



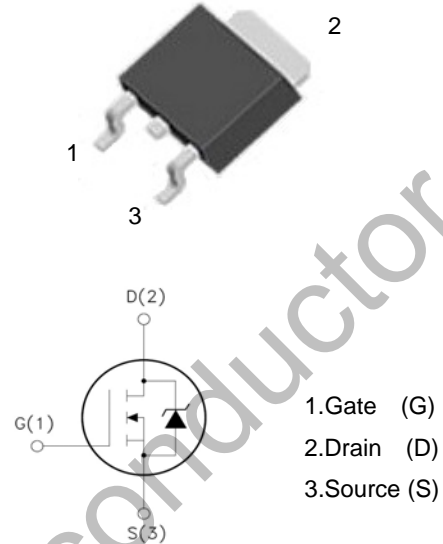
WGD50N06S

60V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 40nC (Typ.).
- VDSS=60V, ID=50A
- RDS(on) : 0.02Ω (Max) @VG=10V
- 100% Avalanche Tested

TO-252



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Maximum	Unit
V _{DSS}	Drain-to-Source Voltage	60	V
V _{GSS}	Gate-to-Source Voltage	±25	V
I _D ³	Continuous Drain Current	T _C =25°C	50
		T _C =100°C	35
I _{DP} ⁴	Pulsed Drain Current	200	A
I _{AS} ⁵	Avalanche Current	15	
E _{AS} ⁵	Avalanche energy	300	mJ
PD	Maximum Power Dissipation	T _C =25°C	85
		T _C =100°C	57
T _J , T _{STG}	Junction & Storage Temperature Range	-55~175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
R _{θjc}	Thermal Resistance-Junction to Case	1.8	°C/W
R _{θja}	Thermal Resistance-Junction to Ambient	62.5	

Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	—	—	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V	—	—	1	uA
		T _J =125°C	—	—	100	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	—	3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V	—	—	±100	nA
R _{DS(on)} ¹	Drain-Source On-Resistance	V _{GS} =10V, I _D =25A	—	—	20	mΩ
			—	—	—	
Diode Characteristics						
V _{SD} ¹	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	—	0.8	1.2	V
I _S ³	Diode Continuous Forward Current		—	—	50	A
t _{rr}	Reverse Recovery Time	I _F =20A, di/dt=100A/u	—	28	—	nS
Q _{rr}	Reverse Recovery Charge	s	—	40	—	nC
Dynamic Characteristics²						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V Frequency=1MHz	—	2050	—	pF
C _{oss}	Output Capacitance		—	158	—	
C _{rss}	Reverse Transfer Capacitance		—	120	—	
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, I _D =25A, V _{GS} =10V, R _G =3Ω	—	7.4	—	nS
t _r	Rise Time		—	5.1	—	
t _{d(off)}	Turn-Off Delay Time		—	28.2	—	
t _f	Fall Time		—	5.5	—	
Gate Charge Characteristics²						
Q _g	Total Gate Charge	V _{DS} =48V, V _{GS} =10V I _D =25A	—	50	—	nC
Q _{gs}	Gate-to-Source Charge		—	6.0	—	
Q _{gd}	Gate-to-Drain Charge		—	15	—	

Note: 1: Pulse test; pulse width ≤ 300us, duty cycle ≤ 2%.

2: Guaranteed by design, not subject to production testing.

3: Package limitation current is 50A. Calculated continuous current based on maximum allowable junction temperature.

4: Repetitive rating, pulse width limited by max junction temperature.

5: Starting T_J = 25°C, L = 0.5mH, I_{AS} = 31A.

