

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-100V	36mΩ@-10V	-25A
	51mΩ@-4.5V	



合肥矽普半导体

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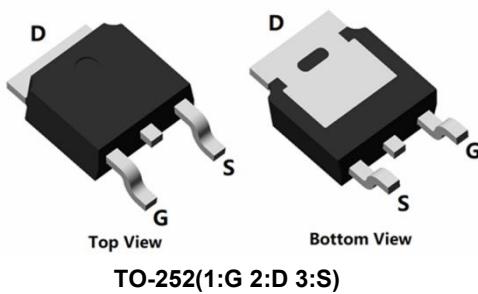
Feature

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

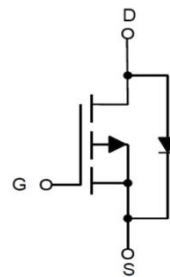
Applications

- Power switching application
- Battery management
- Uninterruptible power supply

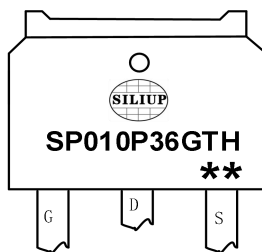
Package



Circuit diagram



Marking



SP010P36GTH : Product code
** : Week code

Order Information

Device	Package	Unit/Tube
SP010P36GTH	TO-252	2500

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	-25	A
Continuous Drain Current (Tc=100°C)	I _D	-17	A
Pulsed Drain Current	I _{DM}	-100	A
Single Pulse Avalanche Energy ¹	E _{AS}	196	mJ
Power Dissipation (Tc=25°C)	P _D	95	W
Power Dissipation (Tc=100°C)	P _D	38	W
Thermal Resistance Junction-to-Case	R _{θJC}	1.32	°C/W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C

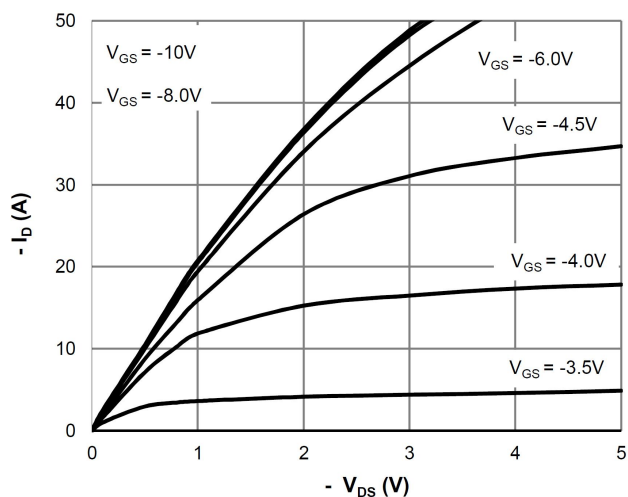
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	ID=-250μA , VGS=0V	-100	-	-	V
Drain Cut-Off Current	I _{DSS}	VDS=-80V , VGS=0V	-	-	-1	uA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID=-250uA	-1.5	-2.0	-2.5	V
Drain-Source ON Resistance	R _{DS(ON)}	VGS=-10V , ID=-15A	-	36	45	mΩ
		VGS=-4.5V , ID=-10A	-	51	68	
Gate Resistance	R _G	VDS=-50V , VGS=0V , f=1MHz	-	10.2	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	VDS=-50V , VGS=-10V , f=1.0MHz	-	1193	-	pF
Output Capacitance	C _{oss}		-	256	-	
Reverse Transfer Capacitance	C _{rss}		-	15	-	
Total Gate Charge	Q _g	VDS=-50V , VGS=-10V , ID=20A	-	20	-	nC
Gate-Source Charge	Q _{gs}		-	6.4	-	
Gate-Drain Charge	Q _{gd}		-	3.2	-	
Gate Plateau Voltage	V _{plateau}		-	-4.3	-	V
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	VGS=-10V , VDD=-50V , ID=-5A , RG=6Ω	-	10.8	-	nS
Rise Time	t _r		-	54	-	
Turn-Off Delay Time	t _{d(off)}		-	48	-	
Fall Time	t _f		-	80	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	-25	A
Reverse Recovery Time	T _{rr}	IS=-15A, di/dt=-100A/us, TJ=25℃	-	50	-	nS
Reverse Recovery Charge	Q _{rr}		-	130	-	nC

