4080K/J(文件编号：S&CIC1774) N-Channel Trench Power MOSFET

Description

Features

- 40V,80A
- $R_{DS(ON)}$=6.8mΩ (Typ.) @ V_{GS} = 10V

$R_{DS(ON)}$=9.5mΩ (Typ.) @ V_{GS} = 4.5V

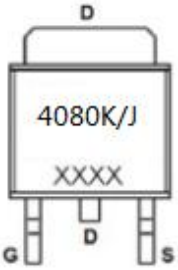
- High Density Cell Design for Ultra Low $R_{DS(ON)}$
- Fully Characterized Avalanche Voltage and Current
- Good Stability and Uniformity with High E_{AS}
- Excellent Package for Good Heat Dissipation

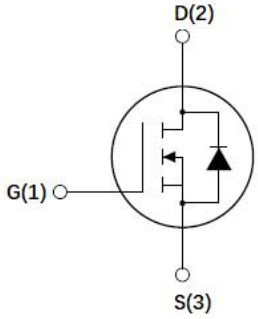
Application

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

Package


TO-252





Absolute Maximum Ratings (T_C=25℃ 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℃	80	A
		T_C = 100℃	42	A
I_{DM}	Pulsed Drain Current note1		210	A
E_{AS}	Single Pulsed Avalanche Energy note2		106	mJ
P_D	Power Dissipation	T_C = 25℃	42	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.8	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

Electrical Characteristics (T_C=25℃ 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 note3	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		-	-	80	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℃, 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℃,VDD=30V,VG=10V, RG=25Ω， L=0.5mH

