B1D10065F

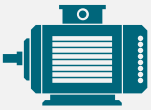
650V ▲ 10A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ SMD type
Excellent surge capability
Easy paralleling due to positive V_F temperature coefficient
TO-263-2L (D2PAK) package ▲ Epoxy meets UL94-V0 ▲ MSL3
Low forward voltage
Temperature independent switching

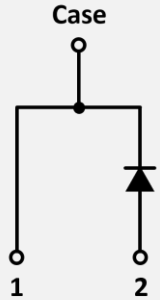
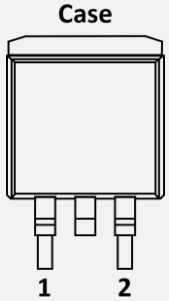
SPECIFICATION

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	10A
Total Capacitive Charge (T_J = 25°C)	Q_C	29nC
Capacitance Stored Energy (V_R = 400V)	E_C	7.5μJ
Diode Forward Voltage (T_J = 175°C, I_F = 10A)	V_F	1.75V
Power Dissipation	P_{TOT}	134W

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	33	A
Continuous Forward Current	T_C = 155°C	I_F	10	A
Non-Repetitive Forward Surge Current	T_C = 25°C, t_p = 10ms, Half Sine Wave	I_{FSM}	75	A
I^2t Value	T_C = 25°C, t_p = 10ms	$\int i^2dt$	28.12	A^2s
Power Dissipation	T_C = 25°C	P_{TOT}	134	W
Power Dissipation	T_C = 110°C	P_{TOT}	58	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 = 10A, T_J = 25°C	V_F		1.45	1.60	V
Diode Forward Voltage	I_F = 10A, T_J = 175°C	V_F		1.75	2.00	V
Reverse Current	V_R = 650V, T_J = 25°C	I_R		1	70	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		29		nC
Total Capacitance	V_R = 1V, f = 1MHz, T_J = 25°C	C		457		pF
Total Capacitance	V_R = 300V, f = 1MHz, T_J = 25°C	C		49.7		pF
Total Capacitance	V_R = 600V, f = 1MHz, T_J = 25°C	C		49.3		pF
Capacitance Stored Energy	V_R = 400V, T_J = 25°C	E_C		7.5		µJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta,JC}$		1.113		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 ▪ Typical Forward Characteristics I_F vs. V_F

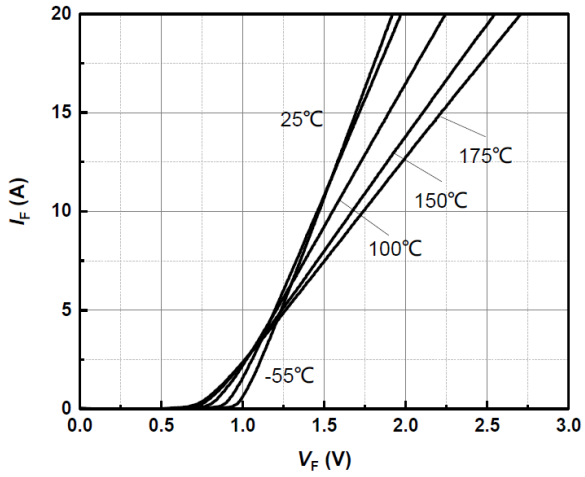


Fig. 2 ▪ Typical Reverse Current I_R as function of Reverse Voltage V_R

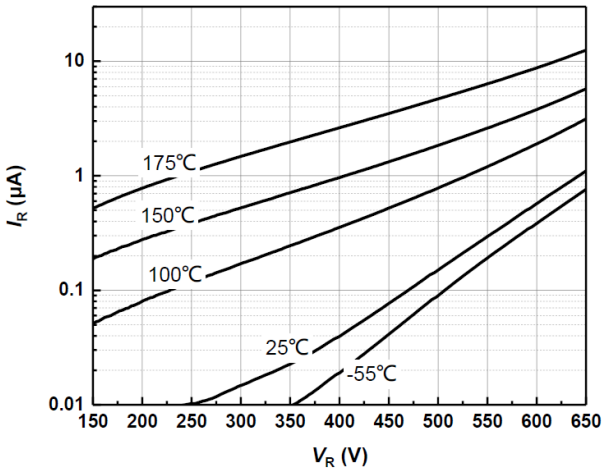


Fig. 3 ▪ Diode Forward Current I_F as function of Case Temperature T_C (D = Duty Cycle)