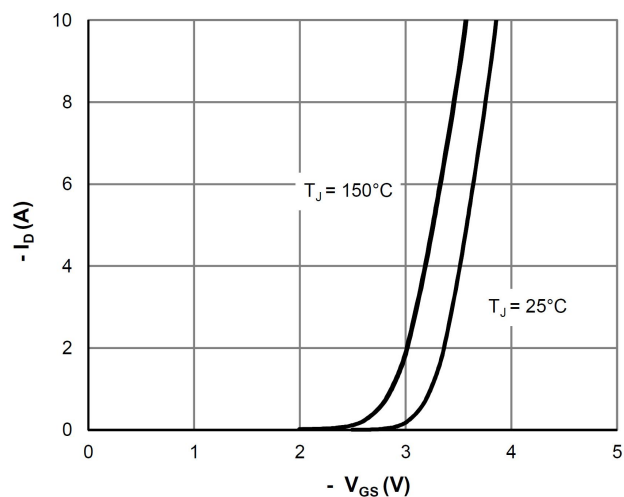
Note:

- The EAS test condition is VDD=-50V,VGS=-10V,L=0.5mH,RG=25Ω

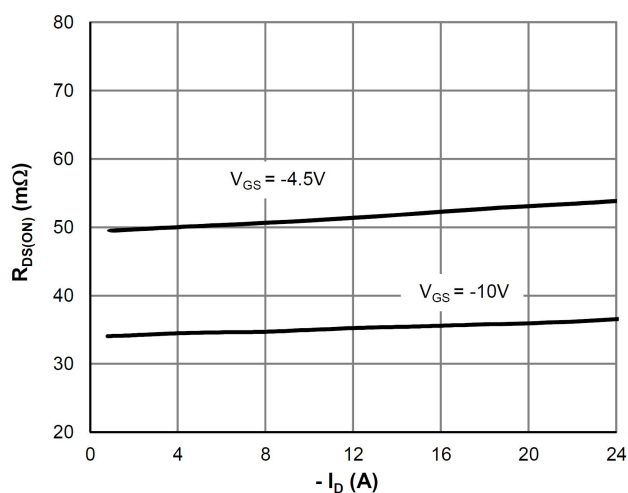
Typical Characteristics



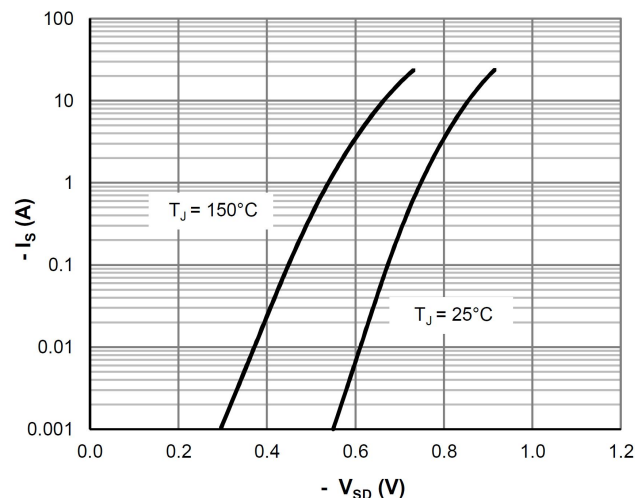
Saturation Characteristics



