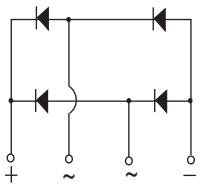
Glass Passivated Single-Phase Bridge Rectifier

Case Type GBL



FEATURES

- UL recognition file number E54214
- Ideal for printed circuit boards
- High surge current capability
- Typical I_R less than 0.1 µA
- High case dielectric strength
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

TYPICAL APPLICATIONS

General purpose use in AC/DC bridge full wave rectification for monitor, TV, printer, SMPS, adapter, audio equipment, and home appliances application.

MECHANICAL DATA

Case: GBL
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 1A whisker test

Polarity: As marked on body

PRIMARY CHARACTERISTICS	
Package	GBL
$I_{F(AV)}$	1.5 A
V_{RRM}	200 V, 600 V, 800 V
I_{FSM}	80 A
I_R	5 µA
V_F at I_F = 0.75 A	1.0 V
T_J max.	150 °C
Diode variations	In-line

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	G2SB20	G2SB60	G2SB80	UNIT
Maximum repetitive peak reverse voltage	V_{RRM}	200	600	800	V
Maximum RMS voltage	V_{RMS}	140	420	560	V
Maximum DC blocking voltage	V_{DC}	200	600	800	V
Maximum average forward rectified output current at T_A = 25 °C	$I_{F(AV)}$	1.5			A
Peak forward surge current single sine-wave superimposed on rated load	I_{FSM}	80			A
Rating for fusing (t < 8.3 ms)	I^2t	27			A^2s
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150			°C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

PARAMETER	TEST CONDITIONS	SYMBOL	G2SB20	G2SB60	G2SB80	UNIT
Maximum instantaneous forward voltage drop per diode	0.75 A	V_F	1.00			V
Maximum DC reverse current at rated DC blocking voltage per diode	T_A = 25 °C	I_R	5.0			µA
	T_A = 125 °C		300			

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	G2SB20	G2SB60	G2SB80	UNIT
Typical thermal resistance	$R_{\theta JA}$	40			°C/W
	$R_{\theta JC}$	12			

Note

- Unit mounted on PCB with 0.5" x 0.5" (12 mm x 12 mm) copper pads and 0.375" (9.5 mm) lead length

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
G2SB60-M3/45	2.045	45	20	Tube
G2SB60-M3/51	2.045	51	400	Anti-static PVC tray

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

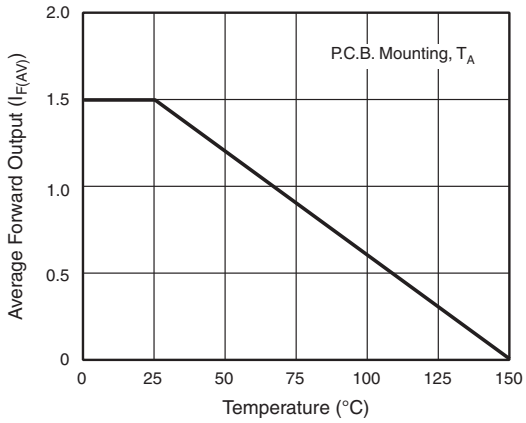


Fig. 1 - Derating Curve Output Rectified Current

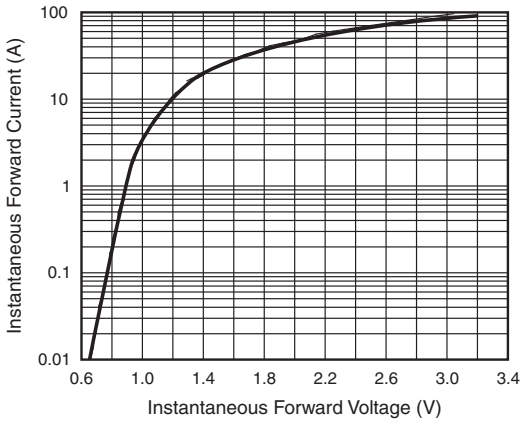


Fig. 3 - Typical Forward Characteristics Per Diode

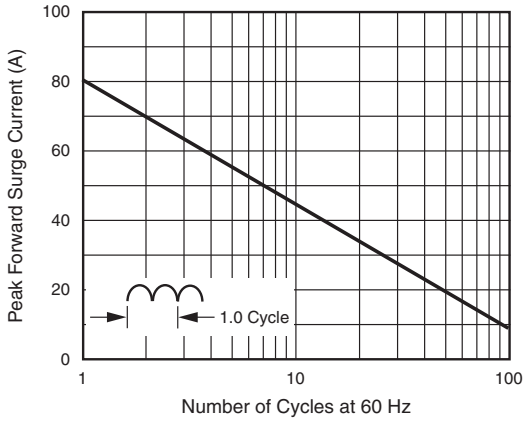


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current Per Diode

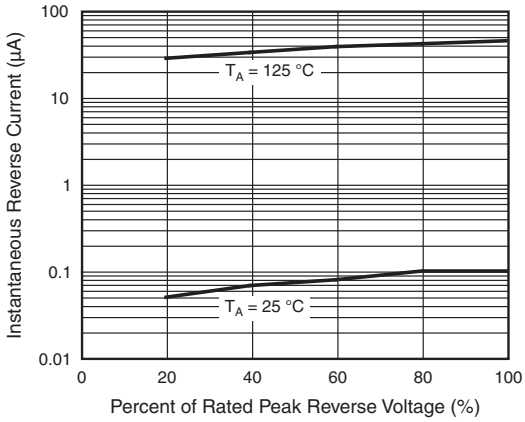


Fig. 4 - Typical Reverse Characteristics Per Diode

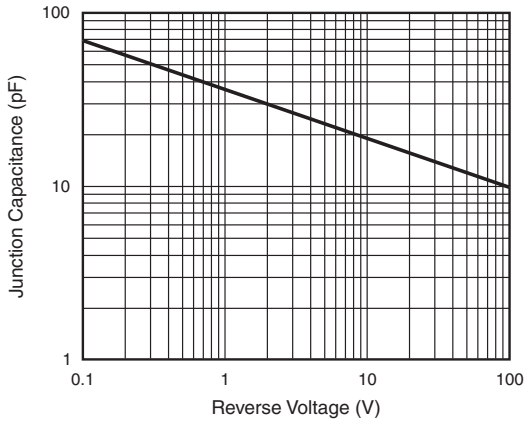


Fig. 5 - Typical Junction Capacitance Per Diode

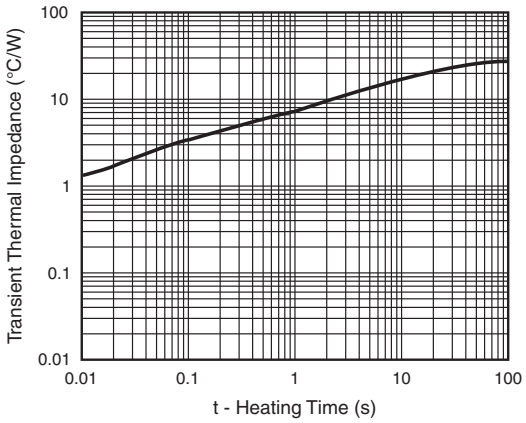
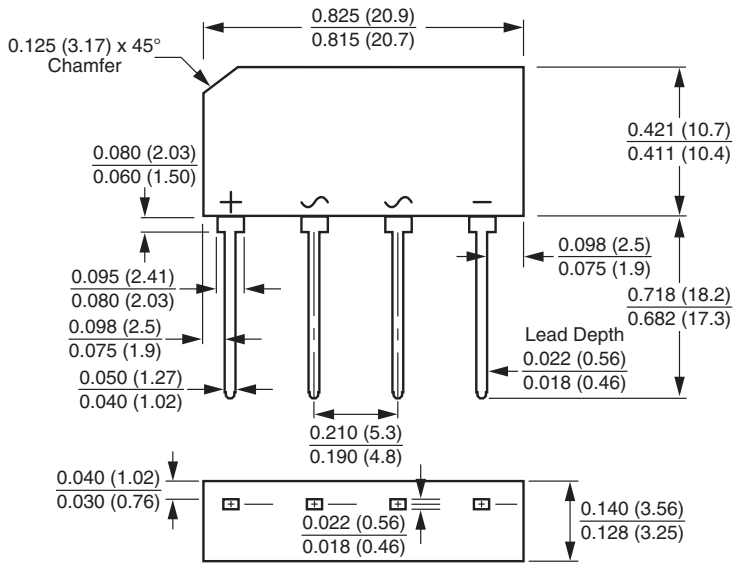


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

Case Type GBL

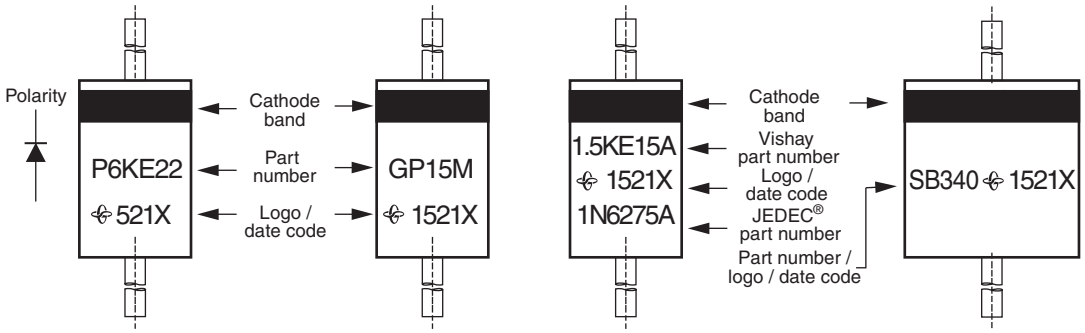


Polarity shown on front side of case, positive lead beveled corner

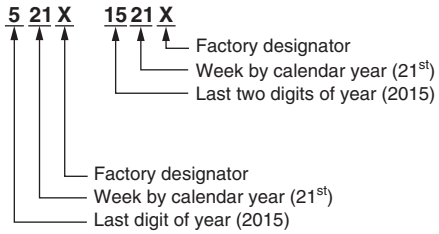
Vishay General Semiconductor

AXIAL MARKING

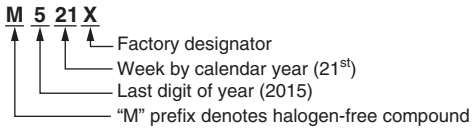
Package: DO-41 (DO-204AL), DO-15 (DO-204AC), DO-201AD, GP20, 1.5KE, P600
Examples:



DATE CODE (for RoHS-compliant products)

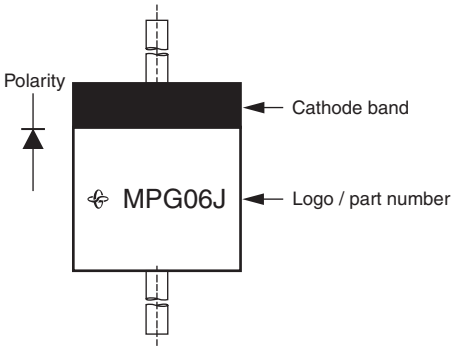


DATE CODE (for halogen-free products)



Notes
(1) No cathode band marking for TVS bi-directional type
(2) Date code per individual part number specification

MPG06

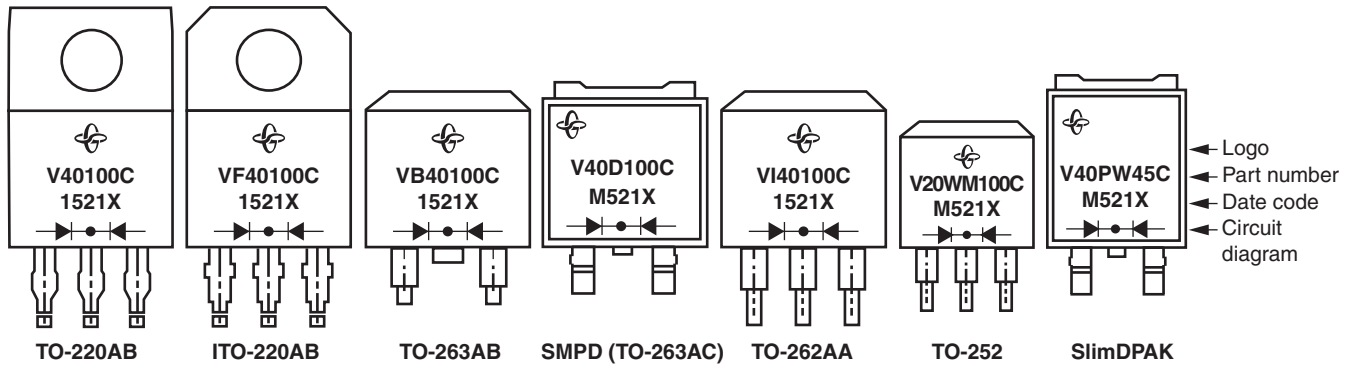


PART NUMBER MARKING CODE		
TYPE	**RoHS-COMPLIANT**	**HALOGEN-FREE**
MPG06 series	MPG06x	M06x
RMPG06 series	RMPG06x	MR06x
UG06 series	UG06x	MUG06x
SB0x series	SB0x0	MSB0x0
TPMP06 series	T-x	MT-x

