

B2D10065F

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



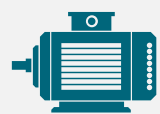




Temperature independent switching

Ultra-low forward voltage and high surge current

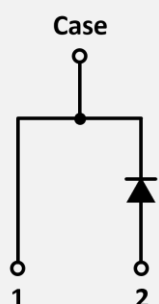
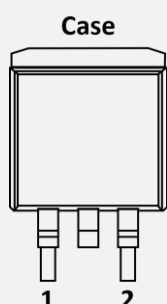
SPECIFICATION

Item ($T_C = 25^\circ\text{C}$, unless otherwise noted)		Characteristics
Operating Temperature Range	T_J	-55°C to $+175^\circ\text{C}$
Storage Temperature Range	T_S	-55°C to $+175^\circ\text{C}$
Repetitive Peak Reverse Voltage	V_{RRM}	650V
Continuous Forward Current at $T_C = 155^\circ\text{C}$	I_F	10A
Total Capacitive Charge ($T_J = 25^\circ\text{C}$)	Q_C	29nC
Capacitance Stored Energy ($V_R = 400\text{V}$)	E_C	$7.5\mu\text{J}$
Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 10\text{A}$)	V_F	1.67V
Power Dissipation	P_{TOT}	125W

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 ▲ $T_C = 25^\circ\text{C}$, 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	$T_C = 25^\circ\text{C}$	I_F	34	A
Continuous Forward Current	$T_C = 155^\circ\text{C}$	I_F	10	A
Non-Repetitive Forward Surge Current	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave	I_{FSM}	75	A
I^2t Value	$T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$	$\int i^2 dt$	28.12	A^2s
Power Dissipation	$T_C = 25^\circ\text{C}$	P_{TOT}	125	W
Power Dissipation	$T_C = 110^\circ\text{C}$	P_{TOT}	54	W
Operating Junction Temperature		T_J	-55 to +175	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 to +175	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Static Characteristics						
DC Blocking Voltage	$T_J = 25^\circ\text{C}$	V_{DC}	650			V
Diode Forward Voltage	$I_F = 10\text{A}$, $T_J = 25^\circ\text{C}$	V_F		1.29		V
Diode Forward Voltage	$I_F = 10\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.67		V
Reverse Current	$V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$	I_R		2		μA
Reverse Current	$V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$	I_R		20		μA

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
Total Capacitive Charge	$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V) dV$	Q_C		29		nC
Total Capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		457		pF
Total Capacitance	$V_R = 300\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		49.7		pF
Total Capacitance	$V_R = 600\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$	C		49.3		pF
Capacitance Stored Energy	$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$	E_C		7.5		μJ

