B1D06065E

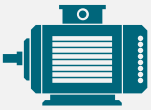
650V ▲ 6A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ SMD type
Excellent surge capability
Easy paralleling due to positive V_F temperature coefficient
TO-252-2L package (DPAK) ▲ Epoxy meets UL94-V0 ▲ MSL3
Low forward voltage
Temperature independent switching

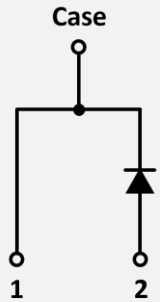
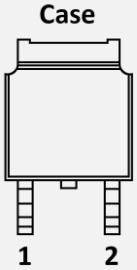
SPECIFICATION

Item (T_C = 25°C, unless otherwise noted)		Characteristics
Operating Temperature Range	T_J	-55°C to +175°C
Storage Temperature Range	T_S	-55°C to +175°C
Repetitive Peak Reverse Voltage	V_{RRM}	650V
Continuous Forward Current at T_C = 155°C	I_F	6A
Total Capacitive Charge (T_J = 25°C)	Q_C	17nC
Capacitance Stored Energy (V_R = 400V)	E_C	4.5μJ
Diode Forward Voltage (T_J = 175°C, I_F = 6A)	V_F	1.73V
Power Dissipation	P_{TOT}	75W

APPLICATIONS

EV Charging	Industrial Inverters	Motors & Drives	Power Factor Correction	Renewable Energy	SMPS	UPS
						

PIN DESCRIPTION

Circuit Diagram	Outline ▪ Top View	Pin No.	Description
		1 2	Cathode (Case Backside) Anode

ABSOLUT MAXIMUM RATINGS ▲ T_C = 25°C, unless otherwise noted

Item	Condition	Symbol		Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Non-Repetitive Peak Reverse Voltage		V_{RSM}	650	V
Continuous Forward Current	T_C = 25°C	I_F	19	A
Continuous Forward Current	T_C = 155°C	I_F	6	A
Non-Repetitive Forward Surge Current	T_C = 25°C, t_p = 10ms, Half Sine Wave	I_{FSM}	45	A
I^2t Value	T_C = 25°C, t_p = 10ms	$\int i^2dt$	10.12	A^2s
Power Dissipation	T_C = 25°C	P_{TOT}	75	W
Power Dissipation	T_C = 110°C	P_{TOT}	32	W
Operating Junction Temperature		T_J	-55 to +175	°C
Storage Temperature Range		T_{STG}	-55 to +175	°C

ELECTRICAL CHARACTERISTICS

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Static Characteristics						
DC Blocking Voltage	T_J = 25°C	V_{DC}	650			V
Diode Forward Voltage	I_F = 6A, T_J = 25°C	V_F		1.43	1.60	V
Diode Forward Voltage	I_F = 6A, T_J = 175°C	V_F		1.73	2.20	V
Reverse Current	V_R = 650V, T_J = 25°C	I_R		1	60	µA
Reverse Current	V_R = 650V, T_J = 175°C	I_R		20	200	µA

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
Total Capacitive Charge	V_R = 400V, T_J = 25°C $Q_C = \int_0^{V_R} C\,(V)dV$	Q_C		17		nC
Total Capacitance	V_R = 1V, f = 1MHz, T_J = 25°C	C		271		pF
Total Capacitance	V_R = 300V, f = 1MHz, T_J = 25°C	C		30.1		pF
Total Capacitance	V_R = 600V, f = 1MHz, T_J = 25°C	C		29.8		pF
Capacitance Stored Energy	V_R = 400V, T_J = 25°C	E_C		4.5		µJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		1.983		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 ▪ Typical Forward Characteristics I_F vs. V_F

