

REASUNOS

RS60N50D

N Channel MOSFET



Lead Free Package and Finish

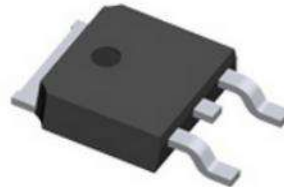
Applications:

- PWM applications
- Load switch
- Power management

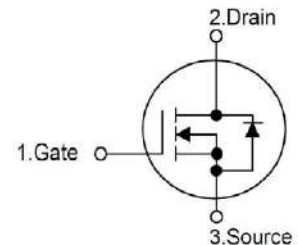
I_D	$R_{DS(ON)}(Max.)$	V_{DSS}
50A	20mΩ	60V

Features:

- $V_{DS}=60V$; $I_D=50A$
 $R_{DS(ON)} < 20m\Omega @ V_{GS} = 10V$
 $R_{ds(on)} < 25m\Omega @ V_{GS} = 4.5V$
- Ultra Low On-Resistance
- High UIS and UIS 100% Test
- RoHS Compliant



TO-252(DPAK) top view



Ordering Information

Part Number	Package	Marking
RS60N50D	TO-252	RS60N50D

Absolute Maximum Ratings $T_c=25^\circ C$ unless otherwise specified

Symbol	Parameter	RS60N50D	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current ($T_c=25^\circ C$)	50	A
	Continuous Drain Current $T_c=100^\circ C$	35	
I_{DM}	Pulsed Drain Current (Note*1)	200	
PD	Power Dissipation ($T_c=25^\circ C$)	89	W
V_{GS}	Gate-to-Source Voltage	± 20	V
EAS	Single Pulse Avalanche Energy (Note*2)	85	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	$^\circ C$
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 175	

*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	RS60N50D	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	1.8	$^\circ C/W$	Drain lead soldered to water cooled heatsink,PD adjusted for a peak junction temperature of $+175^\circ C$.

REASUNOS

RS60N50D

OFF Characteristics TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	60	--	--	V	VGS=0V, ID=250μA
IDSS	Drain-to-Source Leakage Current	--	--	1	μA	VDS=60V, VGS=0V
IGSS	Gate-to-Source Forward Leakage	--	--	100	nA	VGS=+20V VDS=0V
	Gate-to-Source Reverse Leakage	--	--	-100		VGS=-20V VDS=0V

ON Characteristics TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance (Note*3)	--	14.0	20.0	mΩ	VGS=10V, ID=30A
		--	17.0	25.0	mΩ	VGS=4.5V, ID=30A
VGS(TH)	Gate Threshold Voltage	1.2	1.6	2.5	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	--	7.4	--	nS	VDS=30V VGS=10V RL=6.7 RG=3Ω
trise	Rise Time	--	5.1	--		
td(OFF)	Turn-OFF Delay Time	--	28.2	--		
tfall	Fall Time	--	5.5	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	2050	--	pF	VGS=0V VDS=30 Vf=1.0MHz
Coss	Output Capacitance	--	158	--		
Crss	Reverse Transfer Capacitance	--	120	--		
Qg	Total Gate Charge	--	50	--	nC	VDS=30V ID=20A VGS=10V
Qgs	Gate-to-Source Charge	--	6	--		
Qgd	Gate-to-Drain("Miller") Charge	--	15	--		