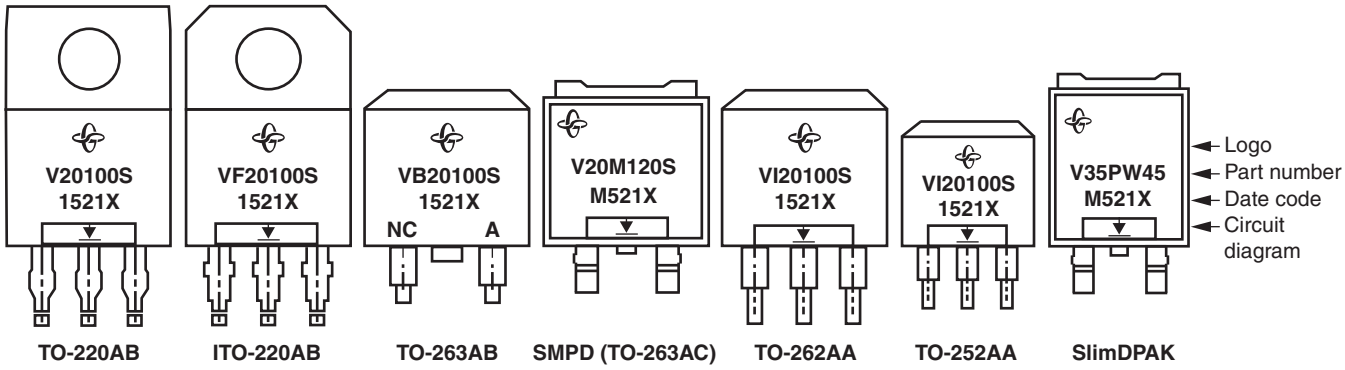
Note
- x - type code

POWER PACK MARKING

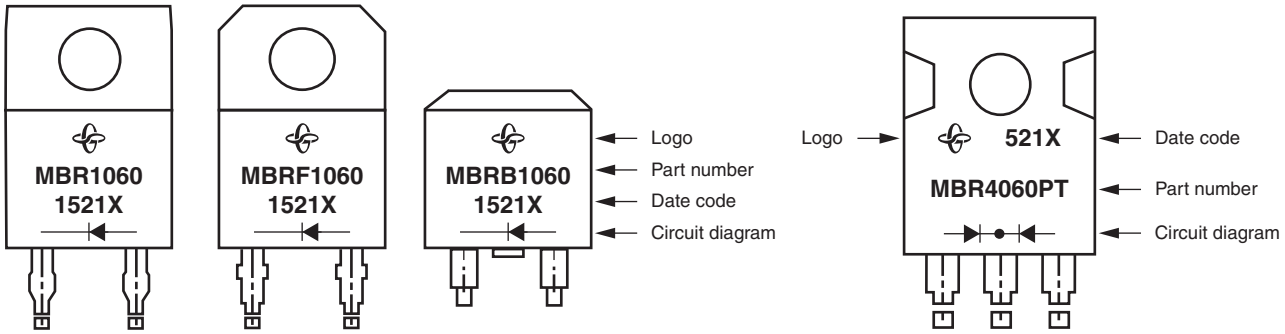
Examples:



TO-220AB ITO-220AB TO-263AB SMPD (TO-263AC) TO-262AA TO-252 SlimDPAK

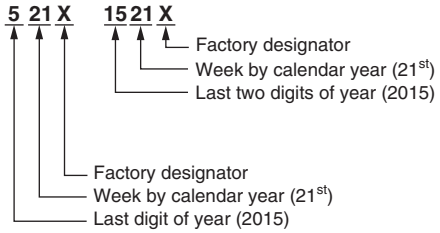


TO-220AB ITO-220AB TO-263AB SMPD (TO-263AC) TO-262AA TO-252AA SlimDPAK



TO-220AC ITO-220AC TO-263AB TO-3P / TO-3PW (TO-247AD)

DATE CODE (for RoHS-compliant products)



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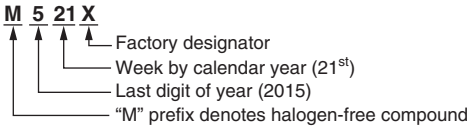


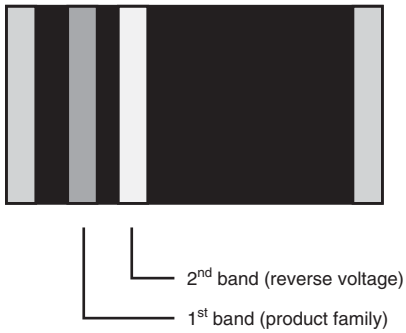
Notes

(1) Date code per individual part number specification

PLASTIC MELF AND MiniMELF MARKING

1. Package: GL41 (DO-213AB)

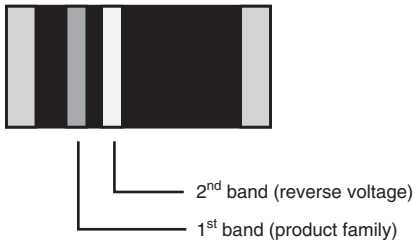
MELF
2.5 mm x 4.9 mm



TYPE	1st BAND	2nd BAND	
BYM10 series	white	gray: 50 V	violet: 1000 V
GL41 series	white	red: 100 V	white: 1300 V
BYM11 series	red	orange: 200 V	brown: 1600 V
RGL41 series	red	yellow: 400 V	
BYM12 series	green	green: 600 V	
EGL41 series	green	blue: 800 V	
BYM13 series	orange	gray: 20 V orange: 40 V green: 60 V	
SGL41 series	orange	red: 30 V yellow: 50 V	
TGL41-xx	blue		
ZGL41-xx	red		

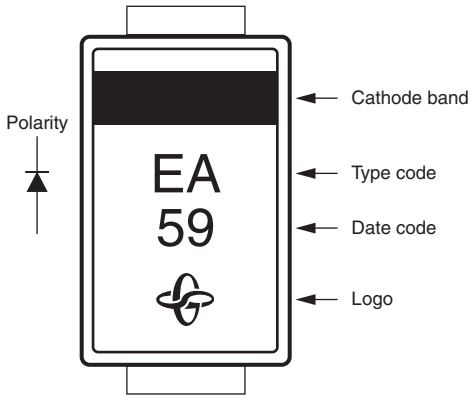
2. Package: GL34 (DO-213AA)

MiniMELF
1.6 mm x 3.5 mm



TYPE	1st BAND	2nd BAND	
BYM07 series	white	gray: 50 V	brown: 300 V
GL34 series	white	red: 100 V	yellow: 400 V
EGL34 series	green	pink: 150 V	green: 600 V
RGL34 series	red	orange: 200 V	blue: 800 V

GF1 (DO-214BA) MARKING



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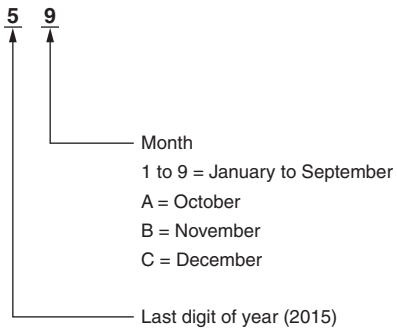
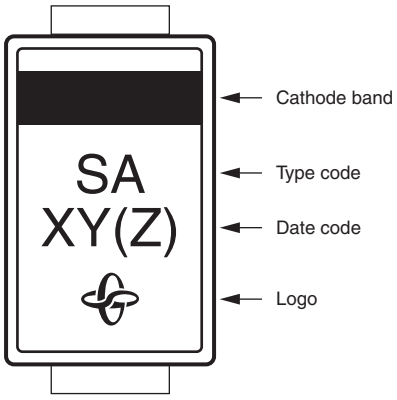


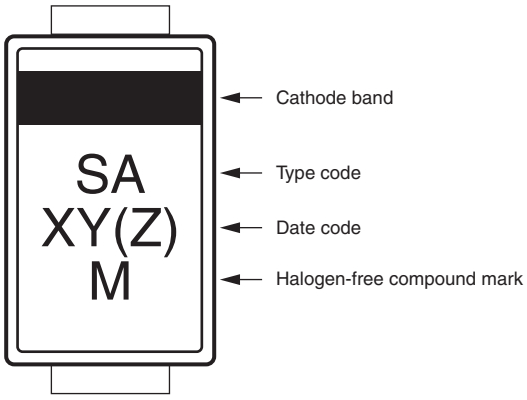
Note
• Type code refers to individual datasheet

SMA (DO-214AC), SMB (DO-214AA), SMC (DO-214AB), SlimSMA (DO-221AC), AND SMPA (DO-221BC) MARKING

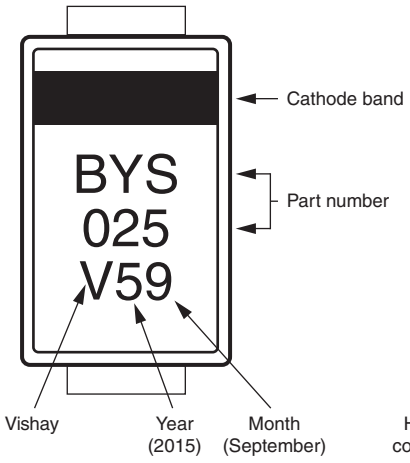
SMA, SMB, SMC



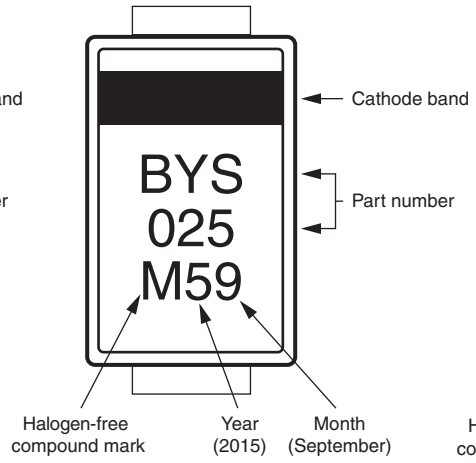
SMA, SMB, SMC, SlimSMA, SMPA



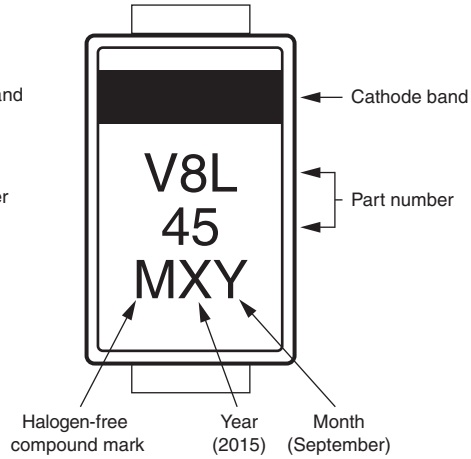
SMA
with "BYS", "BYG" Prefix



SMA
with "BYS", "BYG" Prefix



SMA, SMB, SMC
(for TMBS products with long core part number)



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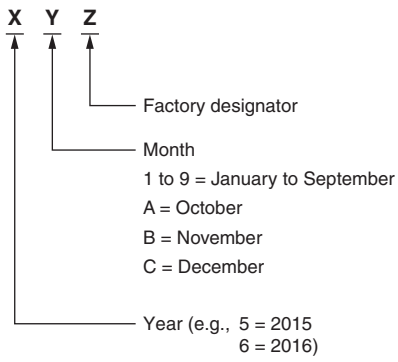
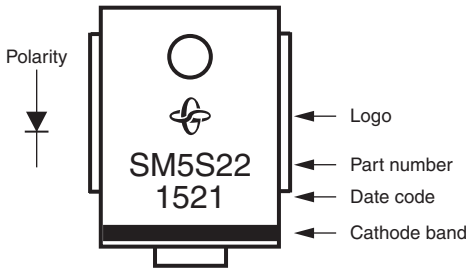
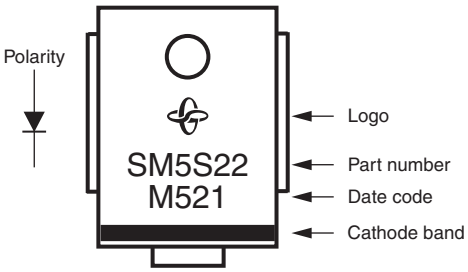


