20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_A = +25°C
20V	56mΩ @ V_{GS} = 4.5V	2.8A
	65mΩ @ V_{GS} = 2.5V	2.6A
	93mΩ @ V_{GS} = 1.8V	2.2A
	140mΩ @ V_{GS} = 1.5V	1.8A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN2065UWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications:

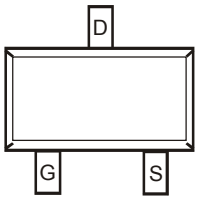
- General Purpose Interfacing Switch
- Power Management Functions
- DC-DC Converters
- Analog Switch

Mechanical Data

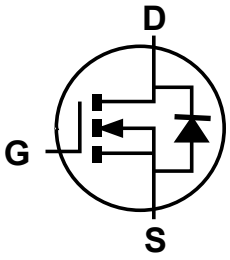
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Alloy42 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.027 grams (Approximate)

SOT323

Top View



Top View



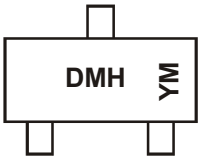
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN2065UWQ-7	Automotive	SOT323	3,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



DMH = Product Type Marking Code
YM or $\overline{Y}$M = Date Code Marking
Y or $\overline{Y}$ = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	……	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	Y	……	I	J	K	L	M	N	O	P	R	S

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	2.8 2.3	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	3.1 2.6	A
Continuous Drain Current (Note 6) V_{GS} = 1.8V	Steady State	T_A = +25°C T_A = +70°C	I_D	2.2 1.7	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	2.4 1.9	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	30	A
Maximum Body Diode Forward Current (Note 5)			I_S	1.2	A

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.43	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	296	°C/W
	t<10s		252	°C/W
Total Power Dissipation (Note 6)		P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	178	°C/W
	t<10s		151	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current @T_C = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±1	µA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.35	—	1	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	52	56	mΩ	V_{GS} = 4.5V, I_D = 2A
		—	59	65		V_{GS} = 2.5V, I_D = 2A
		—	60	93		V_{GS} = 1.8V, I_D = 1A
		—	75	140		V_{GS} = 1.5V, I_D = 0.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	7	—	S	V_{DS} = 5V, I_D = 3.8A
Diode Forward Voltage	V_{SD}	—	0.7	1	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	400	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	73.8	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	65.6	—	pF	
Total Gate Charge	Q_g	—	5.4	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6A
Gate-Source Charge	Q_{gs}	—	0.7	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.4	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	3.5	—	ns	V_{DD} = 10V, V_{GS} = 5V, R_L = 1.7Ω, R_G = 6Ω
Turn-On Rise Time	t_R	—	9.7	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	23.8	—	ns	
Turn-Off Fall Time	t_F	—	7.2	—	ns	

Notes: 5. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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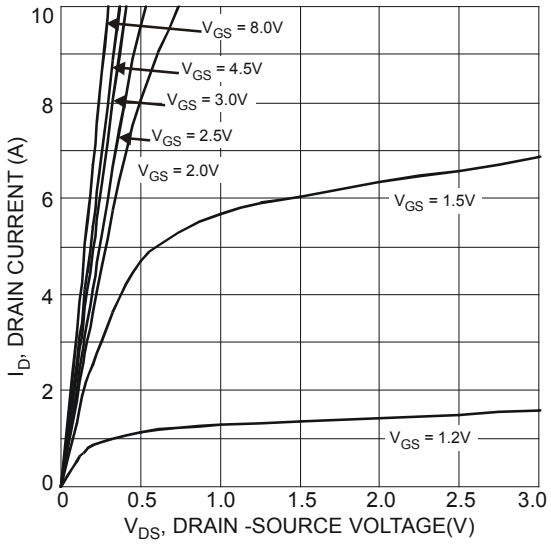

