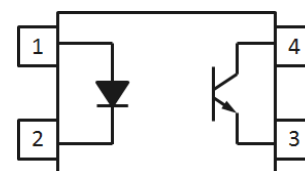


4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER EL357NU-G Series

Preliminary



Schematic



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

Features:

- Halogens free
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Compliance with EU REACH
- Pb free and RoHS compliant
- Current transfer ratio
(CTR: 100~400% at $I_F = 0.5\text{mA}$, $V_{CE} = 5\text{V}$)
- Operating temperature $-40^\circ\text{C} \sim 125^\circ\text{C}$
- High isolation voltage between input and output (Viso=3750 V rms)
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

Description

The EL357NU-G series contains an infrared emitting diode, optically coupled to a phototransistor detector.

The devices in a 4-pin small outline SMD package.

Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I _F	50	mA
	Peak forward current (1us, pulse)	I _{FP}	1	A
	Reverse voltage	V _R	6	V
	Power dissipation	P _D	70	mW
Output	Power dissipation	P _C	150	mW
	Collector current	I _C	30	mA
	Collector-Emitter voltage	V _{CEO}	60	V
	Emitter-Collector voltage	V _{ECO}	5	V
Total Power Dissipation		P _{TOT}	200	mW
Isolation Voltage*1		V _{ISO}	3750	V rms
Operating temperature		T _{OPR}	-40 ~ +125	°C
Storage temperature		T _{STG}	-40 ~ +150	°C
Soldering Temperature*2		T _{SOL}	260	°C

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

*2 For 10 seconds

Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.3	1.6	V	$I_F = 1\text{mA}$
Reverse current	I_R	-	-	10	μA	$V_R = 6\text{V}$
Input capacitance	C_{in}	-	30	250	pF	$V = 0, f = 1\text{kHz}$

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	BV_{CEO}	60	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	5	-	-	V	$I_E = 0.01\text{mA}$

Transfer Characteristics (Ta=25°C unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL357NU	50	-	600	%	$I_F = 0.5\text{mA}, V_{CE} = 5\text{V}$
	EL357NUA	100	-	200		
	EL357NUB	150	-	300		
	EL357NUC	200	-	400		
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	-	0.35	V	$I_F = 3\text{mA}, I_C = 1.6\text{mA}$
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$
Floating capacitance	C_{IO}	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Turn-on time	t_{on}	-	1	-	μs	$V_{CC} = 5\text{V}, I_F = 16\text{mA}, R_L = 1.9\text{K}\Omega$
Turn-off time	t_{off}	-	50	-		

