TM100N04D

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

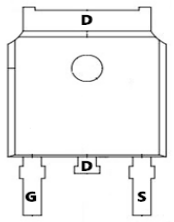
V_{DS} = 40V I_D =100A

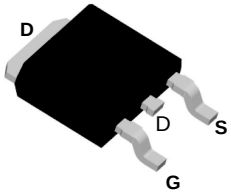
$R_{DS(ON)}$=3.8mΩ (Typ.) @ V_{GS}=10V

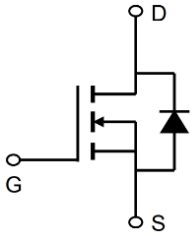
100% UIS Tested
100% R_g Tested

Green Product

D:TO-252-3L







Marking: 100N04

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		40	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25°C	100	A
		T_C = 100°C	55	
I_{DM}	Pulsed Drain Current (1)		240	A
E_{AS}	Single Pulsed Avalanche Energy (2)		156	mJ
P_D	Power Dissipation	T_C = 25°C	142	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		31	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.88	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.9	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 10V, I_D = 30A	-	3.8	5.1	mΩ
		V_{GS} = 4.5V, I_D = 20A	-	5.2	6.9	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	3278	-	pF
C_{oss}	Output Capacitance		-	267	-	pF
C_{rss}	Reverse Transfer Capacitance		-	224	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 30A	-	73	-	nC
Q_g	Gate Source Charge		-	15	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	16	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 30A, R_{GEN} = 3Ω	-	12	-	ns
t_r	Turn-On Rise Time		-	29	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	60	-	ns
t_f	Turn-Off Fall Time		-	16	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	100	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	320	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 30A	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	16	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	10	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=25A
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance