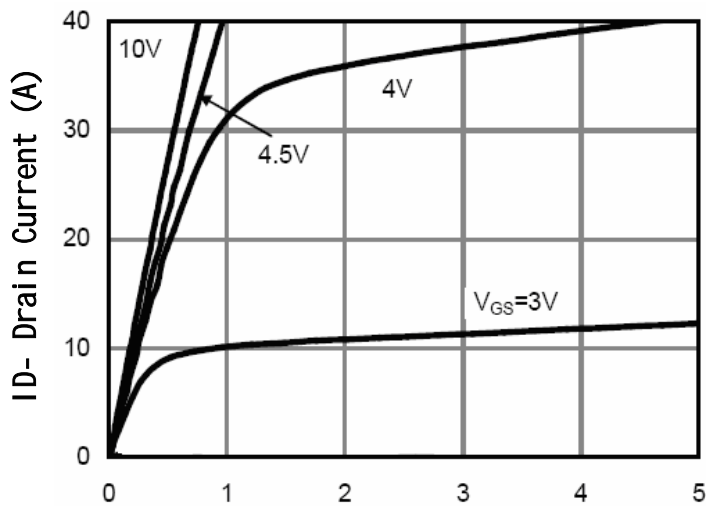
Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
ISD	Source-Drain Current(Body Diode)	--	--	50	A	
ISDM	Pulsed Source-Drain Current(Body Diode)	--	--	200	A	Maximum Pulsed Drain to Source Diode Forward Current
VSD	Diode Forward Voltage	--	--	1.2	V	IS=20A, VGS=0V
trr	Reverse Recovery Time	--	28	--	nS	VGS=0V
Qrr	Reverse Recovery Charge	--	40	--	nC	IF=120A, di/dt=100A/μs

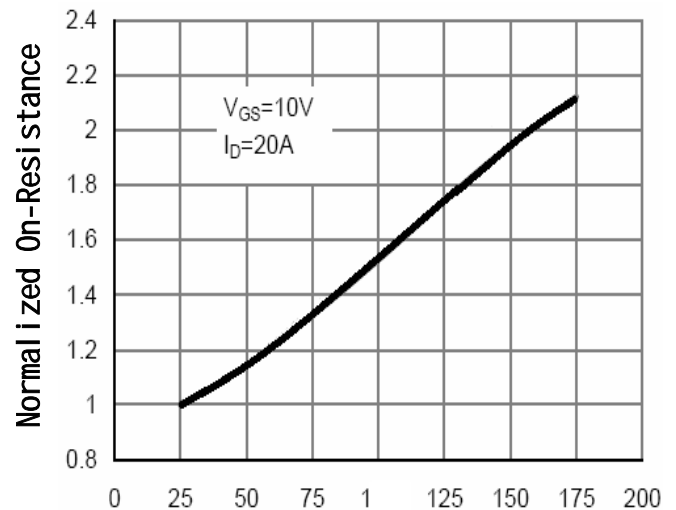
Notes:

- *1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- *2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$
- *3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