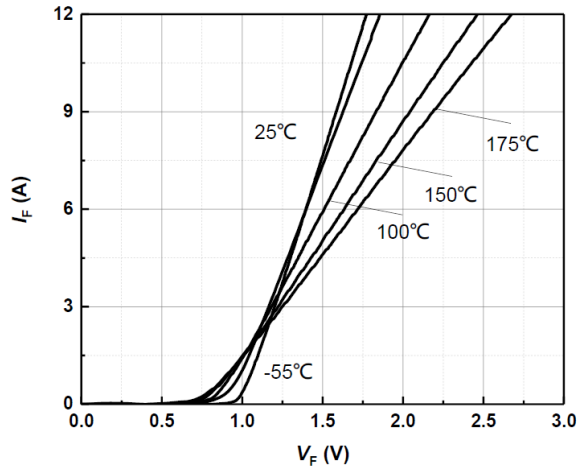


Fig. 2 ▪ Typical Reverse Current I_R as function of Reverse Voltage V_R

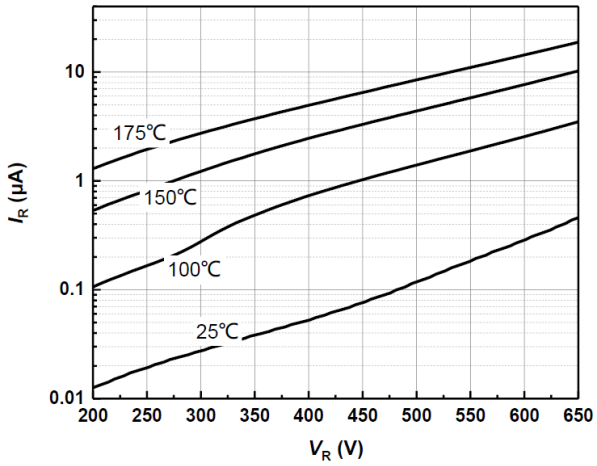


Fig. 3 ▪ Diode Forward Current I_F as function of Case Temperature T_C (D = Duty Cycle)

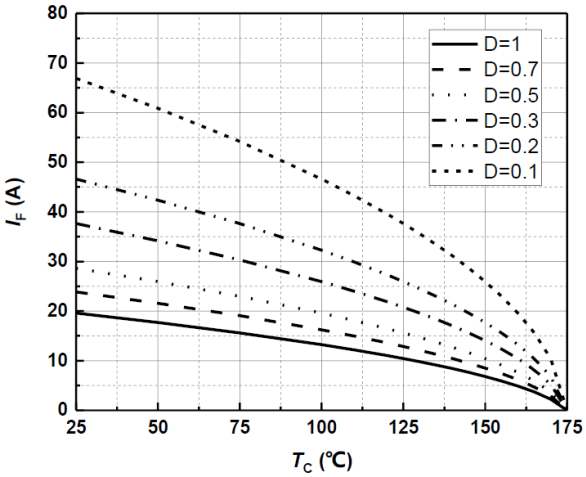


Fig. 4 ▪ Typical Capacitance C as function of Reverse Voltage V_R, C =f(V_R), T_J = 25°C, f = 1MHz

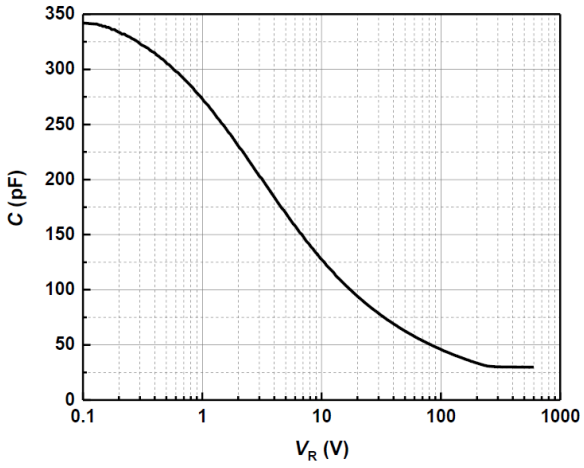


Fig. 5 ▪ Typical Reverse Charge Q_C as function of Reverse Voltage V_R

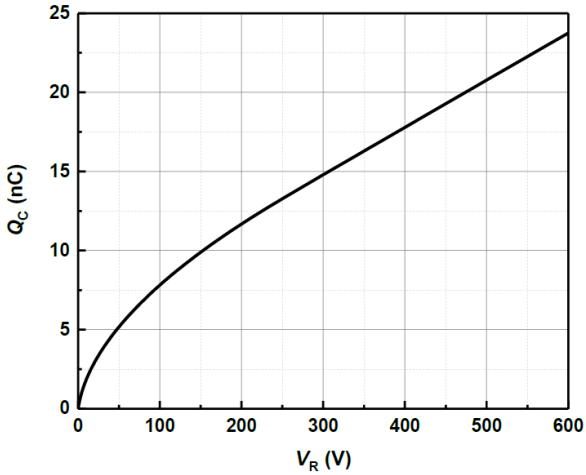
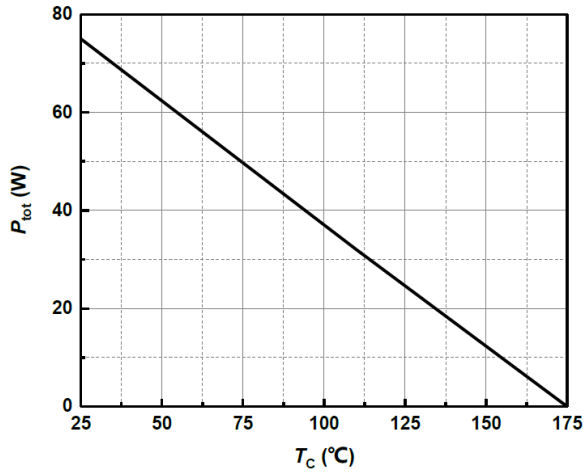


