



MT1911P

100V P-Channel MOSFET

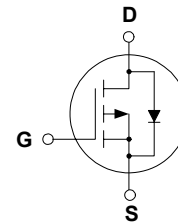
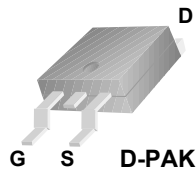
General Description

These P-Channel enhancement mode power field effect transistors are produced using Mos-tech's proprietary, planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

Features

- -9.4A, -100V, $R_{DS(on)} = 0.15\Omega$ @ $V_{GS} = -10V$
- Low gate charge (typical 21 nC)
- Low C_{rss} (typical 65 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- 100% RG tested
- RoHS Compliant



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	-100	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	-9.4	A
	- Continuous ($T_C = 100^\circ\text{C}$)	-6.0	A
I_{DM}	Drain Current - Pulsed (Note 1)	-37.6	A
V_{GSS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	370	mJ
I_{AR}	Avalanche Current (Note 1)	-9.4	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	5.0	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	-6.0	V/ns
P_D	Power Dissipation ($T_A = 25^\circ\text{C}$) *	2.5	W
	Power Dissipation ($T_C = 25^\circ\text{C}$)	50	W
	- Derate above 25°C	0.4	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	2.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient *	--	50	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	110	$^\circ\text{C/W}$

* When mounted on the minimum pad size recommended (PCB Mount)

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-100	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = -250\text{ }\mu\text{A}$, Referenced to 25°C	--	-0.1	--	V/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}$	--	--	-1	μA
		$V_{DS} = -80\text{ V}, T_C = 125^\circ\text{C}$	--	--	-10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-2.0	--	-4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}, I_D = -4.7\text{ A}$	--	0.15	0.19	Ω
g_{FS}	Forward Transconductance	$V_{DS} = -40\text{ V}, I_D = -4.7\text{ A}$ (Note 4)	--	6.3	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	620	800	pF
C_{oss}	Output Capacitance		--	220	290	pF
C_{rss}	Reverse Transfer Capacitance		--	65	85	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -50\text{ V}, I_D = -11.5\text{ A},$ $R_G = 25\text{ }\Omega$ (Note 4, 5)	--	15	40	ns
t_r	Turn-On Rise Time		--	160	330	ns
$t_{d(off)}$	Turn-Off Delay Time		--	35	80	ns
t_f	Turn-Off Fall Time		--	60	130	ns
Q_g	Total Gate Charge	$V_{DS} = -80\text{ V}, I_D = -11.5\text{ A},$ $V_{GS} = -10\text{ V}$ (Note 4, 5)	--	21	27	nC
Q_{gs}	Gate-Source Charge		--	4.6	--	nC
Q_{gd}	Gate-Drain Charge		--	11.5	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	-9.4	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	-37.6	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = -9.4 A	--	--	-4.0	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = -11.5 A, dI _F / dt = 100 A/μs (Note 4)	--	110	--	ns
Q _{rr}	Reverse Recovery Charge		--	0.47	--	μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 6.3\text{ mH}, I_{AS} = -9.4\text{ A}, V_{DD} = -25\text{ V}, R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq -11.5\text{ A}, dI/dt \leq 300\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