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

Typical Performance Characteristics

Figure1: Output Characteristics

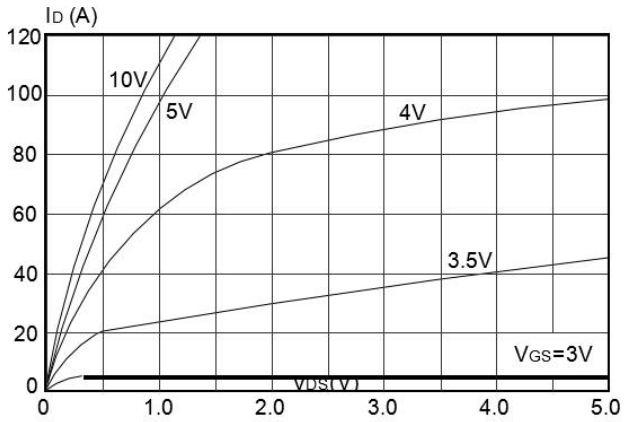


Figure 2: Typical Transfer Characteristics

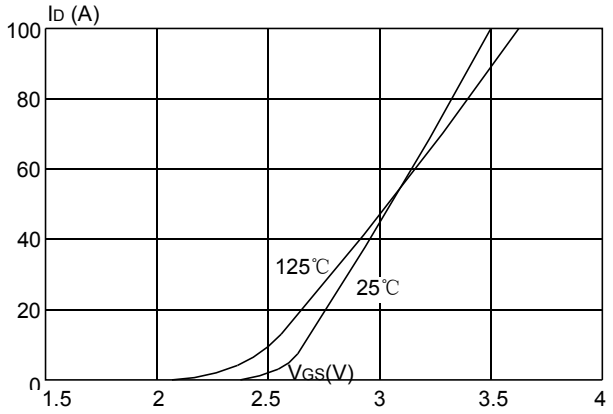


Figure 3: On-resistance vs. Drain Current

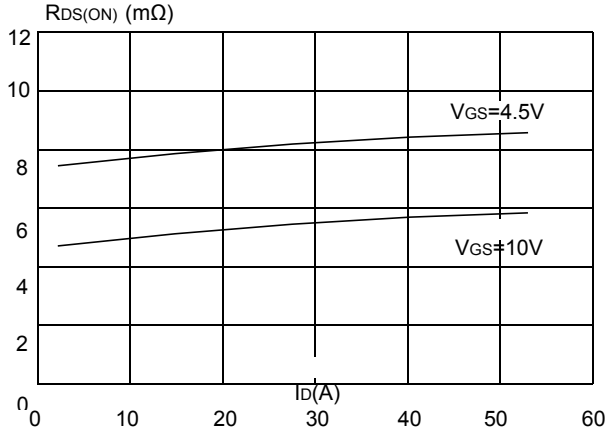


Figure 4: Body Diode Characteristics

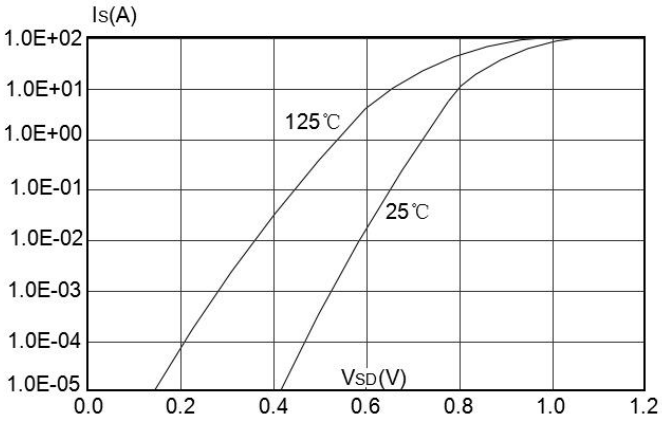


Figure 5: Gate Charge Characteristics

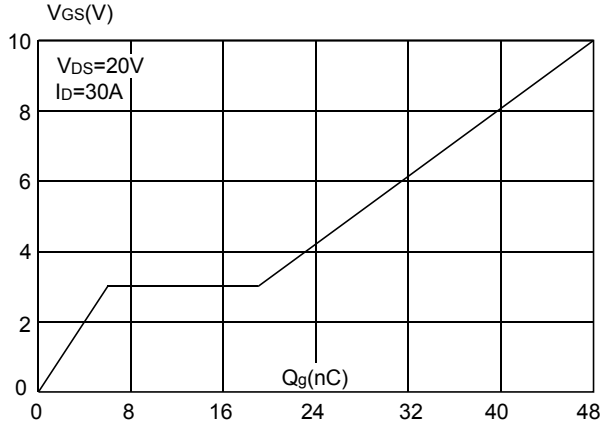