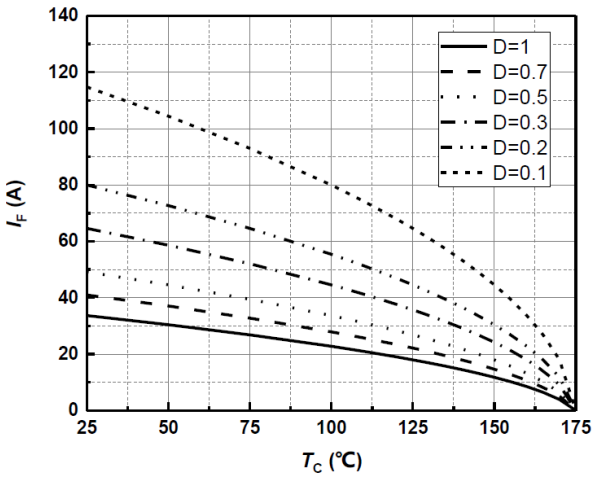


Fig. 4 ▪ Typical Capacitance C as function of Reverse Voltage V_R, C =f(V_R), T_J = 25°C, f = 1MHz

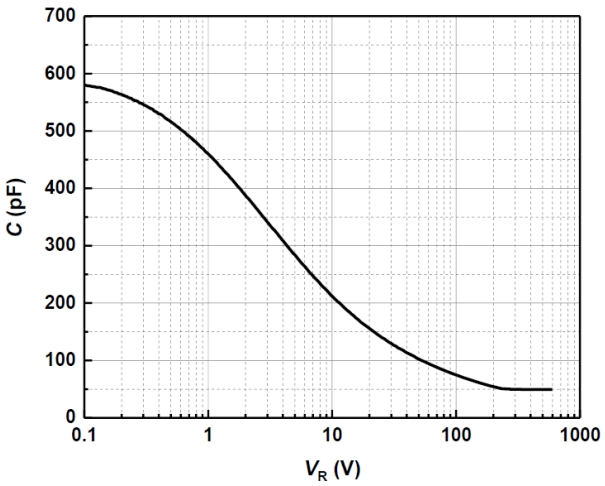


Fig. 5 ▪ Typical Reverse Charge Q_C as function of Reverse Voltage V_R

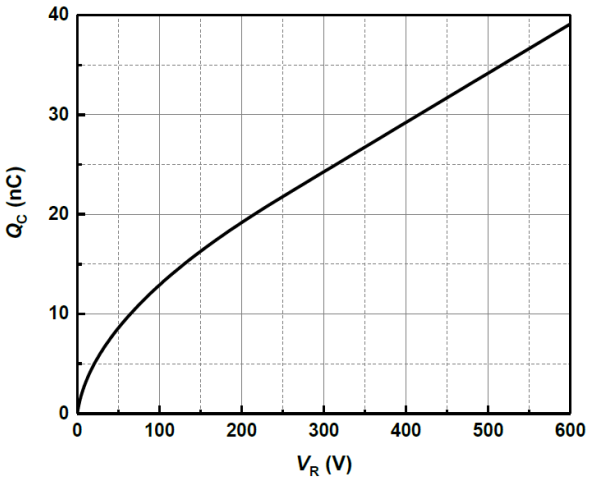
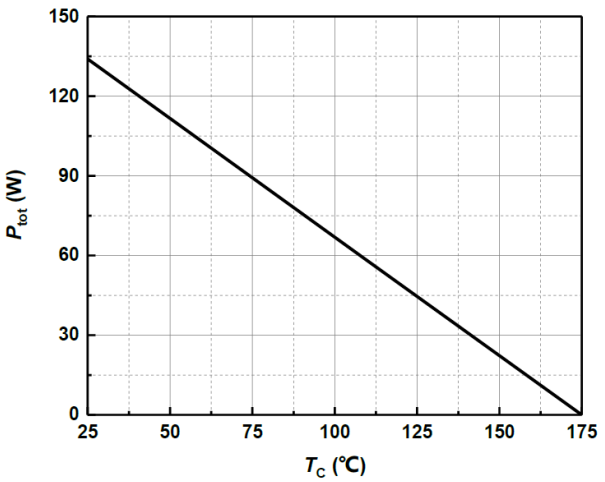