Notes

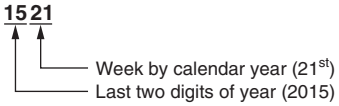
- Type code refers to individual datasheet
- No cathode band marking for TVS bi-directional type
- "XY" 2 digits: For rectifiers and PAR TVS (TPSMA, TPSMB, TPSMB, TPSMC, and TA6F)
- "XYZ" 3 digits: For TRANSZORB® TVS and Power Voltage-Regulating Diodes
- Non "M" mark belongs to RoHS-compliant product

DO-218AB MARKING





DATE CODE (for RoHS-compliant products)



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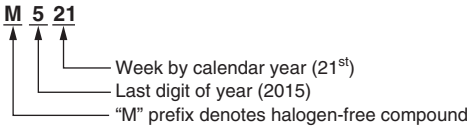
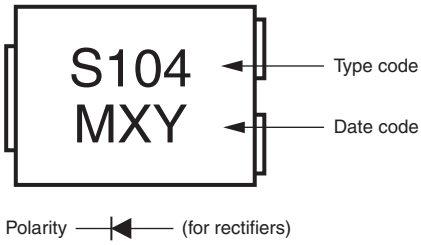
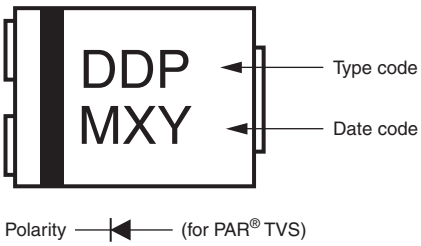
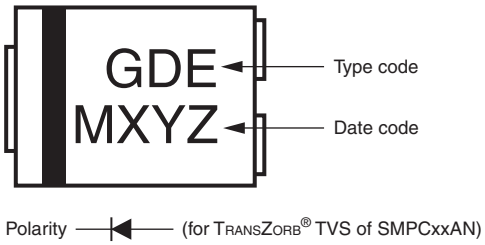
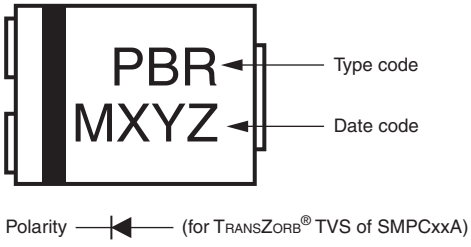


SMPC (TO-277A) MARKING









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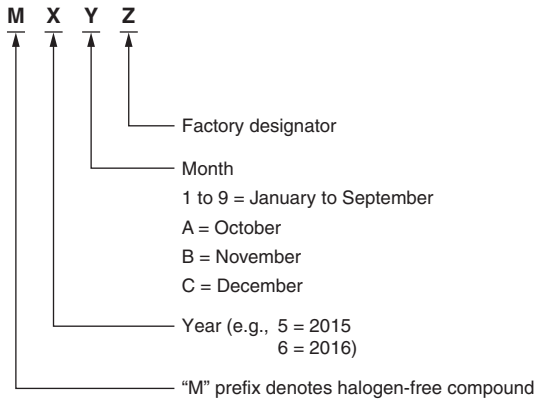
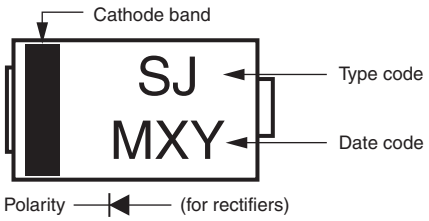
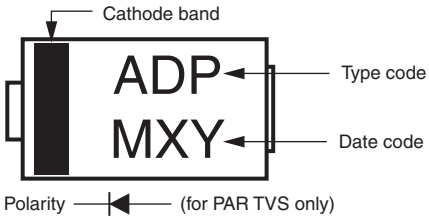


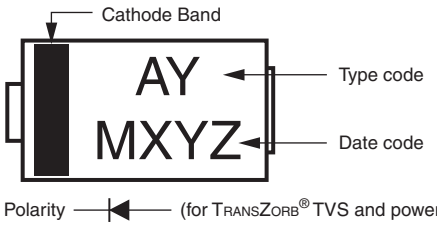
Notes

- Type code refers to individual datasheet
- "XY" 2 digits: for rectifiers and PAR® TVS
- "XYZ" 3 digits: for TRANSZORB® TVS
- TRANSZORB® TVS: cathod band depends on actual polarity
- No cathode band marking for bi-directional PAR TVS type

SMP (DO-220AA) MARKING







DATE CODE

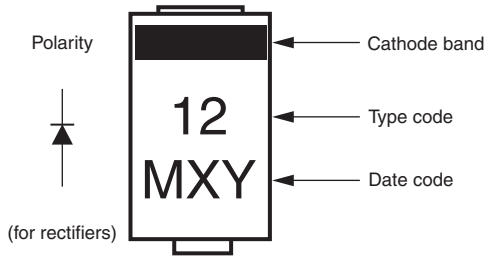
M X Y Z

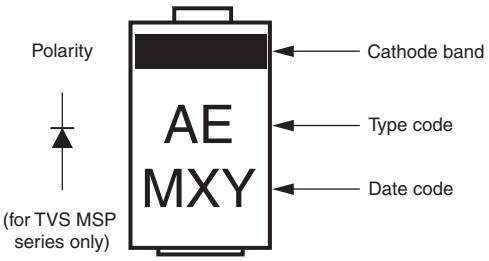
- Z: Factory designator
- Y: Month
  - 1 to 9 = January to September
  - A = October
  - B = November
  - C = December
- X: Year (e.g., 5 = 2015, 6 = 2016)
- M: "M" prefix denotes halogen-free compound

Notes

- Type code refers to individual datasheet
- "XY" 2 digits: for rectifiers and PAR TVS
- "XYZ" 3 digits: for TRANSZORB® TVS and power voltage-regulating diodes

MicroSMP (DO-219AD) MARKING





DATE CODE

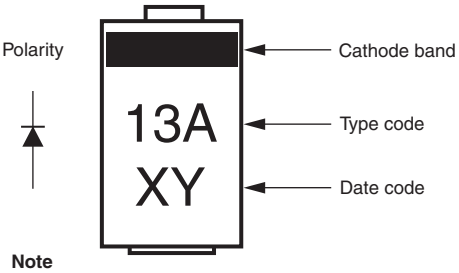
M X Y Z

- Z: Factory designator
- Y: Month
  - 1 to 9 = January to September
  - A = October
  - B = November
  - C = December
- X: Year (e.g., 5 = 2015, 6 = 2016)
- M: "M" prefix denotes halogen-free compound

Note

- Type code refers to individual datasheet

MicroSMF (DO-219AC) MARKING



Note

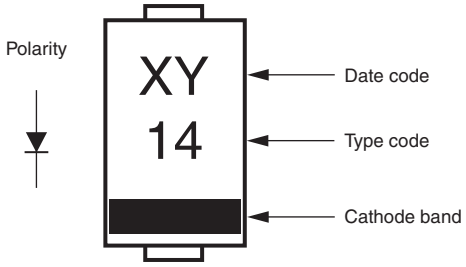
- Type code refers to individual datasheet

DATE CODE

X Y

- Y: Month
  - 1 to 9 = January to September
  - A = October
  - B = November
  - C = December
- X: Year (e.g., 5 = 2015, 6 = 2016)

SMF (DO-219AB) MARKING

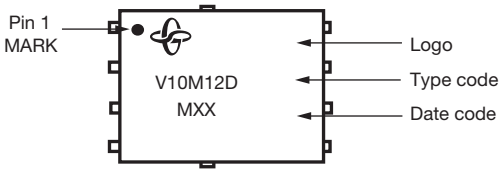


DATE CODE

X Y

Month
1 to 9 = January to September
O = October
N = November
D = December
Year (e.g., G = 2015; H = 2016;
I = 2017; K = 2018; L = 2019) According EN 600626

FlatPAK 5 X 6 MARKING



DATE CODE

M X Y

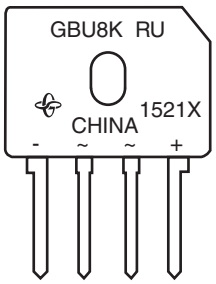
Month
1 to 9 = January to September
A = October
B = November
C = December
Year (e.g. 6 = 2016
7 = 2017)
"M" prefix denotes halogen-free compound

BRIDGE MARKING

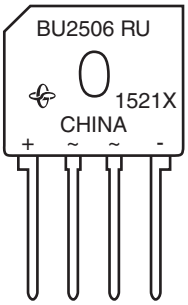
Single in-line bridge marking

Case Style KBPM

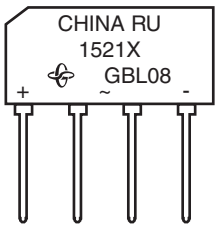
Case Style KBU, GBU



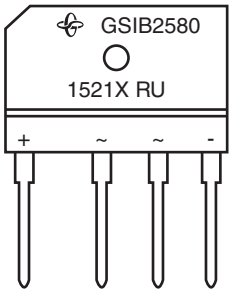
Case Style BU



Case Type KBL, GBL



Case Style GSIB-5S, PB



Logo :

Part number: 3KBP08M, BU2506 (example)
UL approved: RU
Location: China
Date code (e.g.,521X, 1521X or M521X)
Polarity: + Positive output terminal
- Negative output terminal
~ Alternate

DATE CODE (for RoHS-compliant products)

5 21 X

Factory designator
Week by calendar year (21st)
Last digit of year (2015)

DATE CODE (for RoHS-compliant products)

15 21 X

Factory designator
Week by calendar year (21st)
Last two digits of year (2015)

DATE CODE (for halogen-free products)

M 5 21 X

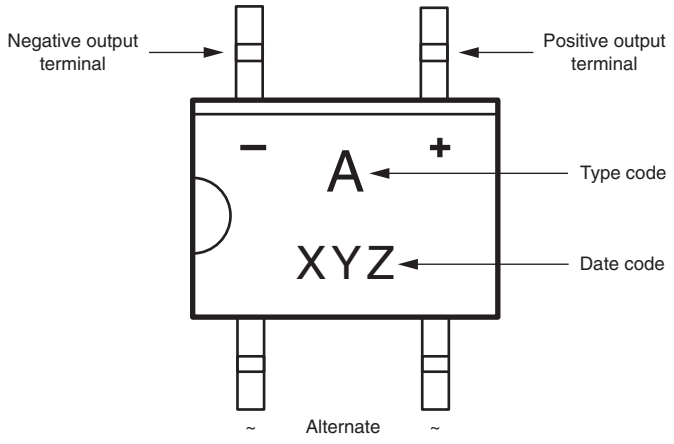
Factory designator
Week by calendar year (21st)
Last digit of year (2015)
"M" prefix denotes halogen-free compound

Note

(1) Date code per individual part number specification

DUAL IN-LINE BRIDGE MARKING

MBS (TO-269AA) and MBM Mini-Bridge



Polarity: + Positive output terminal
- Negative output terminal

DATE CODE

X Y Z

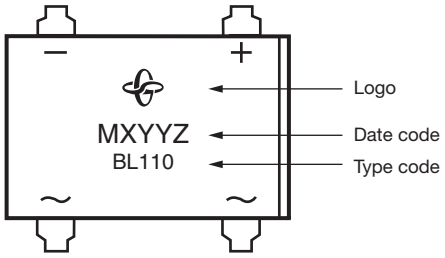
- Z: Factory designator
- Y: Month
  - 1 to 9 = January to September
  - O = October
  - N = November
  - D = December
- X: Year (e.g., 5 = 2015, 6 = 2016)

TYPE	TYPE CODE	TYPE	TYPE CODE
B2S, B2M	B2	MB4S, MB4M	4
B4S, B4M	B4	MB6S, MB6M	6
B6S, B6M	B6	RMB2S	2R
MB2S, MB2M	2	RMB4S	4R

Note

- For halogen-free: add “Underline” below type code (e.g., 6)
- RMB2S and RMB4S only has type code without date code

MBLS



(top view)

