

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
100V	1.8mΩ@10V	200A



合肥矽普半导体

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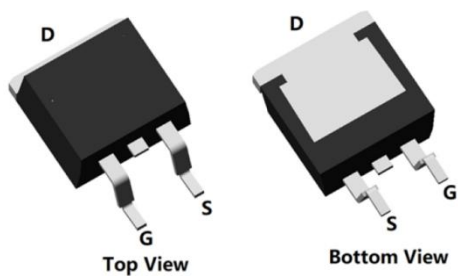
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

Applications

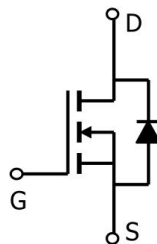
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package

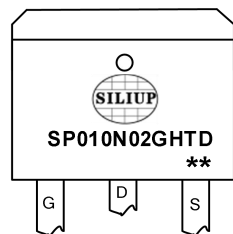


TO-263(1:G 2:D 3:S)

Circuit diagram



Marking



SP010N02GHTD
**

:Device Code
:Week Code

Order Information

Device	Package	Unit/Tape
SP010N02GHTD	TO-263	800

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Tc=25°C)	I_D	200	A
Continuous Drain Current (Tc=100°C)		133	A
Pulsed Drain Current	I_{DM}	800	A
Single Pulse Avalanche Energy ¹	E_{AS}	1560	mJ
Power Dissipation (Tc=25°C)	P_D	300	W
Power Dissipation (Tc=100°C)	P_D	120	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.41	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

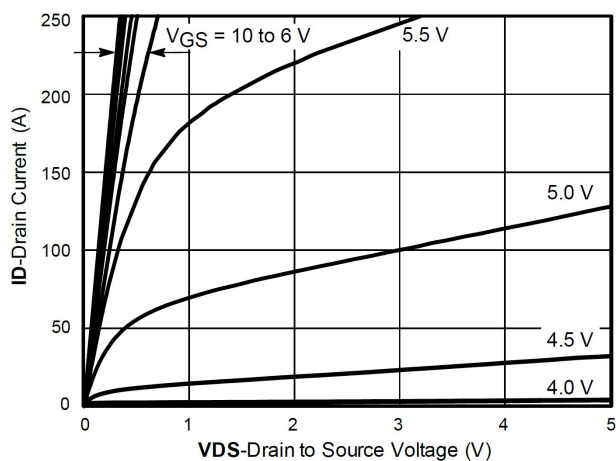
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	100	-	-	V
Drain Cut-Off Current	I _{DSS}	VDS=80V , VGS=0V , TJ=25℃	-	-	1	μA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID =250uA	2.6	3.0	3.4	V
Drain-Source ON Resistance	R _{DS(ON)}	VGS=10V , ID=20A	-	1.8	2.4	mΩ
Gate Resistance	R _G	VDS=50V , VGS=0V , f=1MHz	-	4.1	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	VDS=50V , VGS=0V , f=1MHz	-	12142	-	pF
Output Capacitance	C _{oss}		-	4588	-	
Reverse Transfer Capacitance	C _{rss}		-	48	-	
Total Gate Charge	Q _g	VDS=50V , VGS=10V , ID=125A	-	195	-	nC
Gate-Source Charge	Q _{gs}		-	48	-	
Gate-Drain Charge	Q _{gd}		-	39	-	
Gate Pleteau Vlotage	V _{plateau}		-	5	-	V
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	VDD=50V , VGS=10V , RG=1.6Ω , ID=125A	-	43	-	nS
Rise Time	t _r		-	71	-	
Turn-Off Delay Time	t _{d(off)}		-	149	-	
Fall Time	t _f		-	89	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	IS=1A , VGS=0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	200	A
Reverse Recovery Time	T _{rr}	IS=20A , di/dt=100A/us , TJ=25℃	-	136	-	nS
Reverse Recovery Charge	Q _{rr}		-	380	-	nC