Typical Characteristics

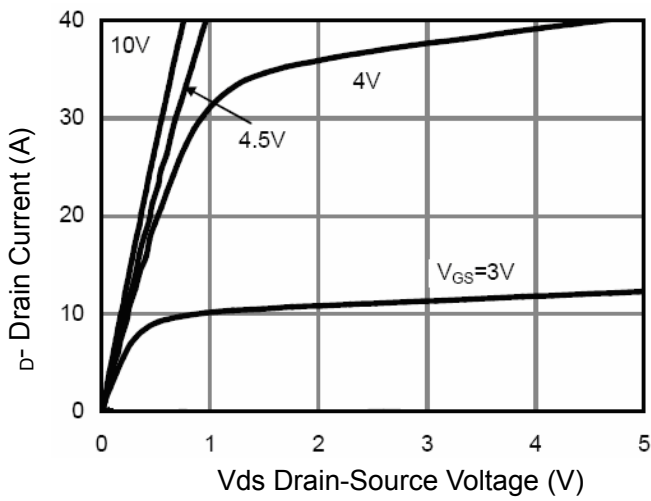


Figure 1 Output Characteristics

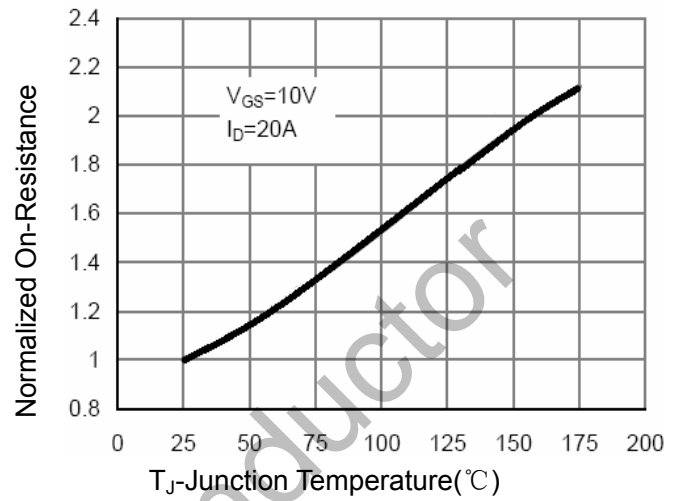


Figure 4 Rdson-Junction Temperature

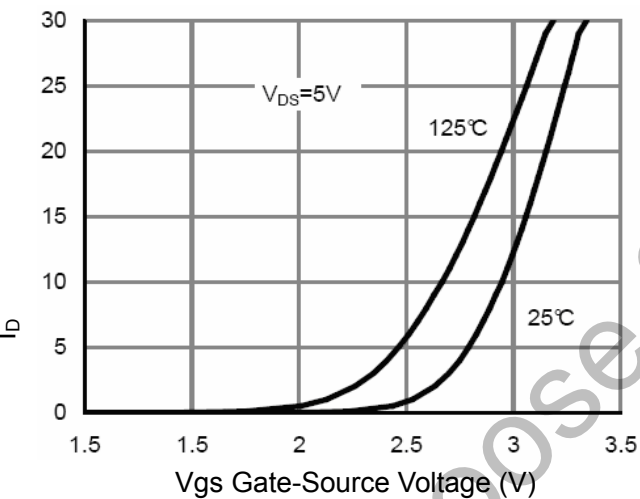


Figure 2 Transfer Characteristics