Fig. 6 ▪ Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 ▪ Capacitance Stored Energy

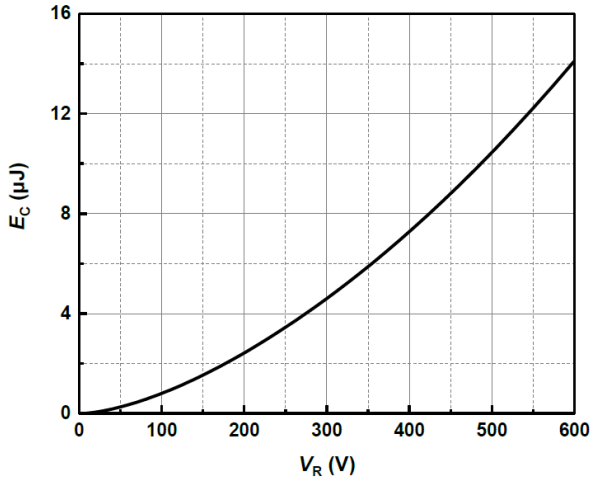
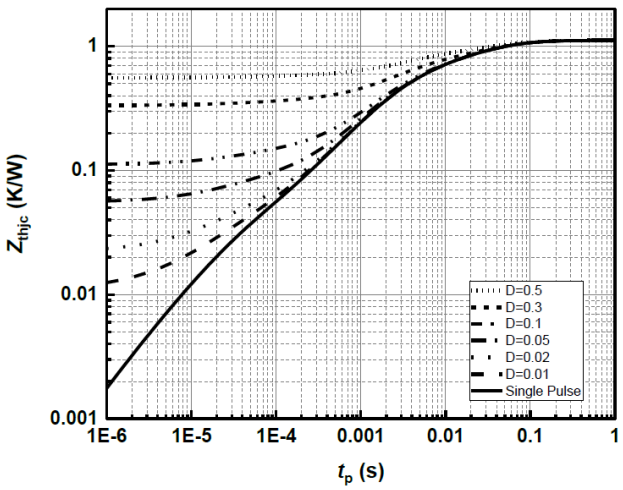
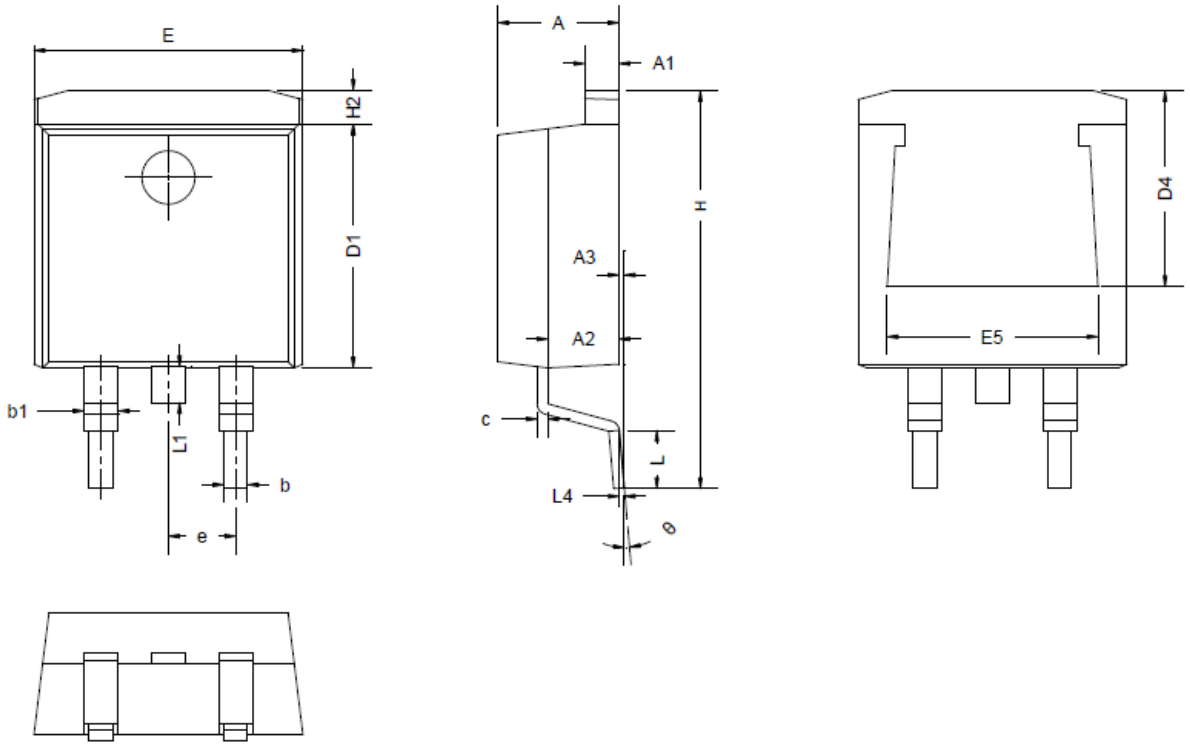