Figure1:OutputCharacteristics

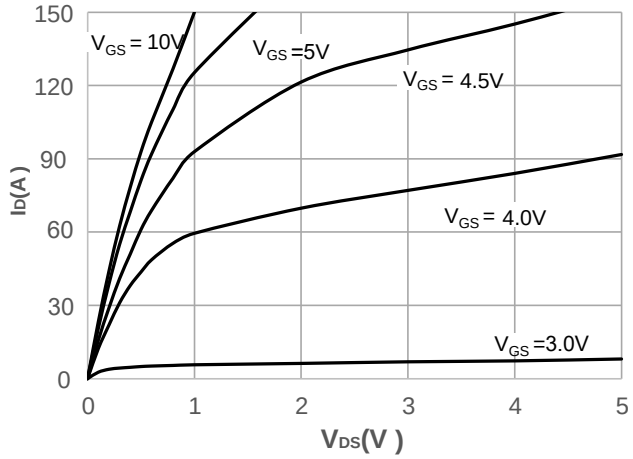


Figure 2: Typical Transfer Characteristics

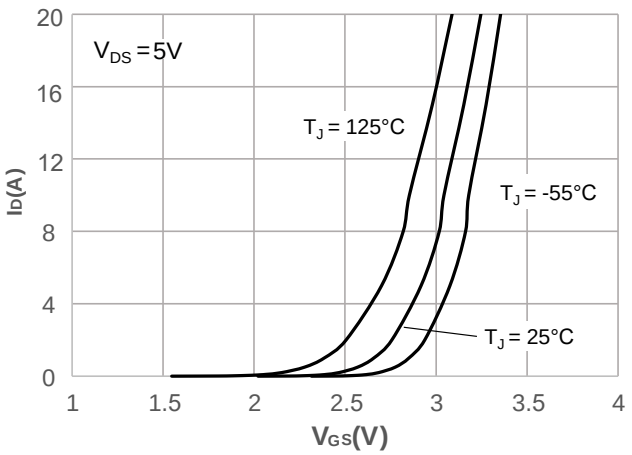


Figure 3: On-resistance vs. Drain Current

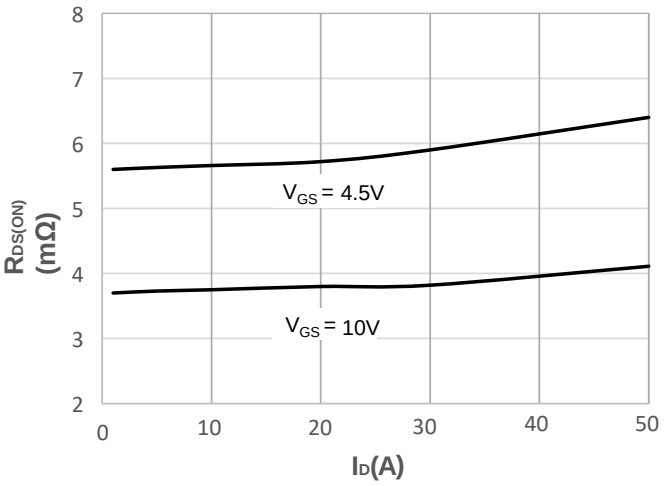


Figure 4: Body Diode Characteristics

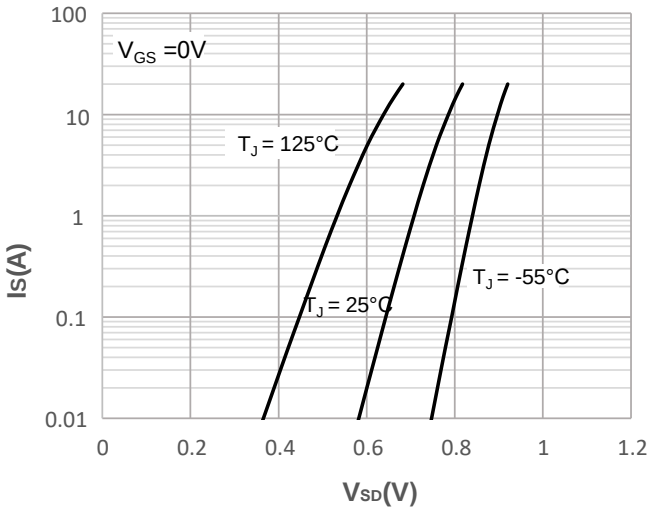