Figure 6: Capacitance Characteristics

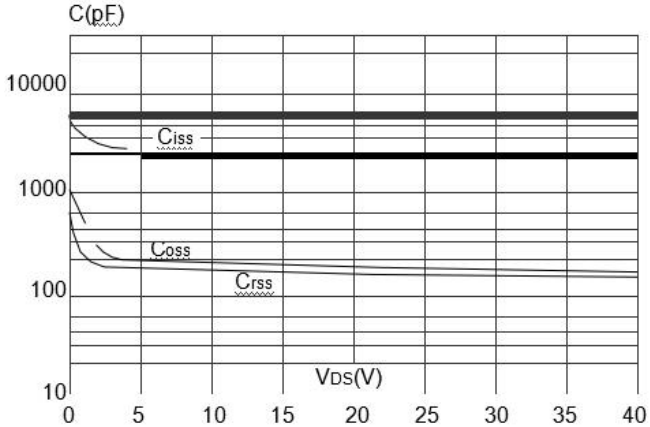


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

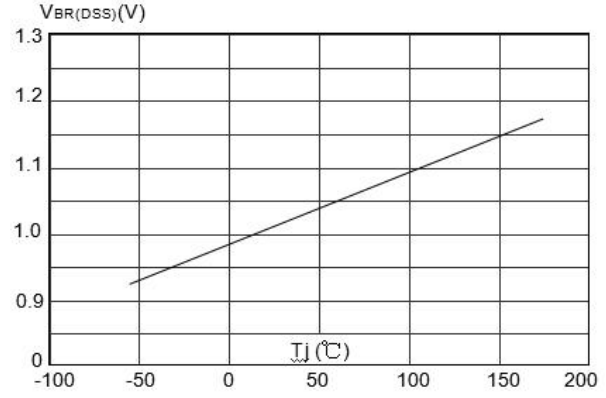


Figure 8: Normalized on Resistance vs. Junction Temperature

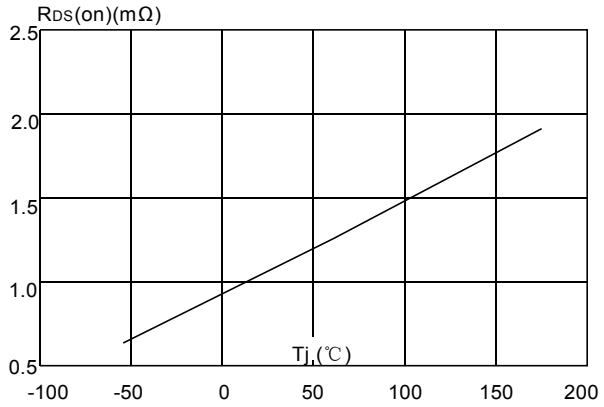


Figure 9: Maximum Safe Operating Area

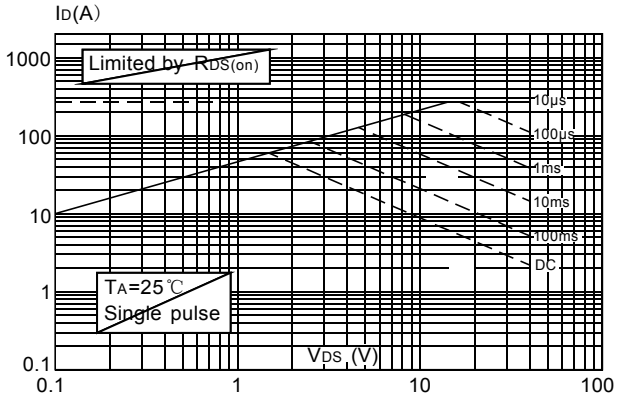


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

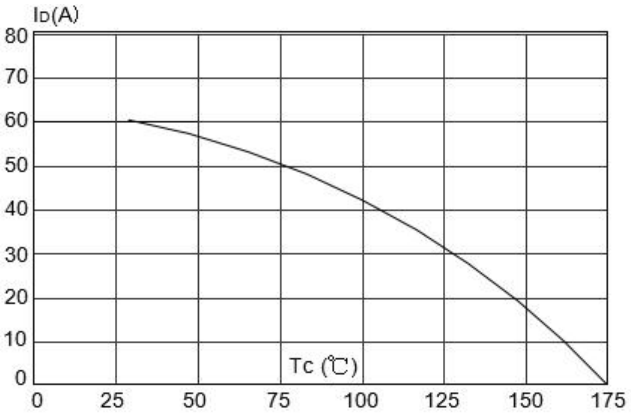
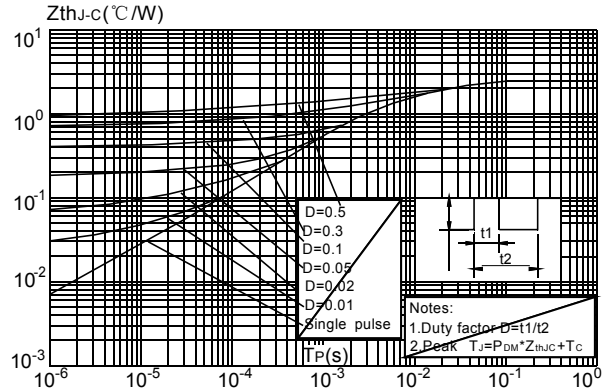