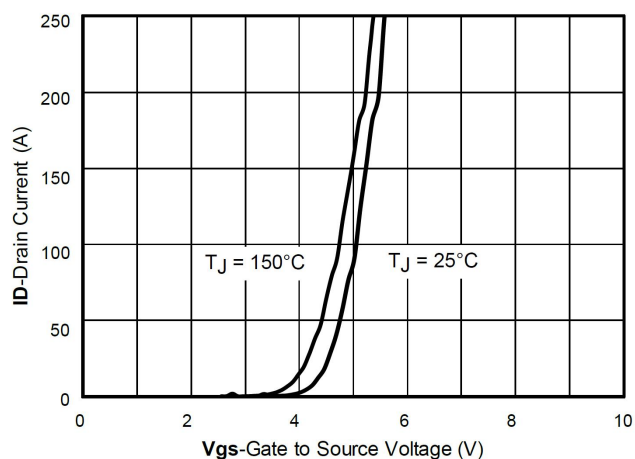
Note :

1. The test condition is $V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

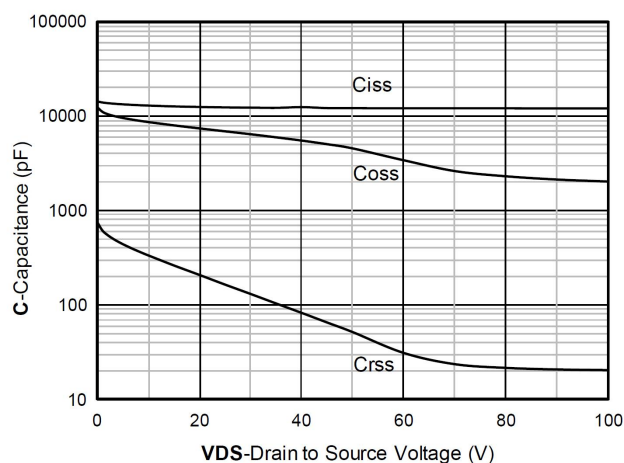
Typical Characteristics



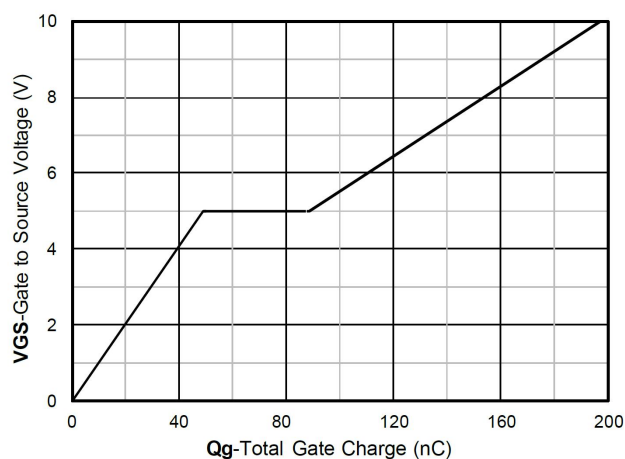
Output Characteristics



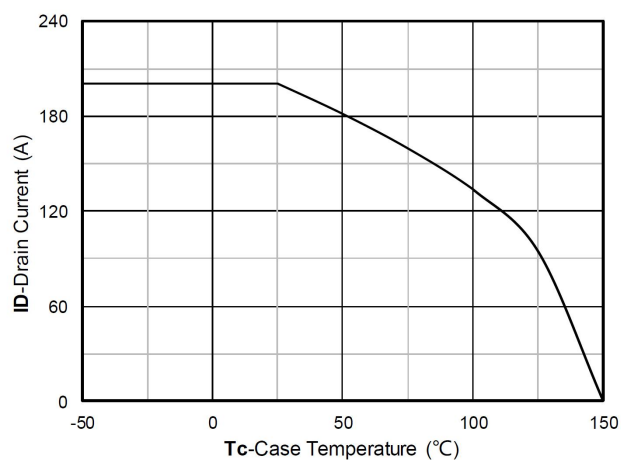
Transfer Characteristics