Fig. 1 Typical Output Characteristics

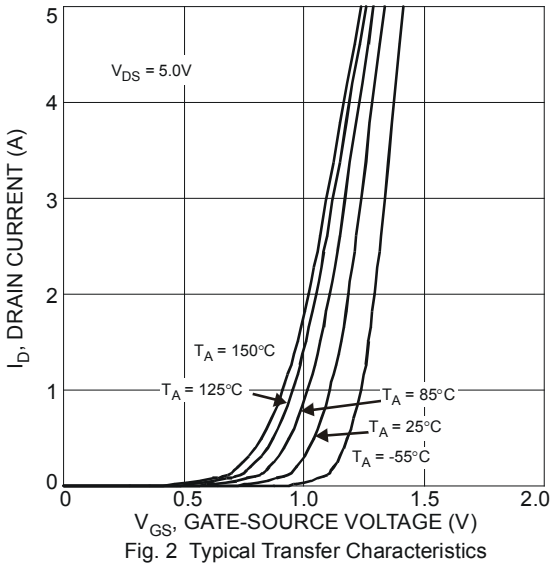

Fig. 2 Typical Transfer Characteristics

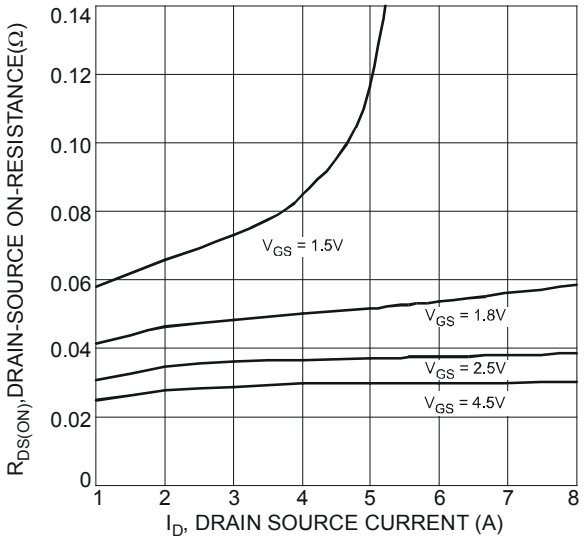

Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

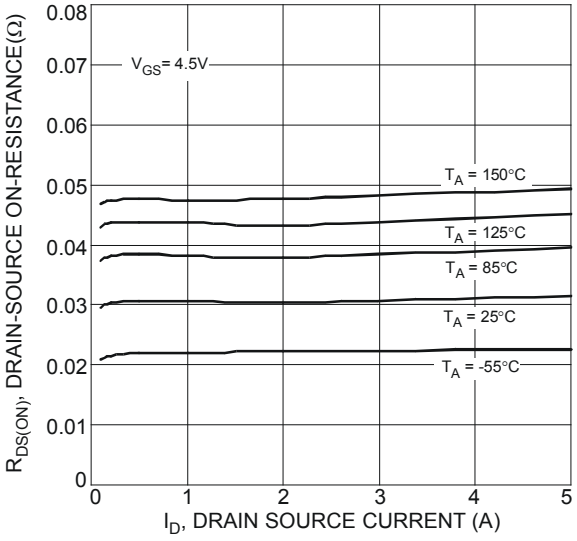

Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