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252,TO-251S)



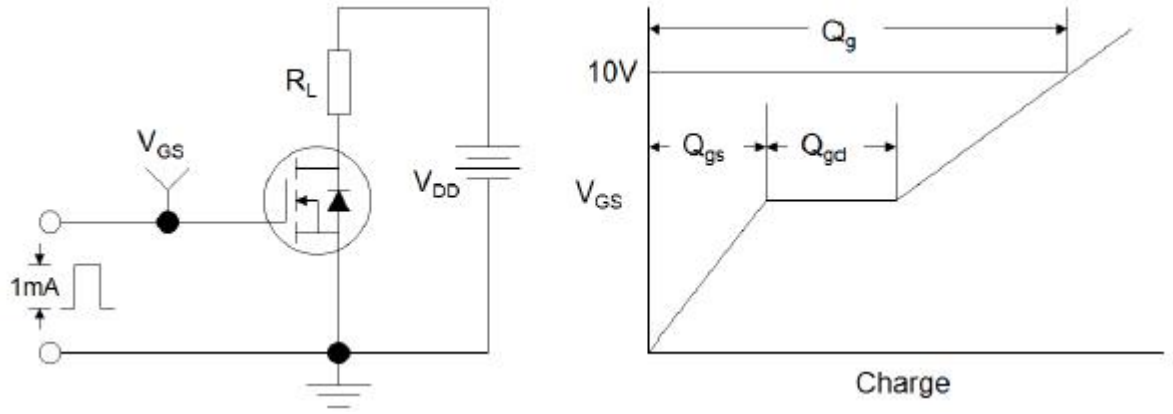


Figure1:Gate Charge Test Circuit & Waveform

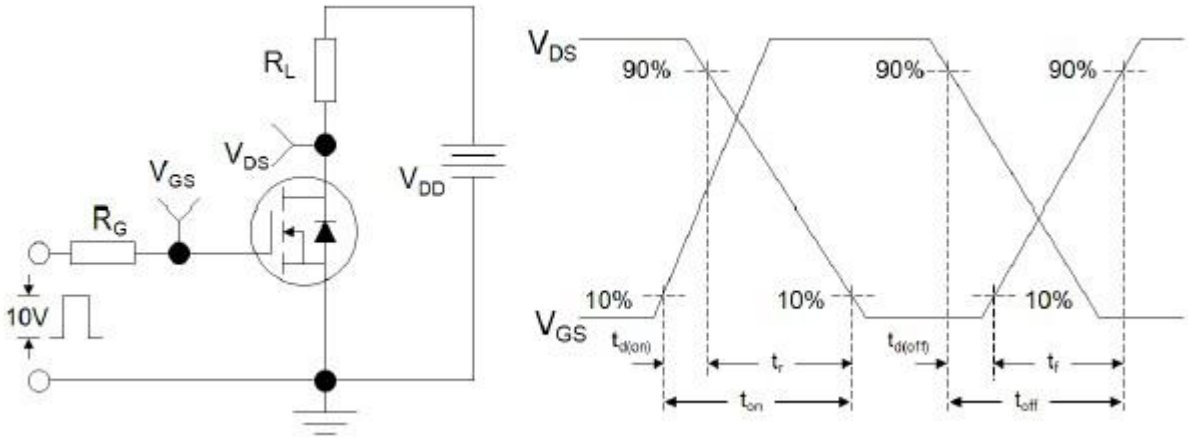