Fig. 6 ▪ Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 ▪ Capacitance Stored Energy

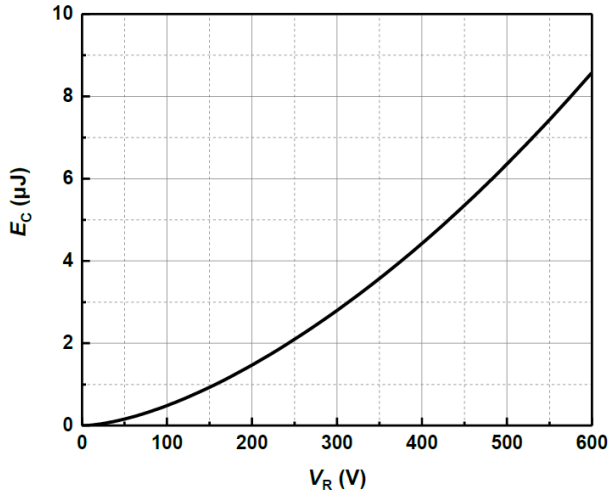
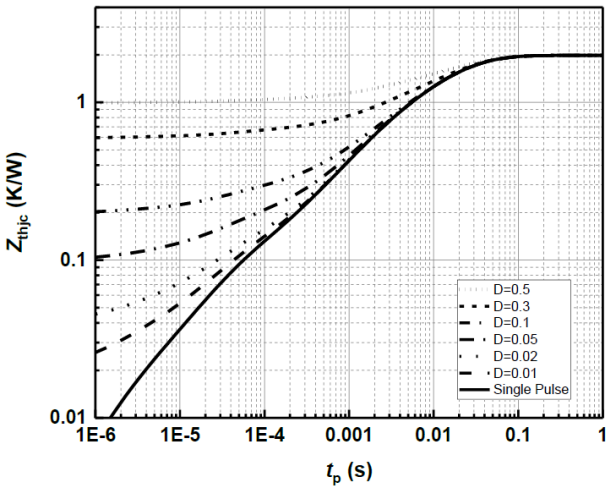
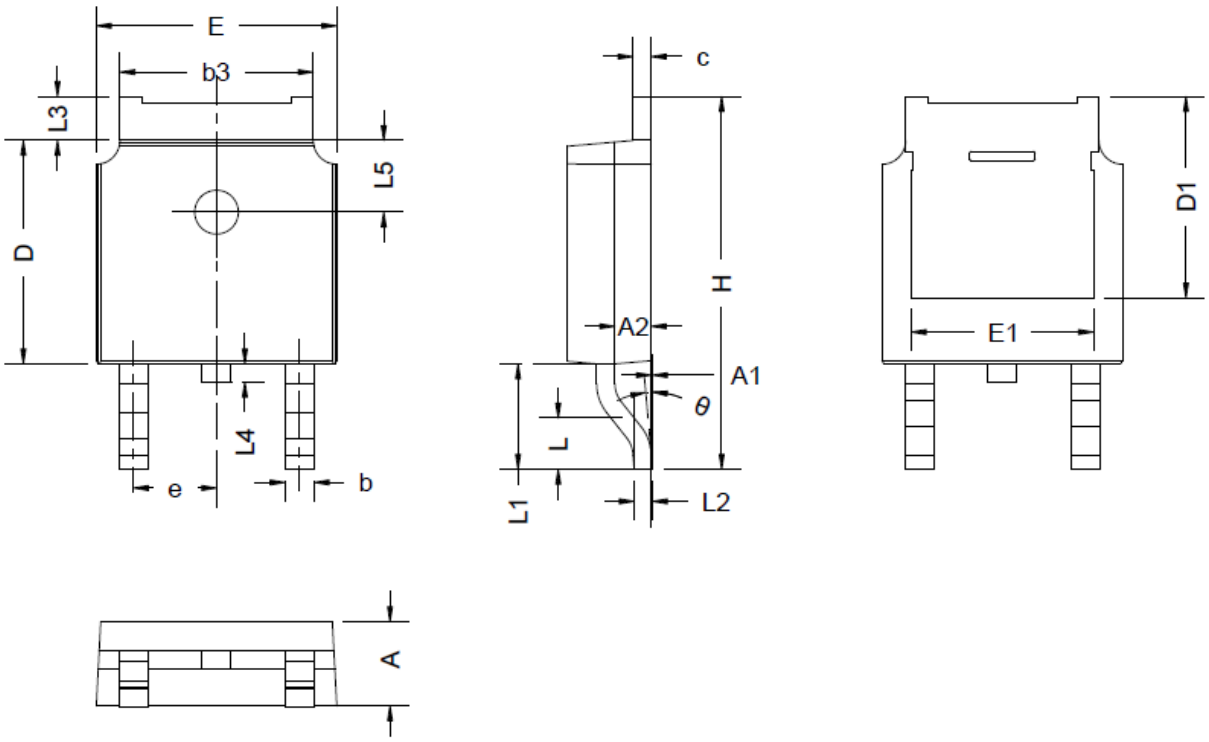