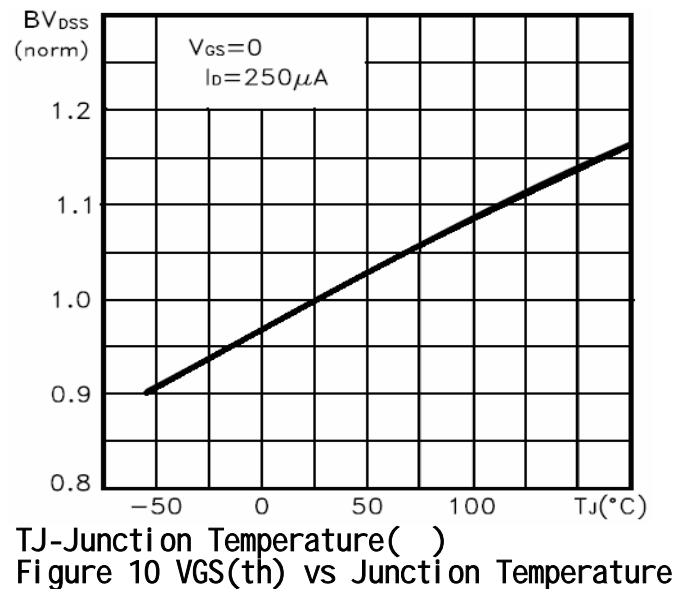
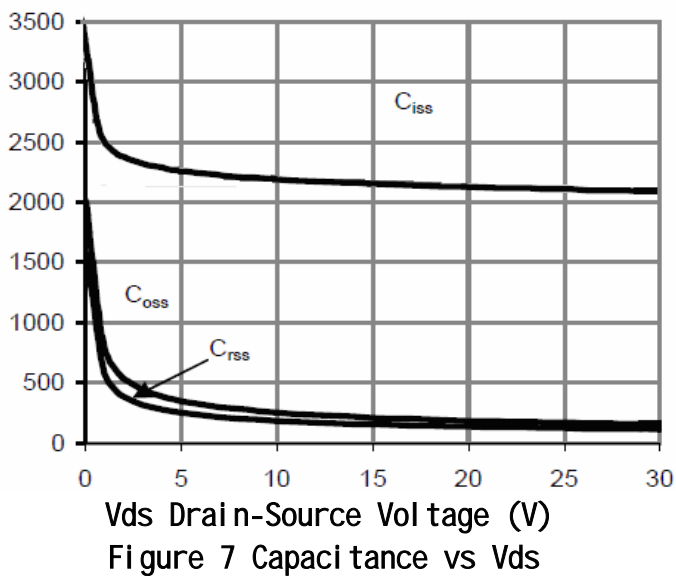
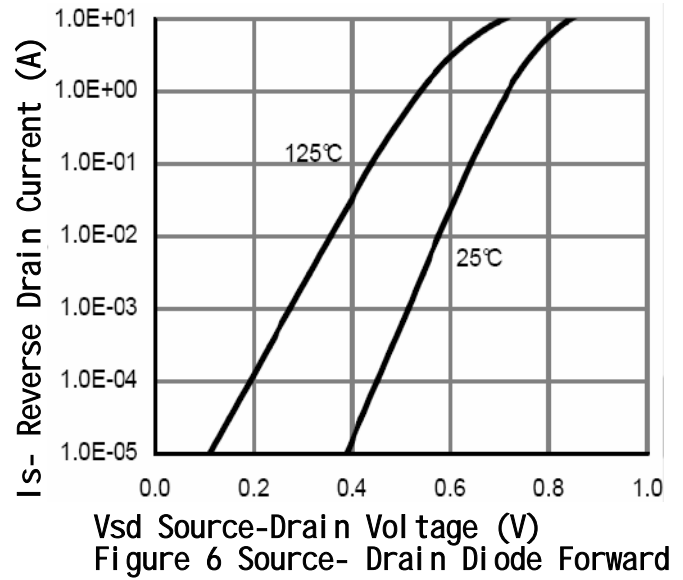
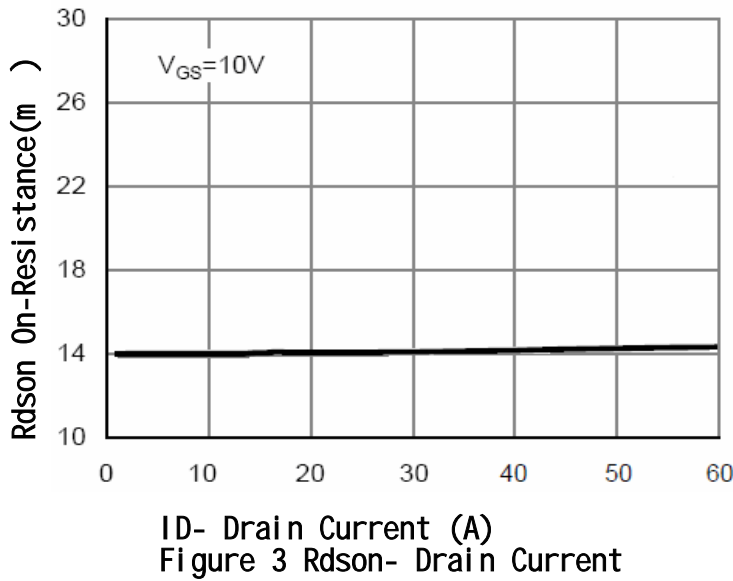
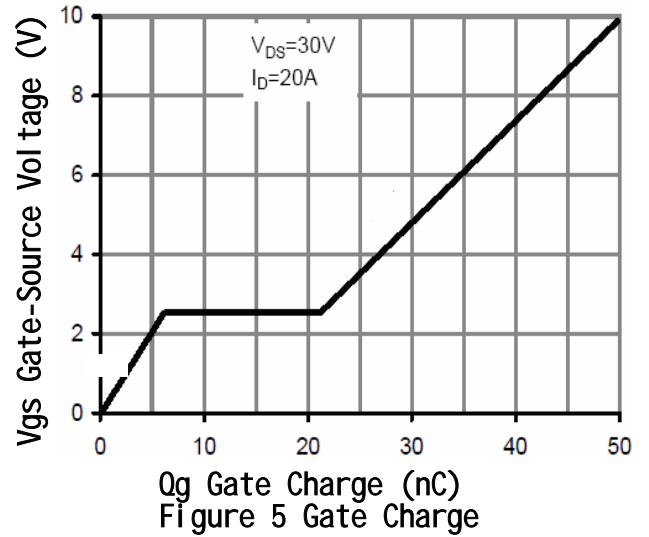
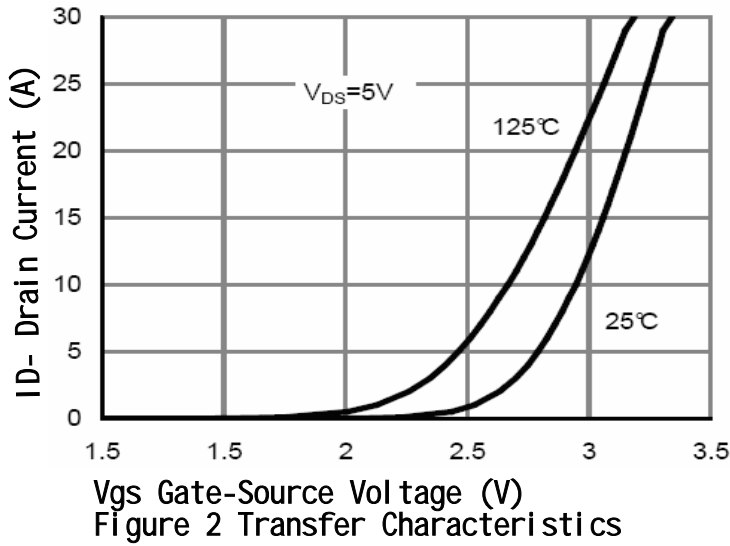
Typical Electrical and Thermal Characteristics (Curves)