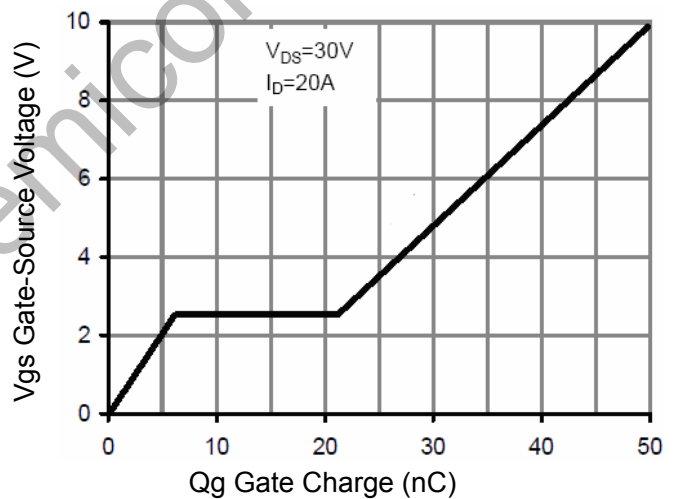


Figure 5 Gate Charge

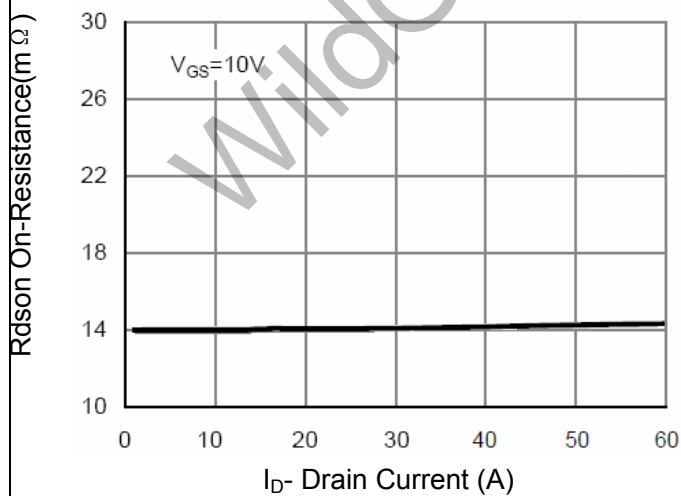


Figure 3 Rdson- Drain Current

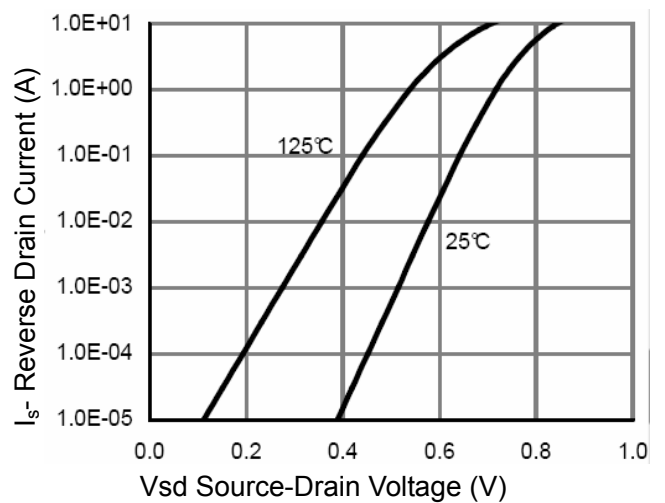


Figure 6 Source- Drain Diode Forward

Typical Characteristics (Continued)