Figure 5: Gate Charge Characteristics

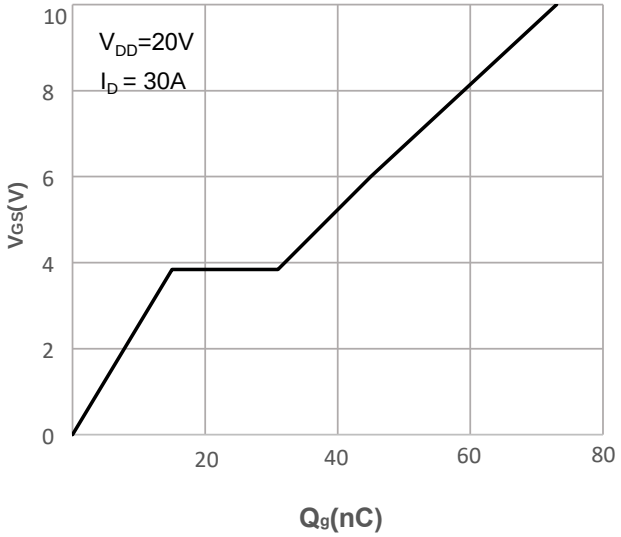


Figure 6: Capacitance Characteristics

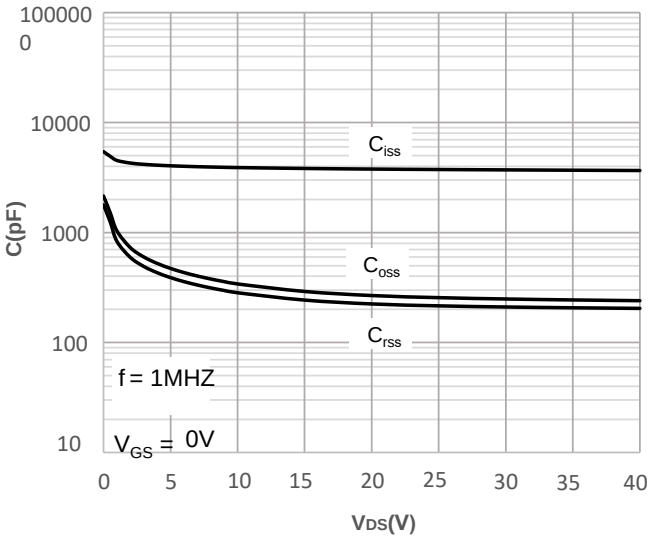


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

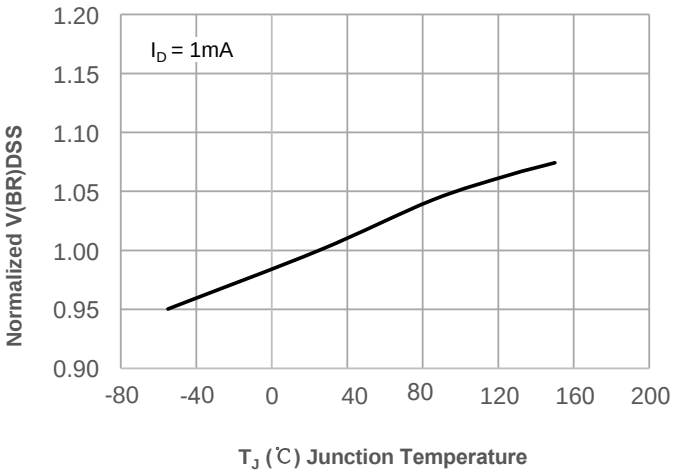


Figure 8: Normalized on Resistance vs. Junction Temperature

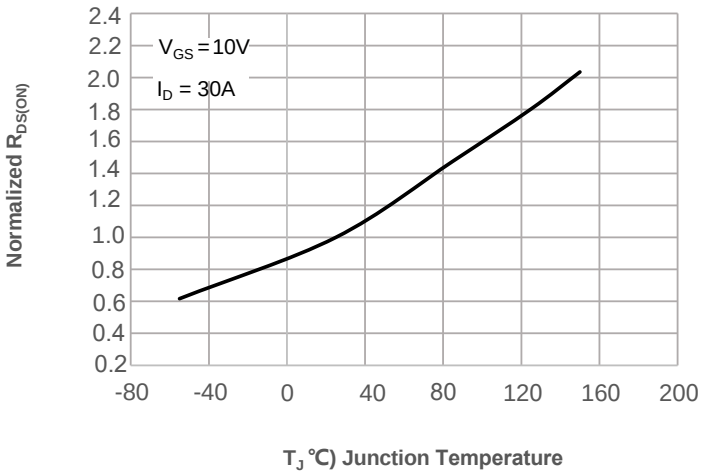