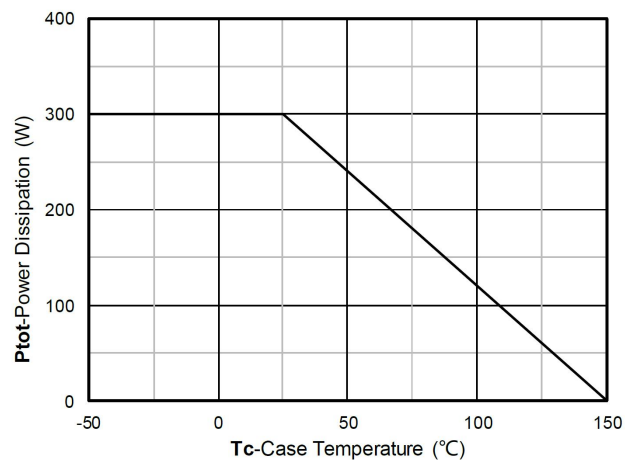
Capacitance Characteristics



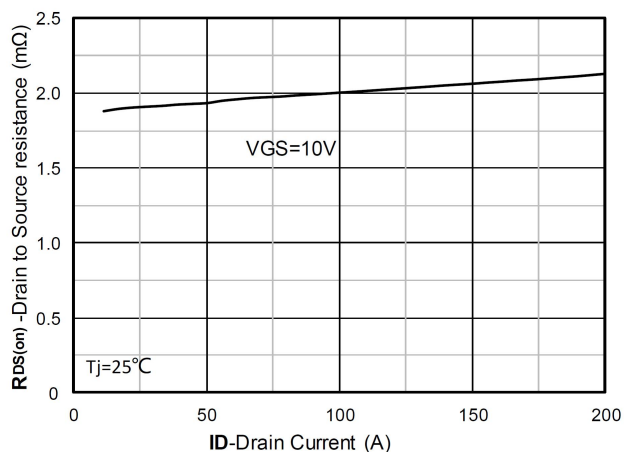
Gate Charge



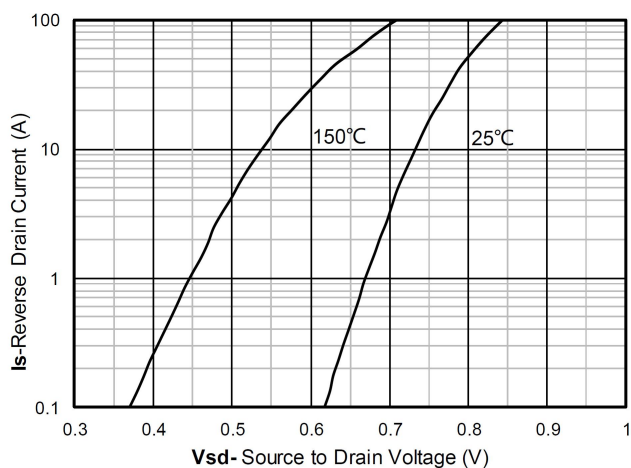
Current dissipation



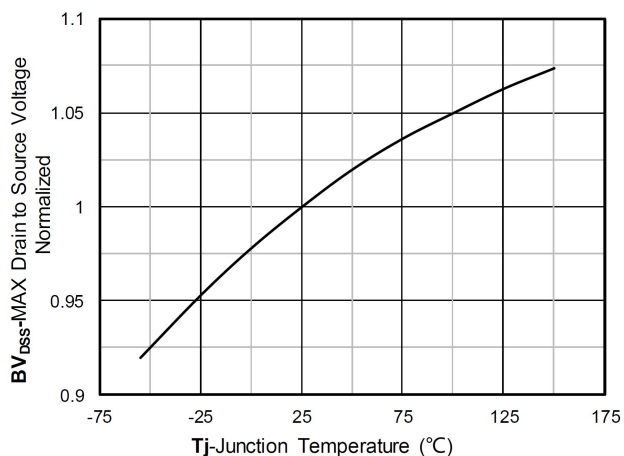
Power dissipation



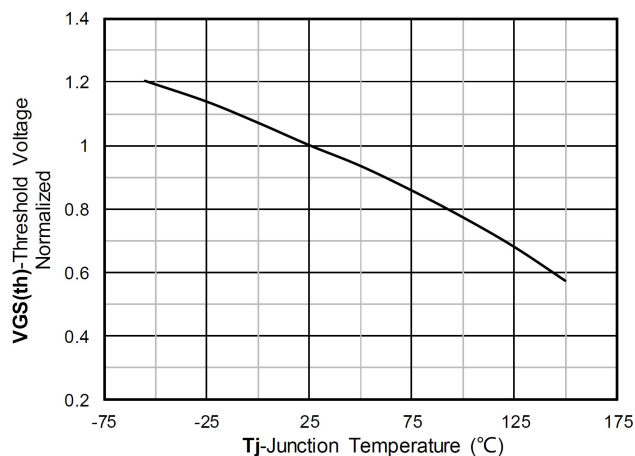
RDS(on) VS Drain Current



