



Description

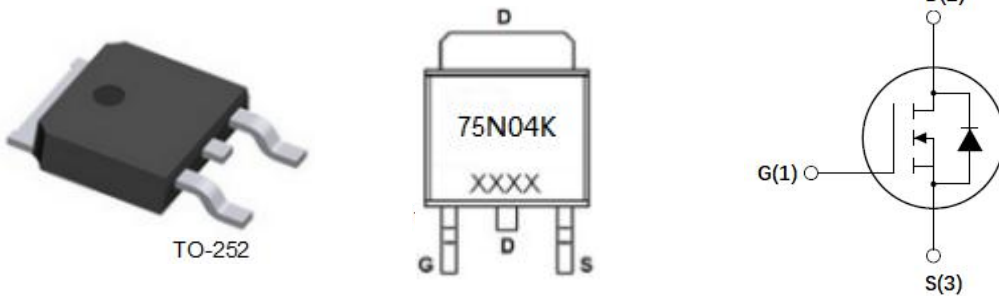
Features

- 40V,60A
- $R_{DS(ON)}=6.8m\Omega$ (Typ.) @ $V_{GS} = 10V$
- $R_{DS(ON)}=9.5m\Omega$ (Typ.) @ $V_{GS} = 4.5V$
- High Density Cell Design for Ultra Low $R_{DS(ON)}$
- Fully Characterized Avalanche Voltage and Current
- Good Stability and Uniformity with High E_{AS}
- Excellent Package for Good Heat Dissipation

Application

- Load Switch
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

Package



Absolute Maximum Ratings (T_c=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V _{DSS}	Drain-Source Voltage	40	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current	T _C = 25°C	60
		T _C = 100°C	42
I _{DM}	Pulsed Drain Current ^{note1}	210	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}	106	mJ
P _D	Power Dissipation	42	W
R _{θJC}	Thermal Resistance, Junction to Case	2.8	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	°C



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to 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	1.1	1.65	2.4	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note3</small>	V _{GS} =10V, I _D =30A	-	6.8	8	mΩ
		V _{GS} =4.5V, I _D =20A	-	9.5	12	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A	10	25	-	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1.0MHz	-	2246	-	pF
C _{oss}	Output Capacitance		-	195	-	pF
C _{rss}	Reverse Transfer Capacitance		-	176	-	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =30A, V _{GS} =10V	-	52	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	14	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =20V, I _D =30A, R _L =1Ω, R _{GEN} =3Ω, V _{GS} =10V	-	13	-	ns
t _r	Turn-on Rise Time		-	37	-	ns
t _{d(off)}	Turn-off Delay Time		-	46	-	ns
t _f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	210	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	T _J =25°C, I _F =20A, dI/dt=100A/μs	-	15	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	8	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25°C, V_{DD}=30V, V_G=10V, R_G=25Ω, L=0.5mH