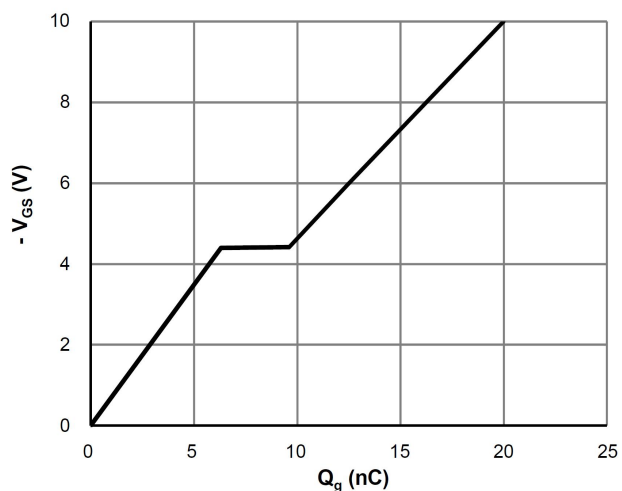
Transfer Characteristics



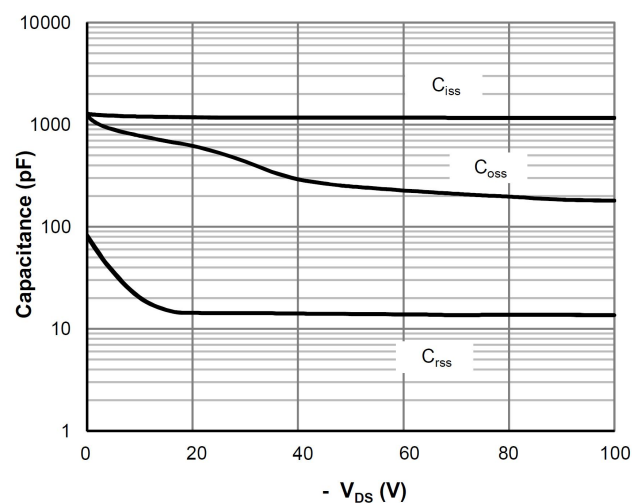
$R_{DS(ON)}$ vs. Drain Current



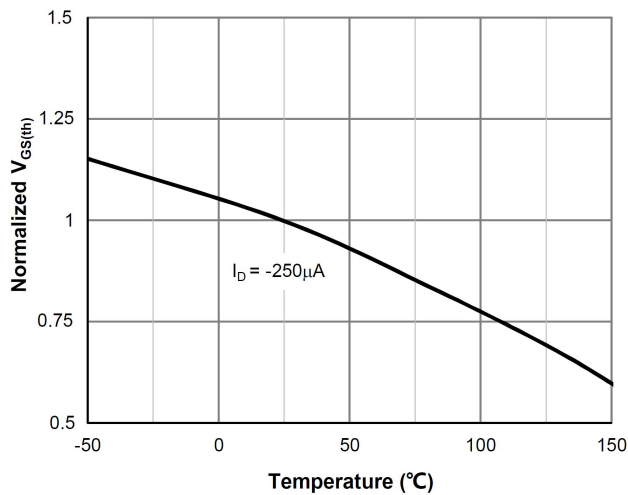
Body-Diode Characteristics



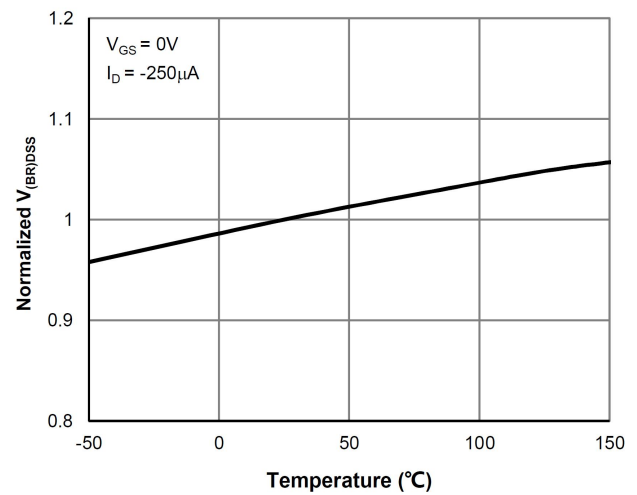
Gate Charge