Fig. 8 ▪ Maximum Transient Thermal Impedance, Z_{thjc} = f(t), Parameter: D = t/T



PACKAGE OUTLINE



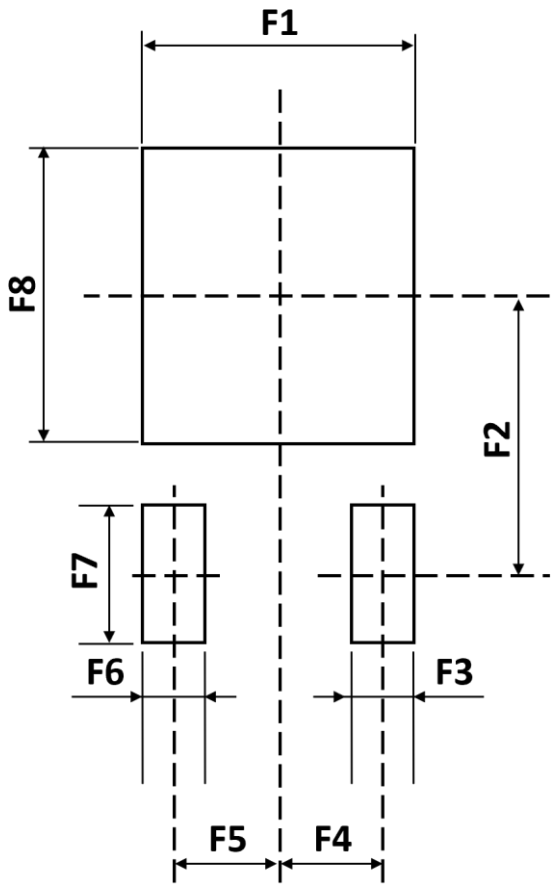
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	2.20	2.30	2.38
A1	0.00	-	0.20
A2	0.90	1.07	1.17
b	0.68	0.78	0.90
b3	5.23	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1		5.30 REF	
E	6.40	6.60	6.73
E1	4.63	-	-

Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
e		2.286 BSC	
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1		2.90 REF	
L2		0.51 BSC	
L3	0.88	-	1.28
L4	0.50	.	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

ORDERING INFORMATION

Part Number	Package	Packing	Reel Qty.	Inner Box Qty.	Outer Box Qty.
B1D06065E	TO-252-2L	Reel	2,500pcs	5,000pcs	30,000pcs