Fig. 8 ▪ Maximum Transient Thermal Impedance, Z_{thjc} = f(t), Parameter: D = t/T



PACKAGE OUTLINE



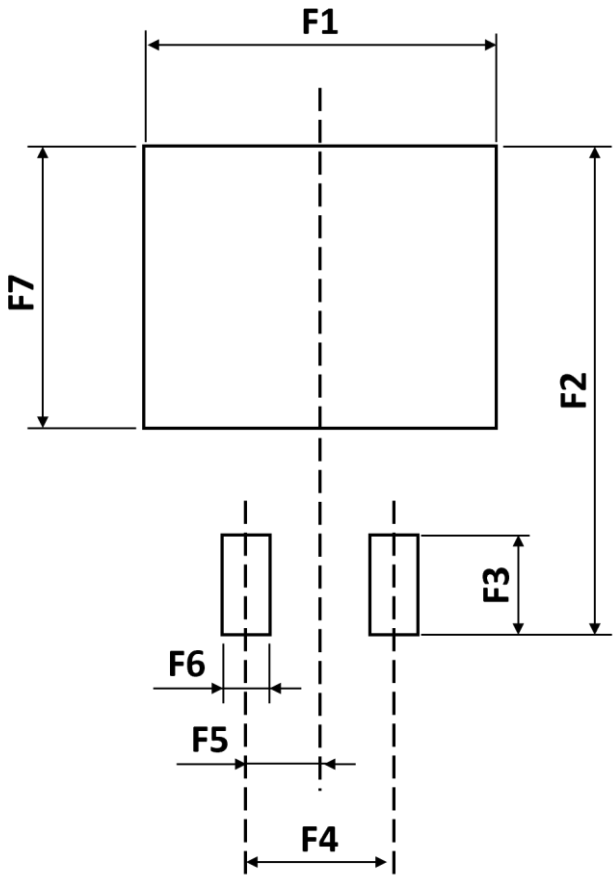
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-

Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
E	9.86	10.16	10.36
E5	7.06	-	-
e		2.54 BSC	
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4		0.25 BSC	
θ	0°	5°	9°