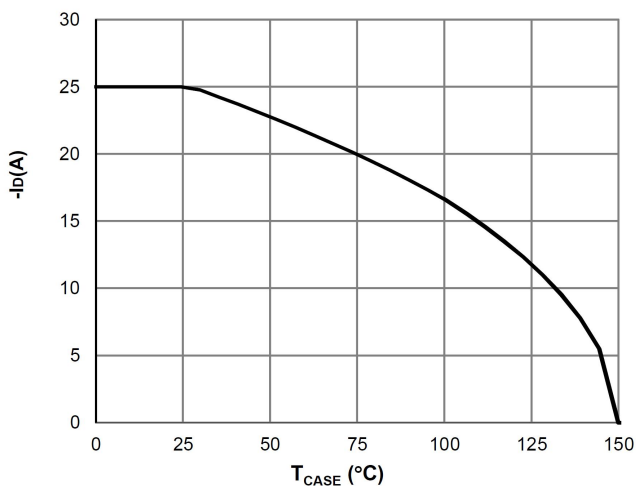
Capacitance Characteristics



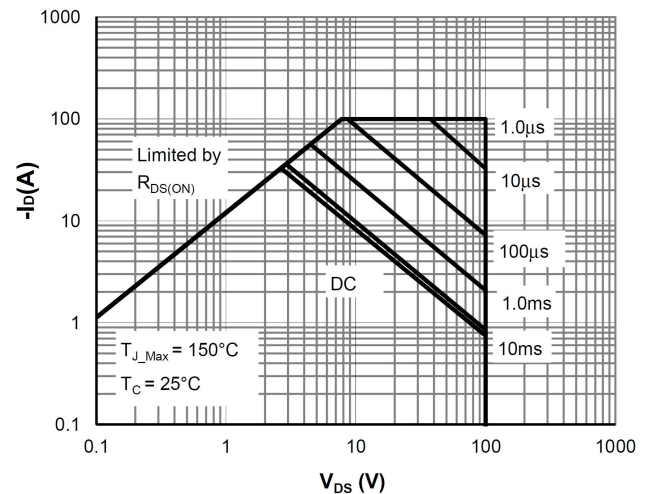
Normalized $V_{GS(th)}$ vs. Junction Temperature



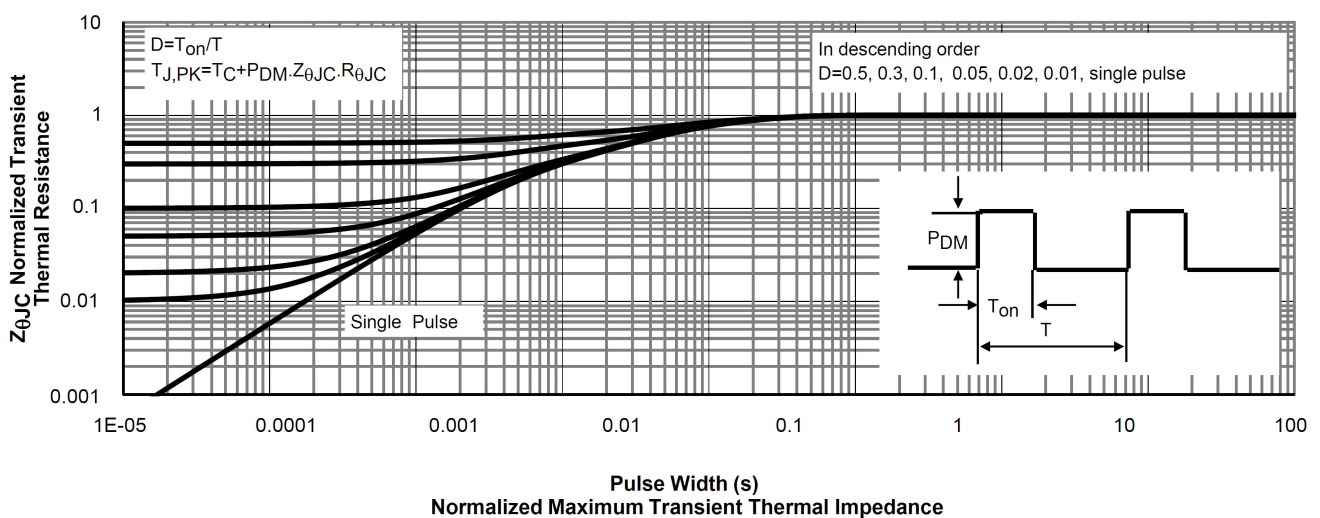
Normalized $V_{BR(DSS)}$ vs. Junction Temperature