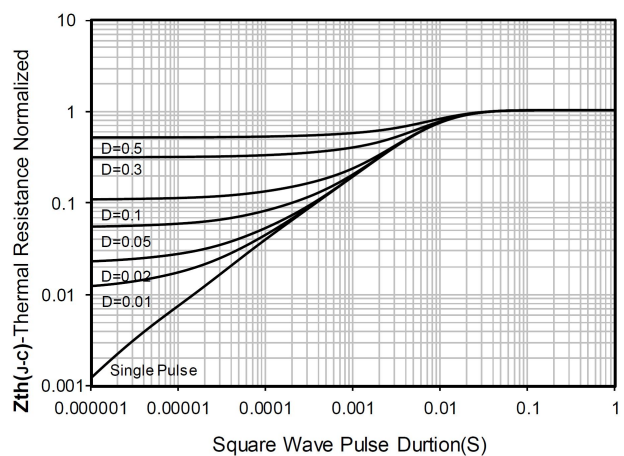
Forward characteristics of reverse diode



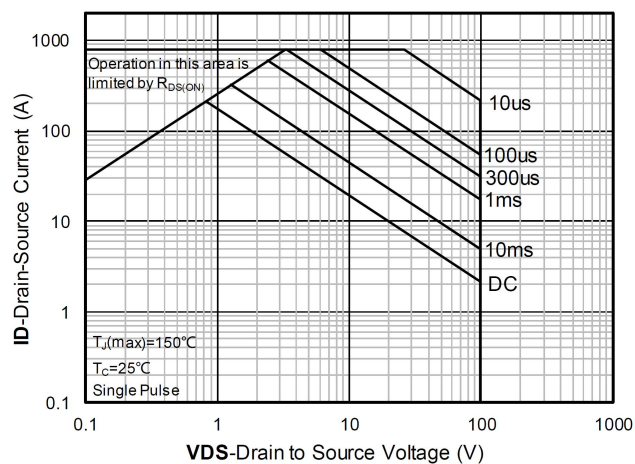
Normalized breakdown voltage



Normalized Threshold voltage



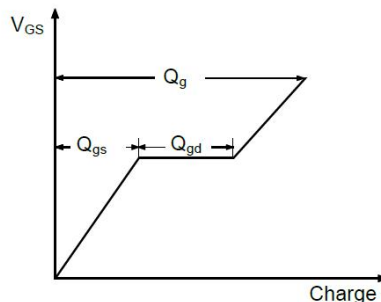
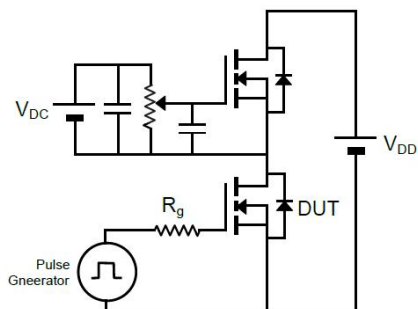
Normalized Maximum Transient Thermal Impedance