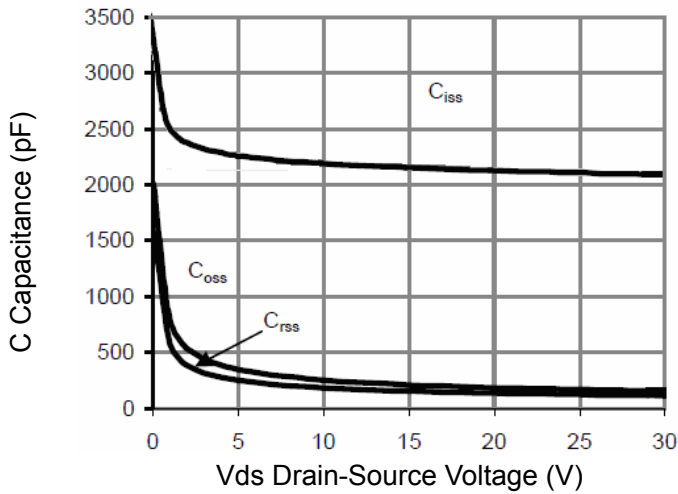


Figure 7 Capacitance vs Vds

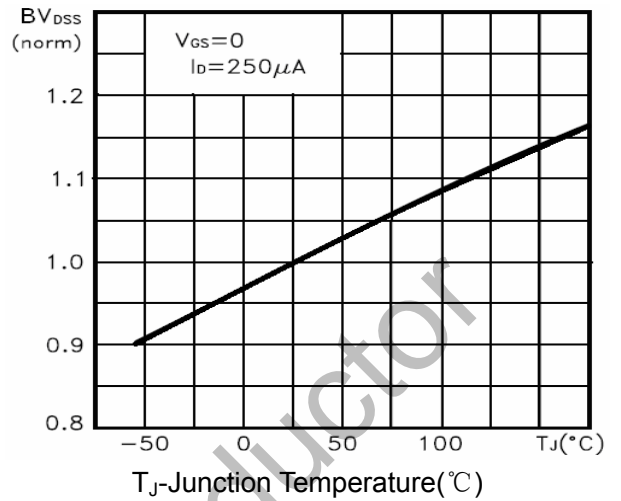


Figure 9 BV_{DSS} vs Junction Temperature

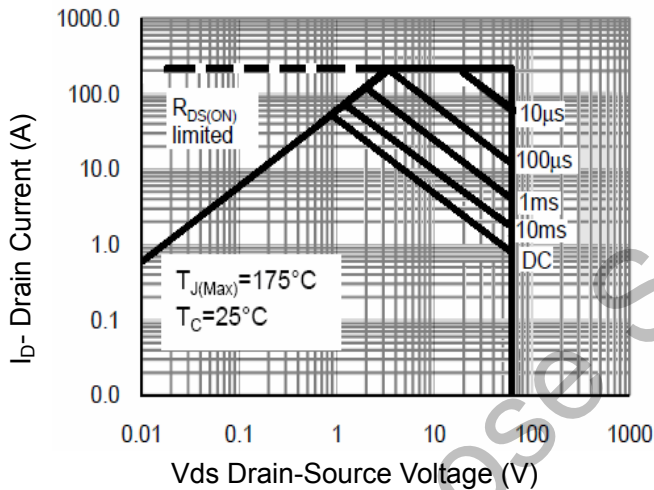


Figure 8 Safe Operation Area

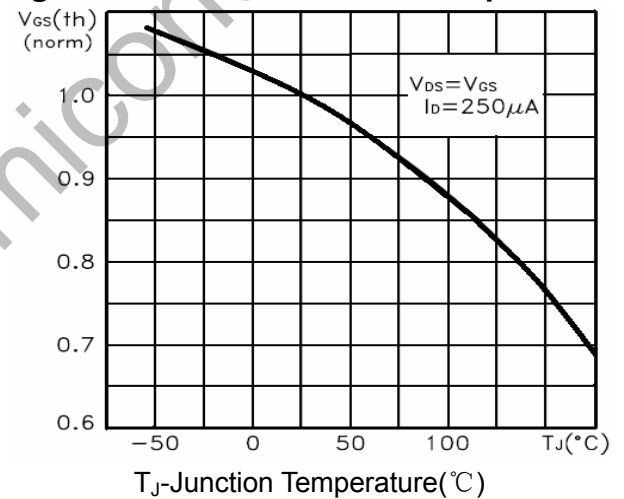