Current De-rating

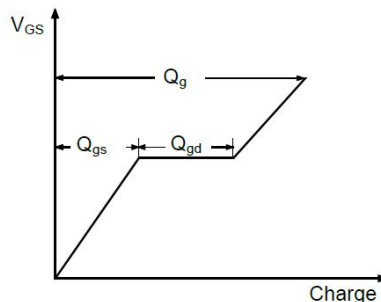
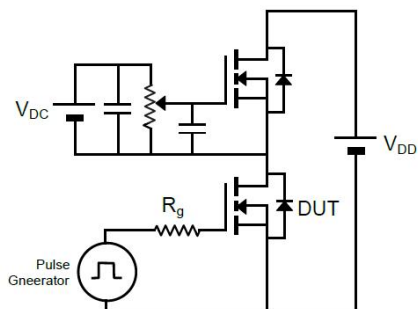


Maximum Safe Operating Area

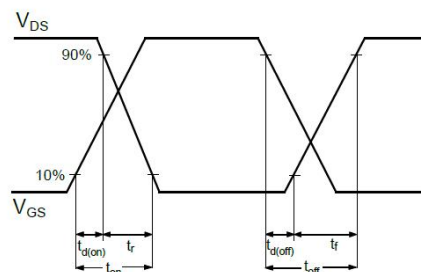
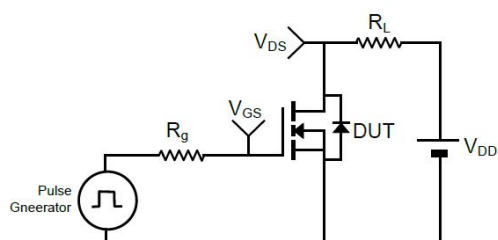


Test Circuit

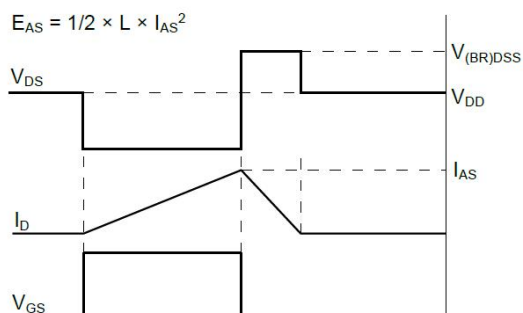
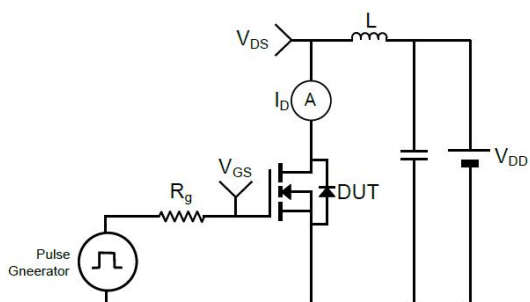
Gate Charge



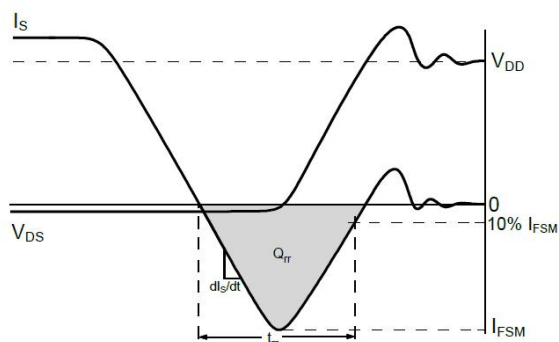
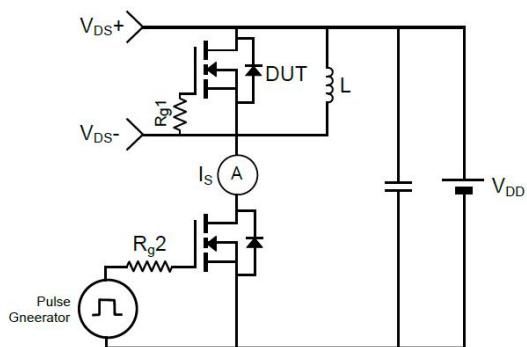
Resistive Load Switching Time



