

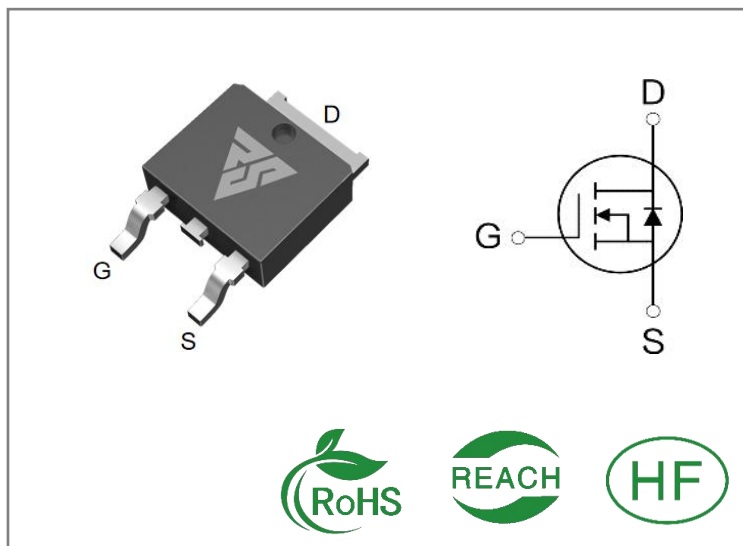
ID	$R_{DS(ON)}$ (Typ)	VDSS
50A	6m $\Omega$	20V

**Applications:**

- Load Switch
- PWM Applications
- Power Managment

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability


**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS20N50D	T0-252	RS20N50D	Tape&reel	2500 PCS

**Absolute Maximun Ratings**  $T_c = 25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	RS20N50D	Units
VDSS	Drain-to-Source Voltage	20	V
ID	Continuous Drain Current $T_C = 25^{\circ}\text{C}$	50	A
ID	Continuous Drain Current $T_C = 100^{\circ}\text{C}$	32	
IDM	Pulsed Drain Current	200	
PD	Power Dissipation	31	W
VGS	Gate- to- Source Voltage	$\pm 12$	V
EAS	Single Pulse Avalanche Engergy $L = 0.5\text{mH}, V_{DD} = 15\text{V}, R_G = 25\Omega, T_j = 25^{\circ}\text{C}$	50	mJ
TL TPKG	Maximum Temperature for Soldering	300	$^{\circ}\text{C}$
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	260	
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the " Absolute Maximum Ratings" Table may cause permanent damage to the device.

**Thermal Resistance**

Symbol	Parameter	RS20N50D	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	4.0	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 °C
R $\theta$ JA	Junction-to- Ambient	32		1 cubic foot chamber,free air.

**OFF Characteristics** TJ= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	20	--	--	V	VGS=0V,ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=20V,VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=12V ,VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-12V ,VDS=0 V

**ON Characteristics** TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	6	7.8	mΩ	VGS=4.5V,ID=25A
		--	8	10.5	mΩ	VGS=2.5V,ID=10A
VGS(TH)	Gate Threshold Voltage	0.5	0.8	1.0	V	VGS=VDS,ID=250μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	9	--	nS	VDS=10V ID=20A RG=3Ω VGS=4.5V
trise	Rise Time	--	20	--		
td(OFF)	Turn- OFF Delay Time	--	39	--		
tfall	Fall Time	--	24	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1600	--	pF	VGS= 0V VDS=10V f=1.0MHz
Coss	Output Capacitance	--	225	--		
Crss	Reverse Transfer Capacitance	--	200	--		
Qg	Total Gate Charge	--	18	--	nC	VDS= 10V ID=25A VGS=4.5V
Qgs	Gate- to- Source Charge	--	3.5	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	5.5	--		

**Source- Drain Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	50	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	200	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=30A,VGS=0V
trr	Reverse Recovery Time	--	7.5	--	nS	VGS=0V IS=20A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	1.5	--	nC	