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



Typical Performance Characteristics

Figure 1: Output Characteristics

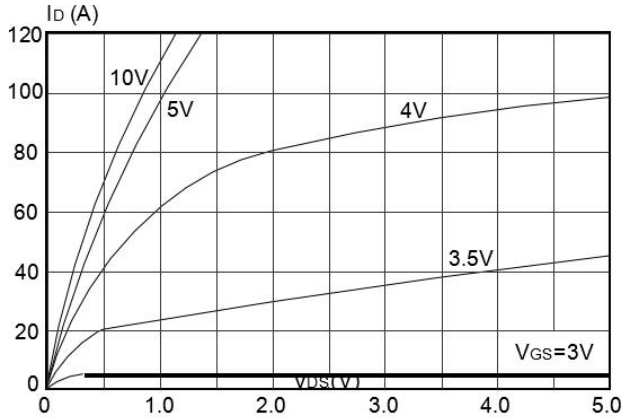


Figure 2: Typical Transfer Characteristics

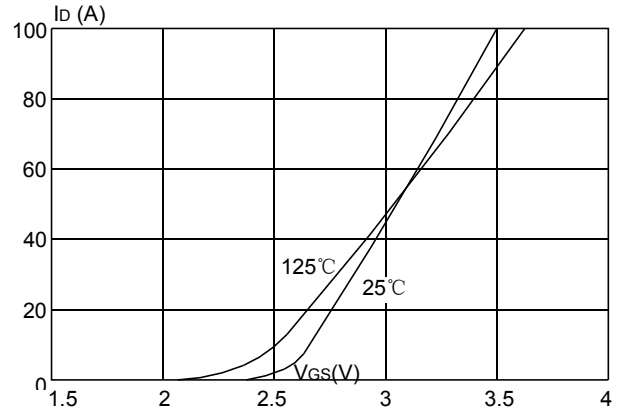


Figure 3: On-resistance vs. Drain Current

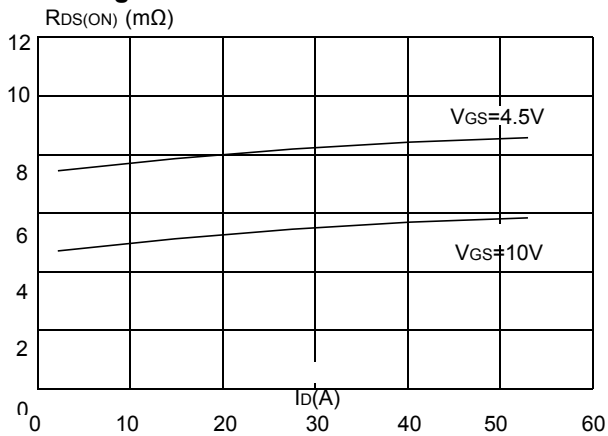


Figure 4: Body Diode Characteristics

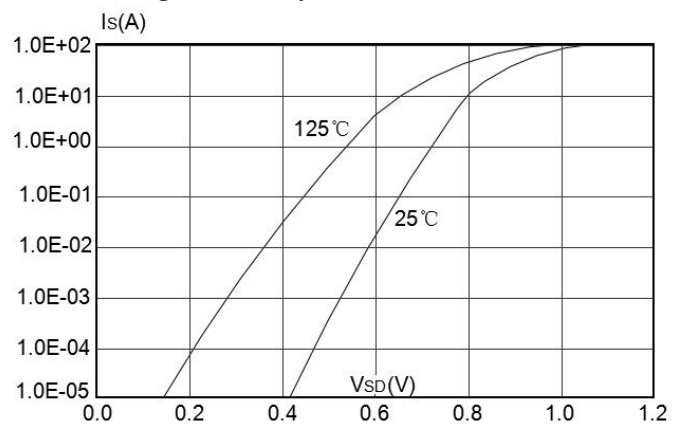


Figure 5: Gate Charge Characteristics

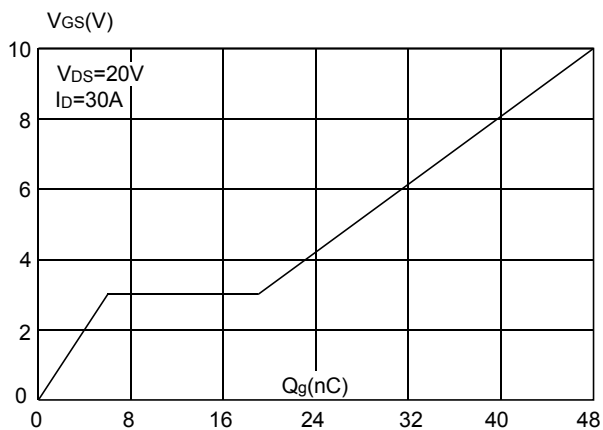