Typical Characteristics

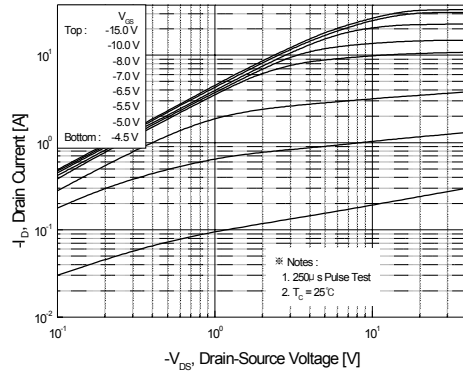


Figure 1. On-Region Characteristics

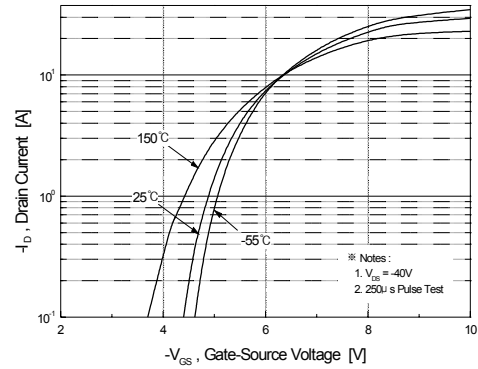


Figure 2. Transfer Characteristics

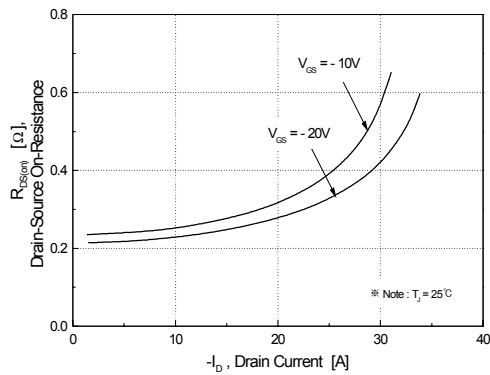


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

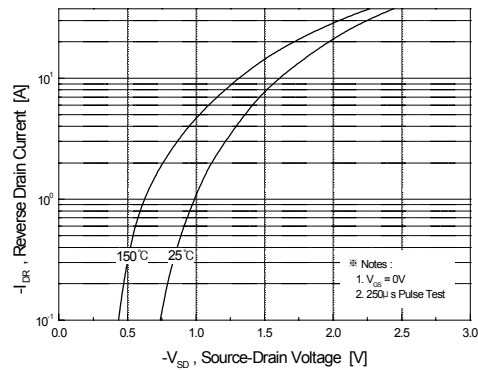


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

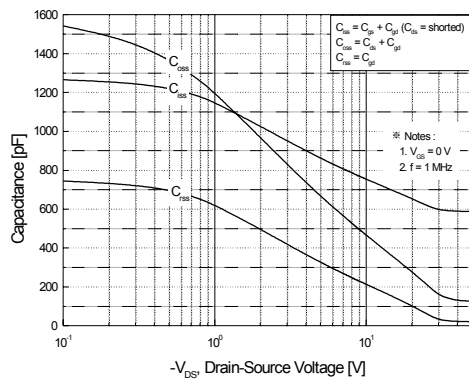


Figure 5. Capacitance Characteristics

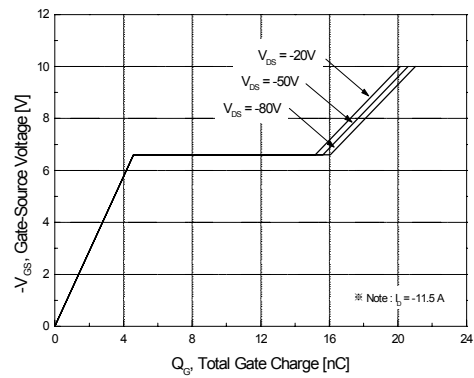


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