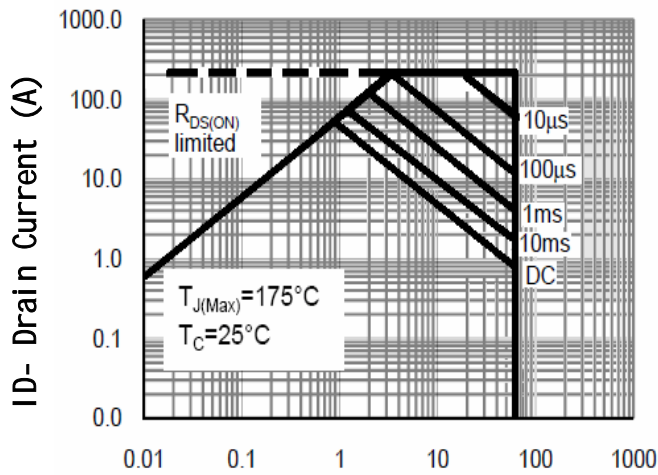


V_{DS} Drain-Source Voltage (V)
Figure 1 Output Characteristics

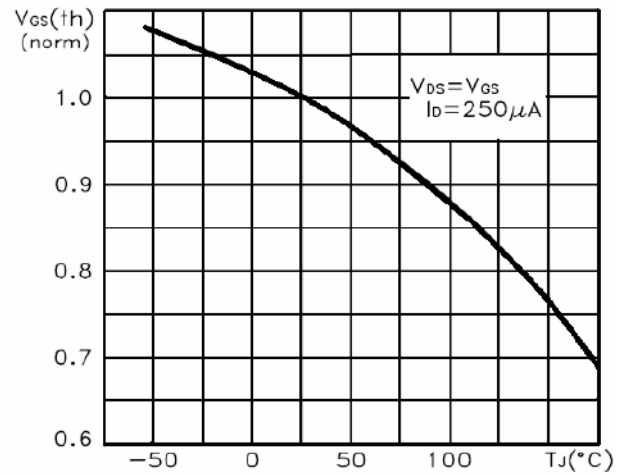


T_J -Junction Temperature ($^{\circ}\text{C}$)
Figure 4 $R_{DS(on)}$ -Junction Temperature