* Typical values at $T_a = 25^\circ\text{C}$

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

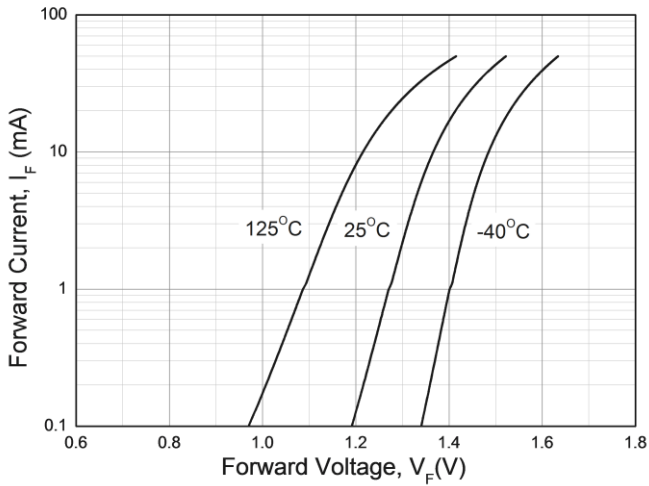


Figure 2. Collector Current vs. Forward Current

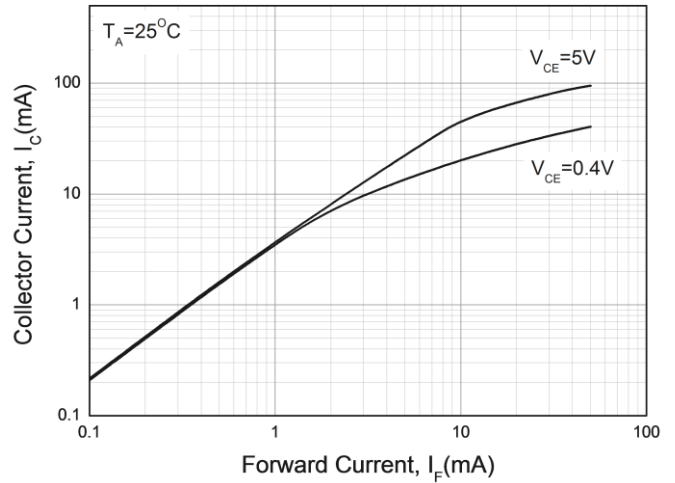


Figure 3. Normalized Current Transfer Ratio vs. Forward Current

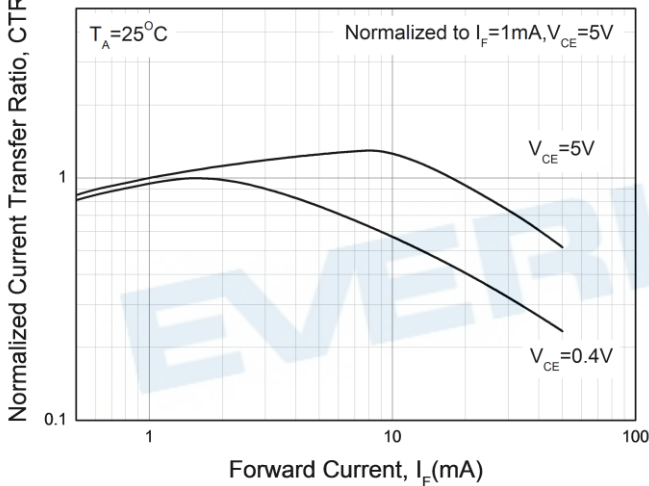