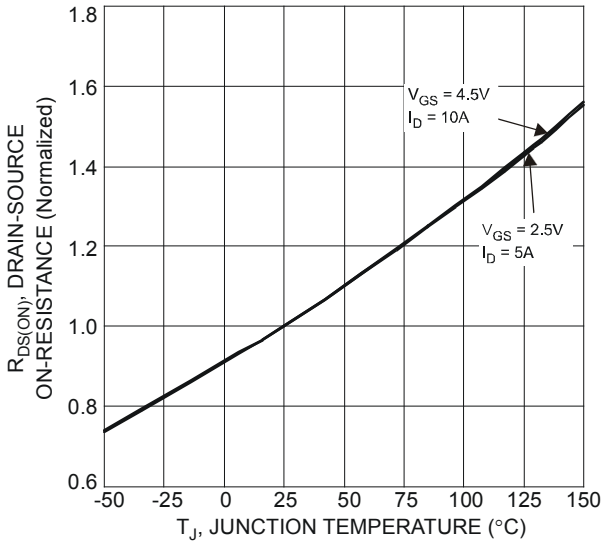

Fig. 5 On-Resistance Variation with Temperature

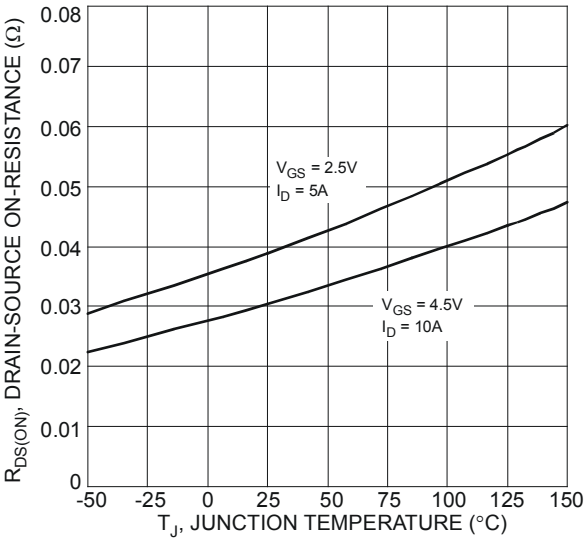

Fig. 6 On-Resistance Variation with Temperature

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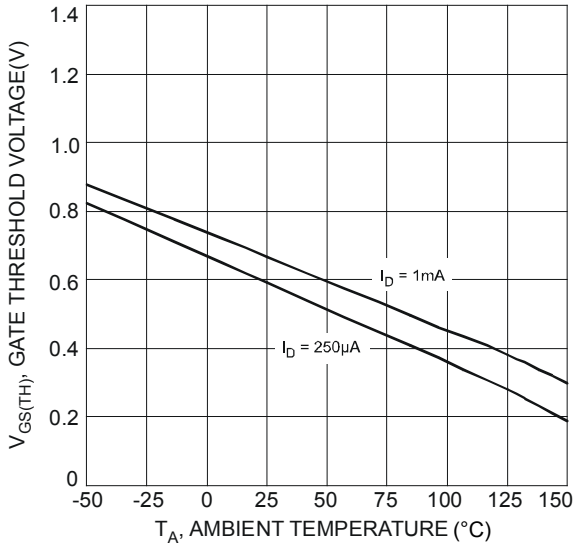