**Notes:**

- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$

## Typical Feature Curve

Figure 1: Output Characteristics

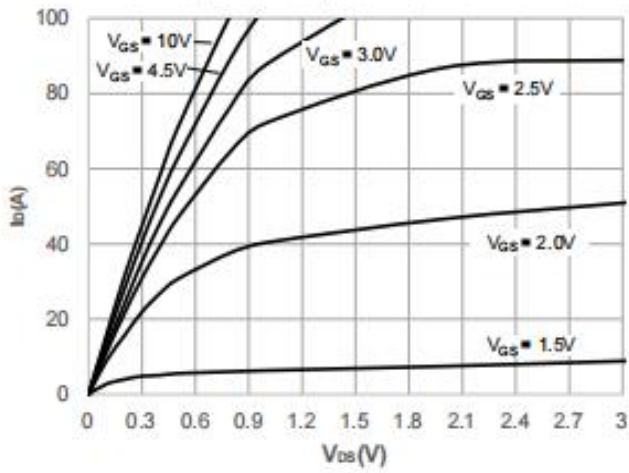


Figure 2: Typical Transfer Characteristics

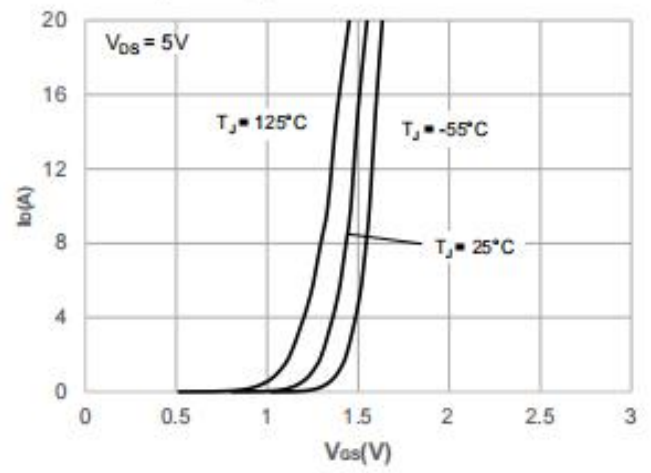


Figure 3: On-resistance vs. Drain Current

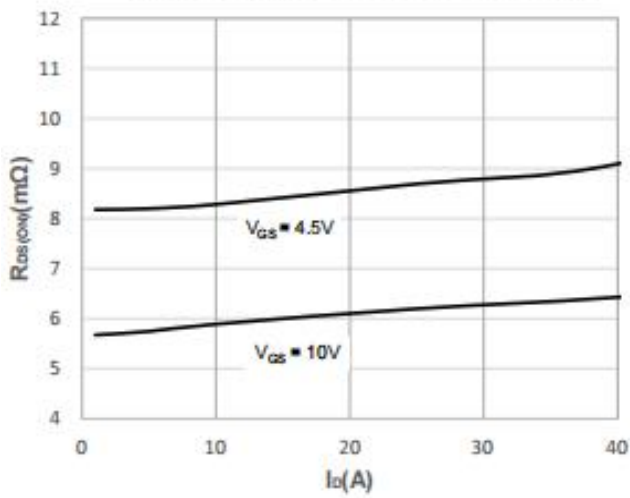


Figure 4: Body Diode Characteristics