DATE CODE

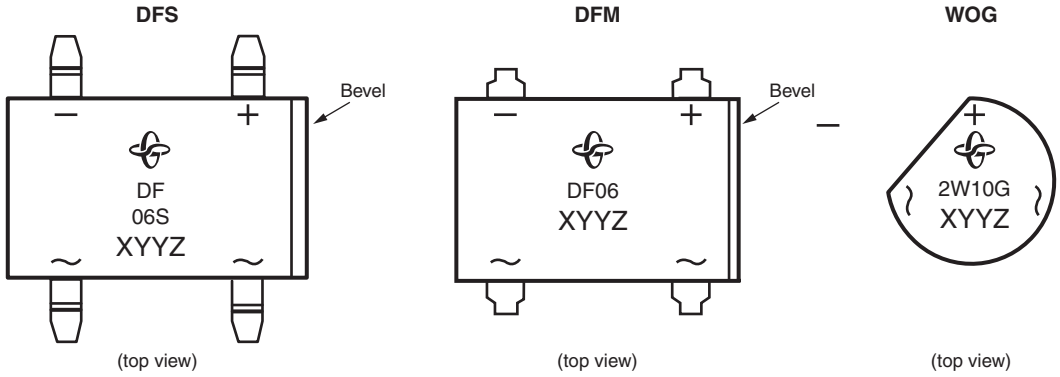
M X Y Z

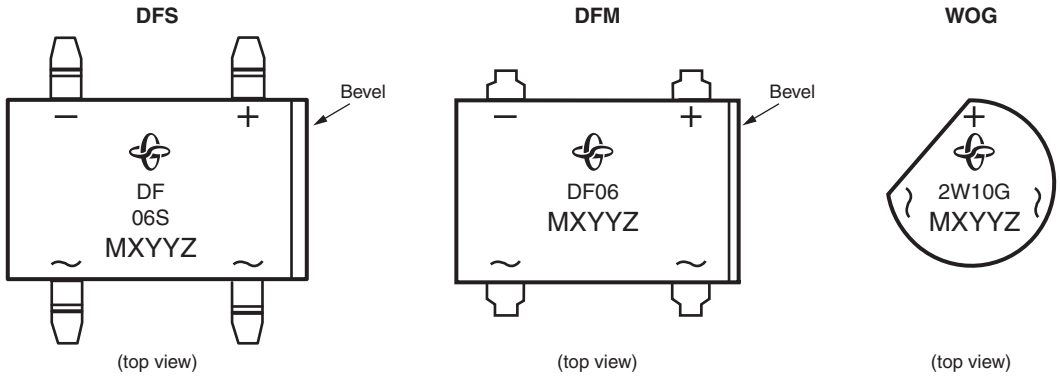
- Z: Factory designator
- Y: Month
  - 1 to 9 = January to September
  - O = October
  - N = November
  - D = December
- X: Year (e.g., 5 = 2015, 6 = 2016)
- M: “M” prefix denotes halogen-free compound

TYPE	TYPE CODE
MBL104S	BL104
MBL106S	BL106
MBL108S	BL108
MBL110S	BL110

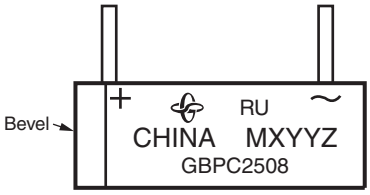
Diodes Group Body Marking

DFS, DFM, and WOG



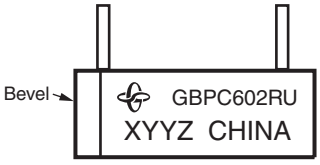


Case Style GBPC/GBPC-W



(side view)

Case Style GBPC1/GBPC6



(side view)

Logo:

Part number: GBPC2508 (example)
UL approved: RU
Location: China
Date code: (M)XYYZ
Polarity: + Positive output terminal
- Negative output terminal
~ Alternate

DATE CODE

M X YY Z

- Z — Factory designator
- YY — Week by calendar year (21st)
- X — Last digit of year (2015)
- M — "M" prefix denotes halogen-free compound

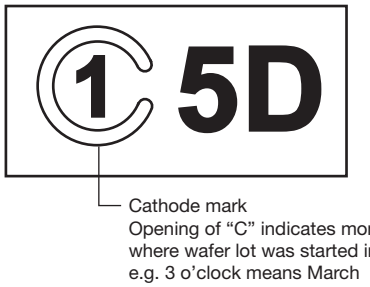
Notes

(1) Date code per individual part number specification
(2) Non "M" mark belongs to RoHS-compliant product
(3) "M" prefix denotes halogen-free compound

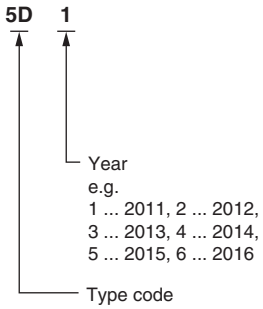
Vishay Semiconductors
(Small Signal Products)

SMD MARKING

CLP0603 MARKING

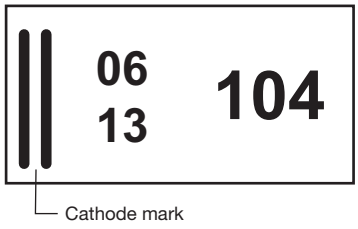


DATE CODE

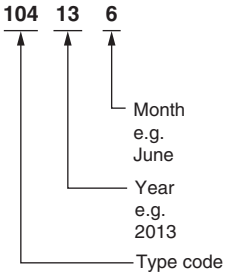


Note
• Type code refers to individual datasheet

CLP1608 MARKING



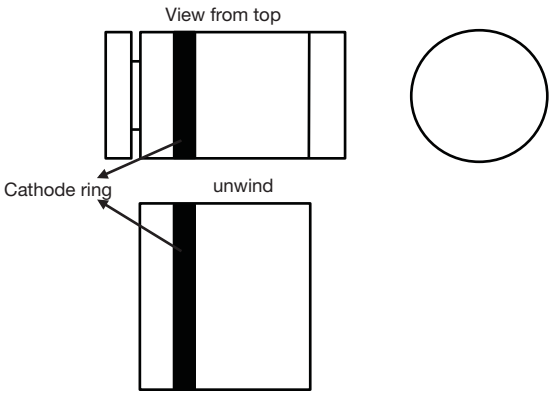
DATE CODE



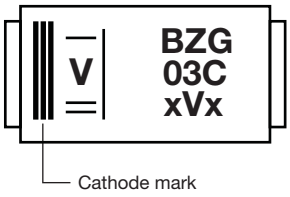
Note
• Type code refers to individual datasheet

DO-213 MARKING

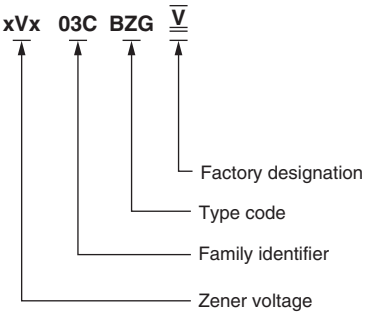
Marking: cathode



SMA (DO-214AC) MARKING

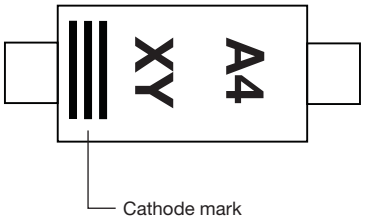


DATE CODE

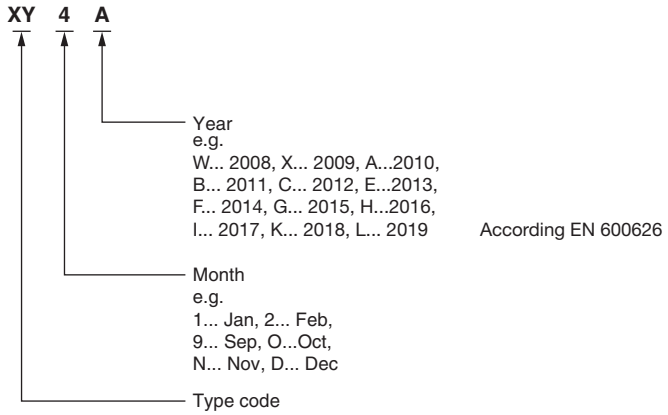


Note
• Type code refers to individual datasheet

SMF (DO-219AB) MARKING



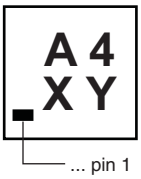
DATE CODE



Note
• Type code refers to individual datasheet

LLP75, LLP1713, LLP2510, LLP2513, LLP3313 MARKING

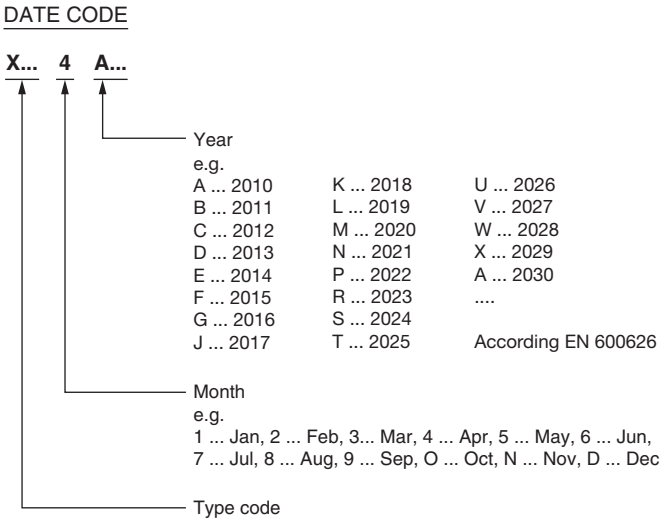
LLP75



LLP1713, LLP2510

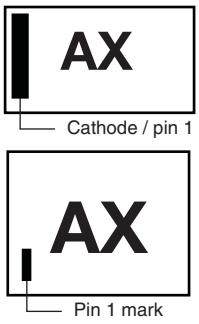
LLP2513, LLP3313

DATE CODE



Note
• Type code refers to individual datasheet

LLP1006, LLP1010 MARKING



DATE CODE

X... A...

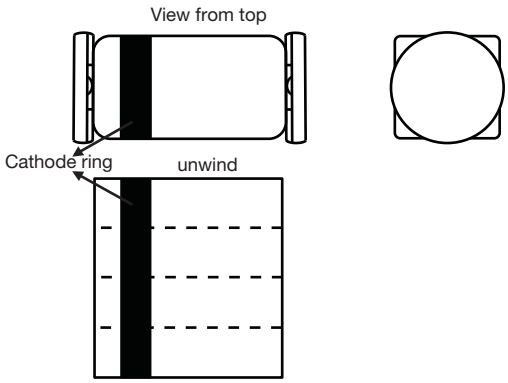
Jan14-A, Feb14-B, Mar14-C, Apr14-D, May14-E, Jun14-F, Jul14-G, Aug14-H, Sep14-J, Oct14-K, Nov14-M, Dec14-N, Jan15-P, Feb15-Q, Mar15-R, Apr15-S, May15-T, Jun15-U, Jul15-V, Aug15-W, Sep15-X, Oct15-Y, Nov15-Z, Dec15-ϒ, Jan16-ϐ, Feb16-ϗ, Mar16-ϙ, Apr16-ϛ, May16-ϝ, Jun16-ϟ, Jul16-ϡ, Aug16-ϣ, Sep16-ϥ, Oct16-ϧ, Nov16-ϩ, Dec16-ϫ, Jan17-ϭ, Feb17-ϯ, Mar17-ϱ, Apr17-ϲ, May17-ϵ, Jun17-1, Jul17-2, Aug17-3, Sep17-4, Oct17-5, Nov17-6, Dec17-7, Jan18 = Jan14,....