Figure 4. Collector Current vs. Collector Emitter Voltage

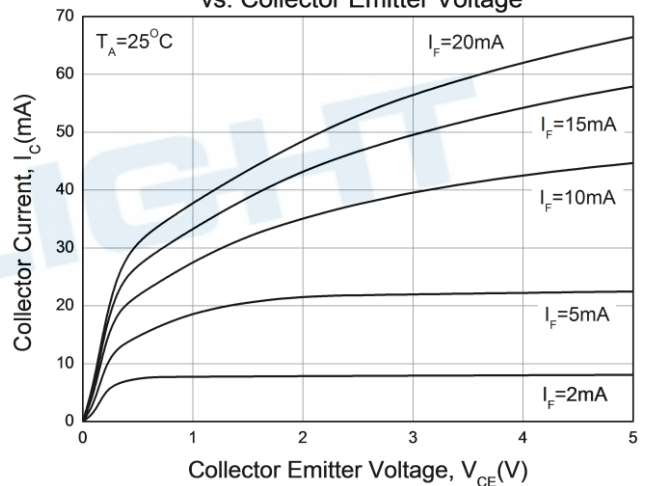


Figure 5. Collector Current vs. Collector Emitter Voltage

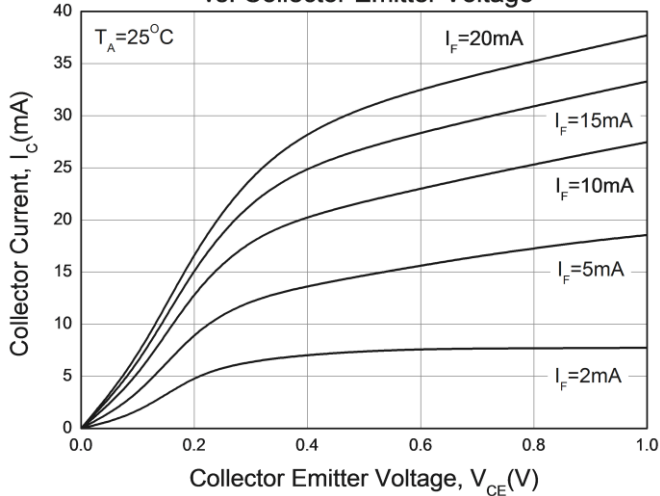


Figure 6. Collector Current vs. Ambient Temperature

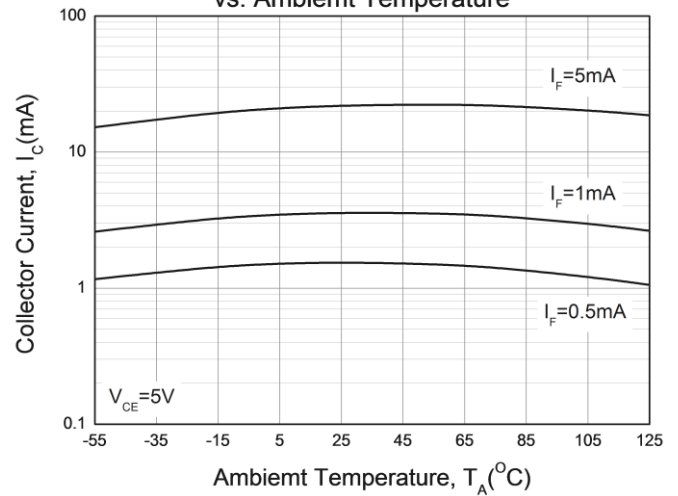


Figure 7. Current Transfer Ratio vs. Ambient Temperature

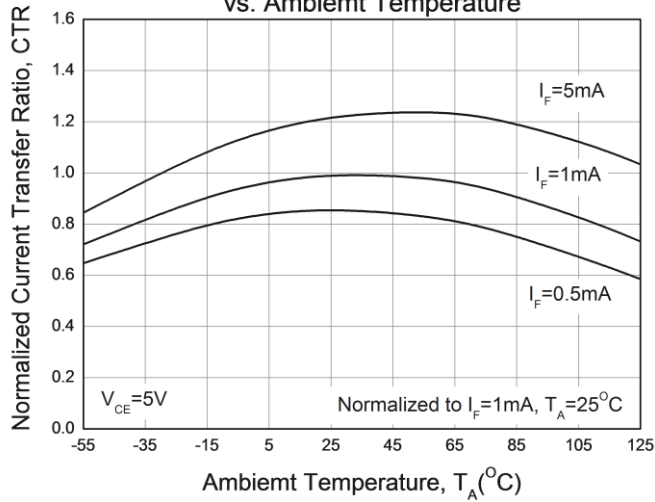