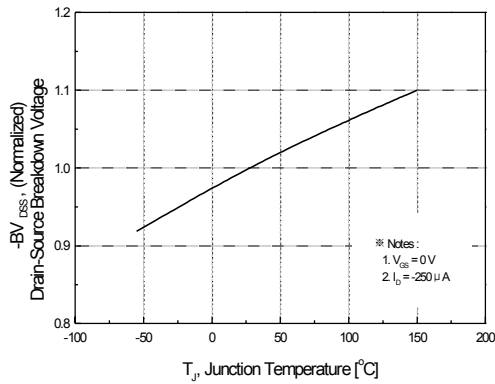


Figure 7. Breakdown Voltage Variation vs. Temperature

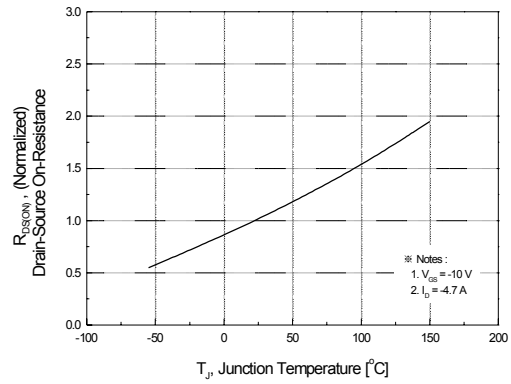


Figure 8. On-Resistance Variation vs. Temperature

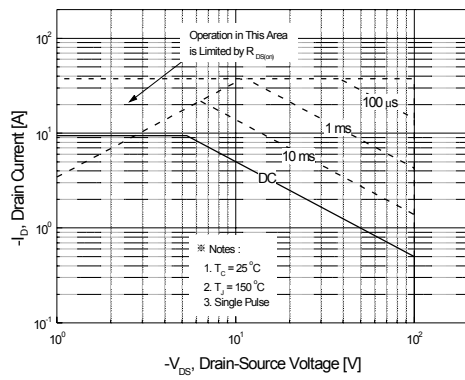


Figure 9. Maximum Safe Operating Area

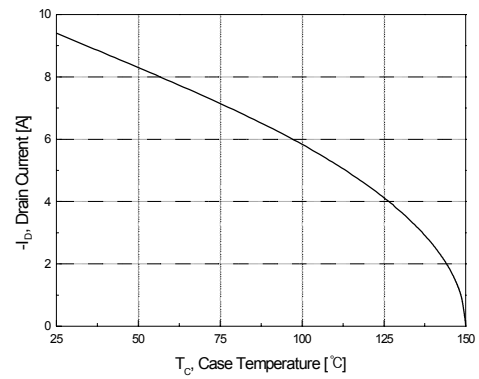


Figure 10. Maximum Drain Current vs. Case Temperature

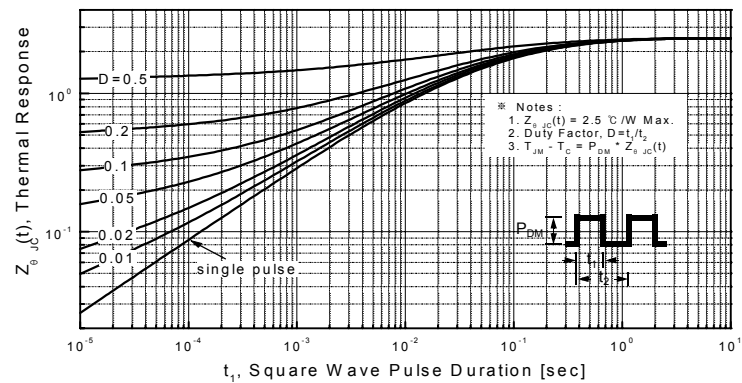
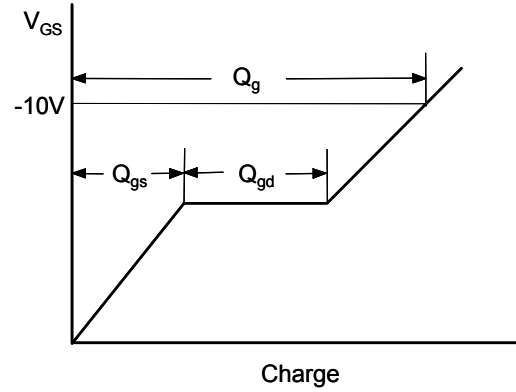
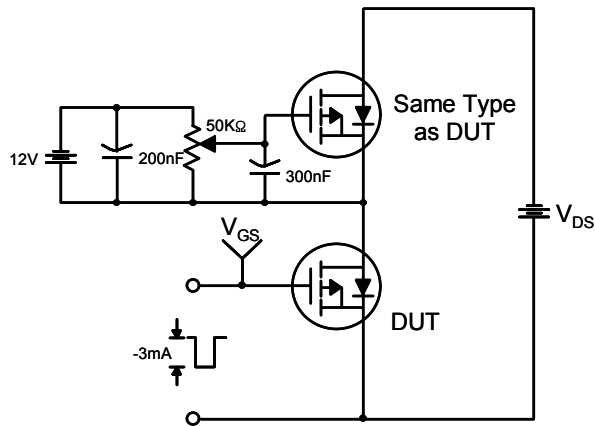
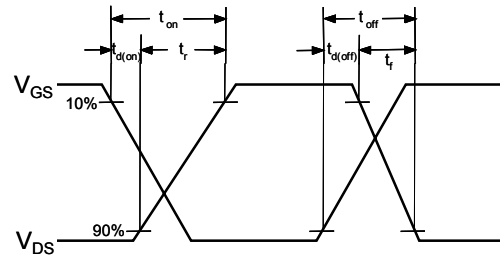
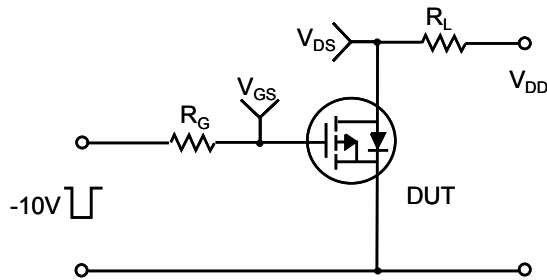


