

60V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX.}$	I_D
60V	20mΩ	50A

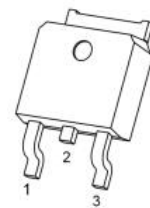
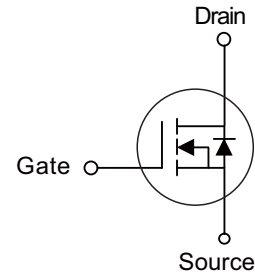
Feature

- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- 60V, 50A, $R_{DS(ON)Max.} = 20mΩ @ V_{GS} = 10V$
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Application

- Portable Equipment and Battery Powered systems.
- Power Management in Notebook Computer

Symbol



TO-252(G:1 D:2 S:3)

Absolute maximum ratings (Ta=25°C unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	50	A
	Pulsed (Note 2)	I_{DM}	100	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	66	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.4	V/ns
Power Dissipation		P_D	28	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L = 0.1 mH, $I_{AS} = 25A$, $V_{DD} = 25V$, $R_G = 25Ω$, Starting $T_J = 25°C$.

4. $I_{SD} \leq 30A$, di/dt ≤ 200A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J = 25°C$.

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	65 (Note)	°C/W
Junction to Case	θ_{JC}	4.46 (Note)	°C/W

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

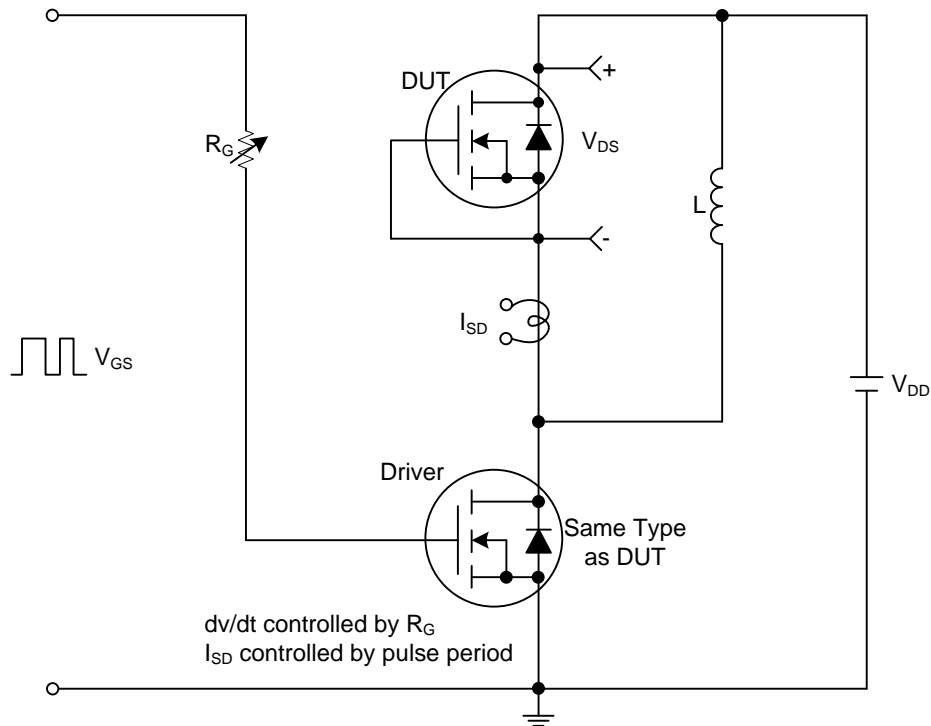
Electrical characteristics (T_A=25 °C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			1.0	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
On characteristics							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =25A		16	20	mΩ
			V _{GS} =4.5V, I _D =20A		20	24	mΩ
Dynamic characteristics							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1820		pF
Output Capacitance		C _{OSS}			220		pF
Reverse Transfer Capacitance		C _{RSS}			180		pF
Switching characteristics							
Total Gate Charge (Note 1)		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =50A, I _G =100μA (Note 1, 2)		62		nC
Gate to Source Charge		Q _{GS}			7		nC
Gate to Drain Charge		Q _{GD}			18		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =50A, R _G =3Ω (Note 1, 2)		8		ns
Rise Time		t _R			18		ns
Turn-off Delay Time		t _{D(OFF)}			44		ns
Fall-Time		t _F			22		ns
Source-drain diode ratings characteristics							
Maximum Body-Diode Continuous Current		I _S				50	A
Maximum Body-Diode Pulsed Current		I _{SM}				100	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =50A, V _{GS} =0V			1.3	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		102		nS
Reverse Recovery Charge		Q _{rr}	dl _F /dt =100A/μs		140		nC