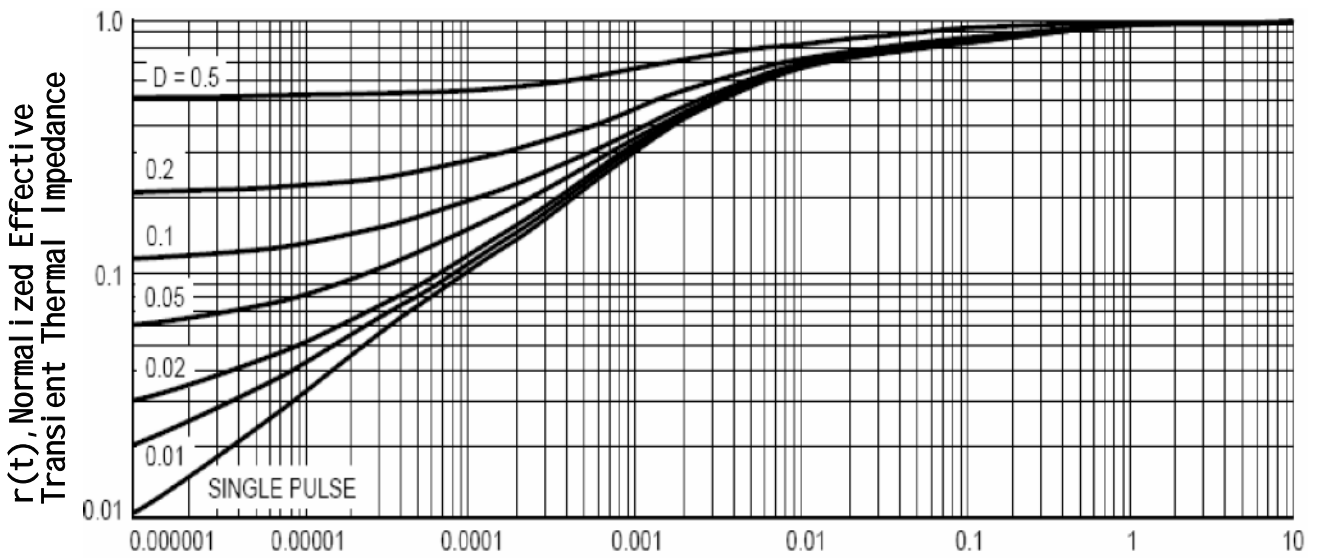




Vds Drain-Source Voltage (V)
 Figure 8 Safe Operation Area



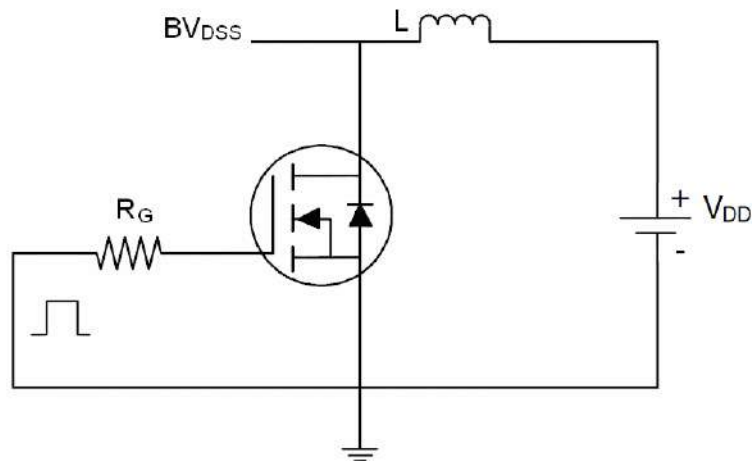
TJ-Junction Temperature()
 Figure 10 VGS(th) vs Junction Temperature