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

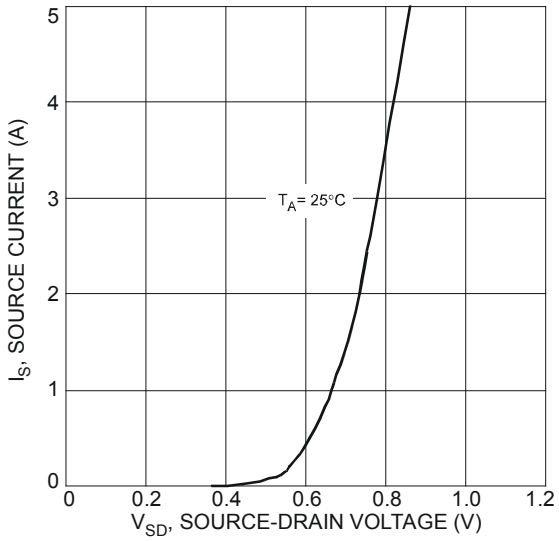

Fig. 8 Diode Forward Voltage vs. Current

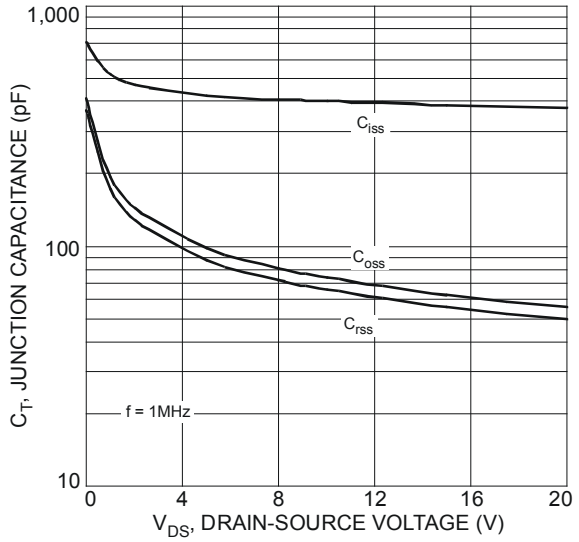

Fig. 9 Typical Junction Capacitance

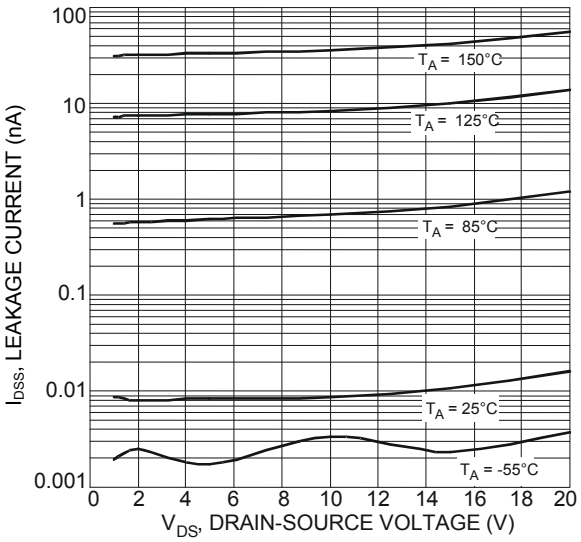

Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

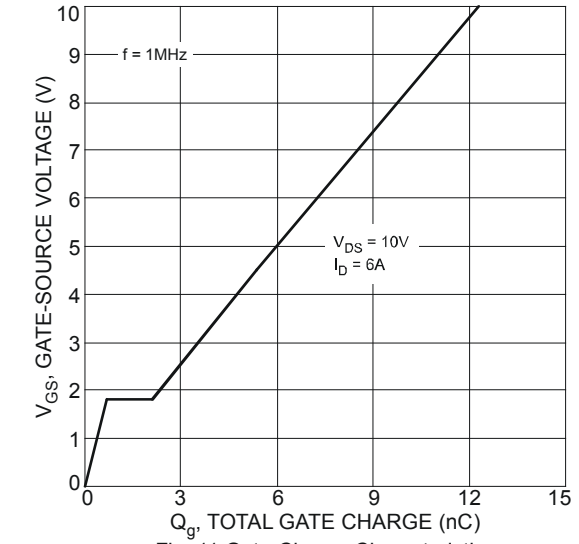

Fig. 11 Gate-Charge Characteristics

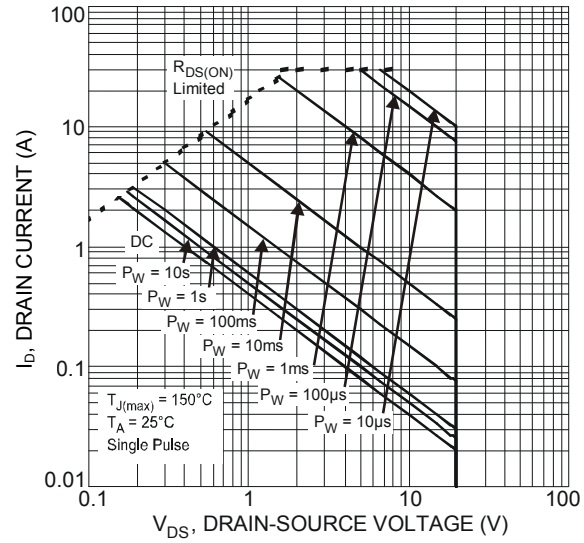

Fig. 12 SOA, Safe Operation Area