Figure 11. Transient Thermal Response Curve

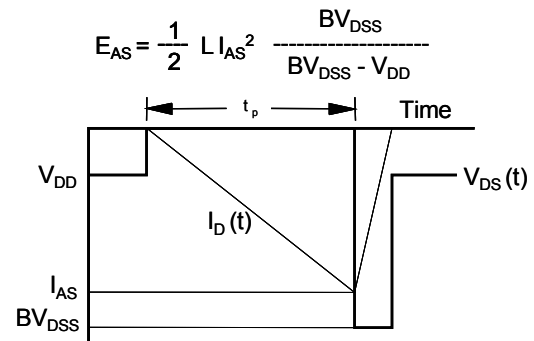
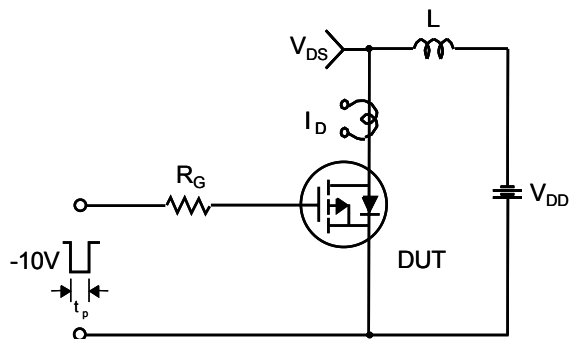
Gate Charge Test Circuit & Waveform



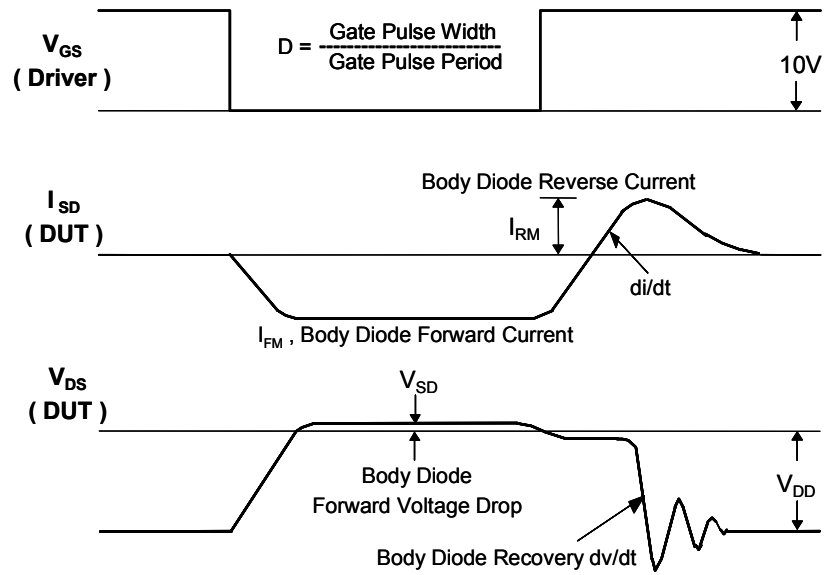
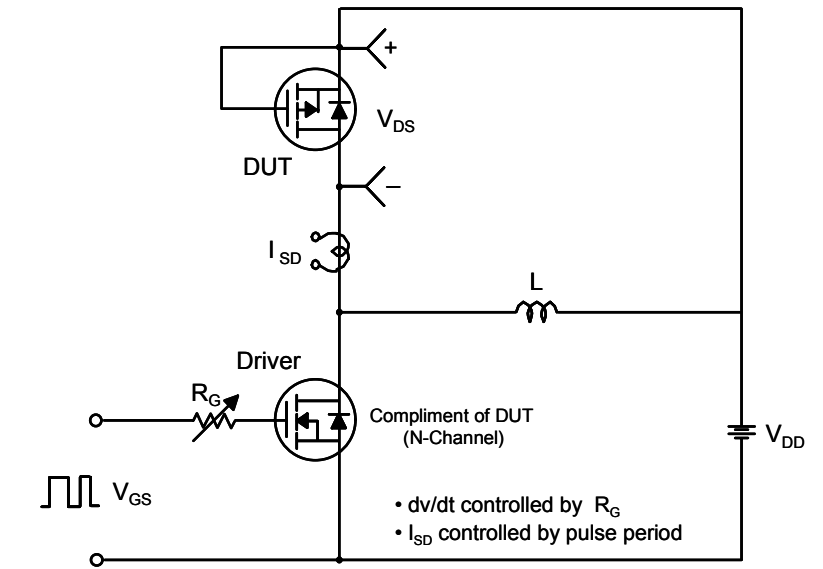
Resistive Switching Test Circuit & Waveforms