Figure 9: Maximum Safe Operating Area

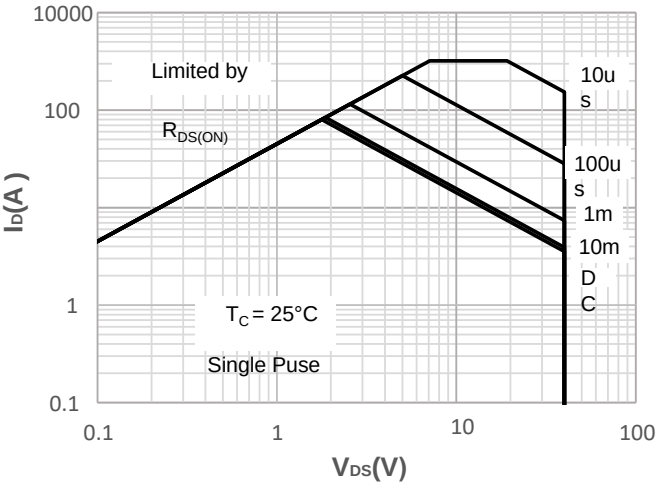


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

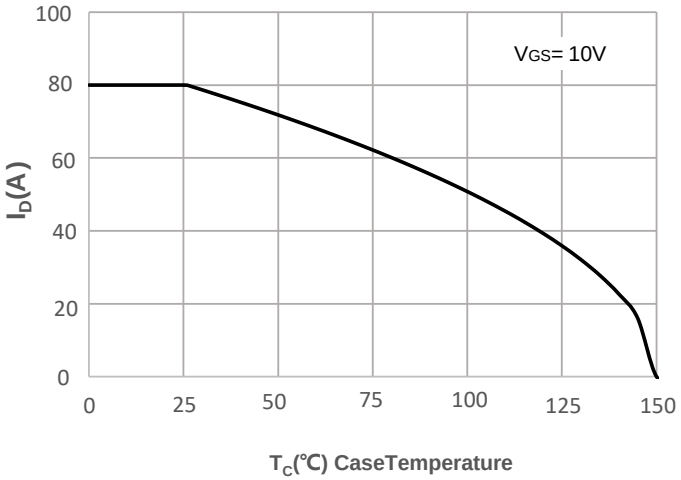


Figure 11: Normalized Maximum Transient Thermal Impedance

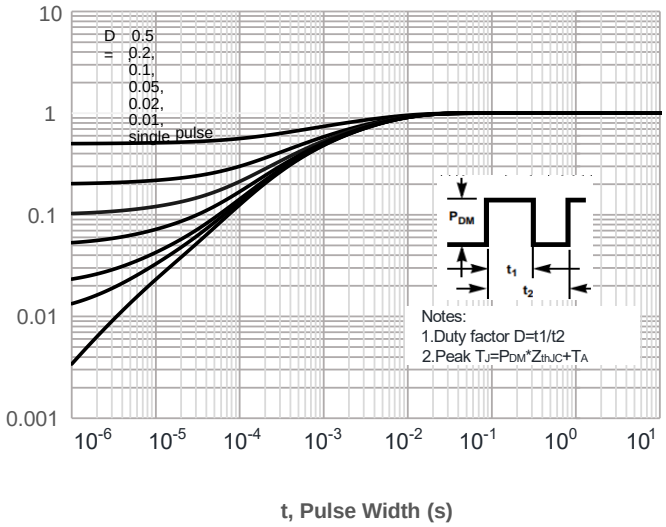
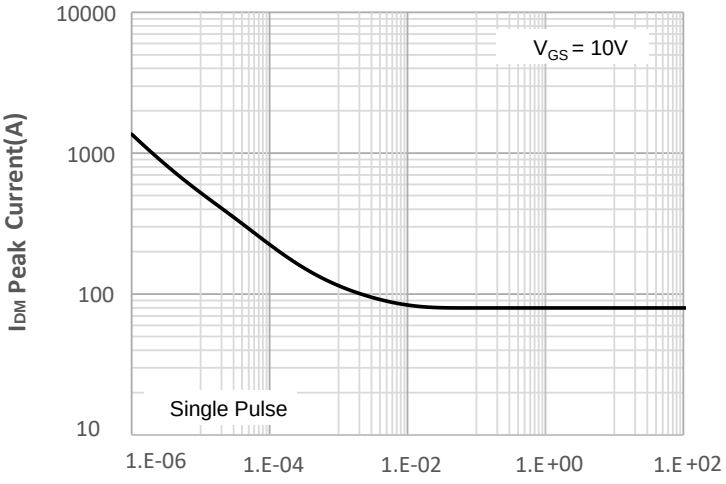