Figure 10 $V_{GS(th)}$ vs Junction Temperature

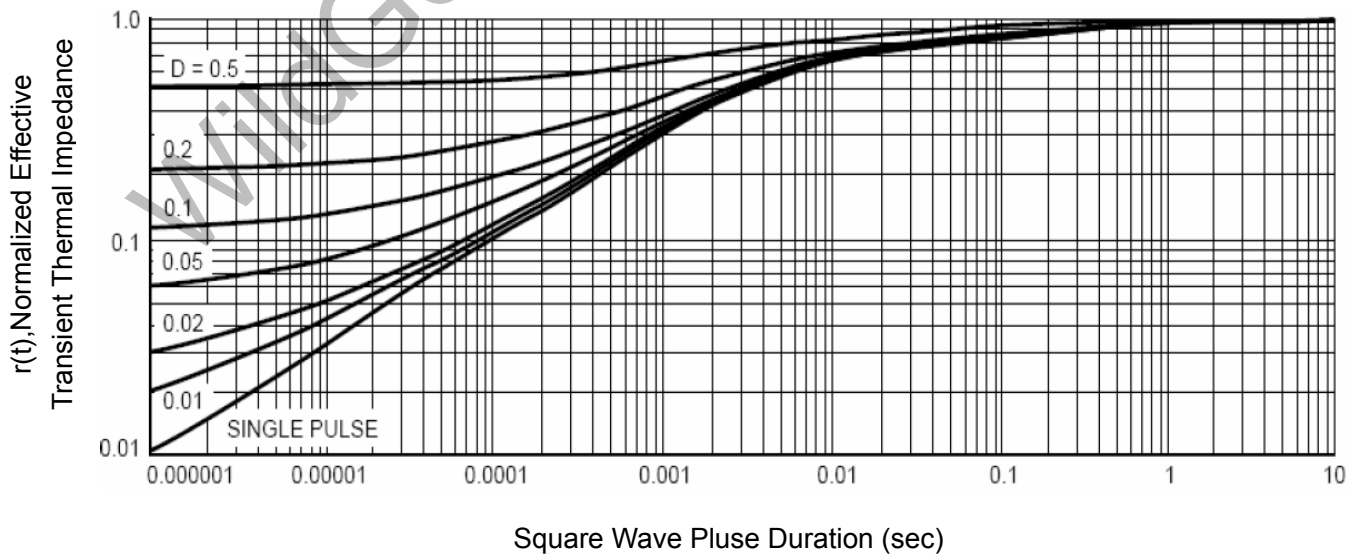
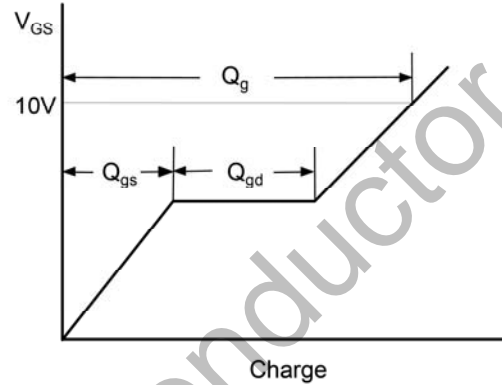
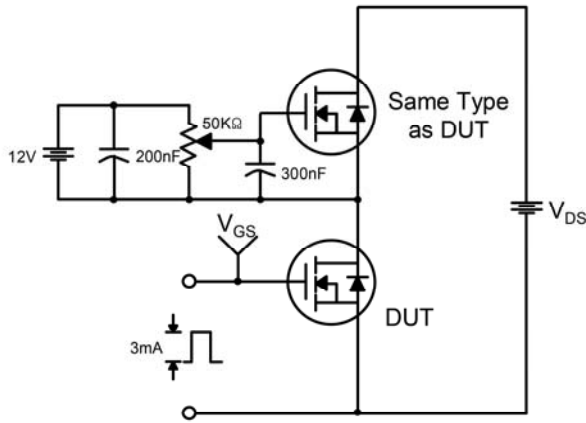
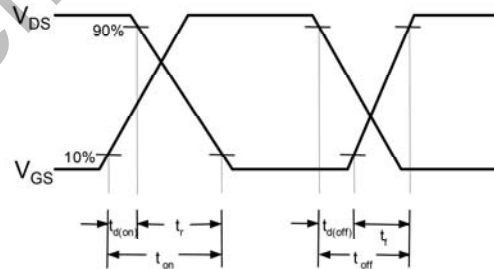
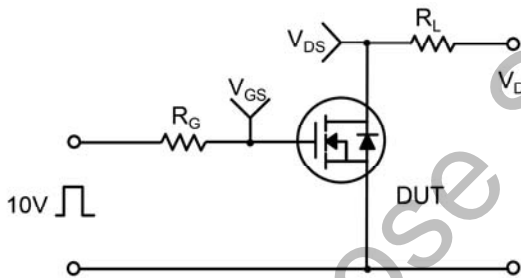