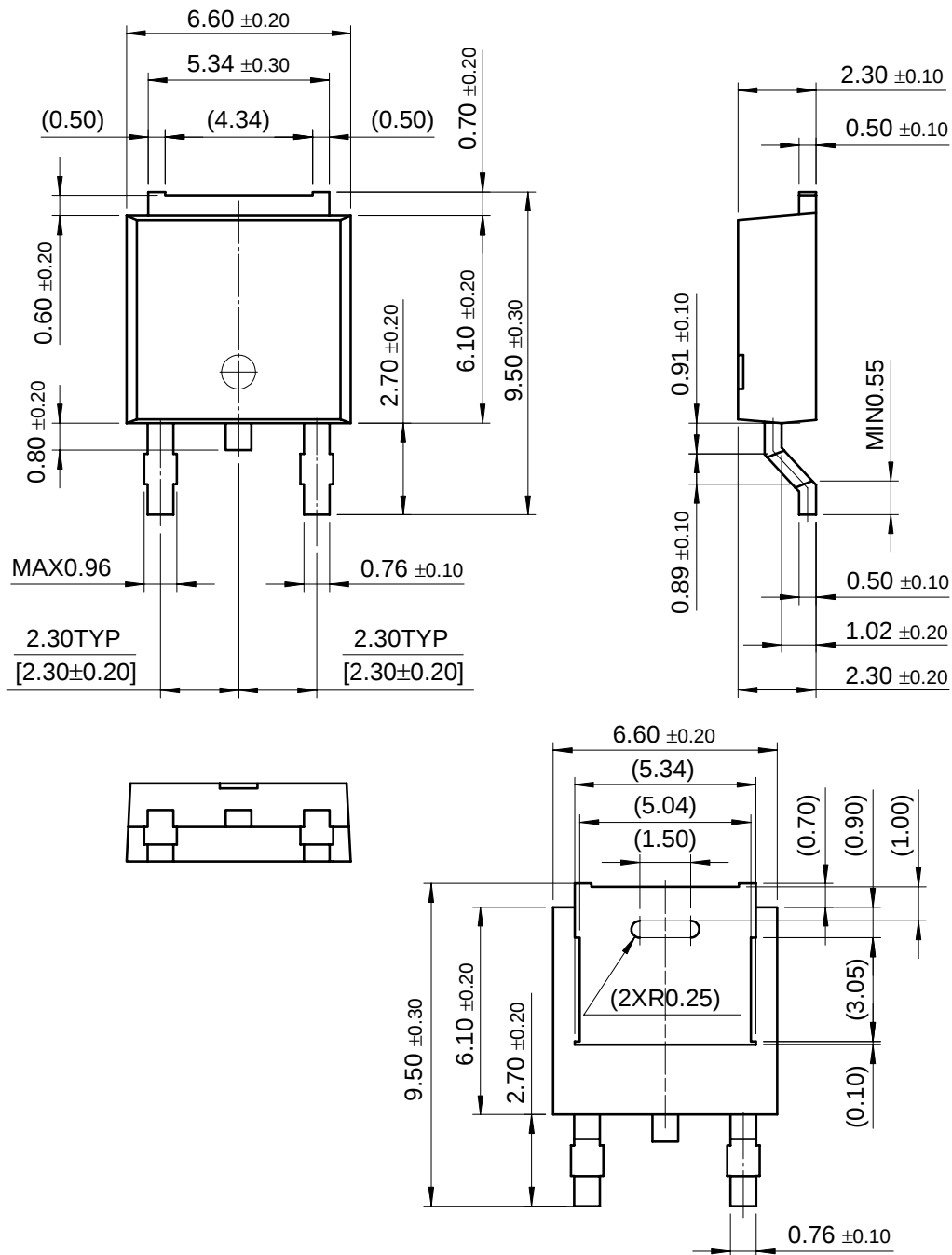
Unclamped Inductive Switching Test Circuit & Waveforms