Figure 6: Capacitance Characteristics

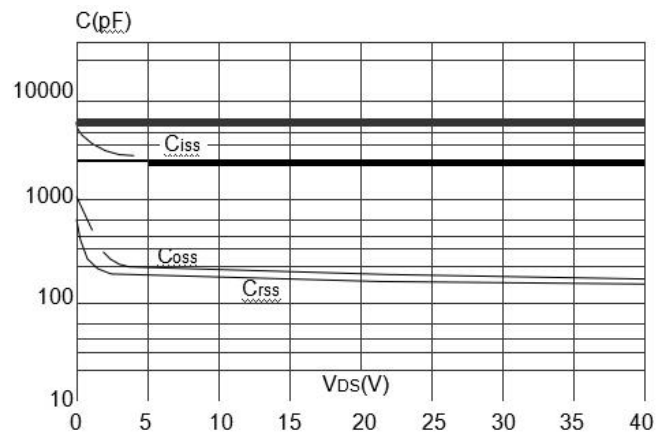




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

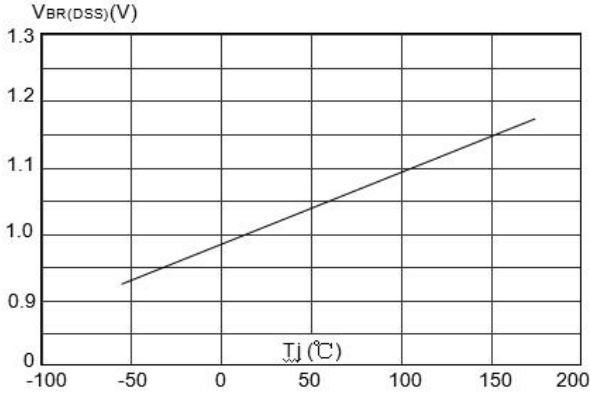


Figure 9: Maximum Safe Operating Area

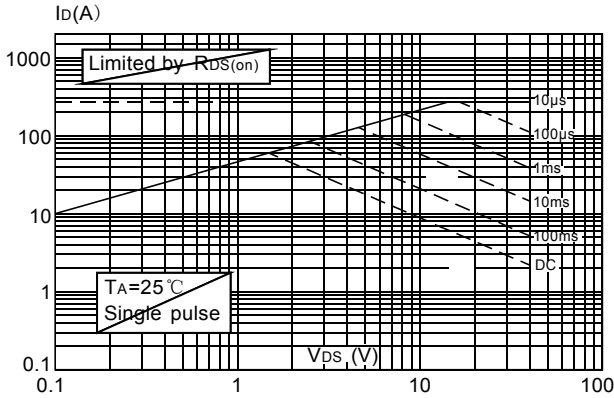


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252,TO-251S)

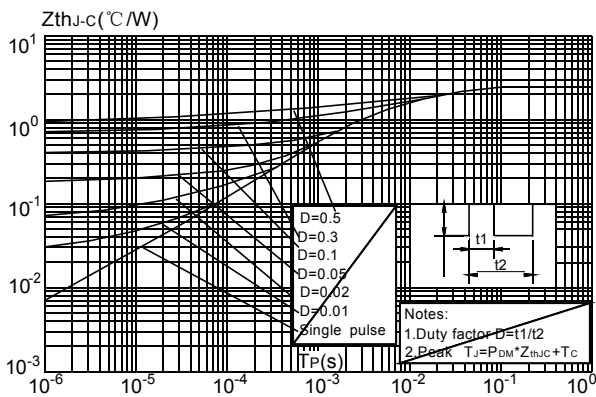


Figure 8: Normalized on Resistance vs. Junction Temperature

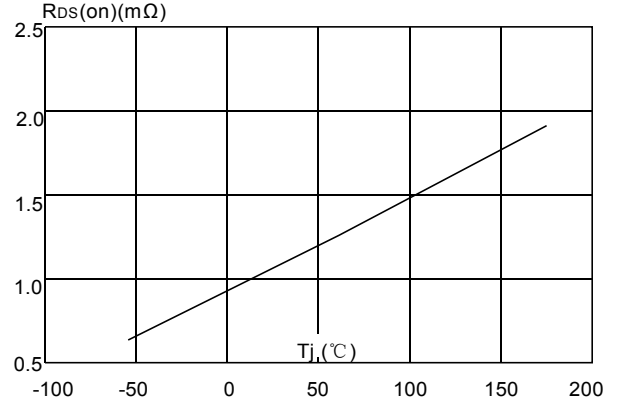
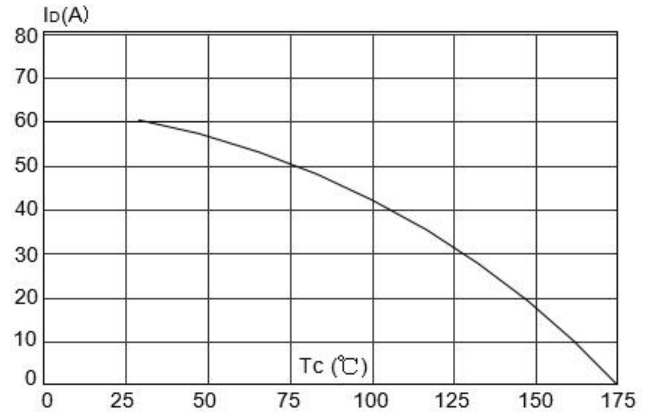