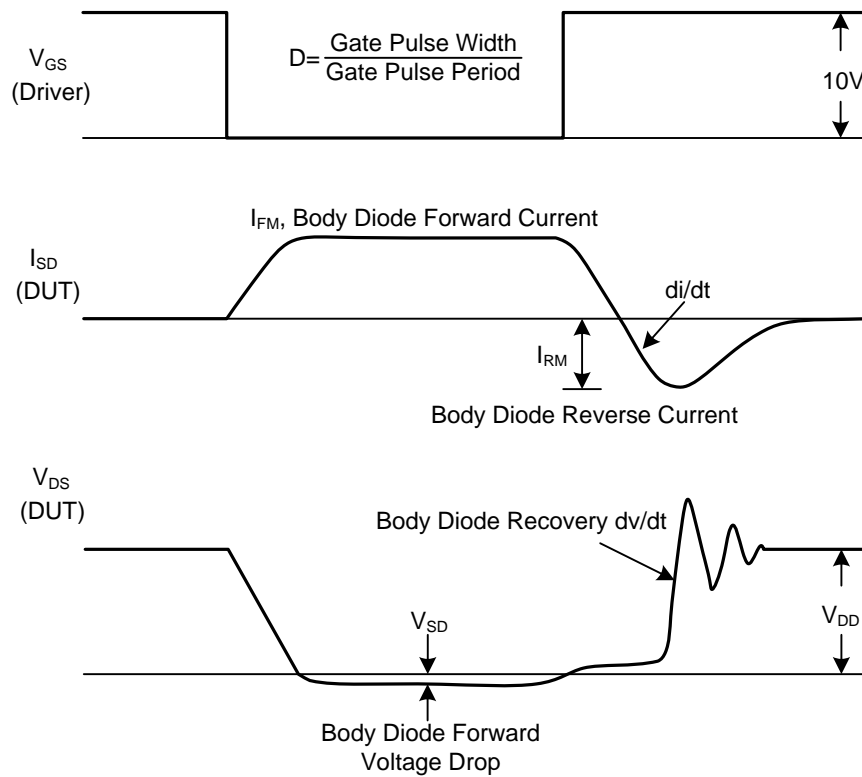
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