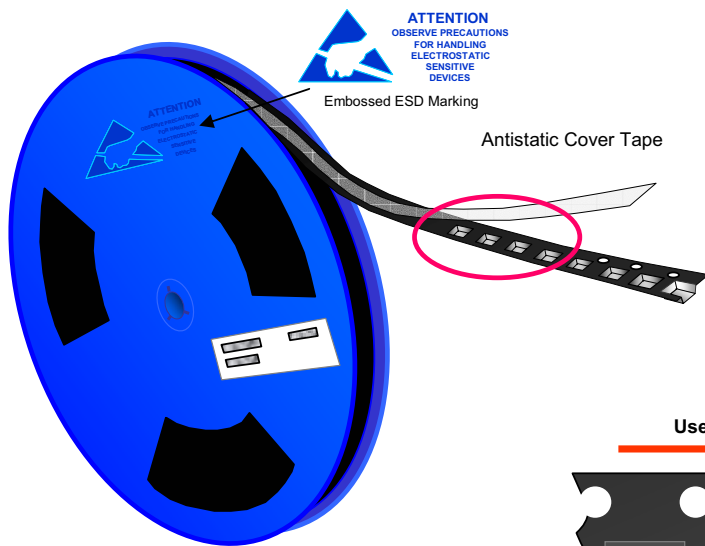
Peak Diode Recovery dv/dt Test Circuit & Waveforms



D-PAK



Dimensions in Millimeters



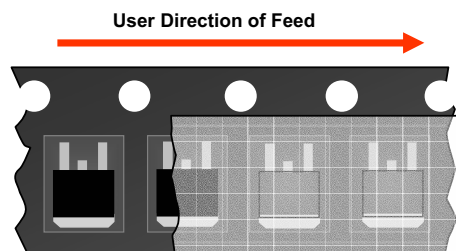
Packaging Description:

TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multi-layered film which comes either in HAA (Heat Activated Adhesive) or PSA (Pressure Sensitive Adhesive). HAA is primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. PSA is composed of transparent polyester backing film, pressure sensitive synthetic polymer (adhesive), and metallized transparent conductive polyester film on the inner face.

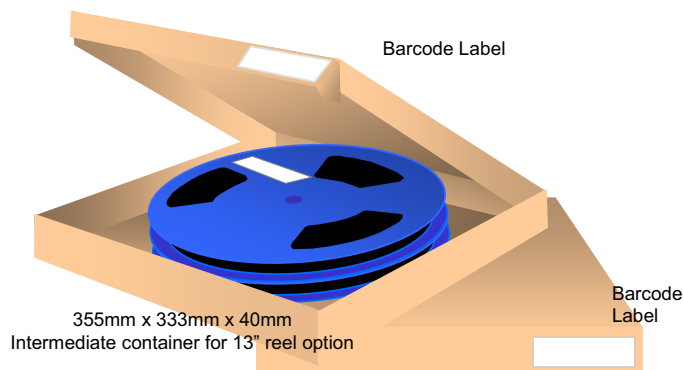
These reeled parts in standard option are shipped with 2500 units per 13" or 330mm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). This and some other options are further described in the Packaging Information table.

These full reels are individually barcode labeled and placed inside a standard intermediate box (illustrated in figure 1.0) made of recyclable corrugated brown paper. One box contains two reels maximum. And these boxes are placed inside a barcode labeled shipping box which comes in different sizes depending on the number of parts shipped.