Figure 8. Collector Dark Current vs. Ambient Temperature

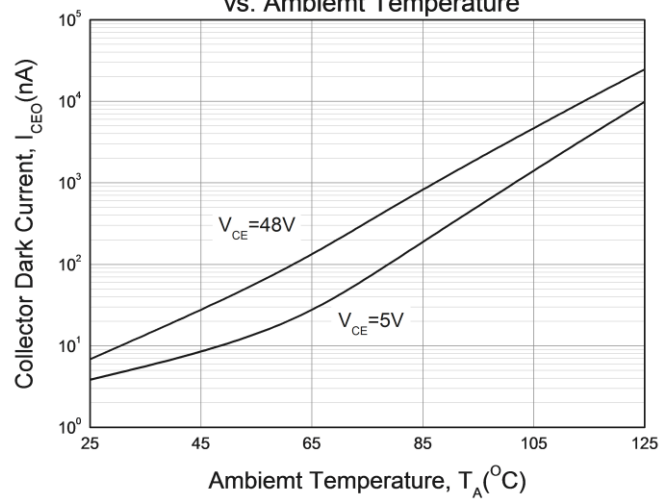


Figure 9. Switching Speed vs. Load resistance

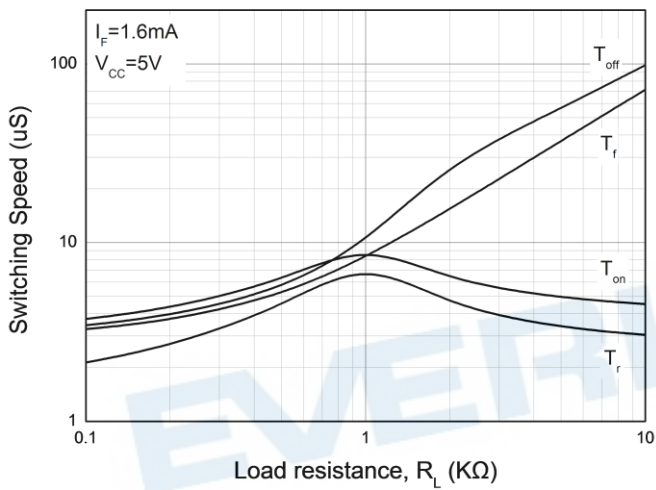


Figure 10. Collector-Emitter Saturation Voltage vs. Ambient Temperature

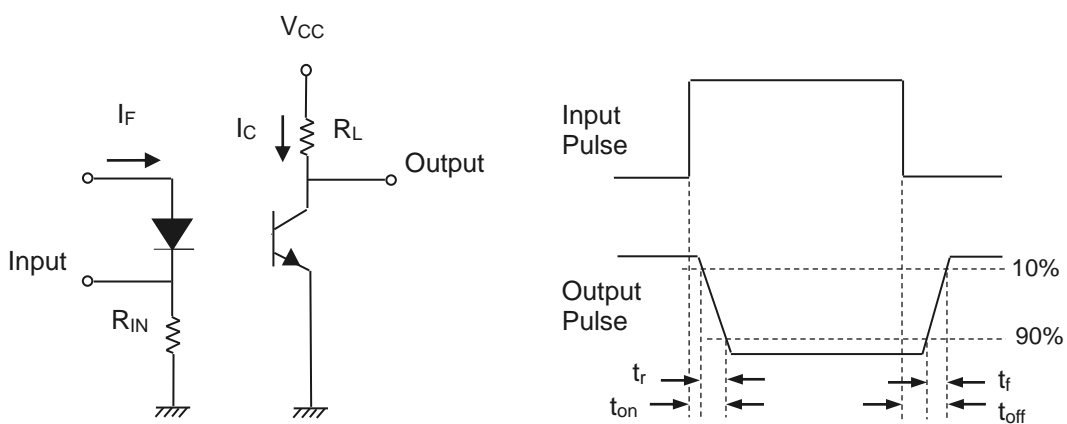
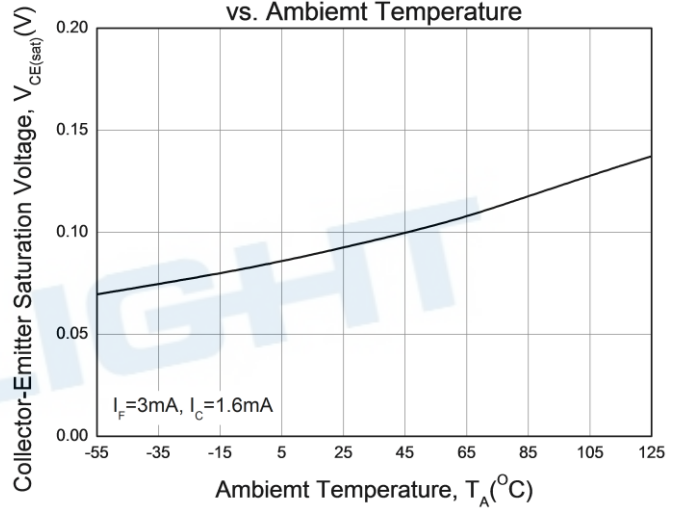