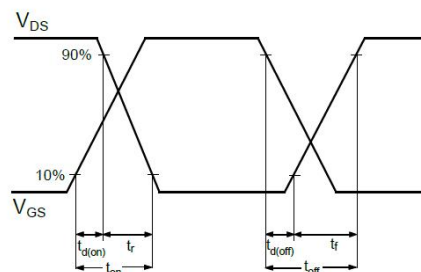
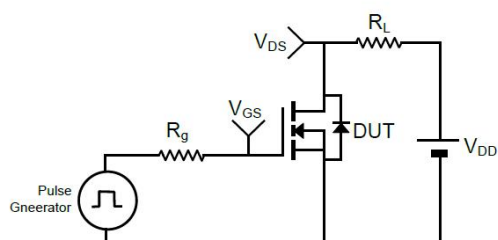
Safe Operation Area

Test Circuit

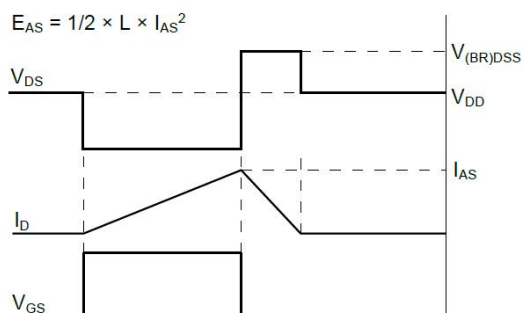
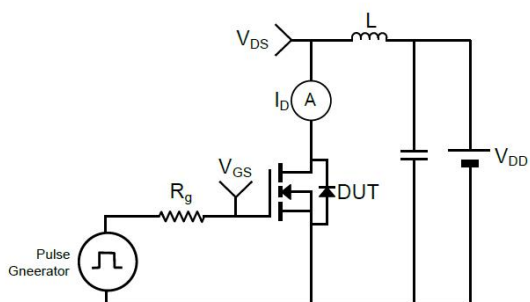
Gate Charge



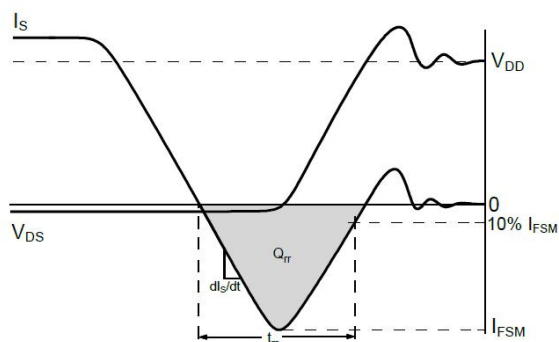
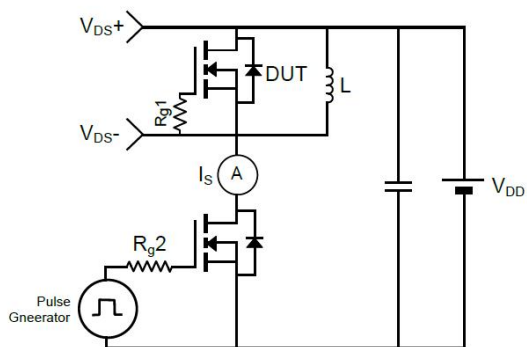
Resistive Load Switching Time