TEST CIRCUITS AND WAVEFORMS

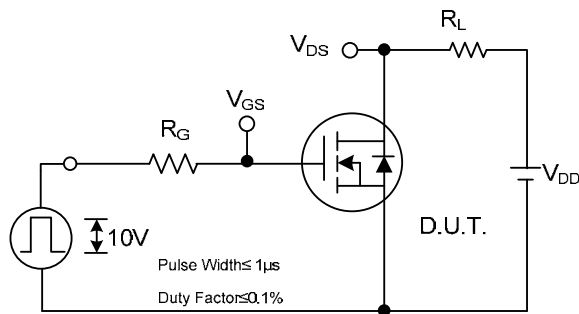
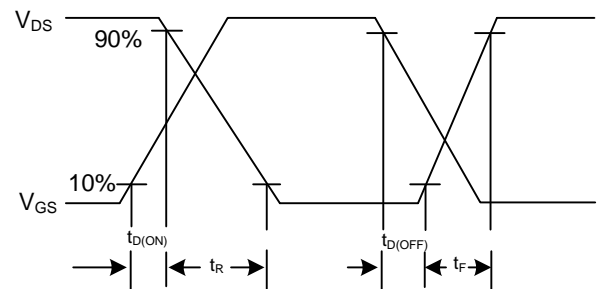
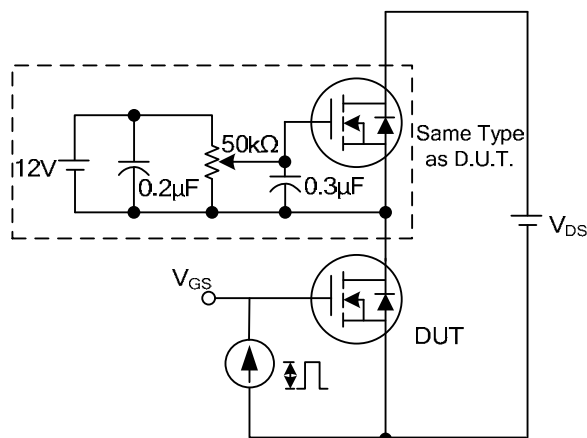
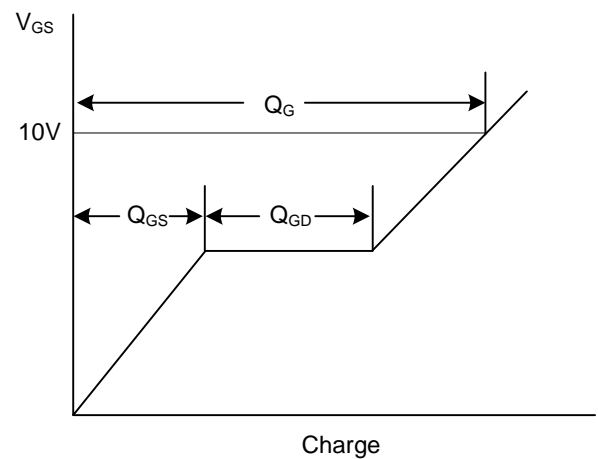
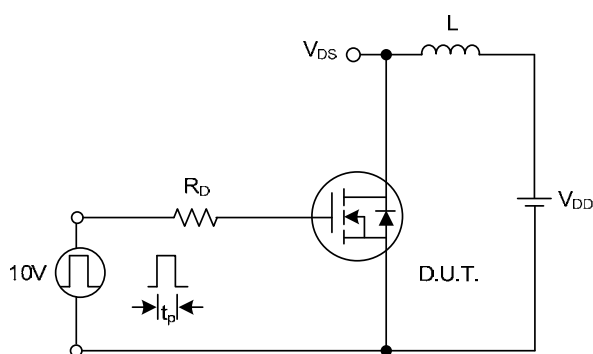
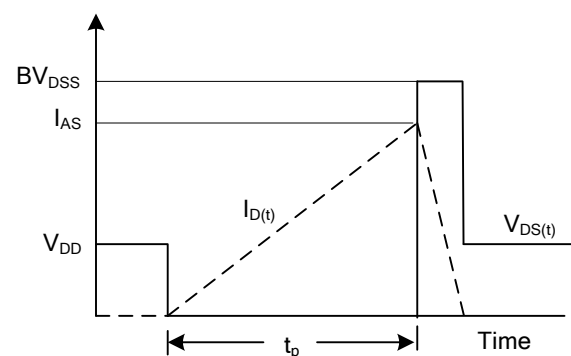