Figure 12: Peak Current Capacity



Test Circuit

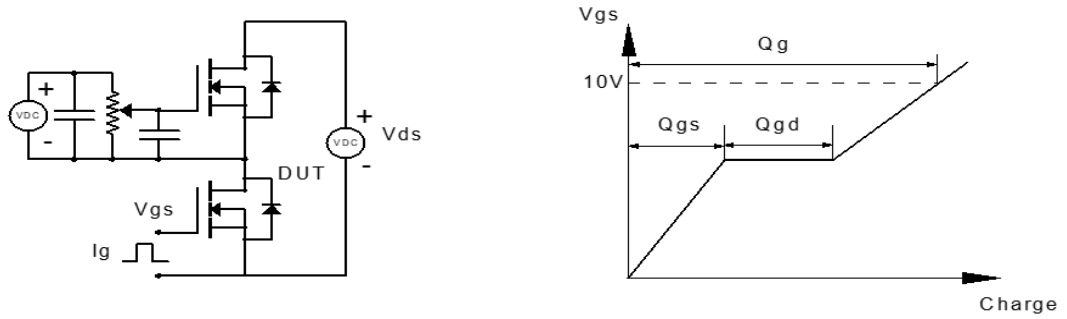


Figure 1: Gate Charge Test Circuit & Waveform

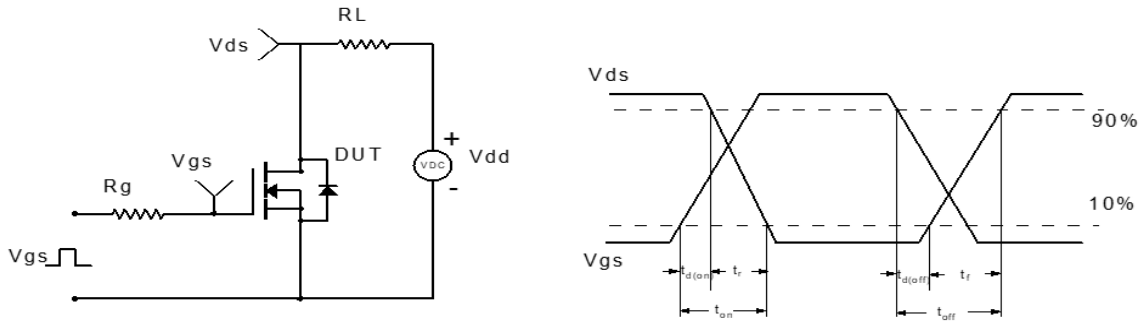


Figure 2: Resistive Switching Test Circuit & Waveform

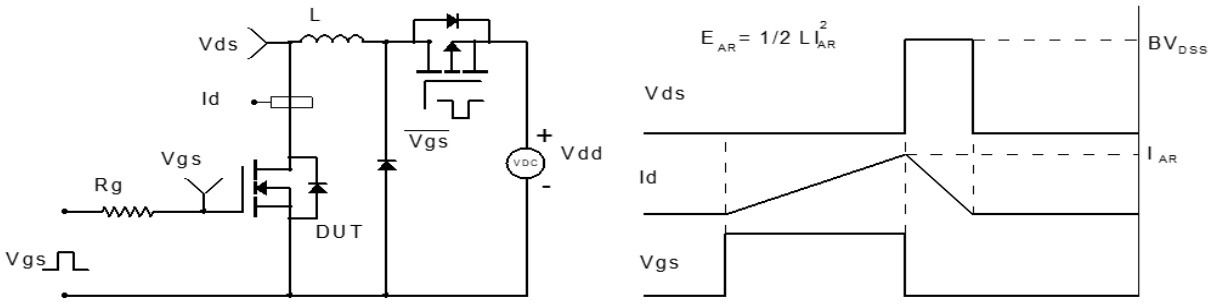


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

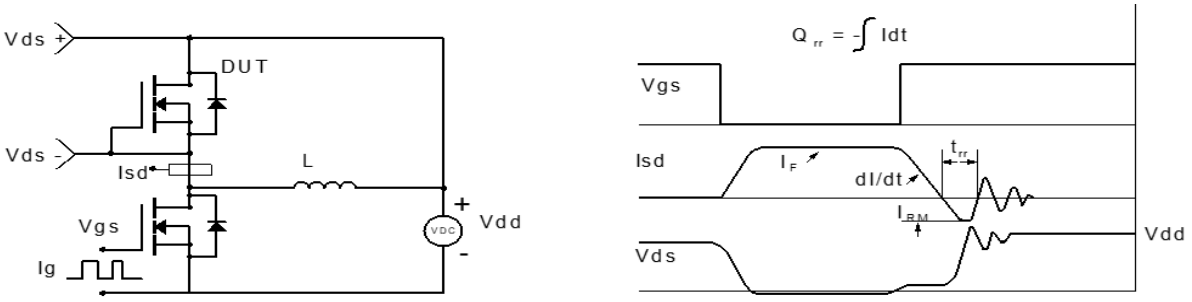