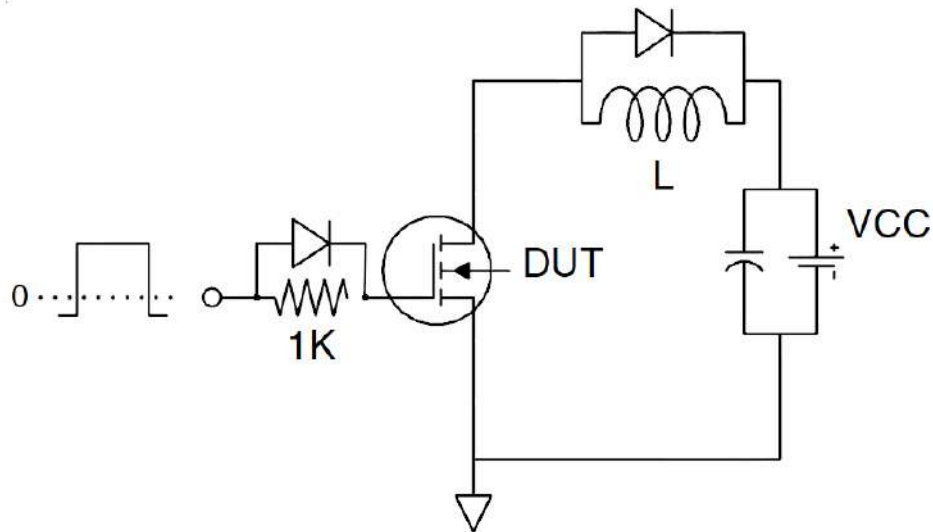
Square Wave Pulse Duration (sec)
 Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

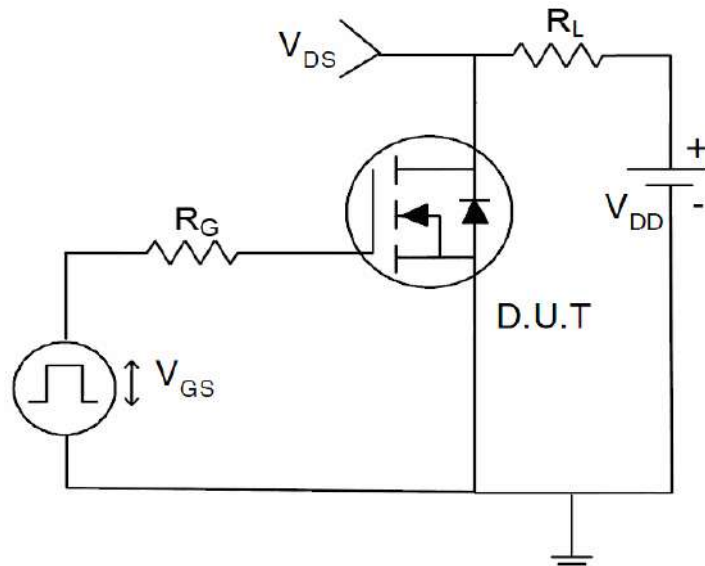
1) EAS test Circuit



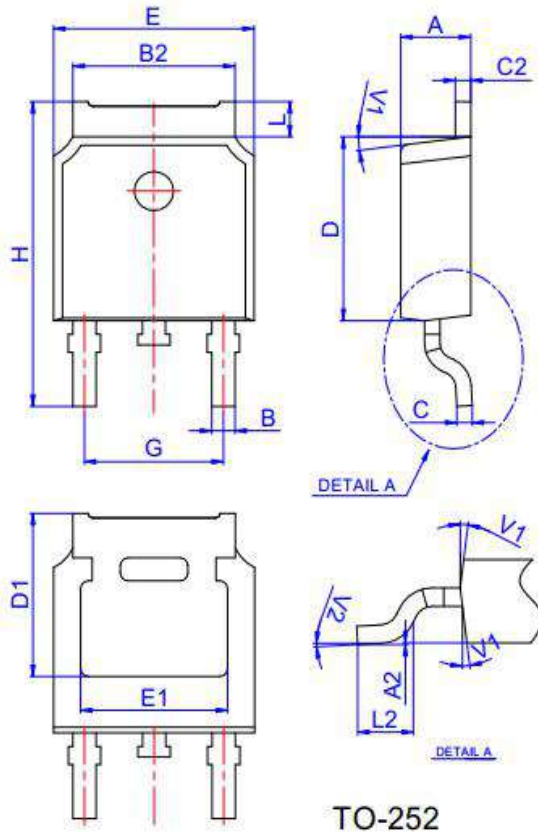
2) Gate charge test Circuit



3) Switch Time Test Circuit



Package outline drawing



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

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