Peak Diode Recovery dv/dt Test Circuit

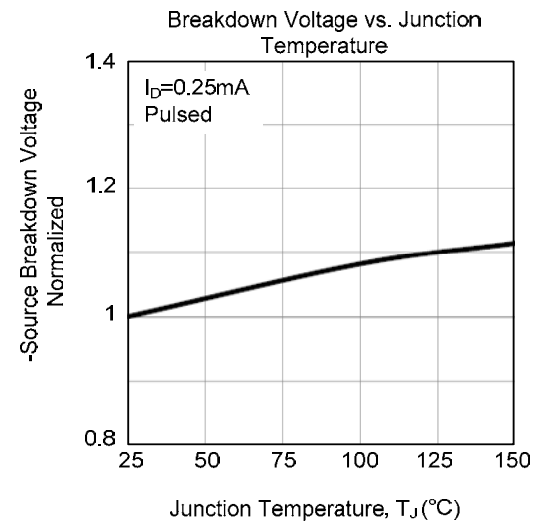
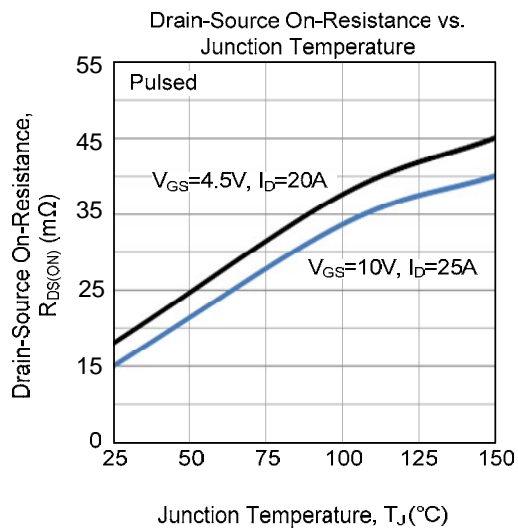
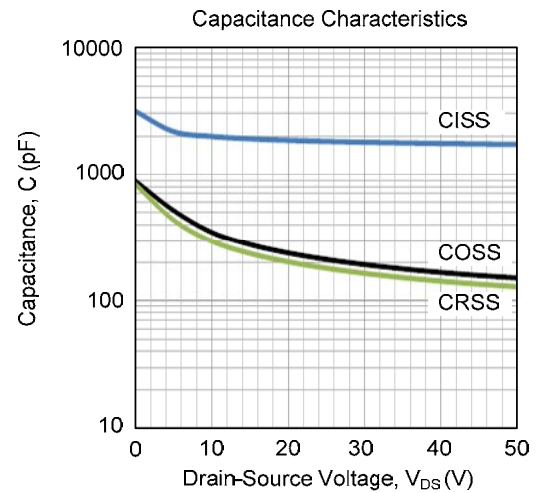
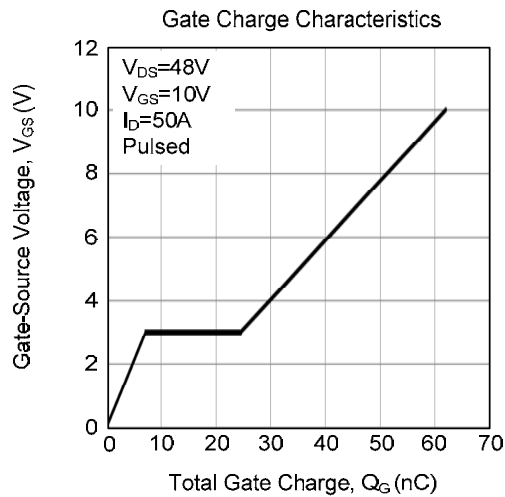
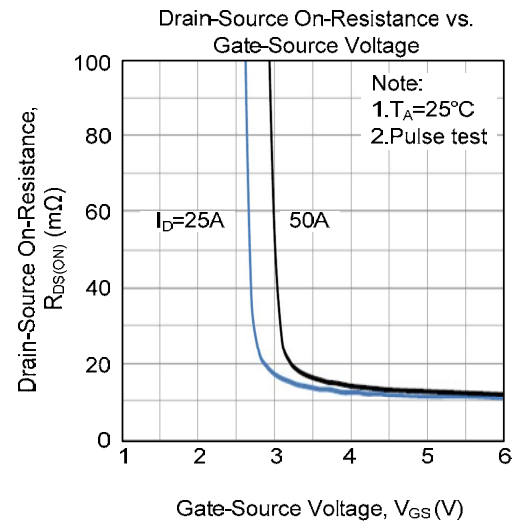
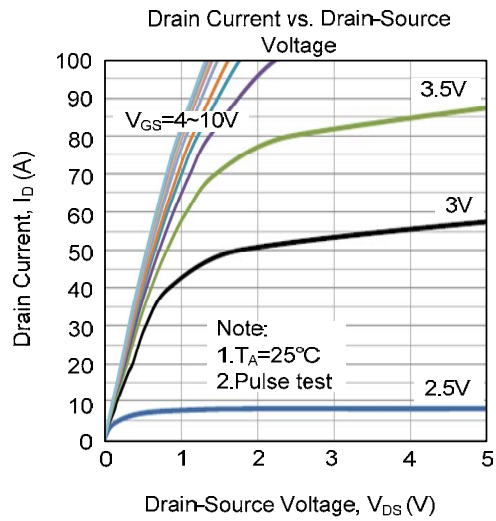