Type code

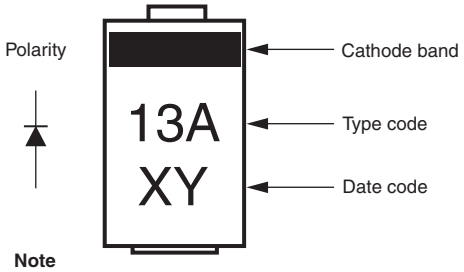
Note
• Type code refers to individual datasheet

MicroMELF MARKING

Marking: cathode



MicroSMF (DO-219AC) MARKING



DATE CODE

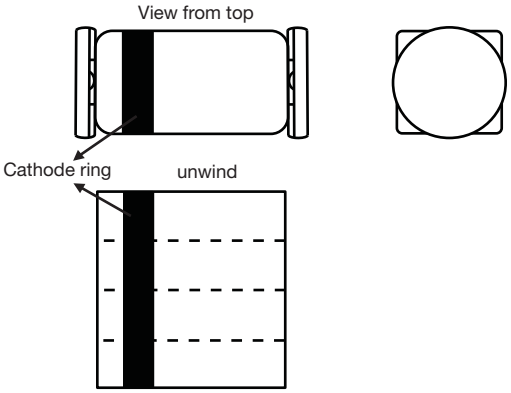
X Y

Month
1 to 9 = January to September
A = October
B = November
C = December
Year (e.g., 5 = 2015
6 = 2016)

Note
• Type code refers to individual datasheet

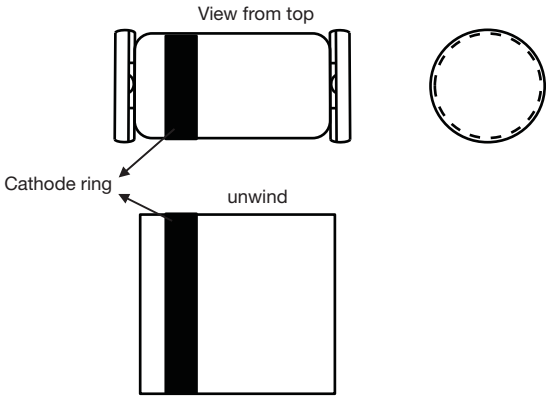
QuadroMELF (SOD-80) MARKING

Marking: cathode



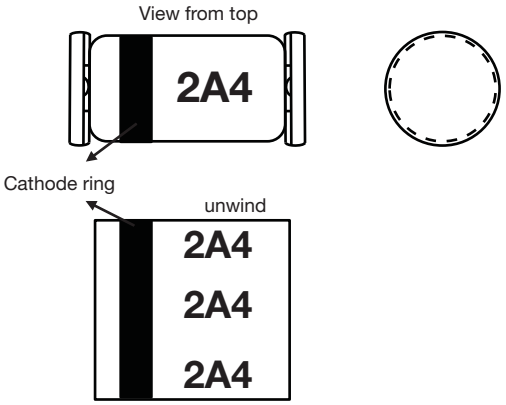
MiniMELF (SOD-80) MARKING

Marking: cathode

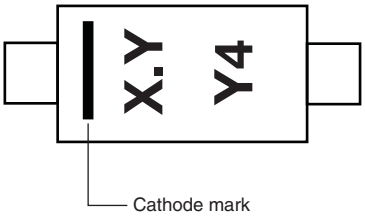


MiniMELF (SOD-80) TLZ MARKING

Marking: type and cathode



SOD-123 MARKING



Note

• Type code refers to individual datasheet

DATE CODE

X.Y 4 Y

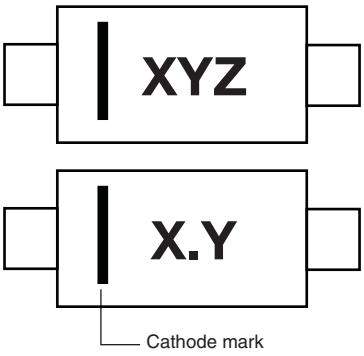
Year
e.g.
Y... 2010, B... 2011, C...2012,
E... 2013, F... 2014, G...2015,
H... 2016, J... 2017, K...2018

Month

Type code (.) for more codes

According EN 600626

SOD-323 MARKING



Note

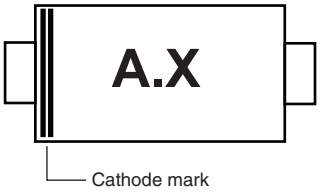
• Type code refers to individual datasheet

XYZ or X.Y

Type code

No date code

SOD-523 MARKING



Note
• Type code refers to individual datasheet

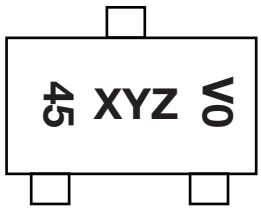
DATE CODE

X A.

Jan14-A, Feb14-B, Mar14-C, Apr14-D, May14-E, Jun14-F, Jul14-G, Aug14-H, Sep14-J, Oct14-K, Nov14-M, Dec14-N, Jan15-P, Feb15-Q, Mar15-R, Apr15-S, May15-T, Jun15-U, Jul15-V, Aug15-W, Sep15-X, Oct15-Y, Nov15-Z, Dec15-Ⱥ, Jan16-Ⱦ, Feb16-Ɔ, Mar16-Ɖ, Apr16-Ǝ, May16-Ƒ, Jun16-Ɠ, Jul16-Ɦ, Aug16-Ɨ, Sep16-Ɯ, Oct16-ƚ, Nov16-Ɵ, Dec16-Ƣ, Jan17-Ƨ, Feb17-Ʃ, Mar17-Ʌ, Apr17-ʍ, May17-ʎ, Jun17-1, Jul17-2, Aug17-3, Sep17-4, Oct17-5, Nov17-6, Dec17-7, Jan18 = Jan14,....

Type code

SOT-23 MARKING



Note
• Type code refers to individual datasheet

DATE CODE

XYZ 45 0 V

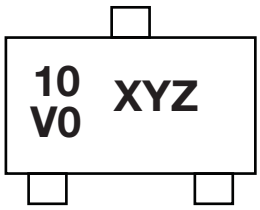
Vishay

Year
e.g.
H ... 2016 M ... 2020
J ... 2017 N ... 2021
K ... 2018
L ... 2019 According EN 600626

Work week 45

Type code

SOT-3xx MARKING



Note
• Type code refers to individual datasheet

DATE CODE

XYZ 10 0 V

Vishay

Year
e.g.
H ... 2016 M ... 2020
J ... 2017 N ... 2021
K ... 2018
L ... 2019 According EN 600626

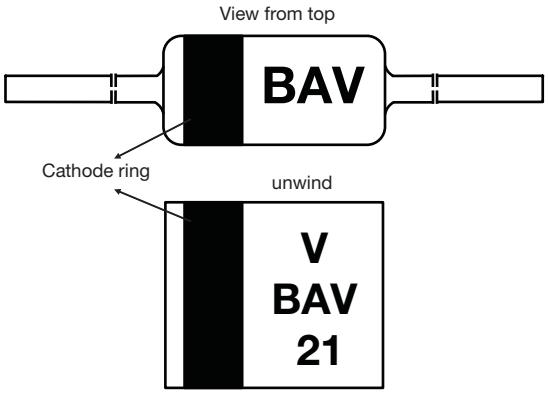
Work week 10

Type code

AXIAL MARKING

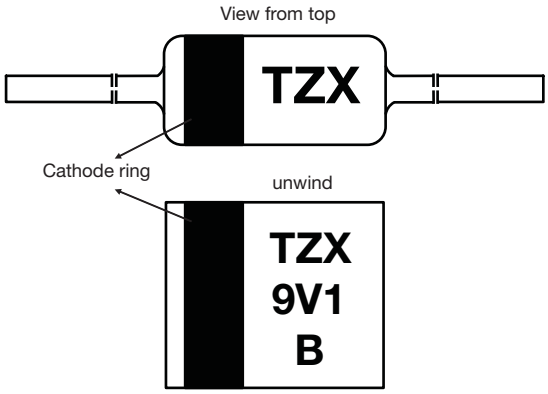
DO-35 (DO-204AH) BAV, BAW, BAS MARKING

Marking: type and cathode



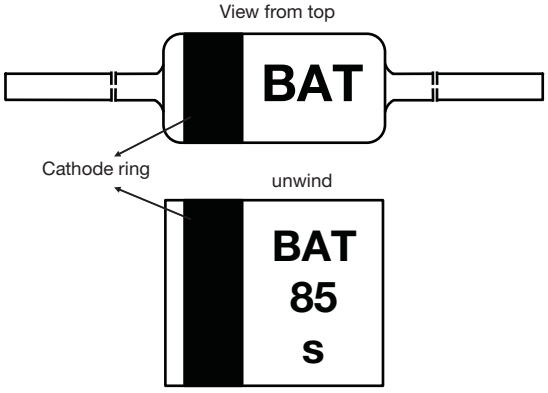
DO-35 (DO-204AH) ZENER TZX MARKING

Marking: type and cathode



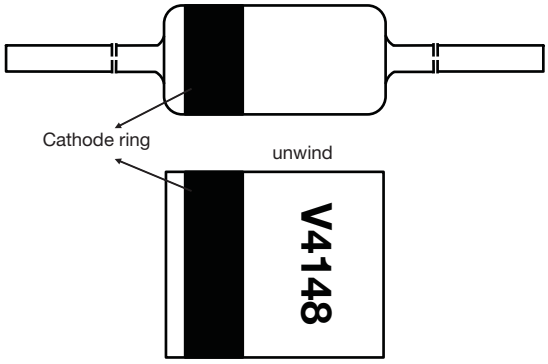
DO-35 (DO-204AH) SCHOTTKY BAT, SD MARKING

Marking: type and cathode



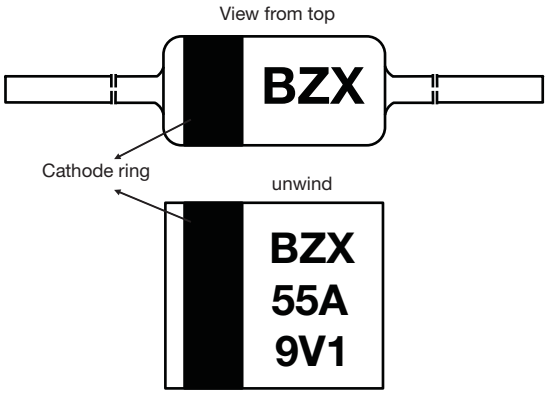
DO-35 (DO-204AH) 1N4148 MARKING

Marking: type and cathode



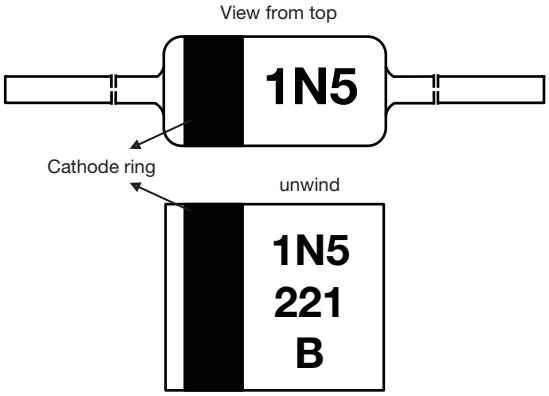
DO-35 (DO-204AH) ZENER BZX55 MARKING

Marking: type and cathode



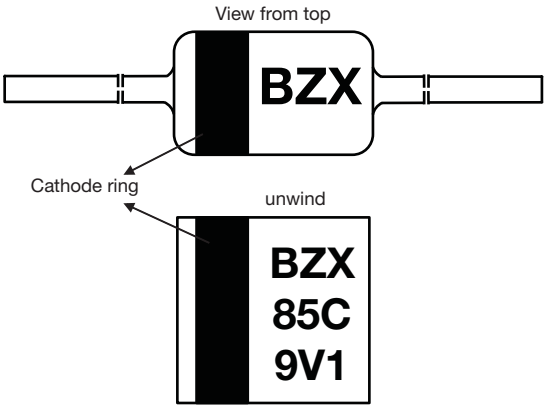
DO-35 (DO-204AH) ZENER 1N52 MARKING

Marking: type and cathode



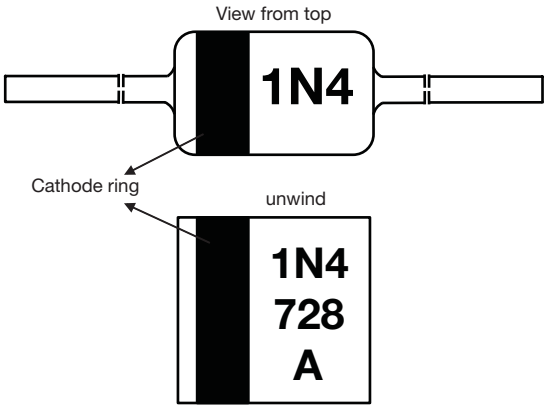
DO-41 (DO-204AL) BZX85 MARKING

Marking: type and cathode



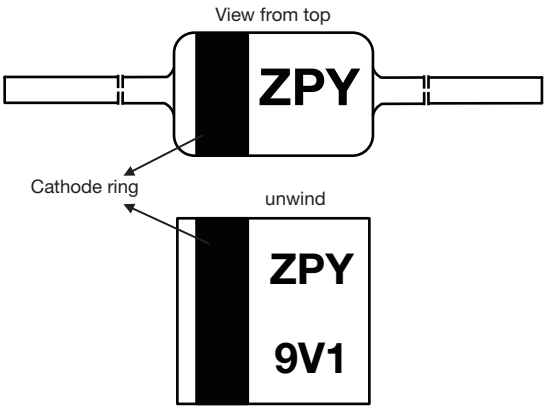
DO-41 (DO-204AL) 1N47xx MARKING

Marking: type and cathode

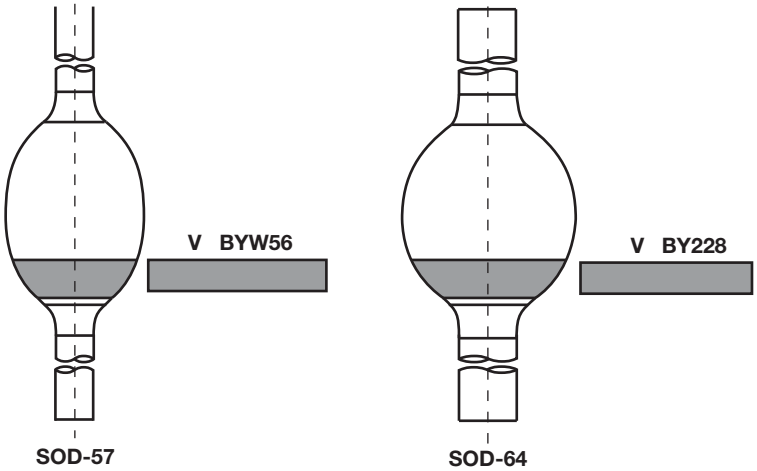


DO-41 (DO-204AL) ZPY MARKING

Marking: type and cathode



SOD-57, SOD-64 MARKING CODE



SOD-57 and SOD-64 Avalanche diodes
The unique part number is followed by letter “V”, means Vishay
e.g. BYT62 V; SF1600 V or BYW83 V