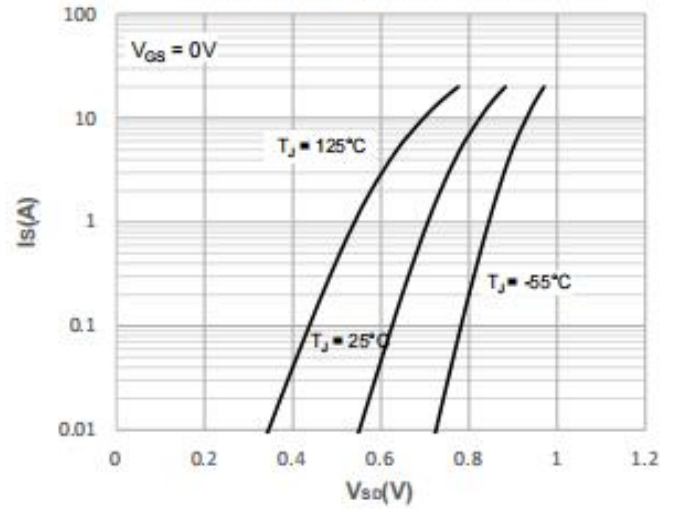


Figure 5: Gate Charge Characteristics

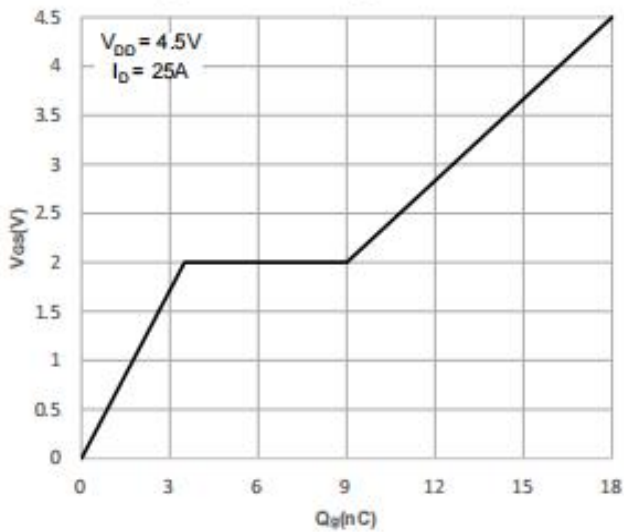


Figure 6: Capacitance Characteristics

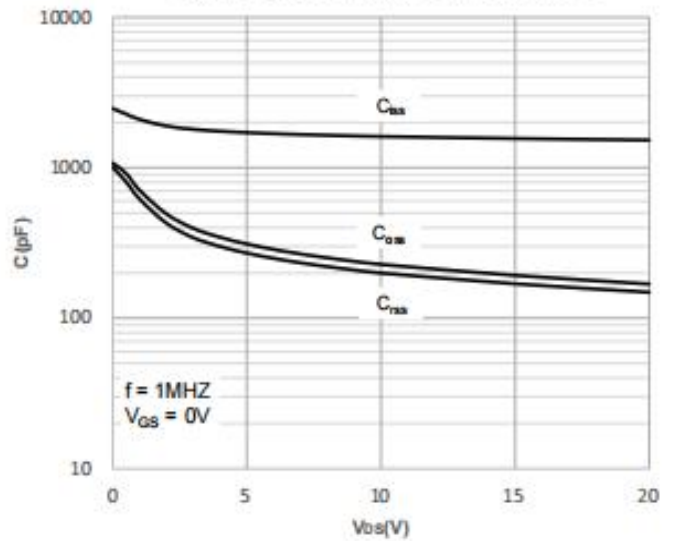


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

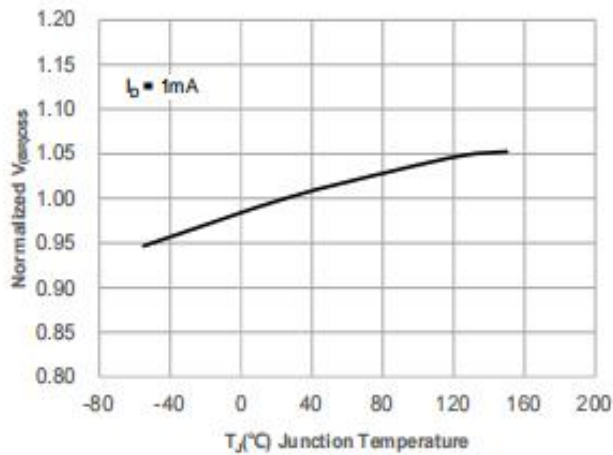


Figure 8: Normalized on Resistance vs. Junction Temperature