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

EL357NU(X)(Y)-VG

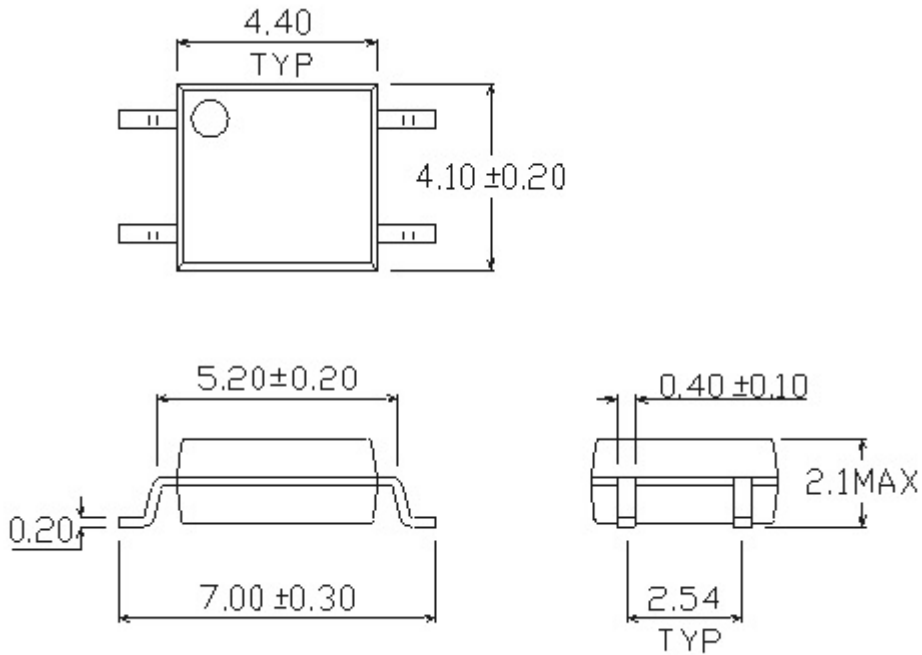
Notes

- X = CTR Rank (A, B, C or none)
- Y = Tape and reel option (TA, TB or none).
- V = VDE (optional)
- G = Halogens free

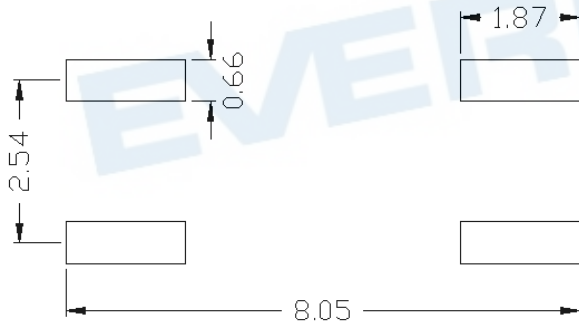
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

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Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Notes