ORDERING INFORMATION

Part Number	Package	Packing	Reel Qty.	Inner Box Qty.	Outer Box Qty.
B1D10065F	TO-263-2L (D2PAK)	Reel	800pcs	4,000pcs	4,000pcs

RECOMMENDED PAD LAYOUT

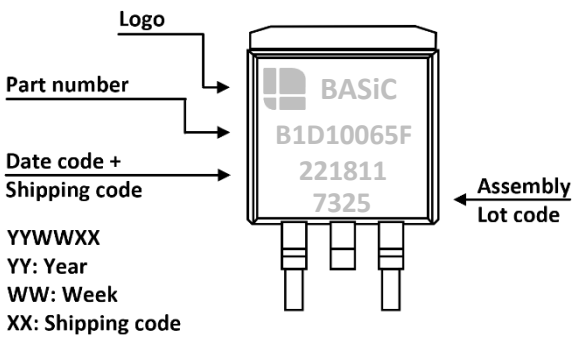


Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
F1	-	12.20	-
F2	-	16.90	-
F3	-	2.54	-
F4	-	5.08	-

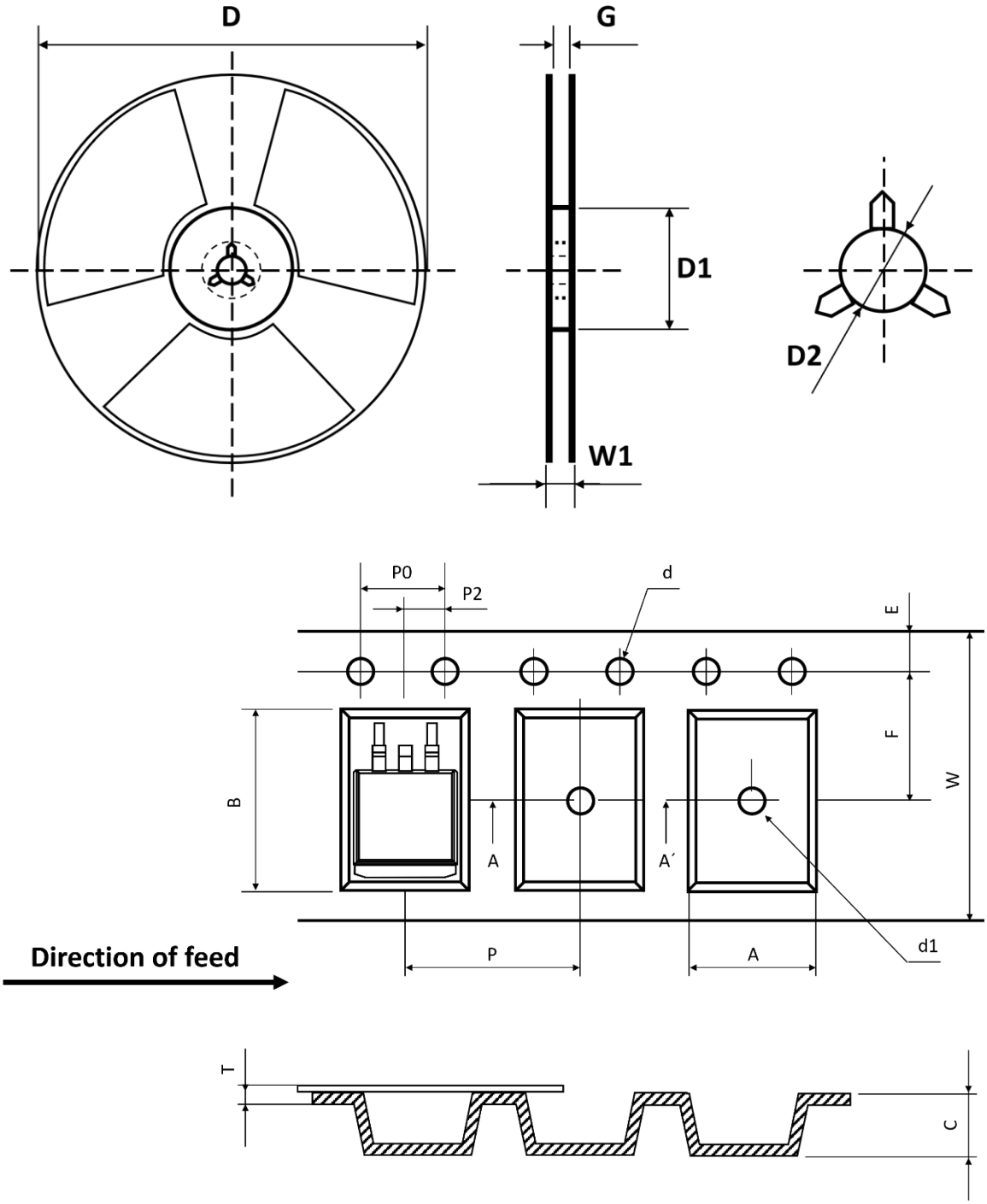
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
F5	-	2.54	-
F6	-	1.60	-
F7	-	9.75	-