THERMAL RESISTANCE PERFORMANCE

Item	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		1.192		K/W

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

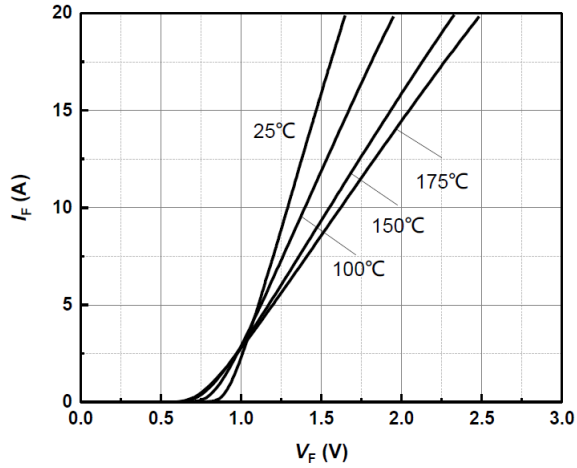


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

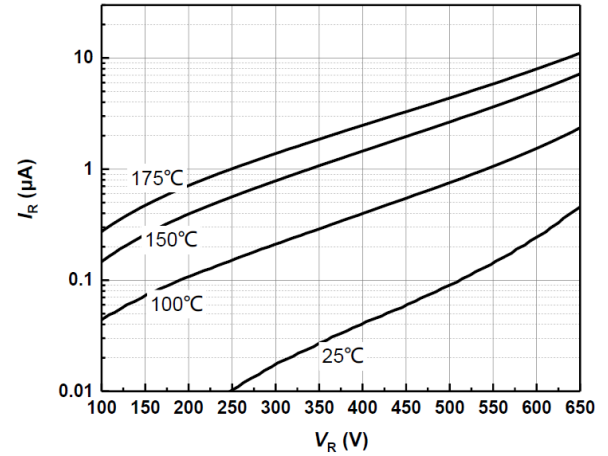


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C (D = Duty Cycle)

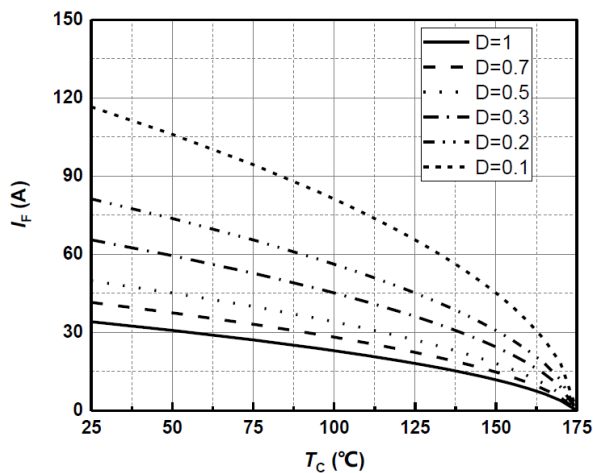


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

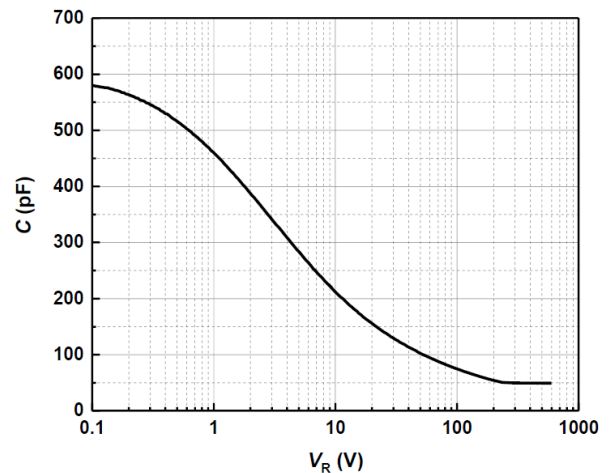


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

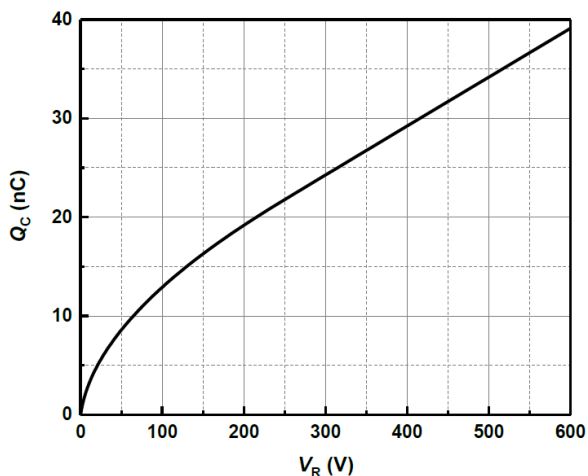
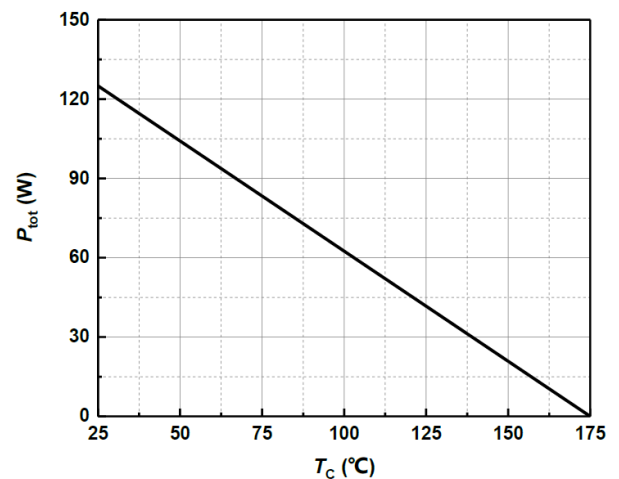