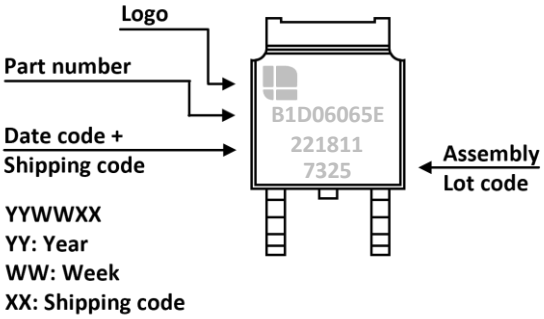
RECOMMENDED PAD LAYOUT



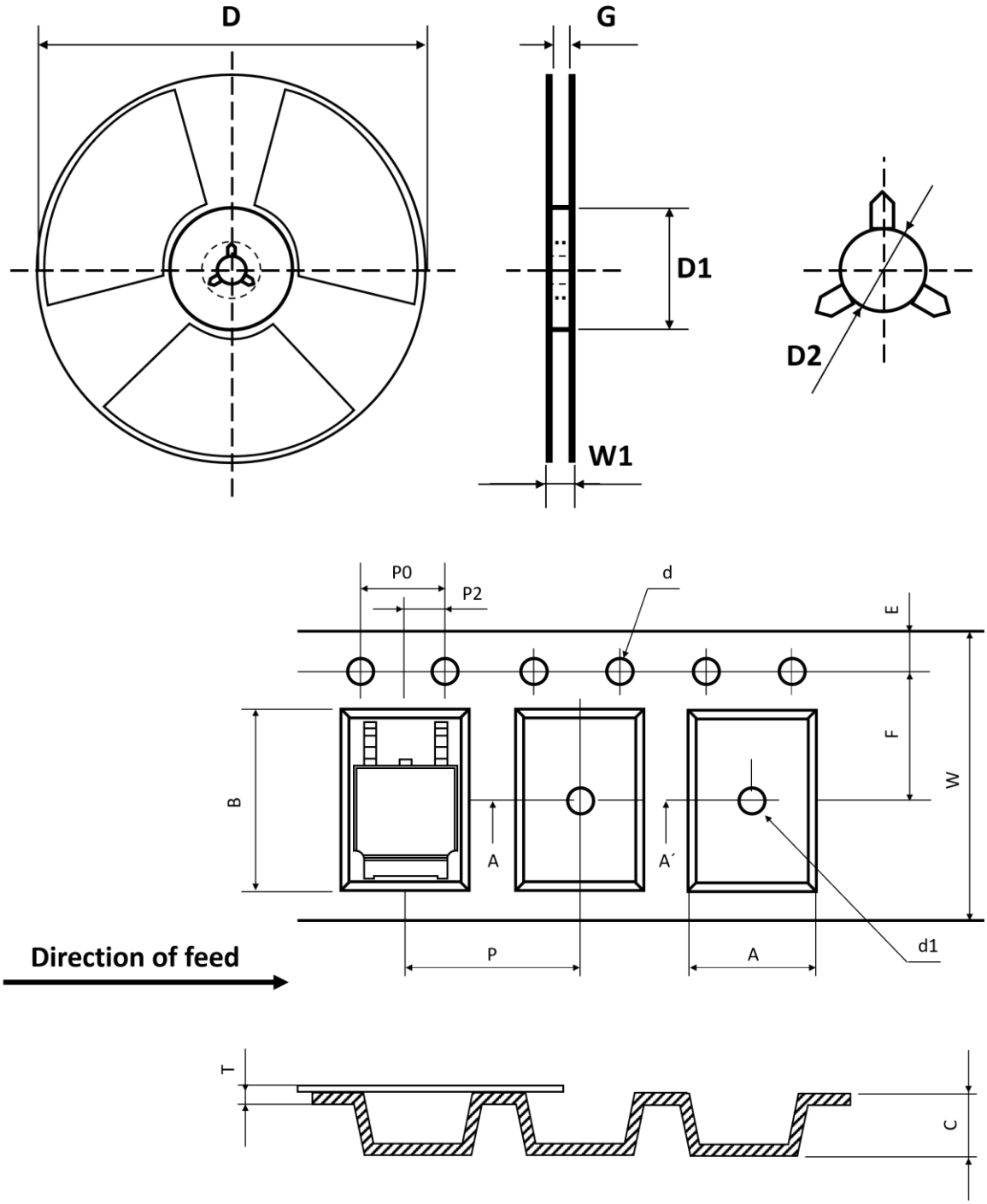
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)	Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
F1	-	6.00	-	F5	-	2.29	-
F2	-	6.25	-	F6	-	1.40	-
F3	-	1.40	-	F7	-	3.00	-
F4	-	2.29	-	F8	-	6.50	-

Notes:
1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please reference document IPC-7351A.