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

PART MARKING



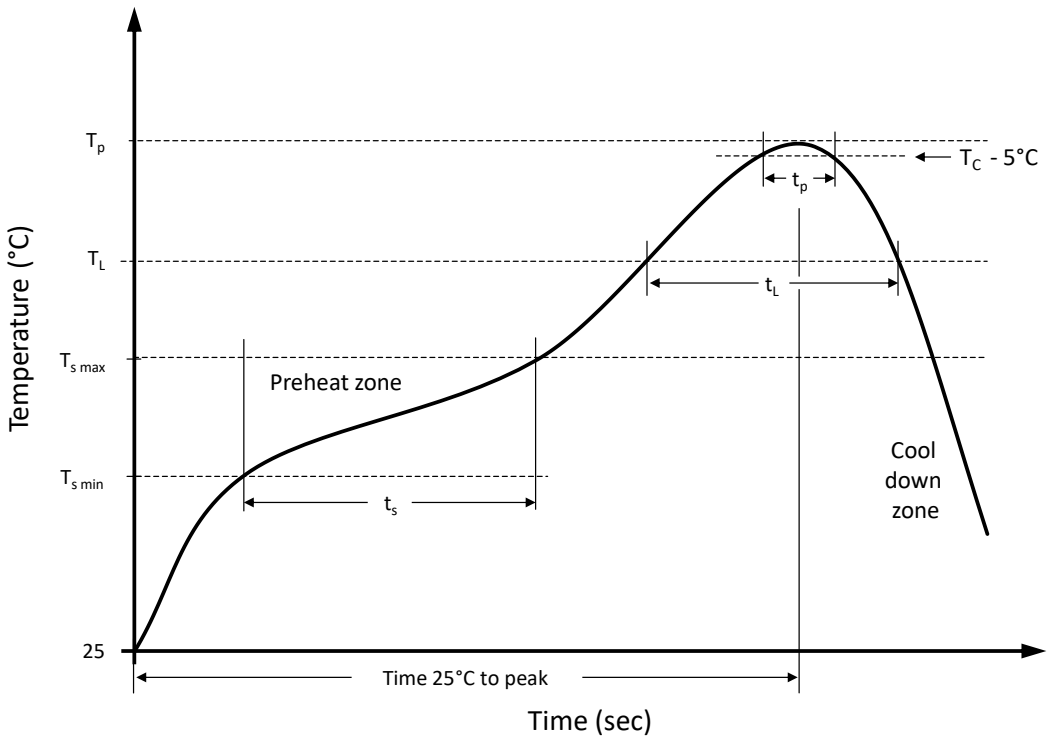
REEL AND TAPE DIMENSIONS ▲ All dimensions in mm



Package	W	A	B	C	d1	D	E	F	P	P0	T	D	D1	D2	G	W1
TO263-2L	24.00	10.70	16.30	5.10	1.50	1.50	1.75	11.50	16.00	4.00	0.35	330	50	13.00	24.40	30.40
	±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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