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 • Capacitance Stored Energy

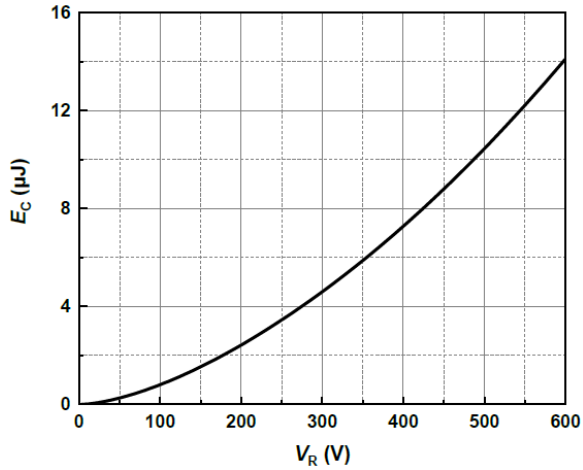
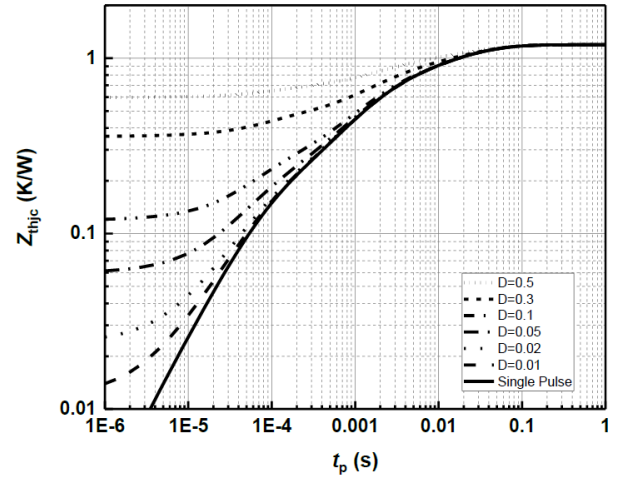
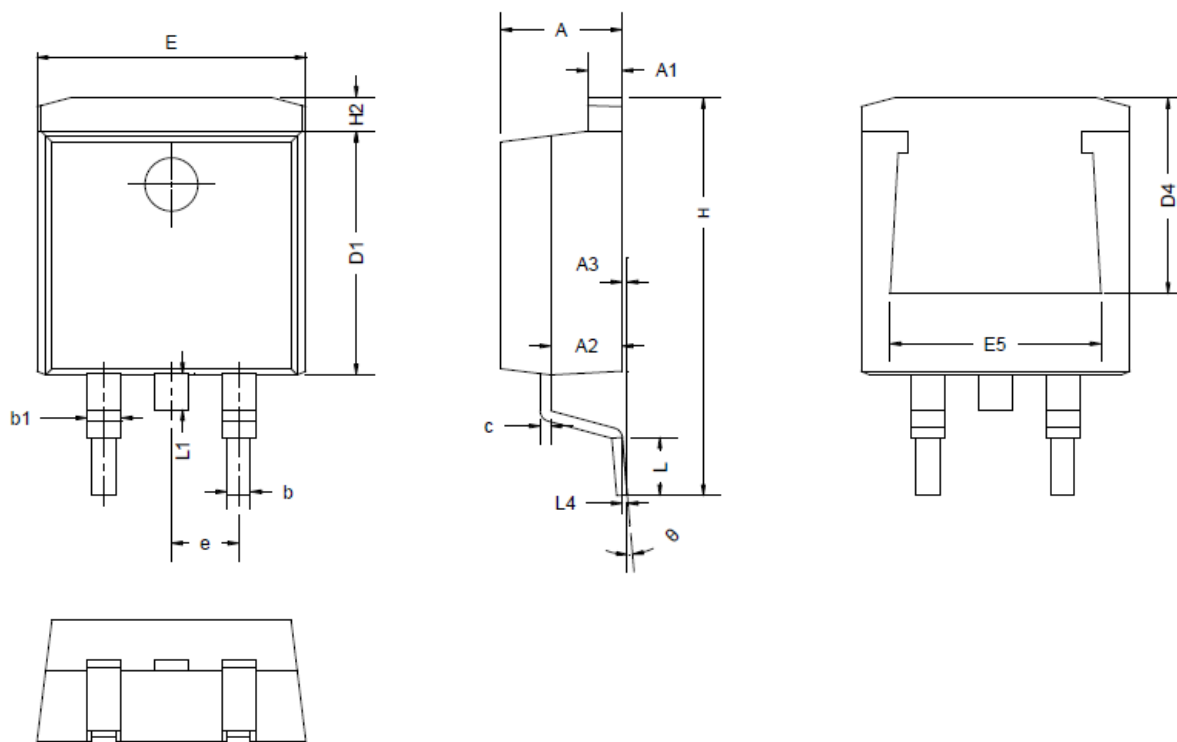