SOD-57 Zener diodes
BZT03Cxx - where “xx” means the Zener voltage (no “V” after the part number)

SOD-64 Zener diodes
BZW03Cxx - where “xx” means the Zener voltage (no “V” after the part number)

Vishay Semiconductors
(High Power Products)

SMF (DO-219AB) MARKING

1st row

First digit: year (E = 2013; F = 2014; G = 2015; H = 2016; I = 2017; K = 2018; L = 2019.....) According EN 600626

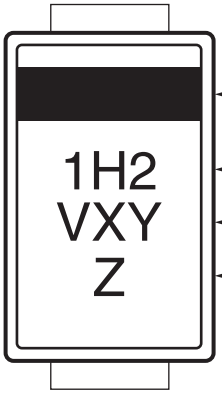
Second digit: month (1 = Jan; 2 = Feb; ... O = Oct; N = Nov; D = Dec)

2nd row

First digit: environmental digit

Second digit: current / voltage rating

SMA (DO-214AC), SMB (DO-214AA), SMC (DO-214AB) (FRED Pt®) MARKING



- Cathode band
- Type code
- Date code
- Environmental digit code

Type Code

1 H 2

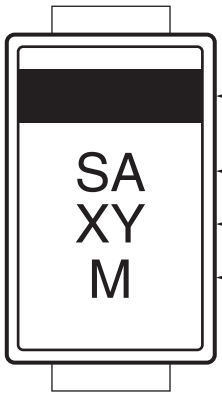
- 1: Current
  1 = 1 A
  ..
  ..
  5 = 5 A
- H: Process type:
  X = hyperfast recovery time
  H = hyperfast recovery time
  U = ultrafast recovery time
  L = low V_F ultrafast recovery time
- 2: Voltage
  FRED Pt®
  2 = 200 V
  ..
  ..
  6 = 600 V

Date Code

X Y

- Y: Year
  (e.g. 1 = 2011, 2 = 2012)
- X: Month:
  1 to 9 = January to September
  A = October
  B = November
  C = December

SMA (DO-214AC), SMB (DO-214AA), SMC (DO-214AB) (Schottky) MARKING



- Cathode band
- Type code
- Date code
- Halogen-free compound mark

Type Code

S A

- A: Voltage
  Schottky standard:
  C = 15 V
  E = 30 V
  F = 40 V
  H = 60 V
  J = 100 V

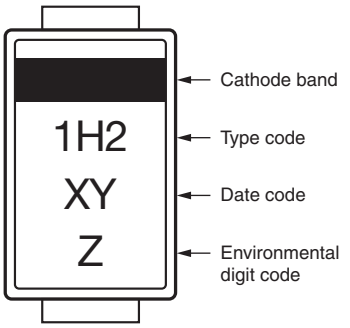
  Schottky MBR series:
  2 = 20 V
  3 = 30 V
  4 = 40 V
  6 = 60 V
  9 = 90 V
  0 = 100 V
- S: Current
  1 = 1 A
  X = 1.5 A
  2 = 2 A
  3 = 3 A
  4 = 4 A
  ..
  ..

Date Code

X Y

- Y: Year
  (e.g. 1 = 2011, 2 = 2012)
- X: Month:
  1 to 9 = January to September
  A = October
  B = November
  C = December

SlimSMA (DO-221AC) MARKING



Type Code

1 H 2

- 1 — Current: 1 = 1 A, .., .., 5 = 5 A
- H — Process type: X = hyperfast recovery time, H = hyperfast recovery time, U = ultrafast recovery time, L = low V_F ultrafast recovery time
- 2 — Voltage: 2 = 200 V, 3 = 300 V, .., ..

Date Code

X Y

- X — Year (e.g. 1 = 2011, 2 = 2012)
- Y — Month: 1 to 9 = January to September, A = October, B = November, C = December

SMPC MARKING

Polarity ◄ (For rectifiers)

1st row

F C H 2

- F — Current
- C — C = common cathode, E = single die
- H — Family: H, U, X, L
- 2 — Volt class: 1 = 100 V, 2 = 200 V, 3 = 300 V, ..

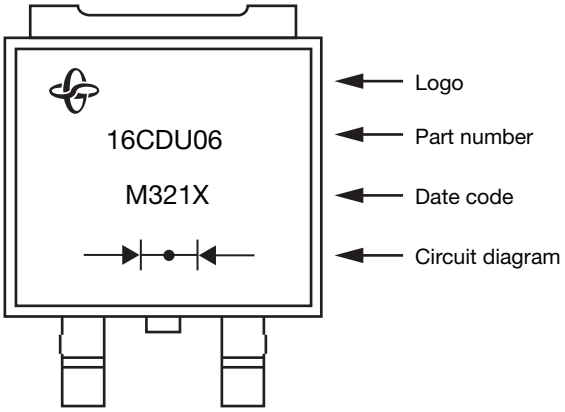
2nd row

M X Y

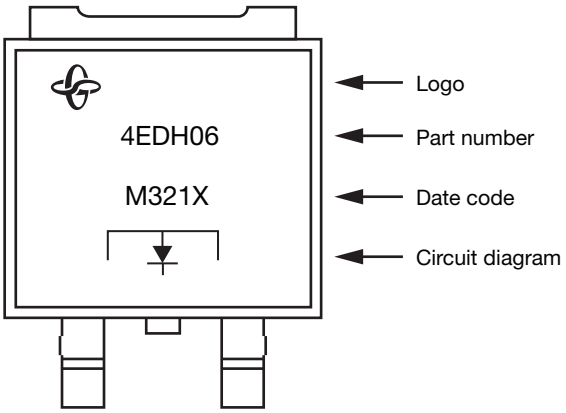
- M — Environmental digit
- X — Year: 1 = 2011, 2 = 2012, ..
- Y — Month: 1 to 9 = January to September, A = October, B = November, C = December

CURRENT	DIGIT	CURRENT	DIGIT
1	D	8	Q
2	F	7	R
3	G	10	S
4	J	11	T
5	K	12	V
6	N	13	Y
7	P	14	Z

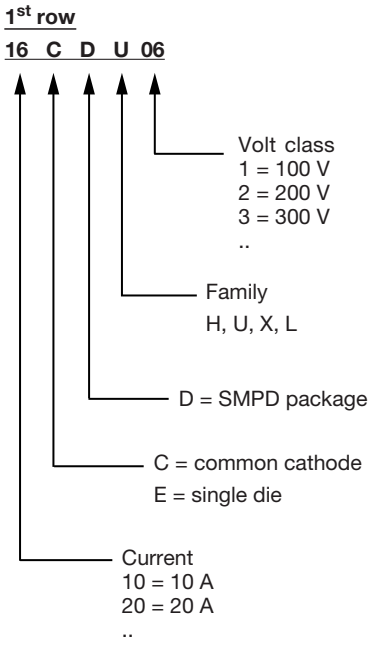
SMPD MARKING

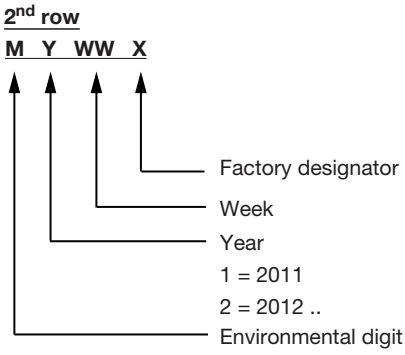


(For Dual Die Parts)



(For Single Die Parts)

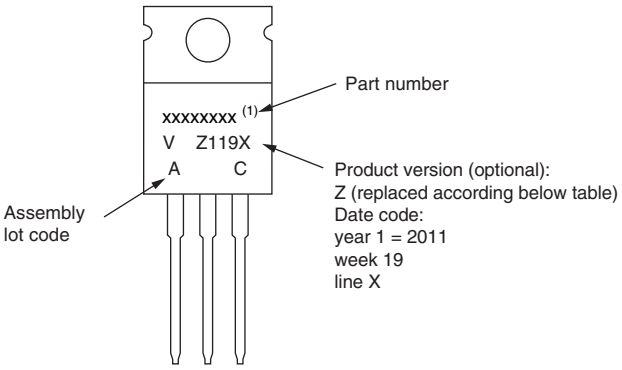




TO-220 MARKING

Examples: TO-220AB, TO-220FP, TO-220AC E, TO-220AC-N3

TO-220AB E

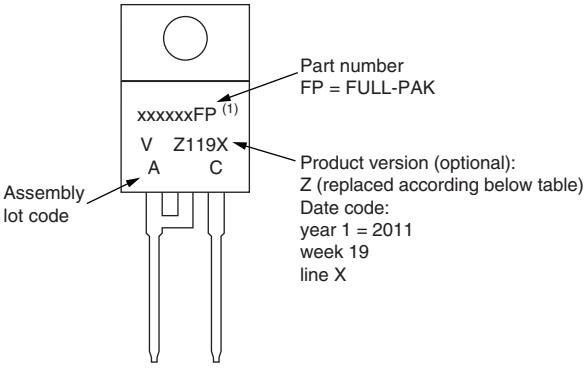


Example: This is a xxxxxxxx (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-220FP-N3

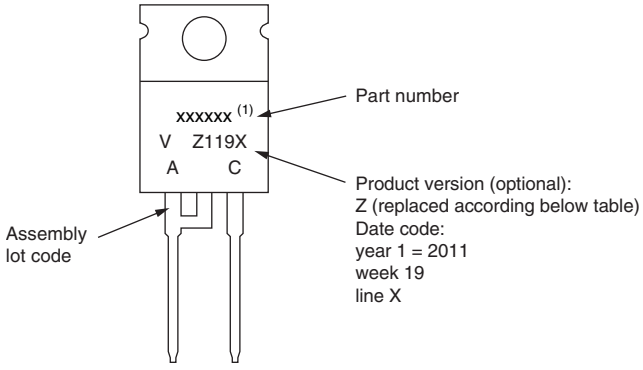


Example: This is a xxxxxxFP (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-220AC E, TO-220AC-N3

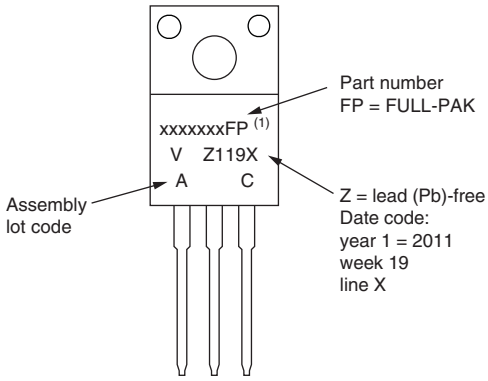


Example: This is a xxxxxx (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-220FP 2L

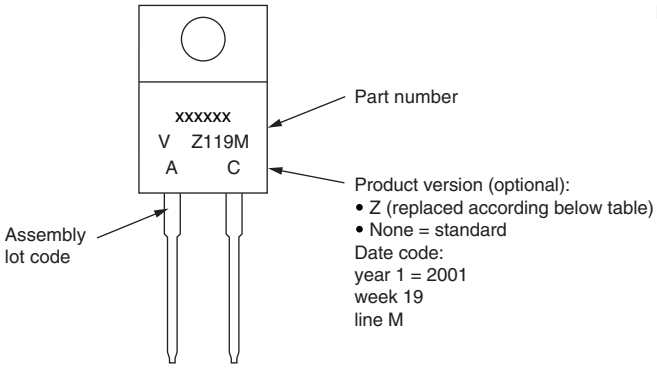


Example: This is a xxxxxxxFP (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-220AC 2L