Peak Diode Recovery dv/dt Test Circuit and Waveforms

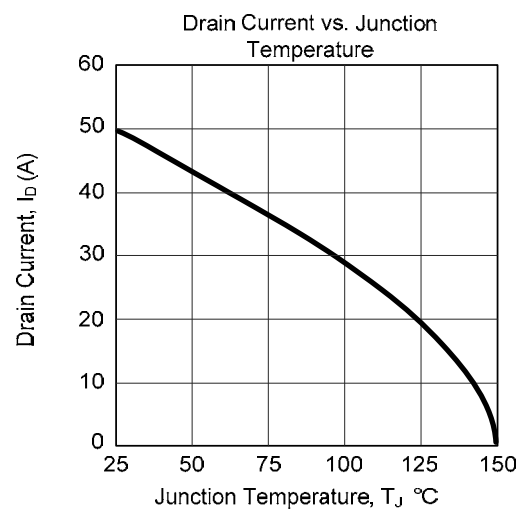
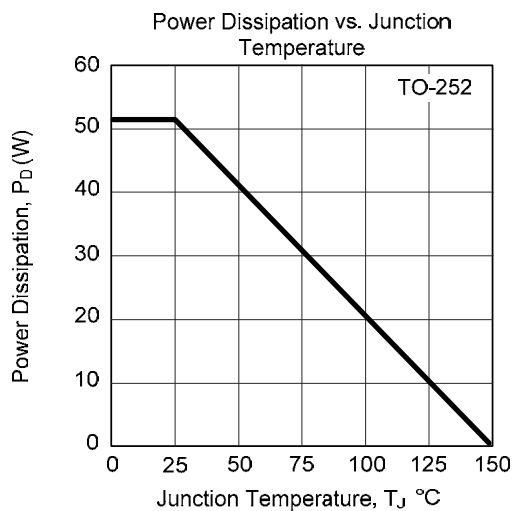
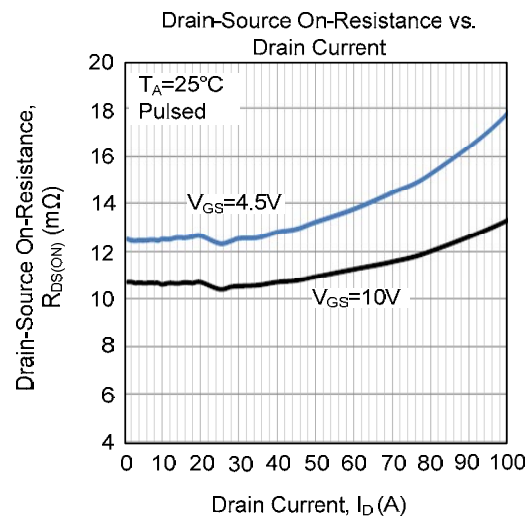
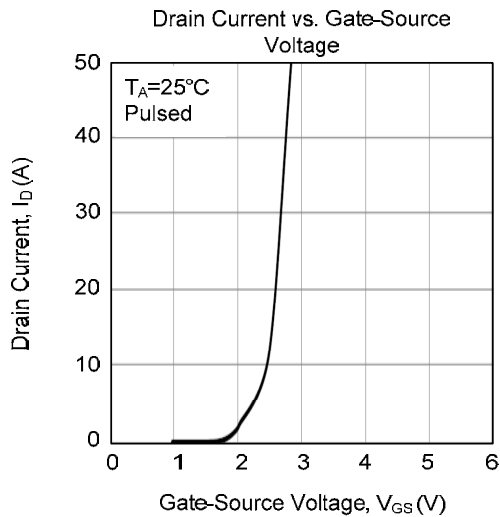
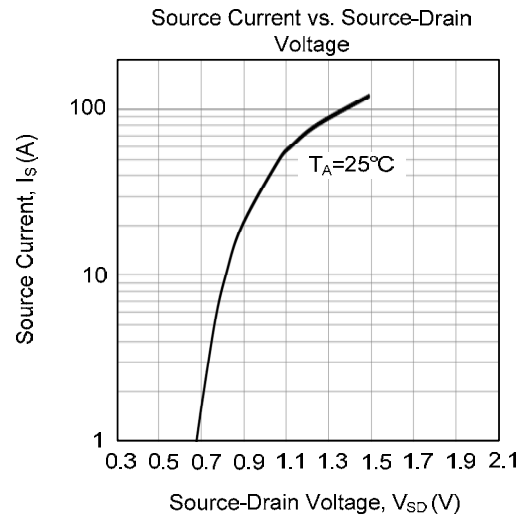
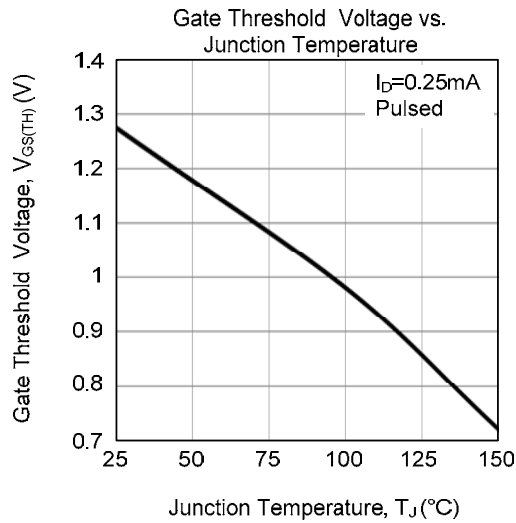
Peak Diode Recovery dv/dt Waveforms