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

Device Marking

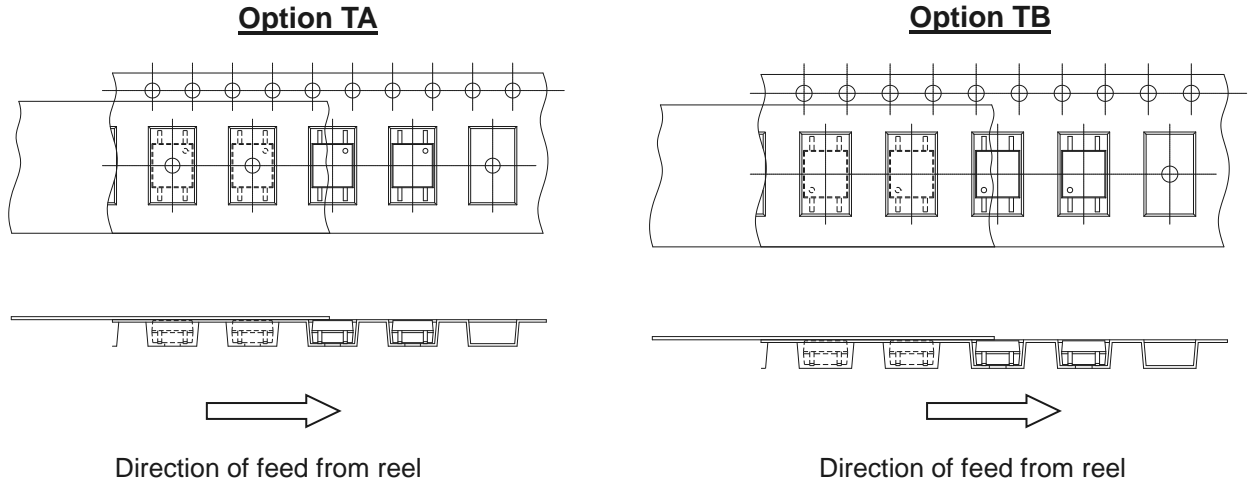


Notes

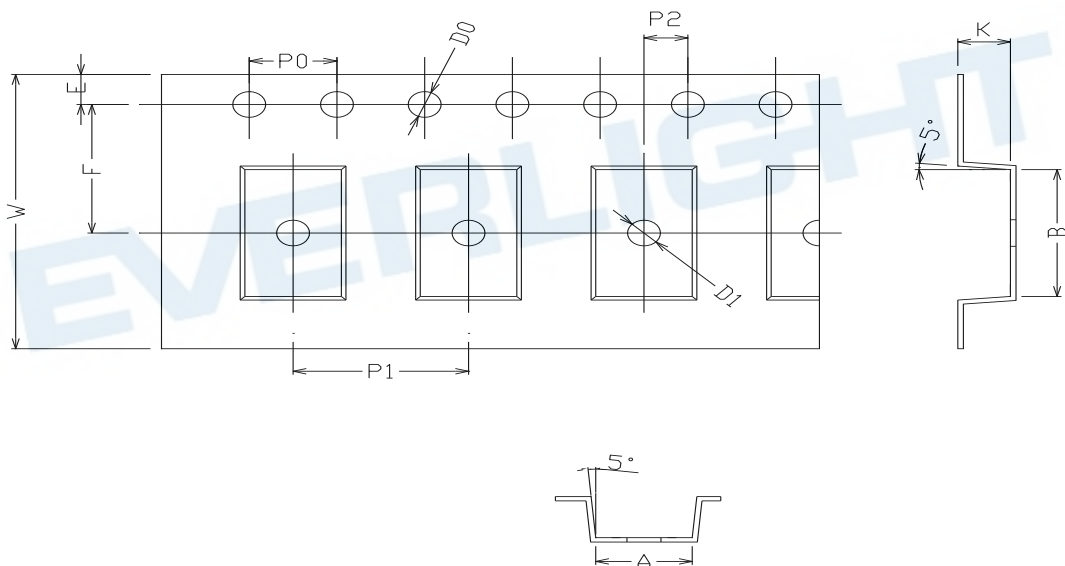
EL	denotes EVERLIGHT
357NU	denotes Device Number
R	denotes CTR Rank (A, B, C or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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Tape & Reel Packing Specifications



Tape dimensions

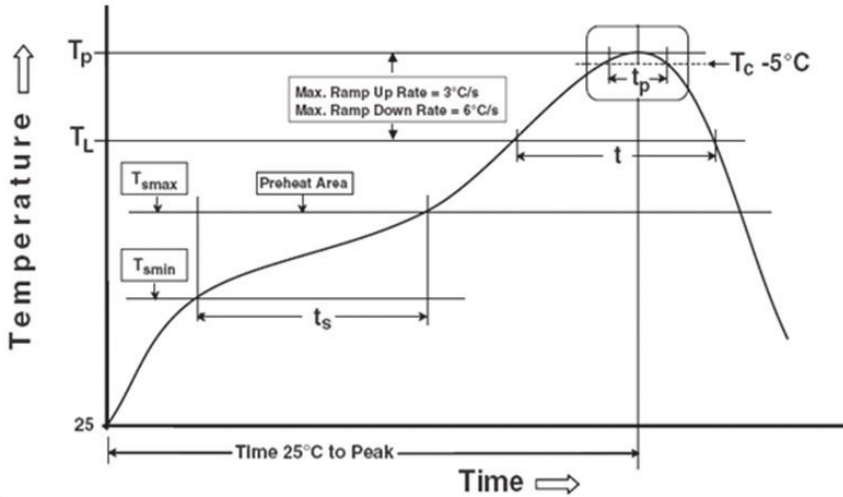


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.6 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.05
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.05	8.0 ± 0.1	2.0 ± 0.1	0.3 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

Preheat

Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max

Other

Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-100 sec
Peak Temperature (T_P)	260°C
Time within 5 °C of Actual Peak Temperature: $T_P - 5^\circ\text{C}$	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

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