Fig. 8 • Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE



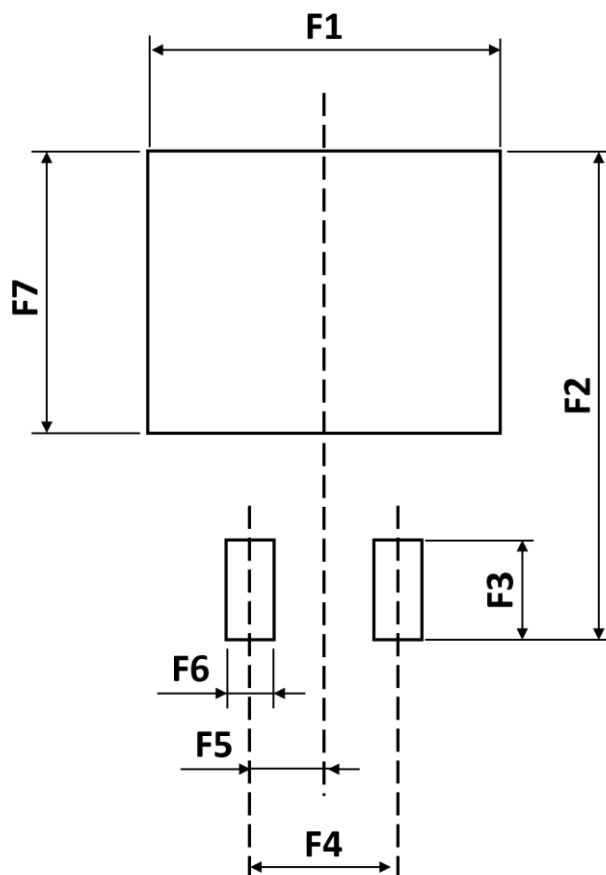
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-

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.
B2D10065F	TO-263-2L (D2PAK)	Reel	800pcs	4,000pcs	4,000pcs