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



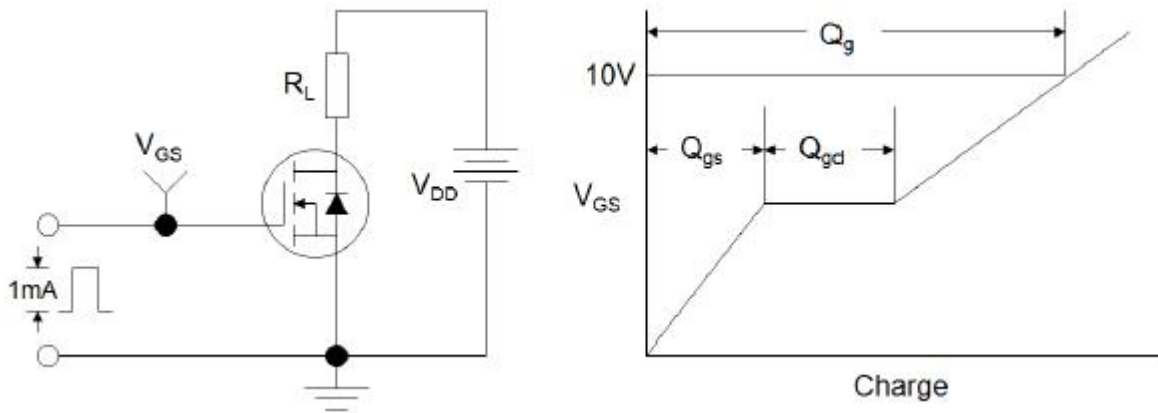


Figure1:Gate Charge Test Circuit & Waveform

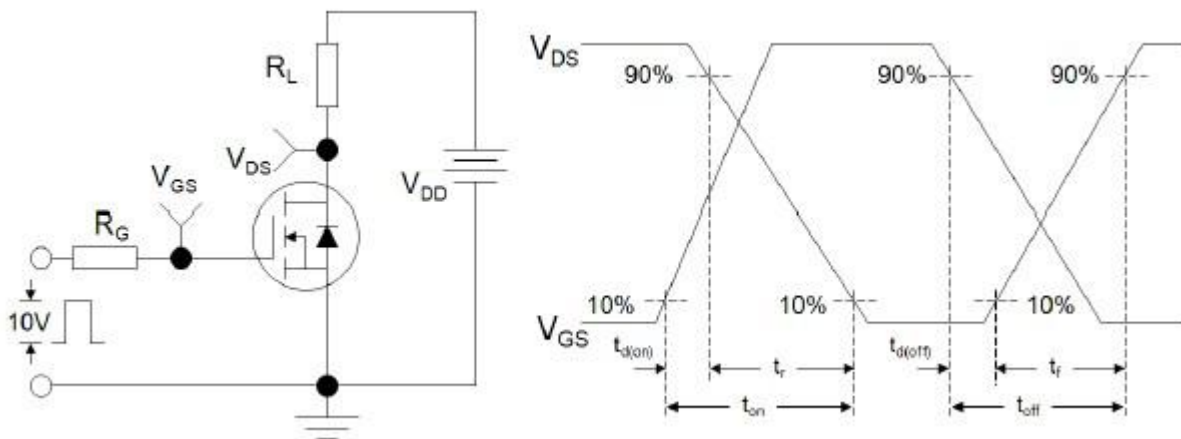