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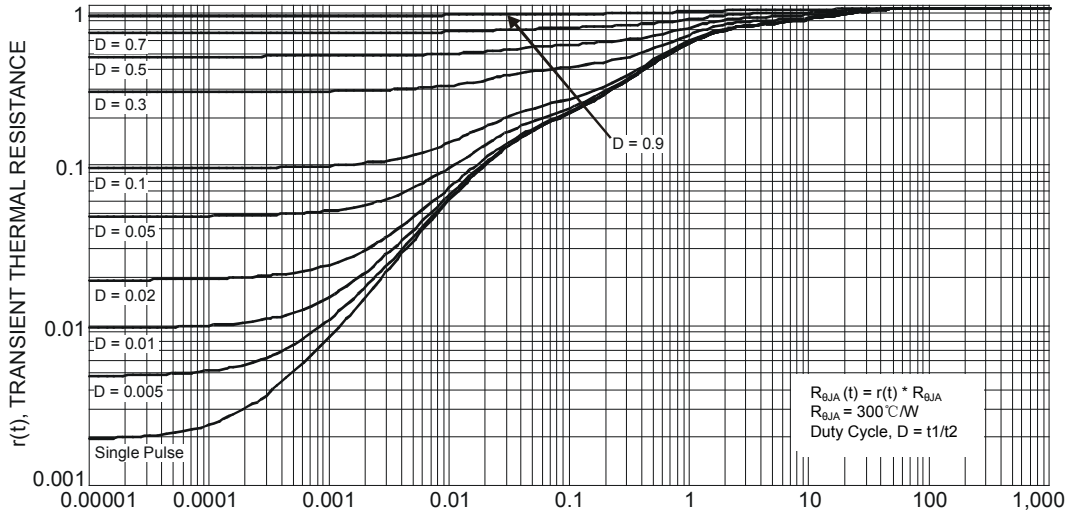

Fig. 13 Transient Thermal Resistance

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

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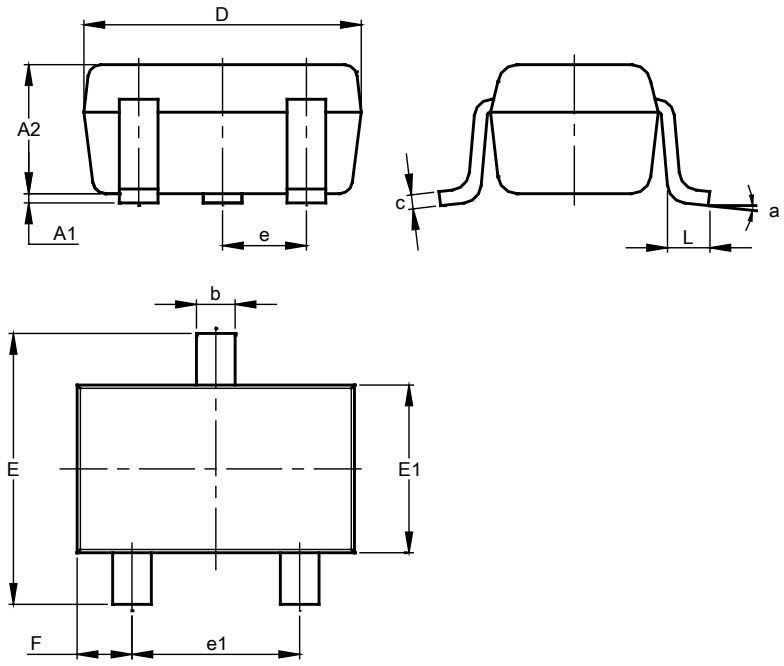
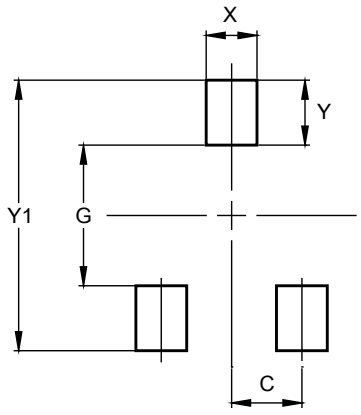


SOT323			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT323



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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