RECOMMENDED PAD LAYOUT



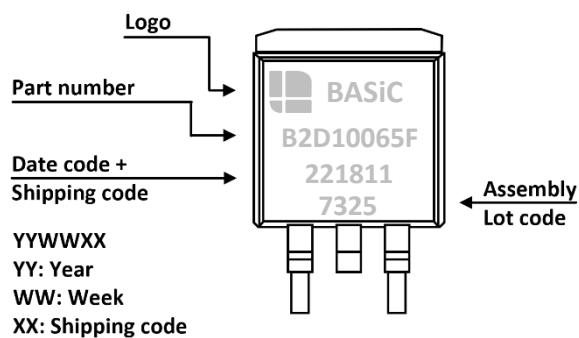
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
F1	-	12.20	-
F2	-	16.90	-
F3	-	2.54	-
F4	-	5.08	-

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

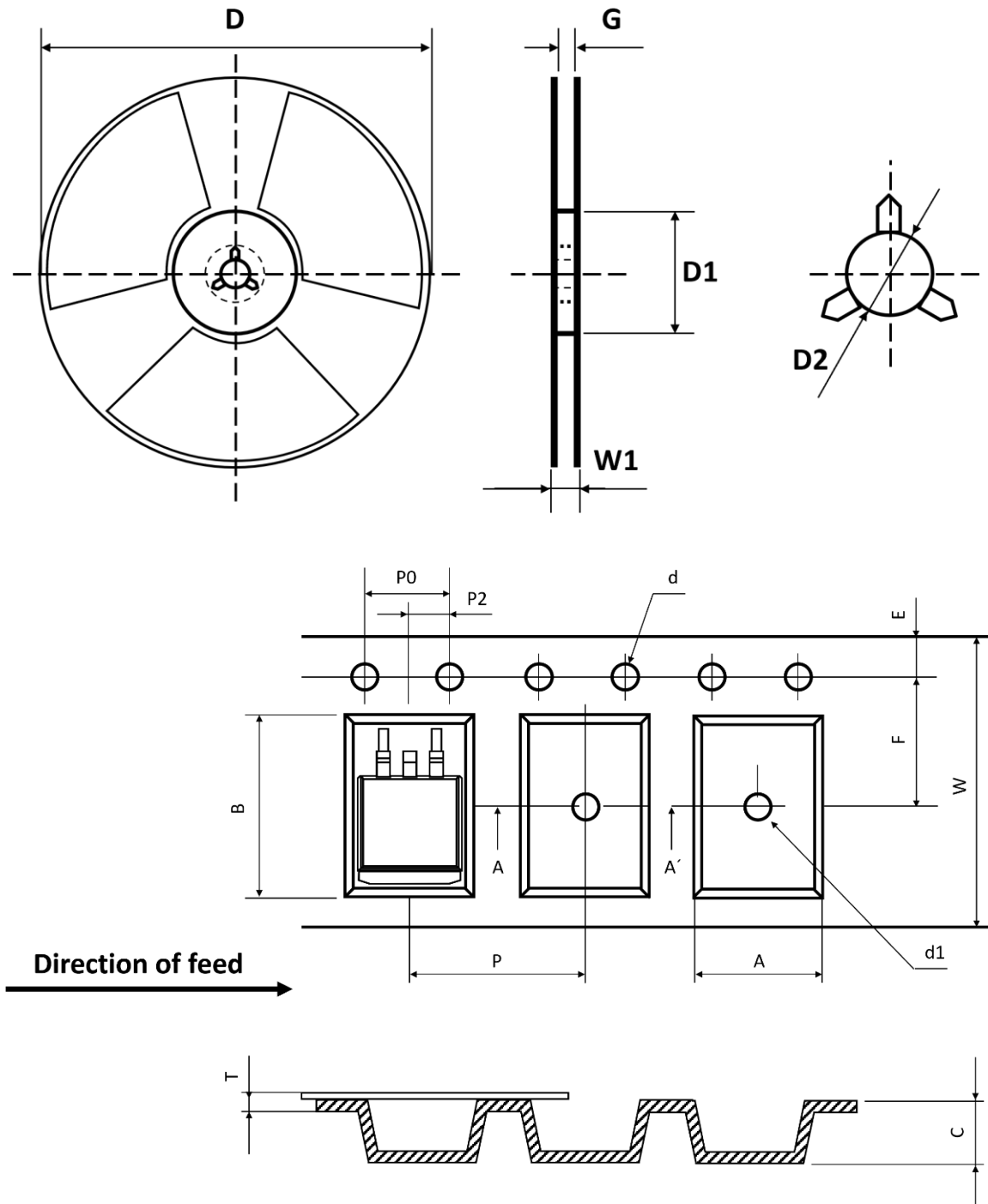
Notes:

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

PART MARKING



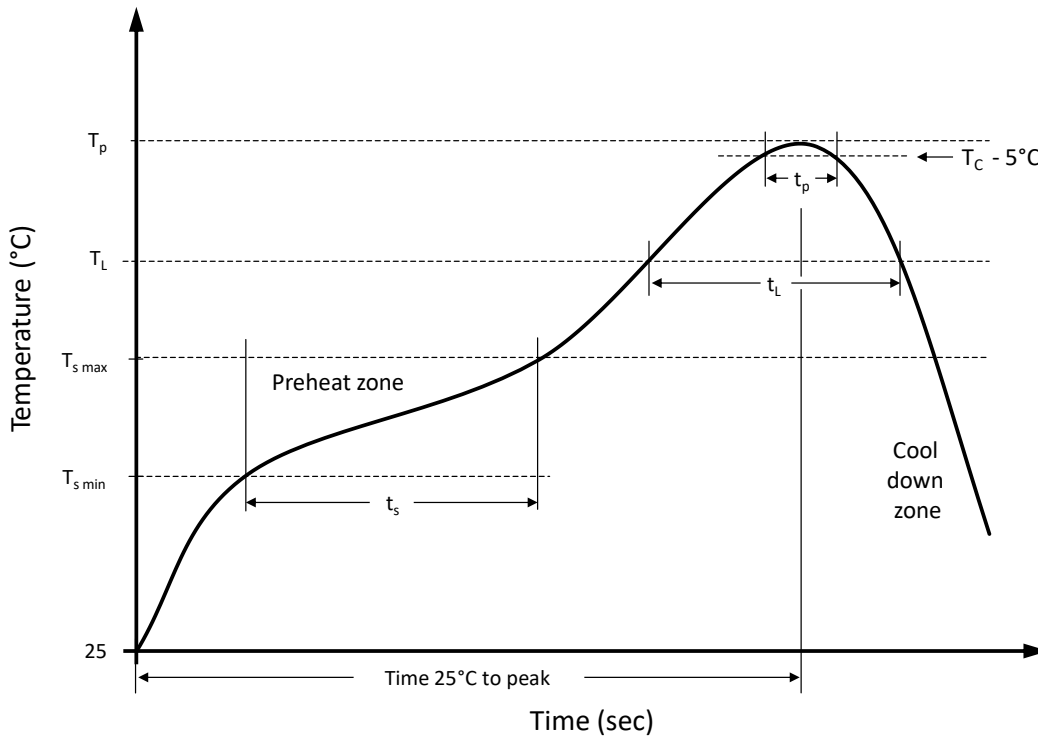
REEL AND TAPE DIMENSIONS ▲ All dimensions in mm



Package	W	A	B	C	d1	D	E	F	P	P0	T	D	D1	D2	G	W1
TO263-2L	24.00 ±0.30	10.70 ±0.10	16.30 ±0.10	5.10 ±0.10	1.50 Max.	1.50 ±0.10	1.75 ±0.10	11.50 ±0.10	16.00 ±0.10	4.00 ±0.10	0.35 ±0.10	330 ±0.30	50 Min.	13.00 ±0.50	24.40 Min.	30.40 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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