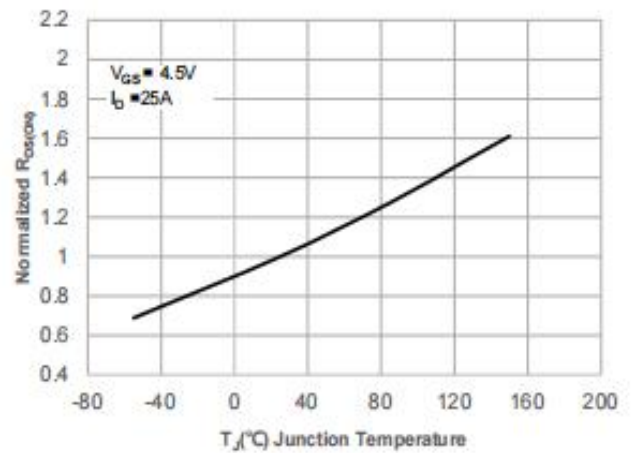


Figure 9: Maximum Safe Operating Area

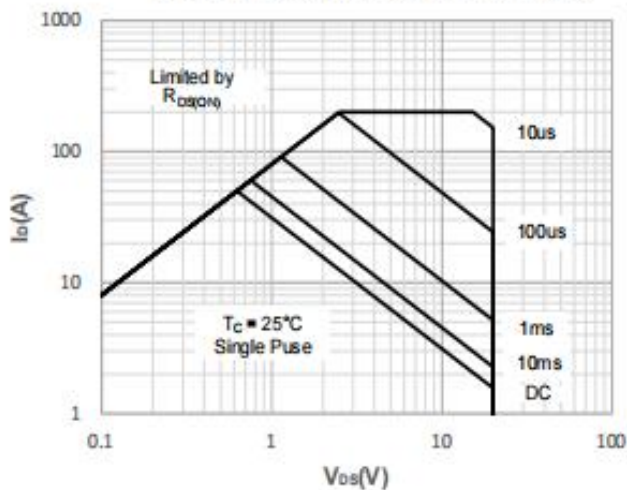


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

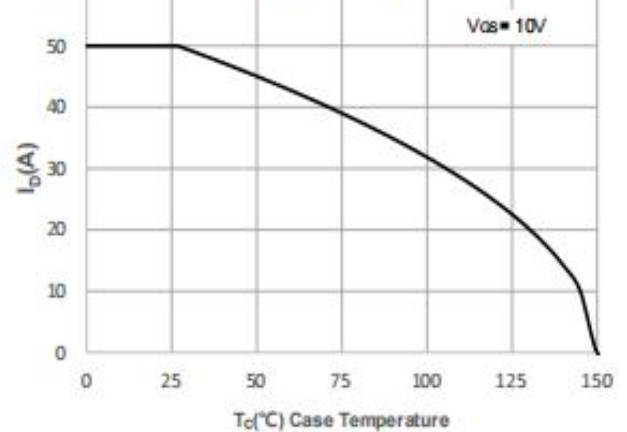


Figure 11: Normalized Maximum Transient Thermal Impedance

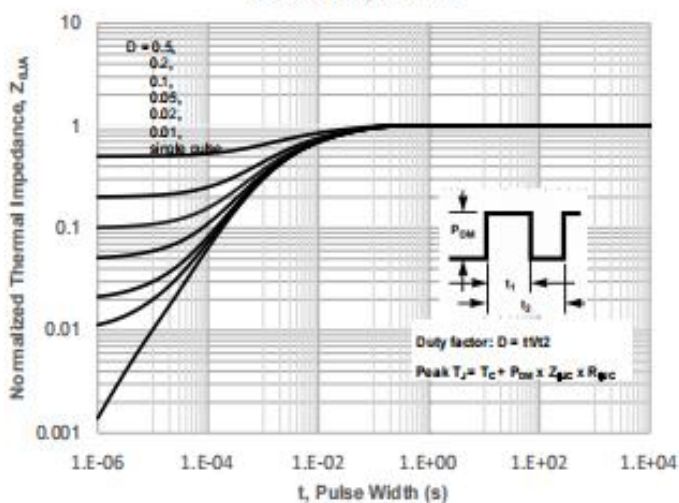
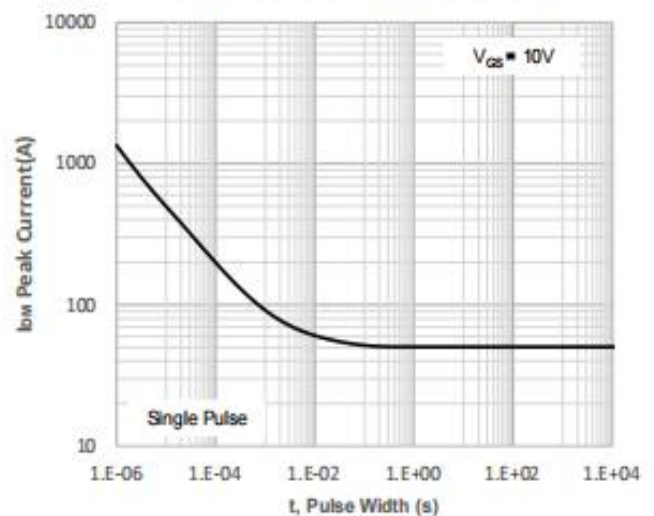