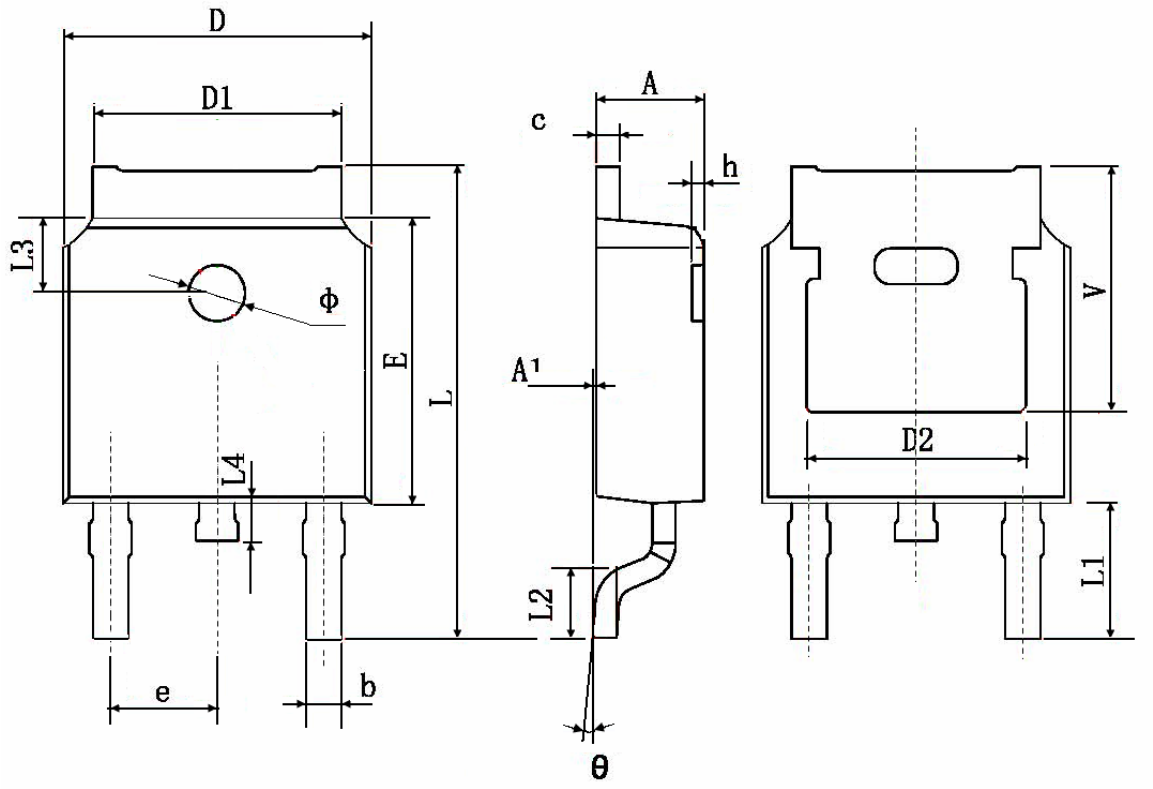


Figure 4: Diode Recovery Test Circuit & Waveform

Package Information:TO-252-3L



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 TYP.		0.190 TYP.	
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 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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 TYP.		0.211 TYP.	