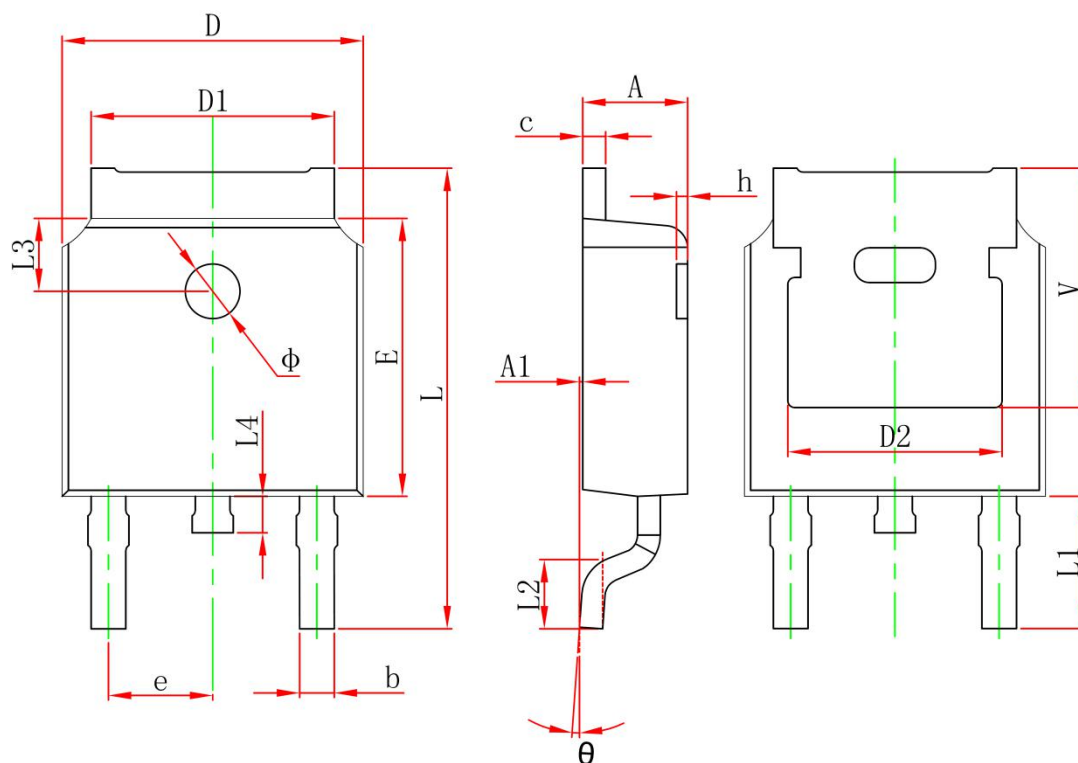
TEST CIRCUITS AND WAVEFORMS(Cont.)

Switching Test Circuit

Switching Waveforms

Gate Charge Test Circuit

Gate Charge Waveform

Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS(Cont.)



TO-252 Package Mechanical Data


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

V 1.0