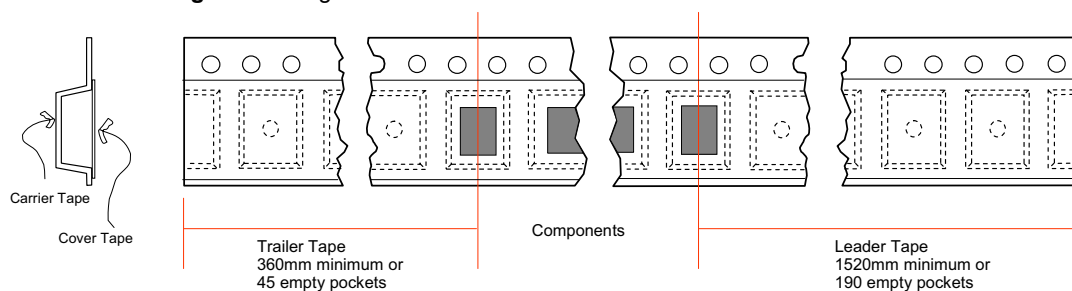
D-PAK (TO-252) Packaging Information		
Packaging Option	Standard (no flow code)	L86Z
Packaging type	TNR	Tube
Qty per Reel/Tube/Bag	2,500	75
Reel Size	13" Dia	-
Box Dimension (mm)	355x333x40	-
Max qty per Box	5,000	-
Weight per unit (gm)	0.300	0.300
Weight per Reel(kg)	1.200	-
Note/Comments		



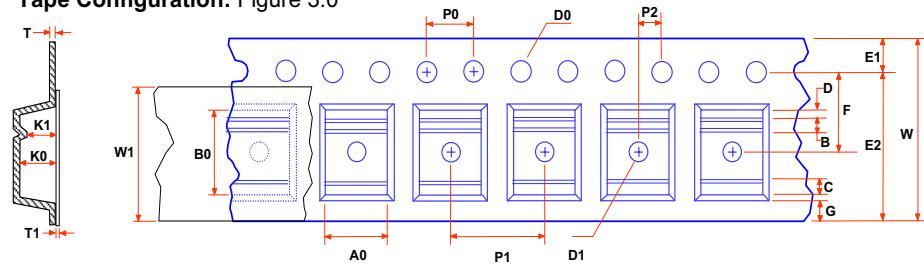
D-PAK (TO-252) Unit Orientation



TO-252 (D-PAK) Tape Leader and Trailer Configuration: Figure 2.0



TO-252 (D-PAK) Embossed Carrier
Tape Configuration: Figure 3.0

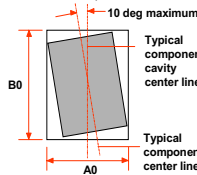


Dimensions are in millimeter																				
Pkg type	A0	B0	B	C	D	W	D0	D1	E1	E2	F	P1	P2	P0	K0	K1	T	G	W1	T1
TO252 DPAK (16mm)	6.90 +/- 0.10	10.50 +/- 0.10	1.20 +/- 0.10	2.0 +/- 0.10	3.0 +/- 0.30	16.0 +/- 0.30	1.55 ± 0.05	1.60 +/- 0.10	1.75 ± 0.10	14.25 min	7.50 +/- 0.10	8.0 +/- 0.10	2.00 ± 0.10	4.00 ± 0.10	2.65 +/- 0.15	1.75 +/- 0.15	0.63 max	0.75 min	13.10 +/- 0.30	0.06 ± 0.02

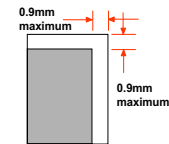
Notes: A0, B0, and K0 dimensions are determined with respect to the IEC/EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)
Component Rotation