Figure 12: Peak Current Capacity



## Test ircuits and Waveforms

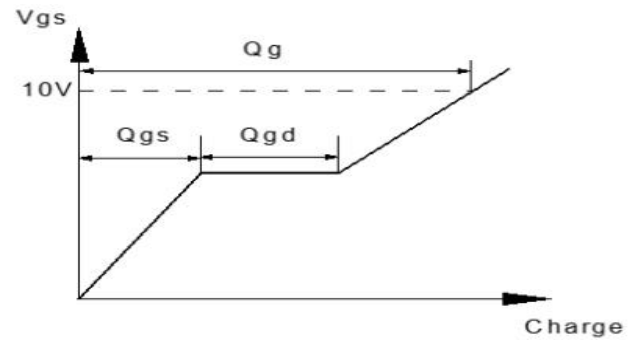
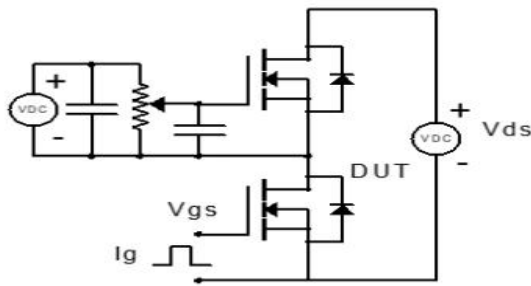


Figure 1: Gate Charge Test Circuit & Waveform

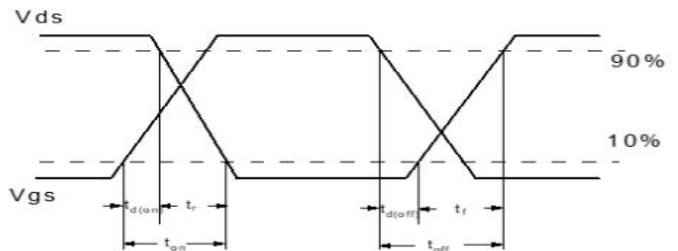
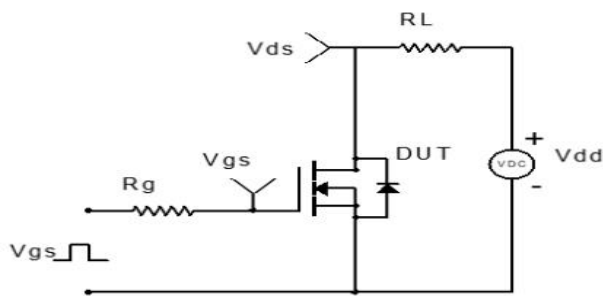


Figure 2: Resistive Switching Test Circuit & Waveform

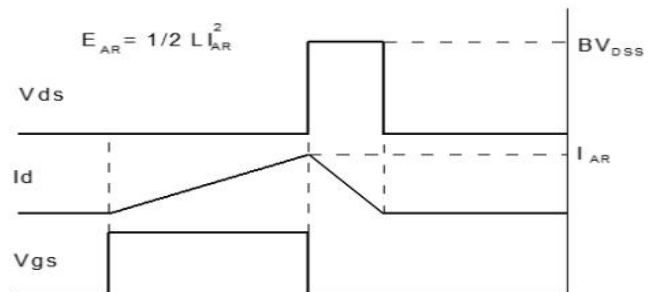
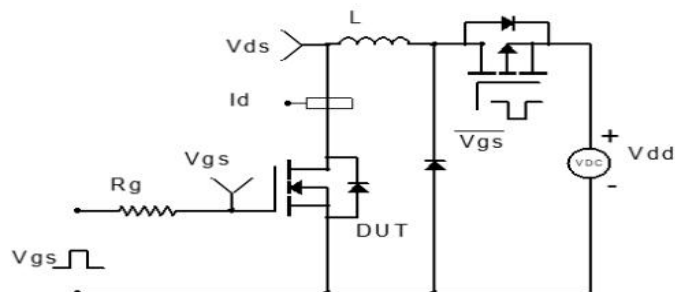