PART MARKING



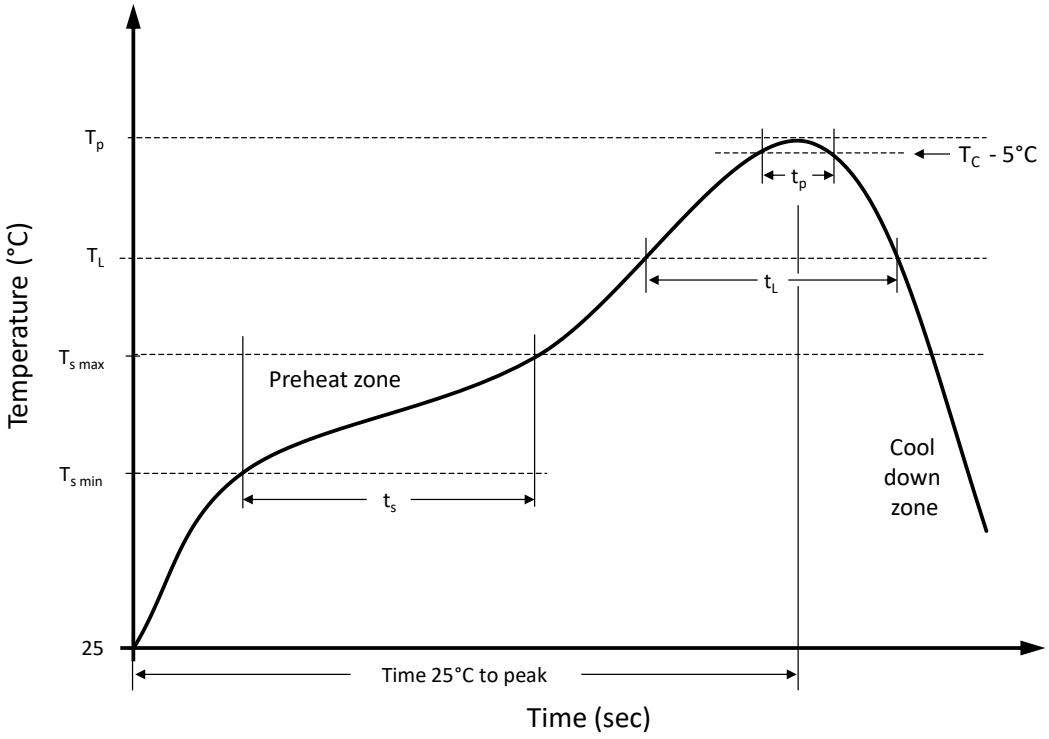
REEL AND TAPE DIMENSIONS ▲ All dimensions in mm



Package	W	A	B	C	d1	D	E	F	P	P0	T	D	D1	D2	G	W1
TO252-2L	16.00	6.90	10.50	2.70	1.50	1.50	1.75	7.50	8.00	4.00	0.30	330	50	13.00	16.40	22.00
	±0.30	±0.10	±0.10	±0.10	Max.	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.30	Min.	±0.50	Min.	Min.

Note: **All dimensions meet EIA-481-D requirements.**

RECOMMENDED REFLOW SOLDERING PROFILE



Recommended reflow soldering conditions ▲ Refer to JEDEC J-STD-020E

Profile Features		Sn-Pb Eutetic Assembly	Pb-Free Assembly
Preheat temperature min.	$T_{s\,min}$	100 °C	150 °C
Preheat temperature max.	$T_{s\,max}$	150 °C	200 °C
Preheat time t_s from $T_{s\,min}$ to $T_{s\,max}$	t_s	120 seconds	120 seconds
Ramp-up rate (T_L to T_p)		max. 3 °C/second	max. 3 °C/second
Liquidous temperature	T_L	183 °C	217 °C
Time t_L maintained above T_L	t_L	150 seconds max.	150 seconds max.
Peak package body temperature	T_p	235°C	260°C
Timeframe of within 5°C below and up to max actual peak body temperature	t_p	20 seconds max.	30 seconds max.
Ramp-down rate (T_L to T_p)		max. 6 °C/second	max. 6 °C/second
Time 25°C to peak temperature		max. 6 minutes	max. 8 minutes

REVISION TABLE

Revision	Date	Status	Notes
001	30/09/2022	Initial release	Initial publication

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