Example: This is a xxxxxx with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "M"

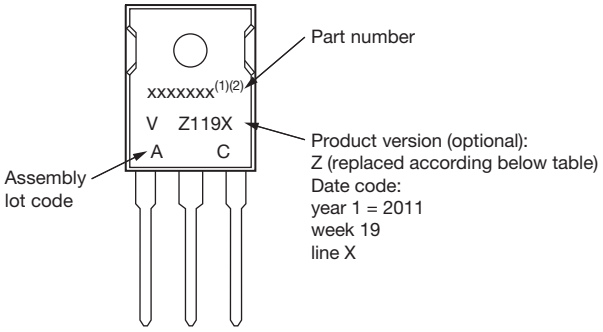
Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-247 MARKING

Examples:

TO-247, 3 pins long-lead



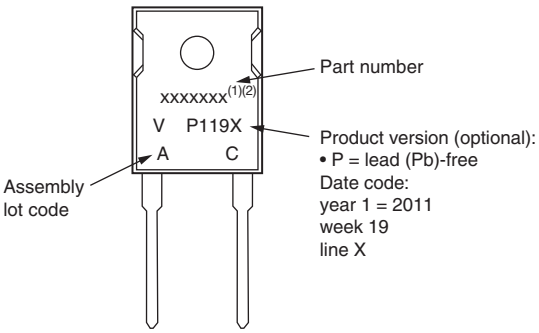
Example: This is a xxxxxxx (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Notes

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

(2) If part number contains "L", product is long-lead

TO-247, 2 pins long-lead



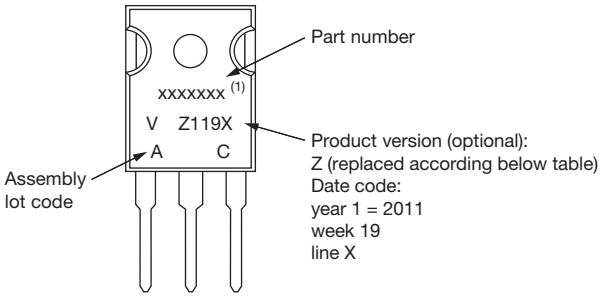
Example: This is a xxxxxxx with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Notes

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

(2) If part number contains "L", product is long-lead

TO-247AC-N3

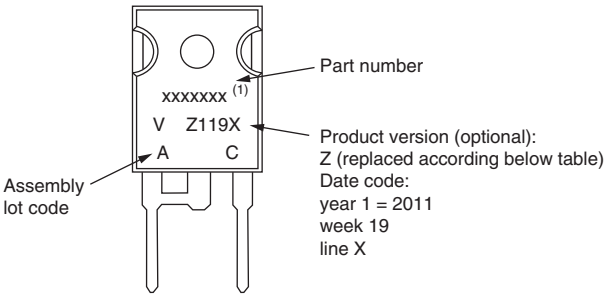


Example: This is a xxxxxxx (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-247AC-N3 modified

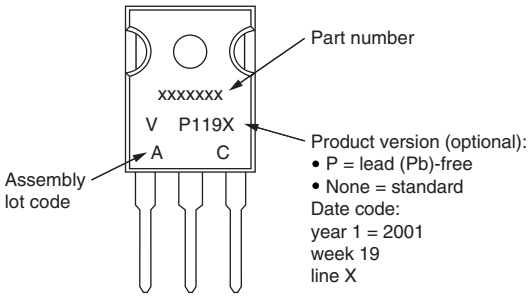


Example: This is a xxxxxxx (1) with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

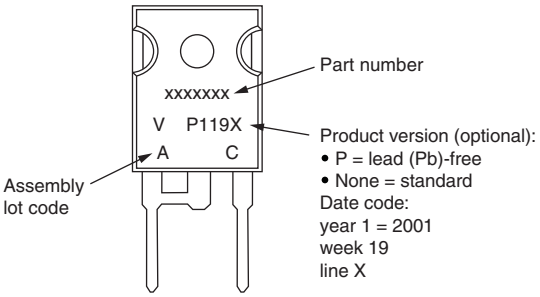
(1) If part number contains "H" as last digit, product is AEC-Q101 qualified

TO-247 PbF



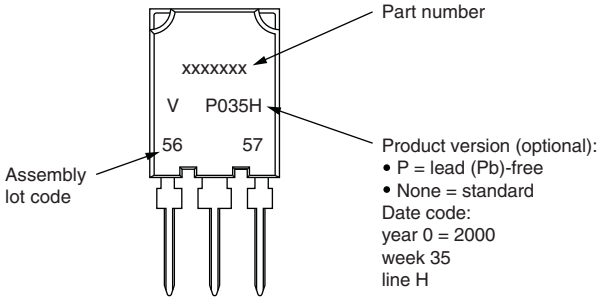
Example: This is a xxxxxxx with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

TO-247 PbF modified



Example: This is a xxxxxxx with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

Super TO-247

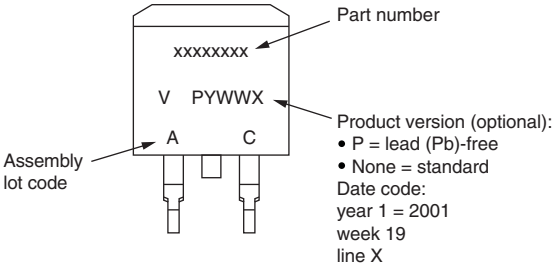


Example: This is a xxxxxxx with assembly lot code 5657, assembled on WW 35, 2000 in assembly line "H"

D²PAK (TO-263AA), TO-262 MARKING

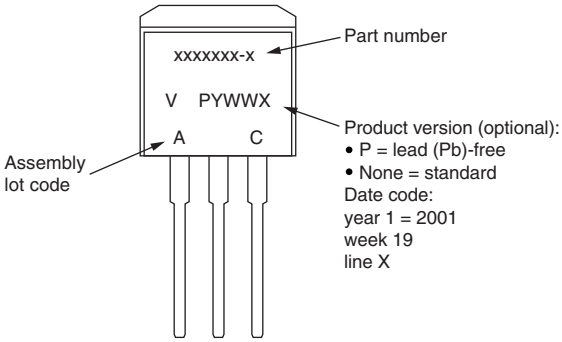
Examples:

D²PAK E (TO-263AA)



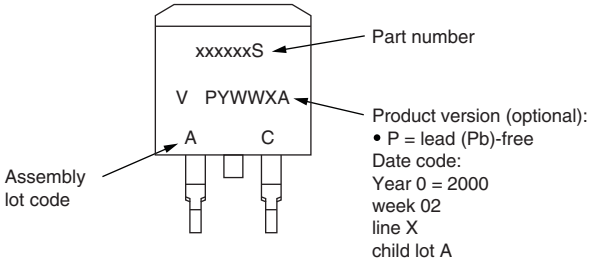
Example: This is a xxxxxxxx with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

TO-262AA



Example: This is a xxxxxxx-x with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"

D²PAK (TO-263AA)

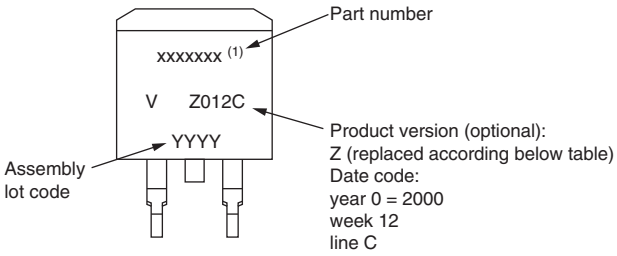


Example: This is a xxxxxxS with assembly lot code AC, assembled on WW 02, 2000

DPAK (TO-252AA) MARKING

Examples:

DPAK E

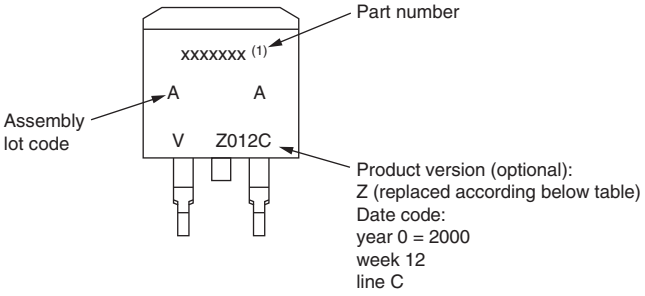


Example: This is a xxxxxxx with assembly lot code YYYY, assembled on WW 12, 2000 in the assembly line “C”

Note

(1) If part number contains “H” as last digit, product is AEC-Q101 qualified

DPAK



Example: This is a xxxxxxx with assembly lot code YYYY, assembled on WW 12, 2000 in the assembly line “C”

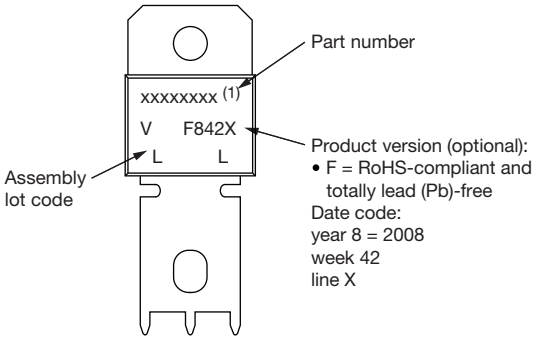
Note

(1) If part number contains “H” as last digit, product is AEC-Q101 qualified

PowerTab® MARKING

Examples:

PowerTab®



Example: This is a xxxxxxxx (1) with assembly lot code LL, assembled on WW 42, 2008 in the assembly line ”X”

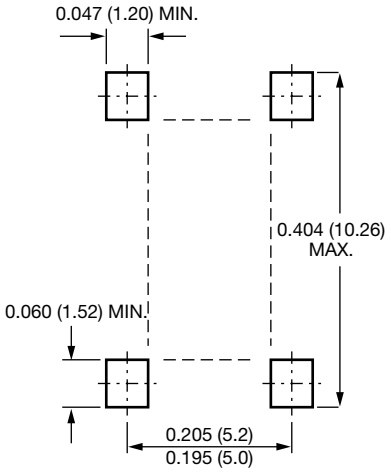
Note

(1) If part number contains “H” as last digit, product is AEC-Q101 qualified

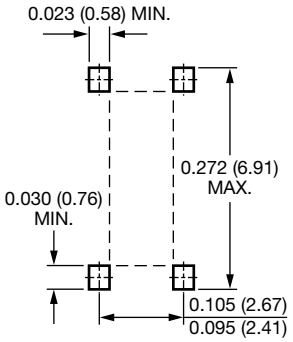
Pad Layouts/Soldering Process

VISHAY GENERAL SEMICONDUCTOR RECOMMENDED MINIMUM MOUNTING PAD LAYOUT SIZES FOR THE SURFACE MOUNT RECTIFIER

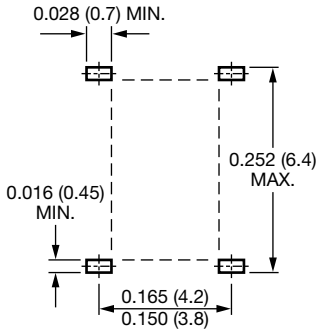
DFS BRIDGE



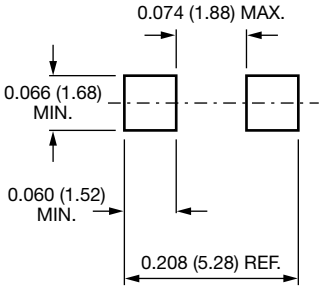
MBS BRIDGE



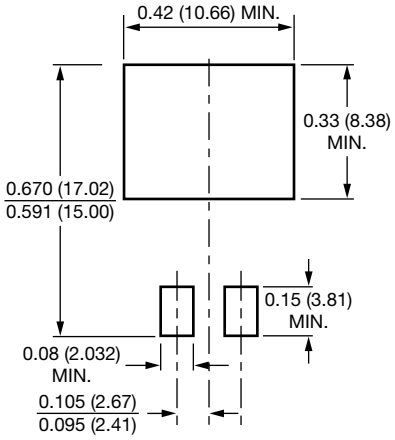
MBLS BRIDGE



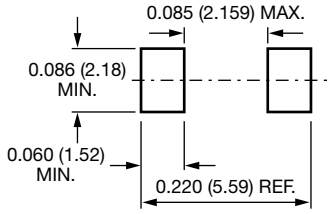
DO-214AC (SMA)/
DO-214BA (GF1)