Figure 2: Resistive Switching Test Circuit & Waveforms

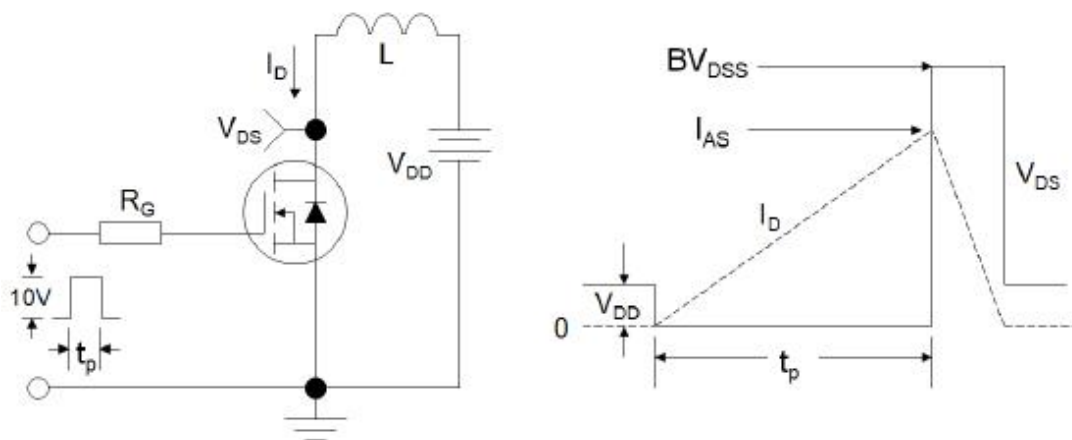
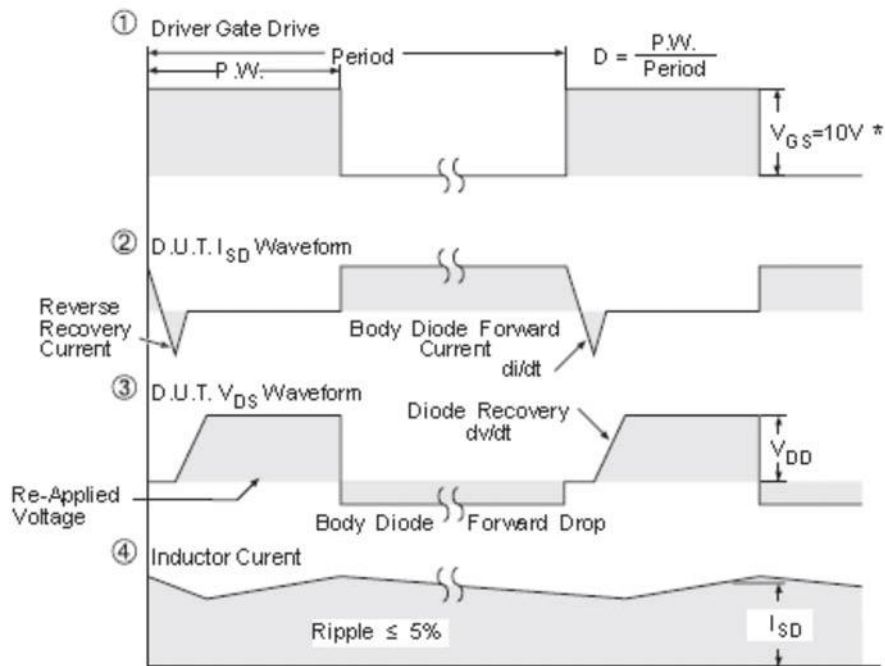
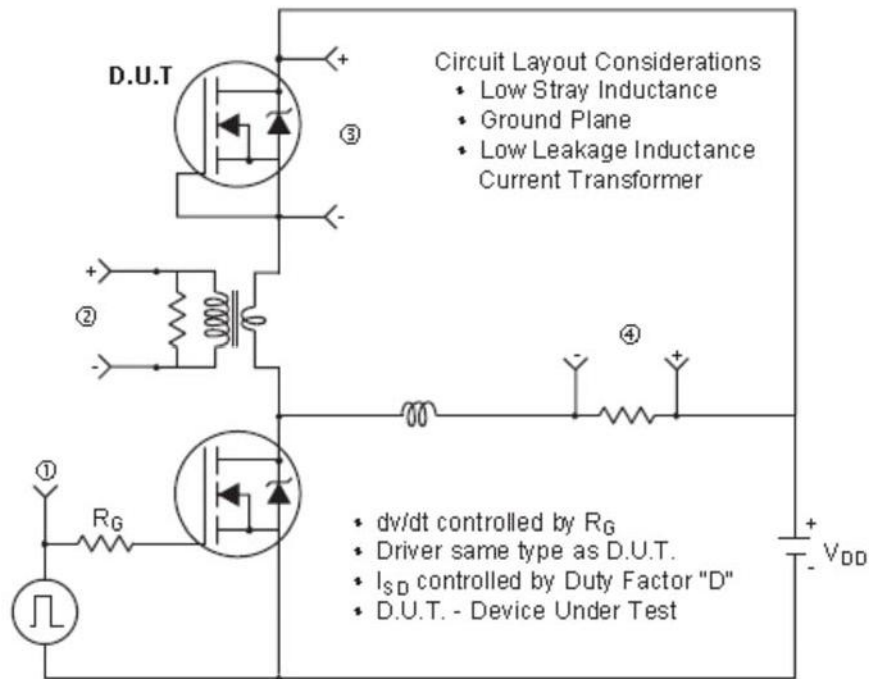