Figure 2: Resistive Switching Test Circuit & Waveforms

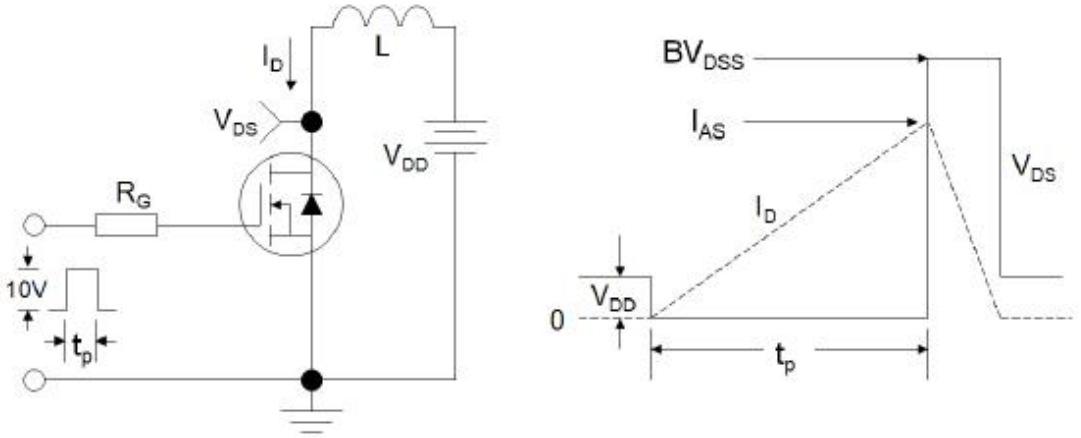


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