Un-clamped Inductive Load Switching

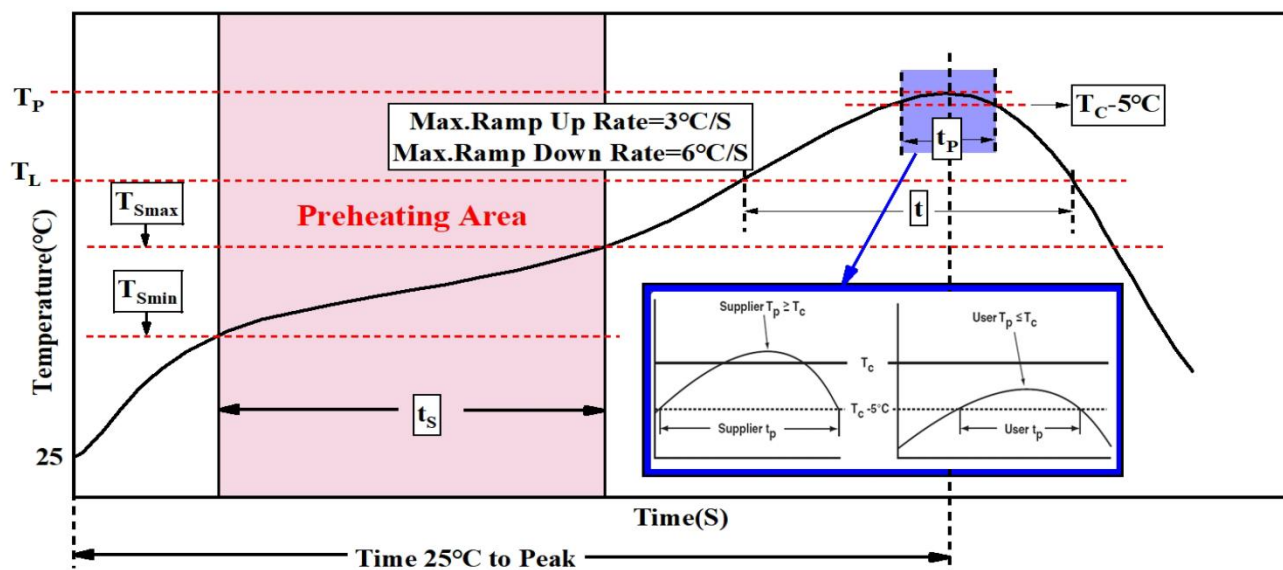


Drain-Source Body Diode Reverse Recovery





Temperature Profile for IR Reflow Soldering



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{Smin})	100°C	150°C
Temperature max (T_{Smax})	150°C	200°C
Time (T_{Smin} to T_{Smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T_{Smax} to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L)	183 °C	217°C
Time at liquidous (t_L)	60-150 seconds	60-150 seconds
Peak package body Temperature e (T_P)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_P)** within 5°C of the specified classification temperature (T_C)	20** seconds	30** seconds
Average ramp-down rate (T_P to T_{Smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T_P) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_P) is defined as a supplier minimum and a user maximum		

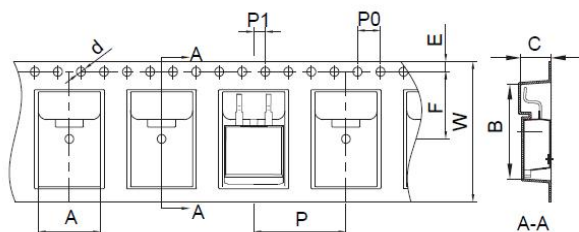
Table 1. SnPb Eutectic Process – Classification Temperatures (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

TO-263 Reel Information

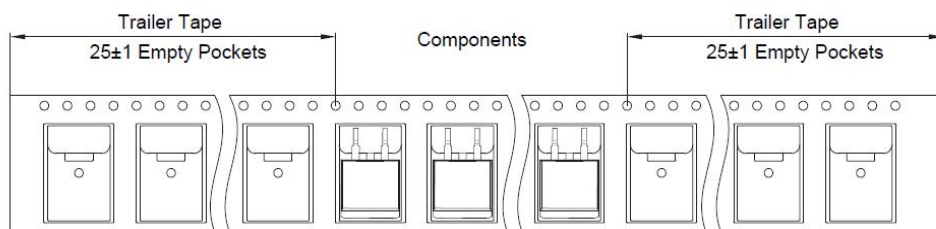


Packaging Description:

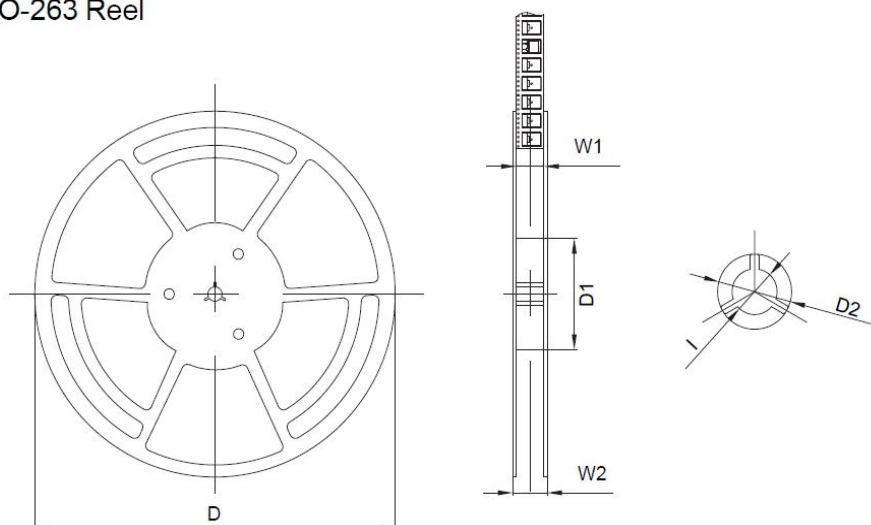
TO-263 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Hear Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 800 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-263	10.80	16.13	5.21	Φ1.55	1.75	11.50	4.00	16.00	2.00	24.00

TO-263 Tape Leader and Trailer



TO-263 Reel

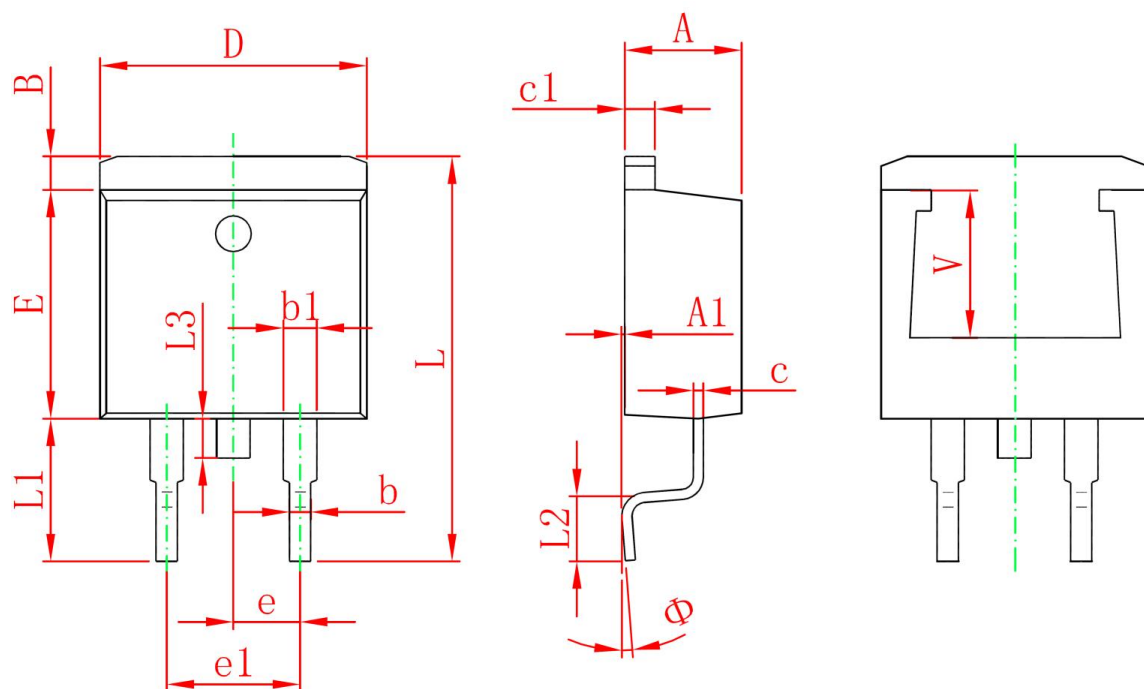


Dimensions are in millimeter						
Reel	D	D1	D2	W1	W2	I
13" Dia	330.00	100.00	Φ21.00	24.40	30.40	Φ13.00

Reel	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)
800 pcs	13 inch	1600 pcs	360×360×65	8000 pcs	378×358×382



TO-263 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220 REF.	