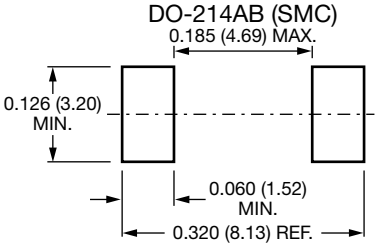
TO-263



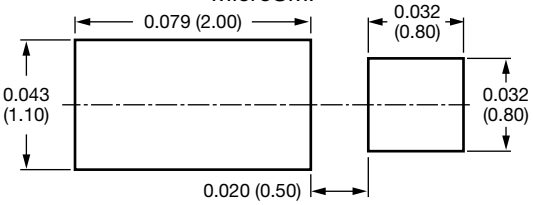
DO-214AA (SMB)



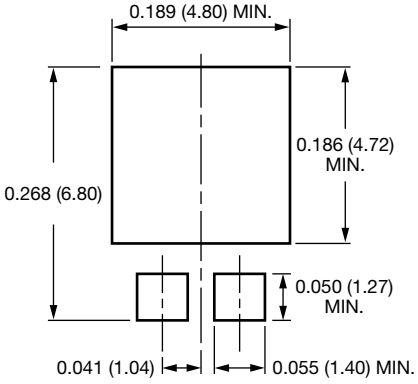
DO-214AB (SMC)



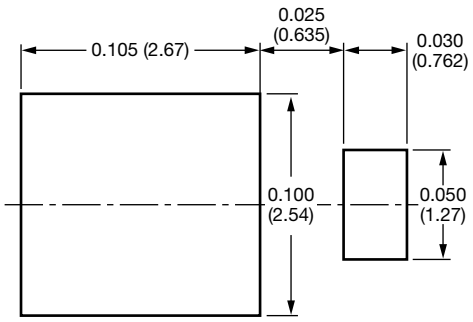
MicroSMP



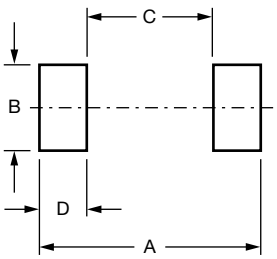
TO-277A (SMPC)



DO-220AA (SMP)

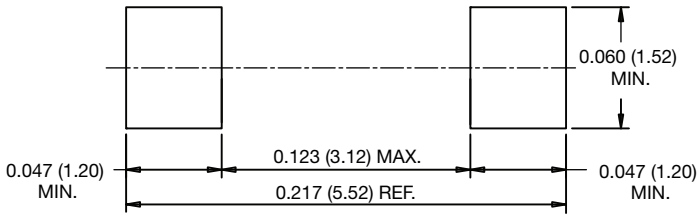


DO-213AA (GL34)/
DO-213AB (GL-41)

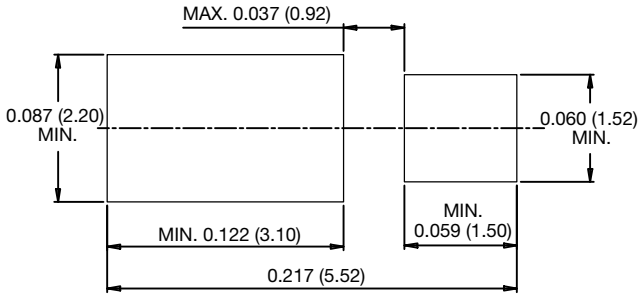


All dimensions in inches (millimeters)

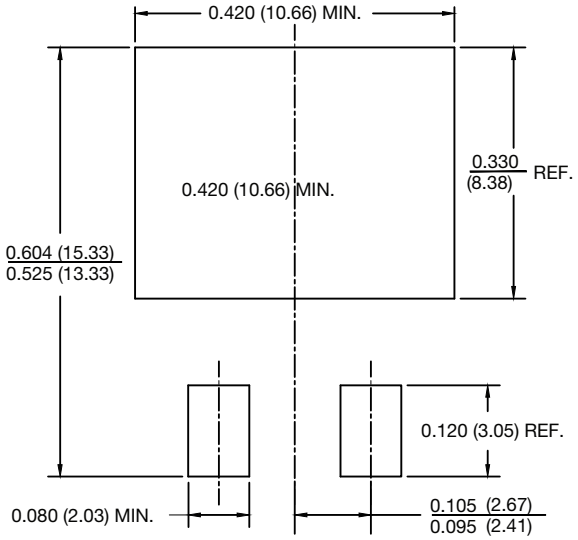
DO-221AC (SlimSMA)



DO-221BC (SMPA)



TO-263AC (SMPD)



DIMENSIONS in inches (millimeters)		
	DO-213AA (GL34)	**DO-213AB (GL41)**
A	0.177 (4.5) ref.	0.236 (6.0) ref.
B	0.079 (2.0) min.	0.118 (3.0) min.
C	0.079 (2.0) max.	0.138 (3.5) max.
D	0.050 (1.25) min.	0.050 (1.25) min.

VISHAY GENERAL SEMICONDUCTOR RECOMMENDED SOLDERING PROCESS

Through hole device (THD) and surface mount device (SMD) imply different soldering technologies leading to different constraints.

In THD, the package body is exposed to relatively low temperatures (< 150 °C) because the lead extremeties are only dipped in the soldering alloy, whereas in SMD the whole package body is exposed to a very high temperature (> 240 °C) during reflow soldering process.

In addition, molding compounds used for encapsulation absorb moisture from the ambient medium. During rapid heating in solder reflow process; this absorded moisture can vaporize, generating pressure at lead frame pad/silicon to plastic interfaces in the package, with a risk of package cracking and potential degradation of device reliability.

Wave soldering with SMD packages is not recommended because the thermal shock associated with package body solder dipping may induce internal structural damage to the package (interface delamination) that may affect long term reliability.

SMD package characterizations performed as a standard by Vishay only induce Solder Reflow Resistance assessment.

JEDEC JESD A111 recommends that wave soldering of SMD packages should be evaluated by the USER, because the stress induced inside the package is very dependant of solder process parameters.

Due to the higher melting point of lead (Pb)-free alloys, the temperature of the solder pot will also increase to improve solderability and shorten contact times. For AgSnCu with melting point of 217 °C, the solder pot temperature will be between 250 °C to 270 °C or as high as 260 °C to 280 °C for SnCu.

RECOMMENDED WAVE SOLDERING PROFILE FOR THROUGH HOLE COMPONENTS

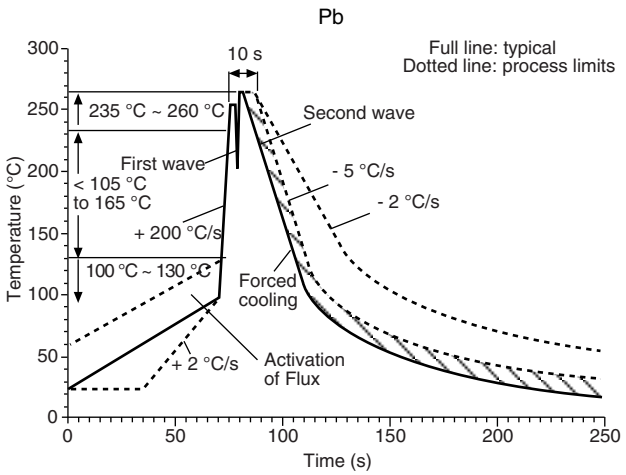
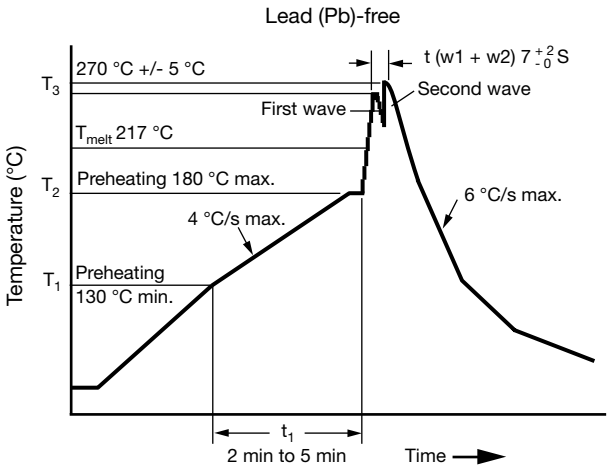


Fig. 1



Notes

- Temperature jump from T_2 to T_3 (w1): 150 °C max.
- Time from 25 °C to T_3 (wave temp.): 8 min max.

Fig. 2

REFLOW FOR SURFACE MOUNTED COMPONENTS

TABLE 1 - CLASSIFICATION REFLOW PROFILE		
PROFILE FEATURE	**Sn-Pb EUTECTIC ASSEMBLY**	**LEAD (Pb)-FREE ASSEMBLY**
Preheat and soak		
Temperature min. ($T_{Smin.}$)	100 °C	150 °C
Temperature max. ($T_{Smax.}$)	150 °C	200 °C
Time ($T_{Smin.}$ to $T_{Smax.}$) (t_S)	60 s to 120 s	60 s to 120 s
Average ramp-up rate ($T_{Smax.}$ to T_p)	3 °C/s maximum	
Liquidous temperature (T_L)	183 °C	217 °C
Time to liquidous (t_L)	60 s to 150 s	60 s to 150 s
Peak package temperature (T_p) (1)	See classification temperature in table 2	See classification temperature in table 3
Time (t_p) (2) with 5 °C of the specified classification temperature (T_C)	20 s (2)	30 s (2)
Average ramp-down rate (T_p to $T_{Smax.}$)	6 °C/s maximum	
Time 25 °C to peak temperature	6 min maximum	8 min maximum

Notes

(1) Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and user maximum

(2) Tolerance for time at peak profile temperature (T_p) is defined as a supplier minimum and user maximum

REFLOW PROFILE

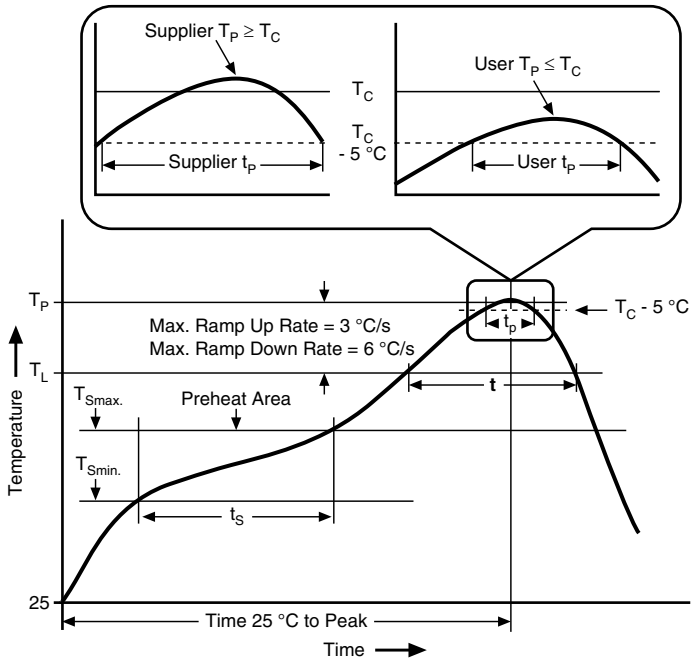


Fig. 3

TABLE 2 - Sn-Pb EUTECTIC PROCESS PACKAGE PEAK REFLOW TEMPERATURES		
PACKAGE THICKNESS	**VOLUME mm^3 < 350**	**VOLUME mm^3 ≥ 350**
< 2.5 mm	235 °C	220 °C
≥ 2.5 mm	220 °C	220 °C

TABLE 3 - LEAD (Pb) - FREE PROCESS PACKAGE CLASSIFICATION REFLOW TEMPERATURES			
PACKAGE THICKNESS	**VOLUME mm^3 < 350**	**VOLUME mm^3 350 TO 2000**	**VOLUME mm^3 > 2000**
< 1.6 mm	260 °C	260 °C	260 °C
1.6 mm to 2.5 mm	260 °C	250 °C	245 °C
≥ 2.5 mm	250 °C	245 °C	245 °C

Tolerance: The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature at the rated MSL level.

Notes

- Package volume excludes external terminals (balls, bumps, lands, leads) and/or non-integral heatsinks.
- The maximum component temperature reached during reflow depends on package thickness and volume. The use of convection reflow processes reduces the thermal gradients between packages. However, thermal gradients due to differences in thermal mass of SMD packages may still exist.
- Recommended soldering process is accordance with J-STD-020D.

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