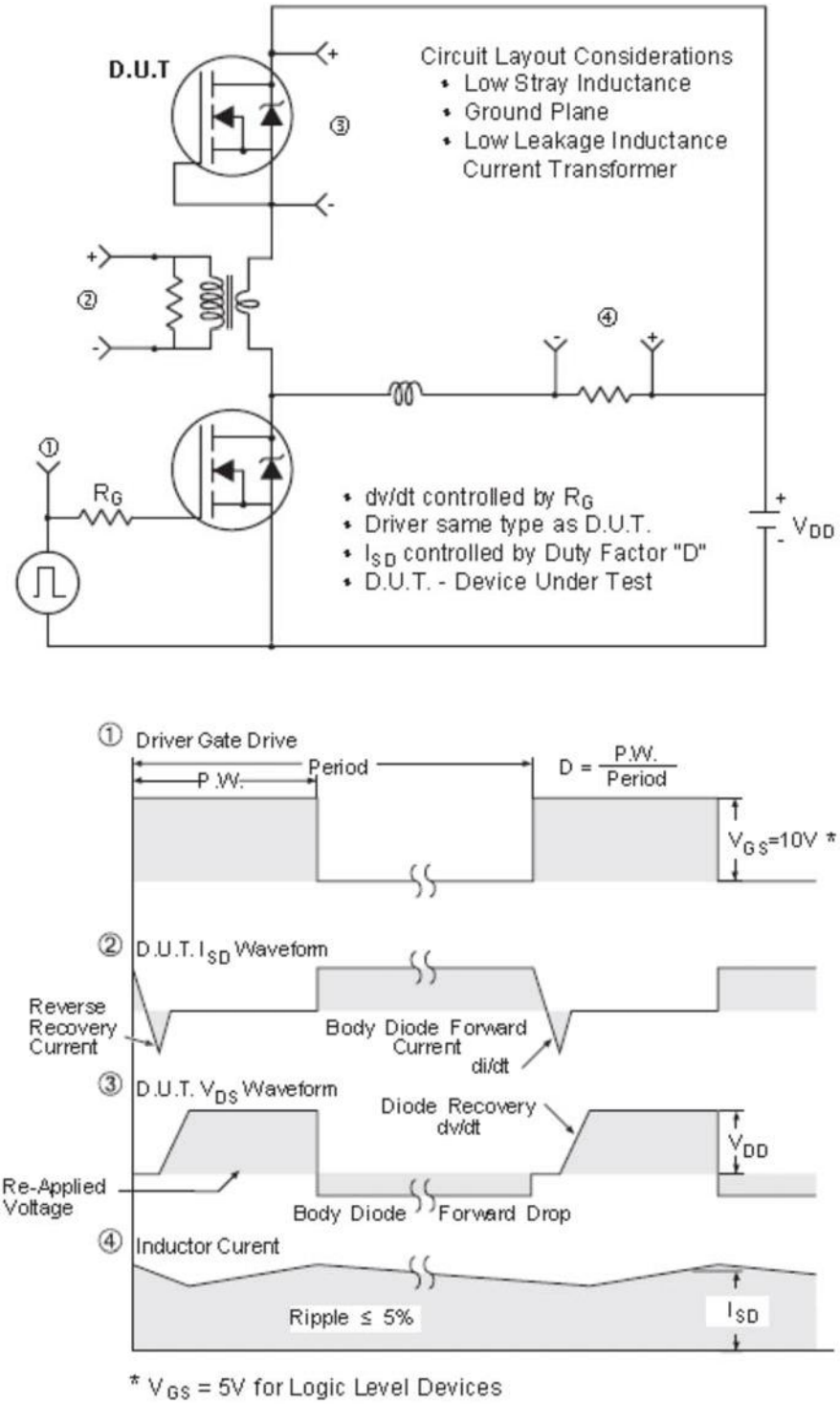
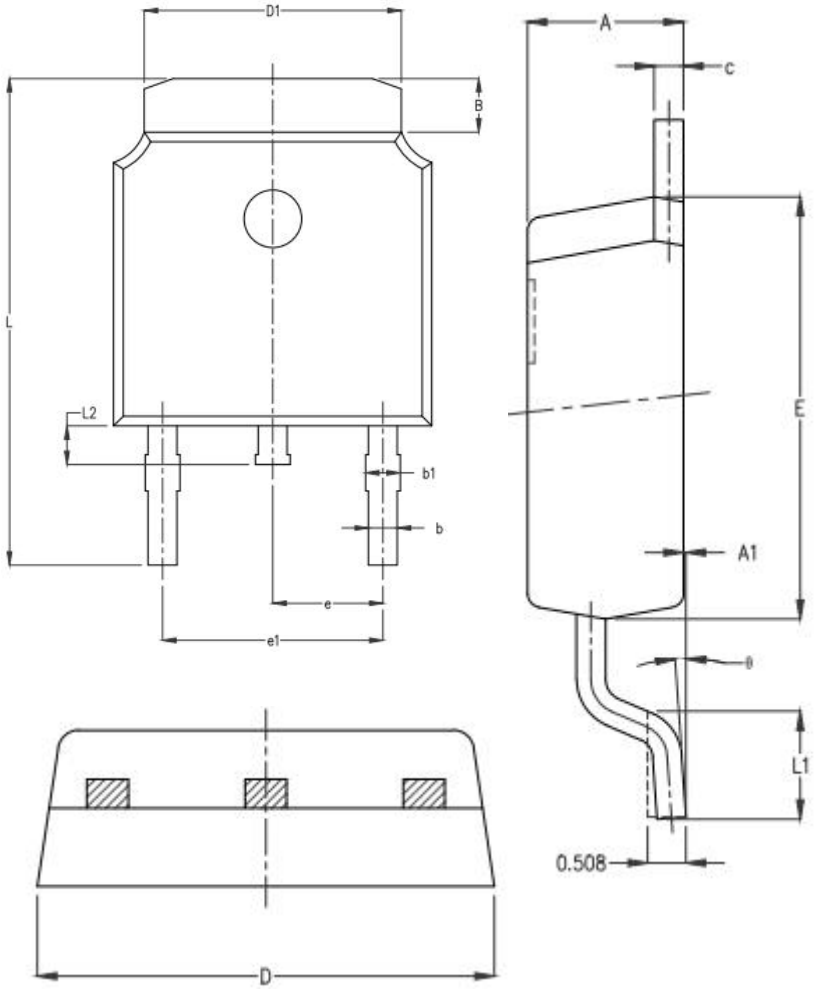


Figure 4:Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

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°