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

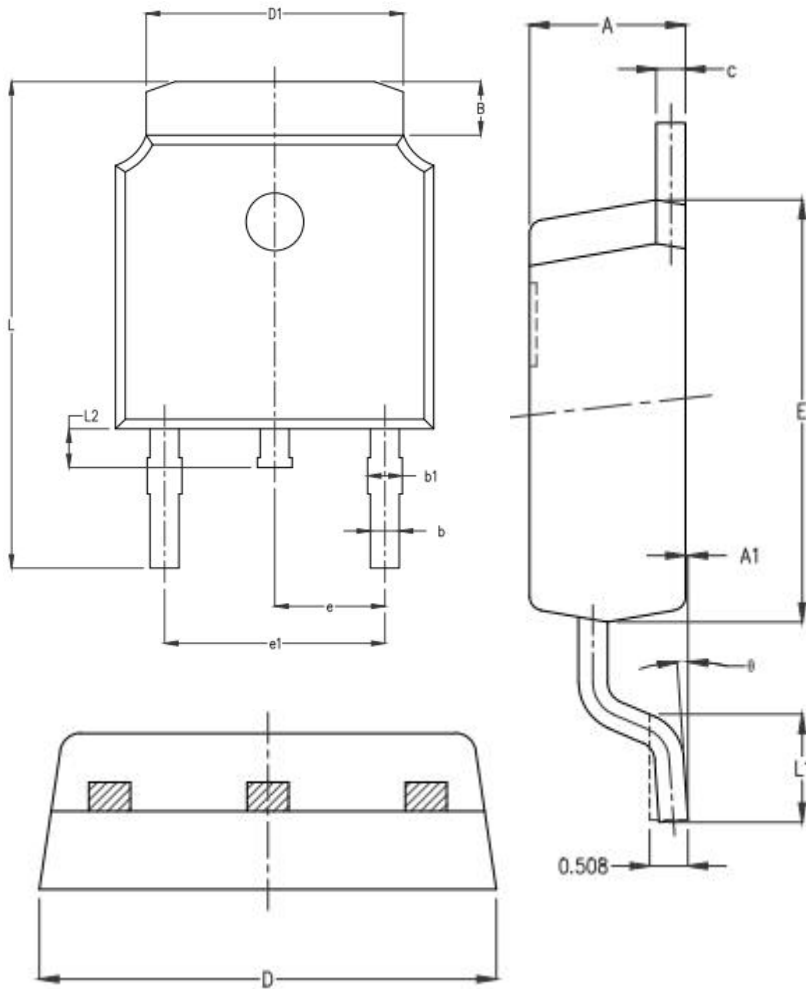


* $V_{GS} = 5V$ for Logic Level Devices

Figure 4: Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)



TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°