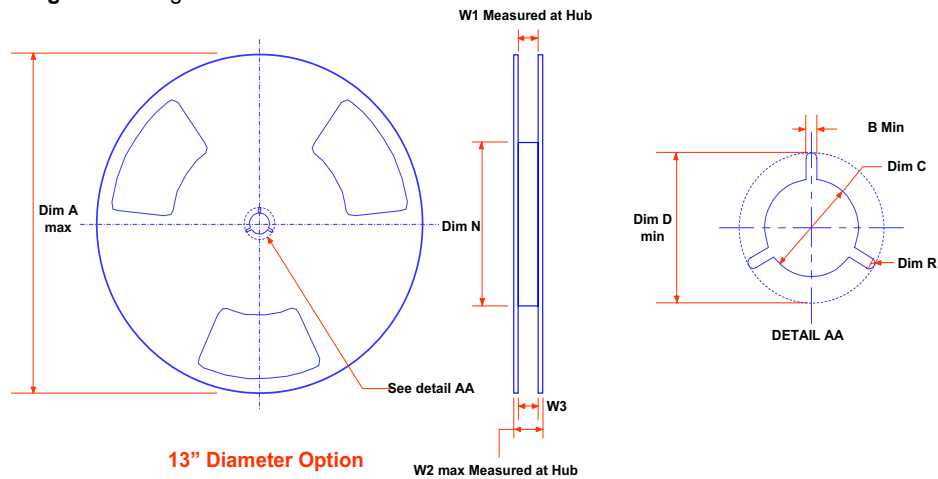


Sketch B (Top View)
Component Rotation



Sketch C (Top View)
Component lateral movement

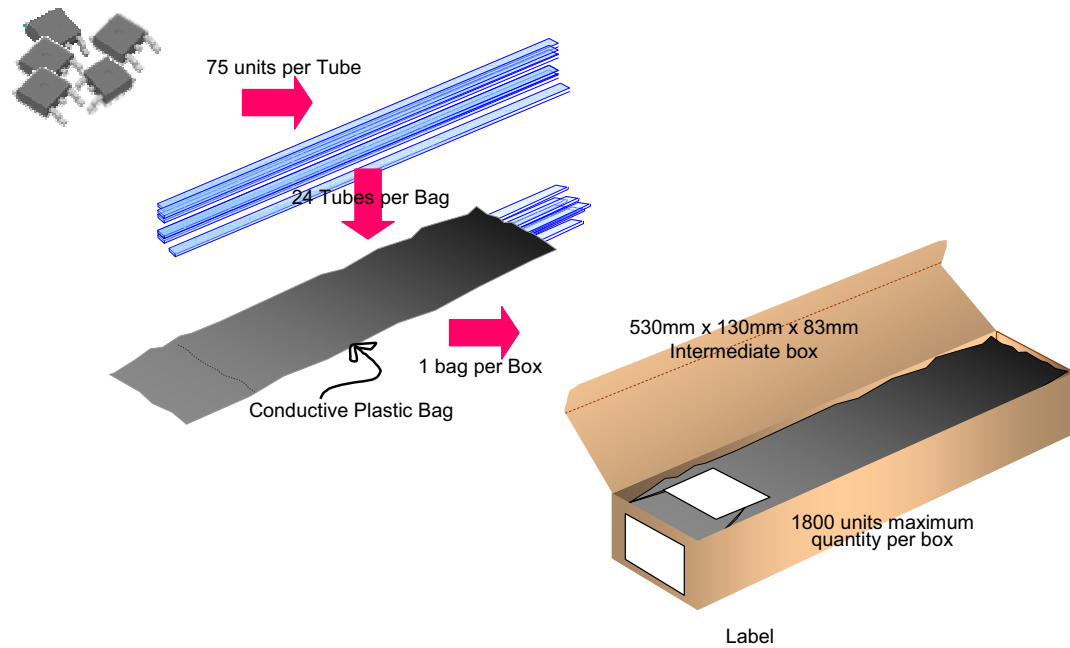
TO-252 (D-PAK) Reel
Configuration: Figure 4.0



13" Diameter Option

Dimensions are in inches and millimeters										
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim R	Dim W1	Dim W2	Dim W3 (LSL-USL)
16mm	13" Dia	13.00 330	0.059 1.50	0.512 +0.020-0.008 13 +0.50/-0.20	0.795 20.20	4.00 100	0.5B 0.5B	0.646 +0.078-0.00 16.4 +2/-0	0.882 22.4	0.626-0.764 15.9-19.4

TO-252 (DPAK) Tube Packing
Configuration: Figure 5.0



TO-252 (DPAK) Tube
Configuration: Figure 6.0