Un-clamped Inductive Load Switching

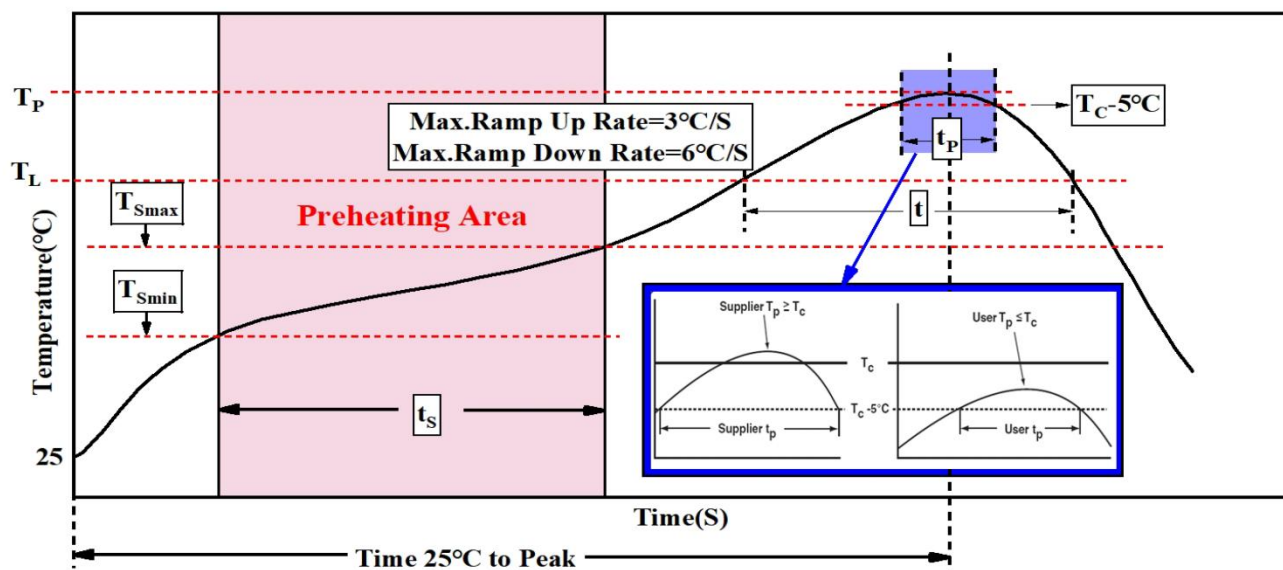


Drain-Source Body Diode Reverse Recovery





Temperature Profile for IR Reflow Soldering



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T _{min})	100°C	150°C
Temperature max (T _{max})	150°C	200°C
Time (T _{min} to T _{max}) (t _s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T _{max} 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 _{max})	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)

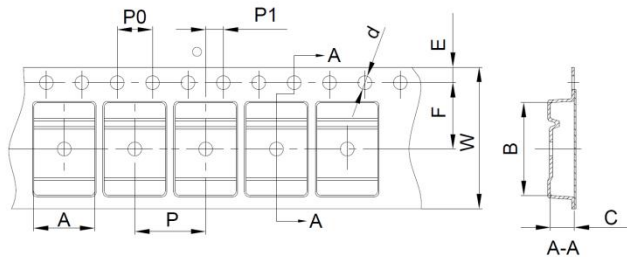
Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

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-252 Embossed Carrier Tape

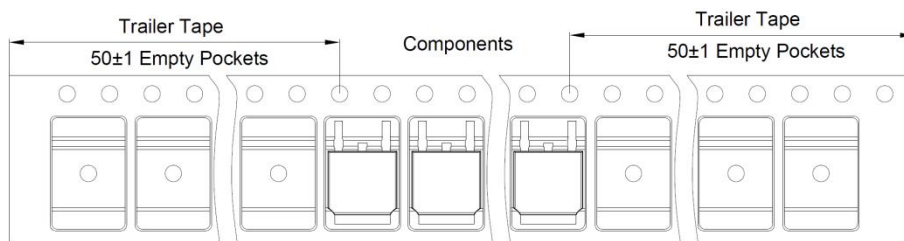


Packaging Description:

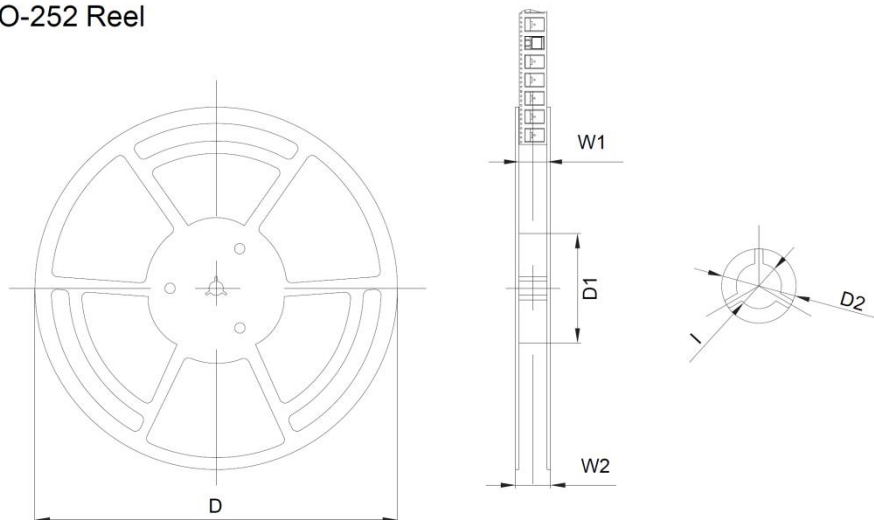
TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Hear Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2500 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-252	6.90	10.50	2.70	Φ1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252 Tape Leader and Trailer



TO-252 Reel

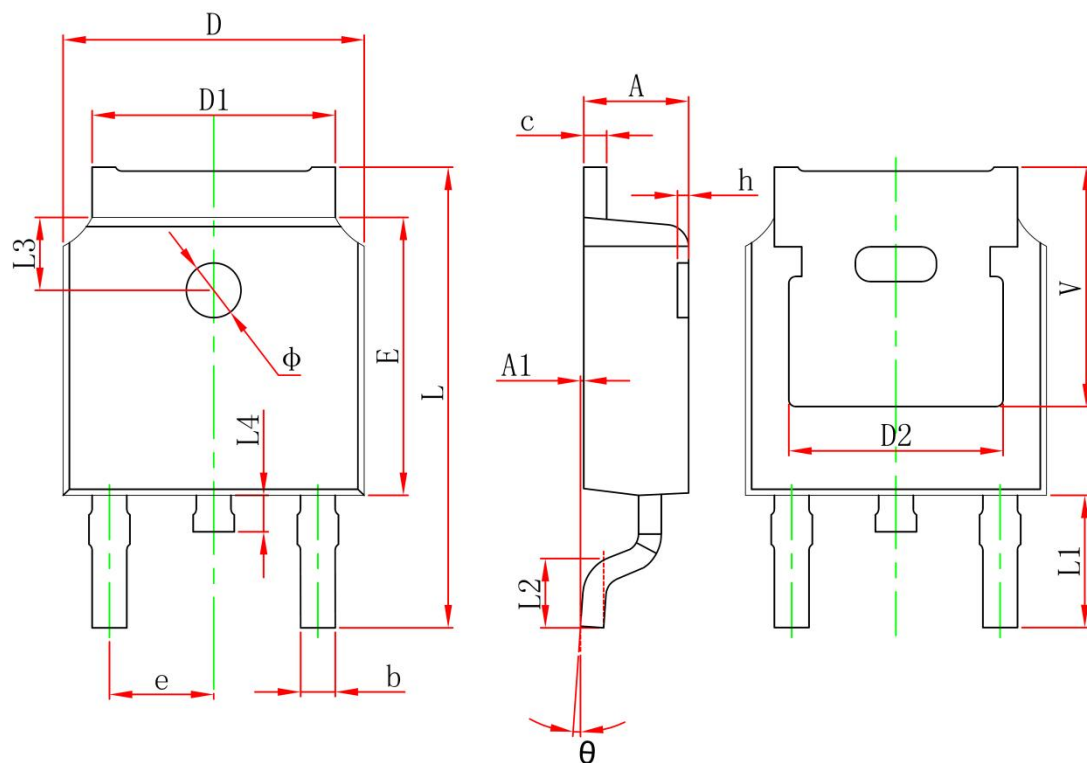


Dimensions are in millimeter						
Reel	D	D1	D2	W1	W2	I
13" Dia	330.00	100.00	Φ21.00	16.40	21.40	Φ13.00

Reel	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)
2500 pcs	13 inch	5000 pcs	360×360×65	25000 pcs	378×358×382



TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
ϕ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	