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

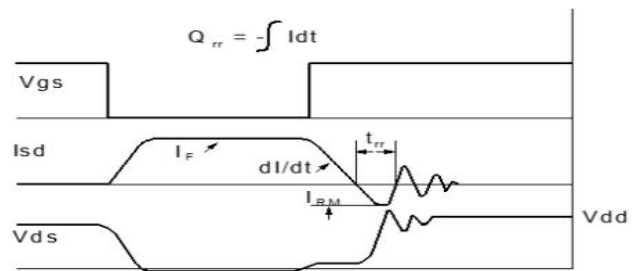
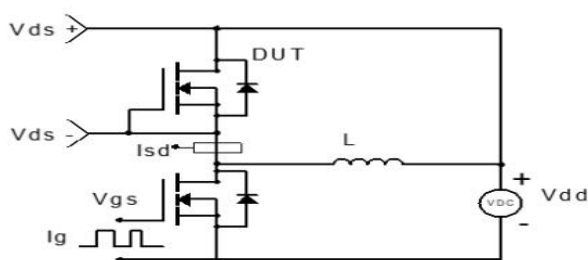
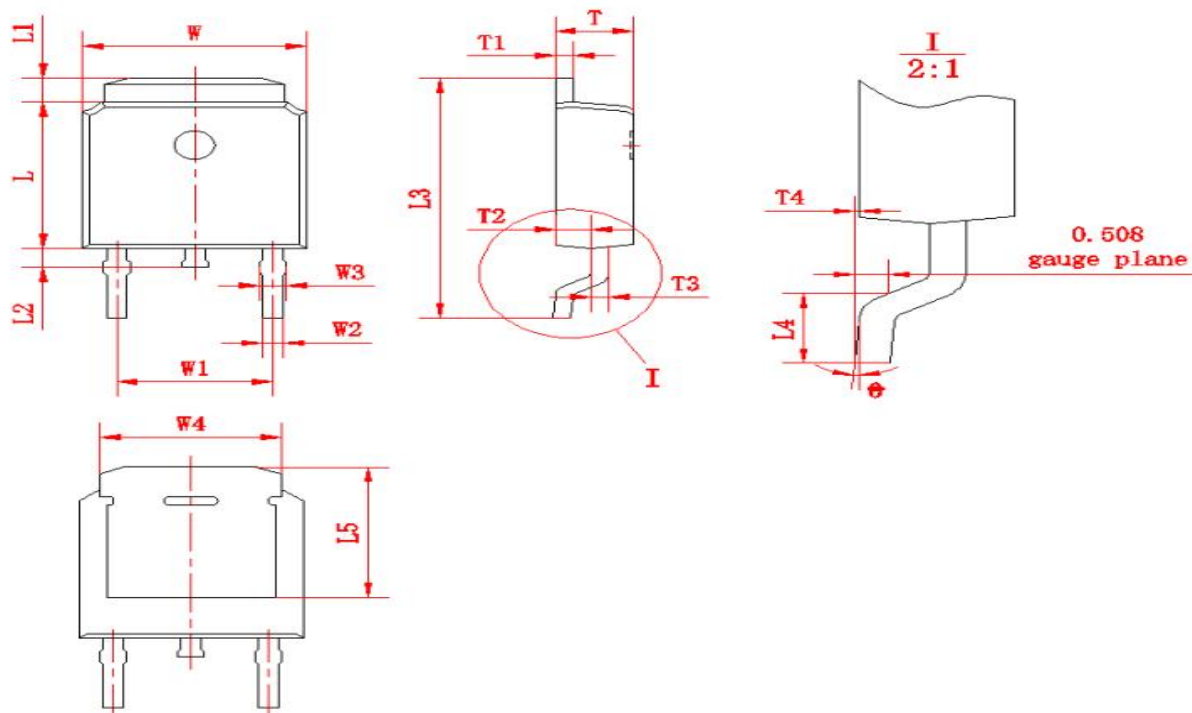


Figure 4: Diode Recovery Test Circuit & Waveform



**Package outline drawing(TO-252 Unit: mm )**


符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
W	6.50	6.70	L1	0.80	1.20	T1	0.48	0.58
W1	(4.572)		L2	0.60	1.00	T2	0.95	1.15
W2	0.6	0.8	L3	9.70	10.30	T3	0.48	0.58
W3	0.68	0.88	L4	1.30	1.70	T4	0.00	0.12
W4	(5.3)		L5	(5.20)		0	0	8
L	6.00	6.20	T	2.20	2.40			

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