Figure 11 Normalized Maximum Transient Thermal Impedance

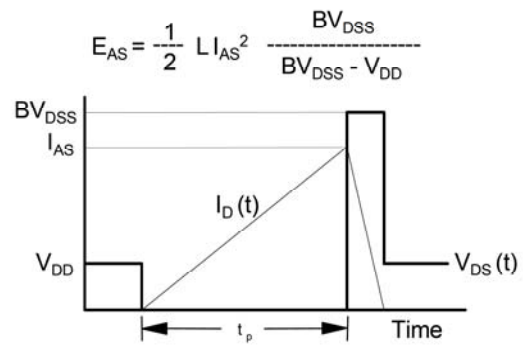
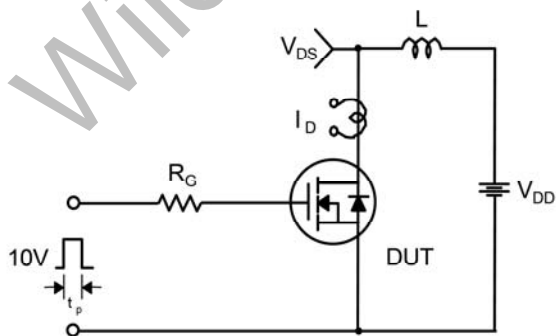
Gate Charge Test Circuit & Waveform



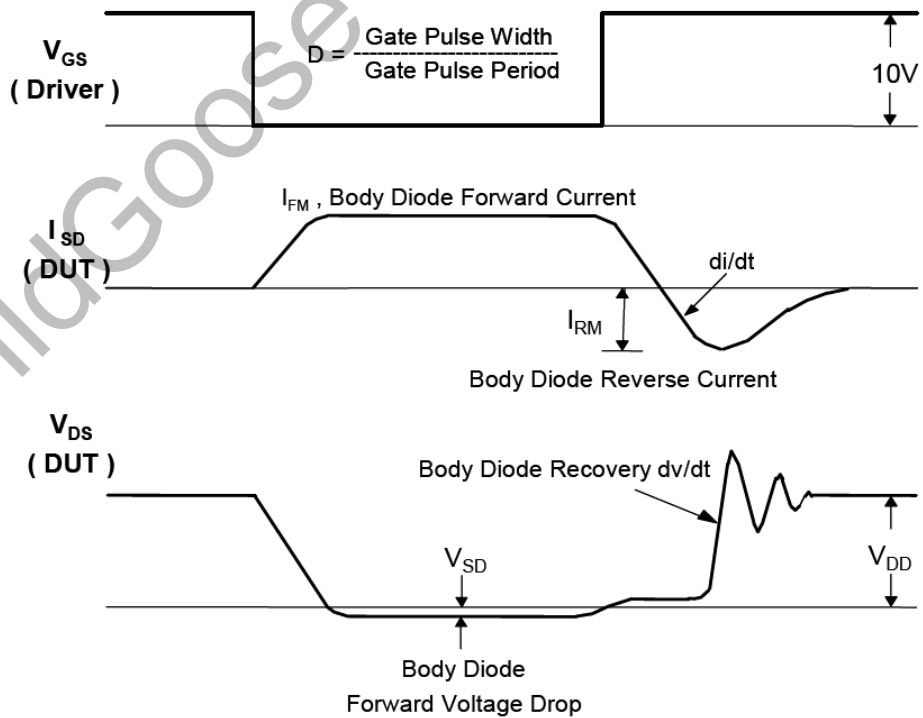
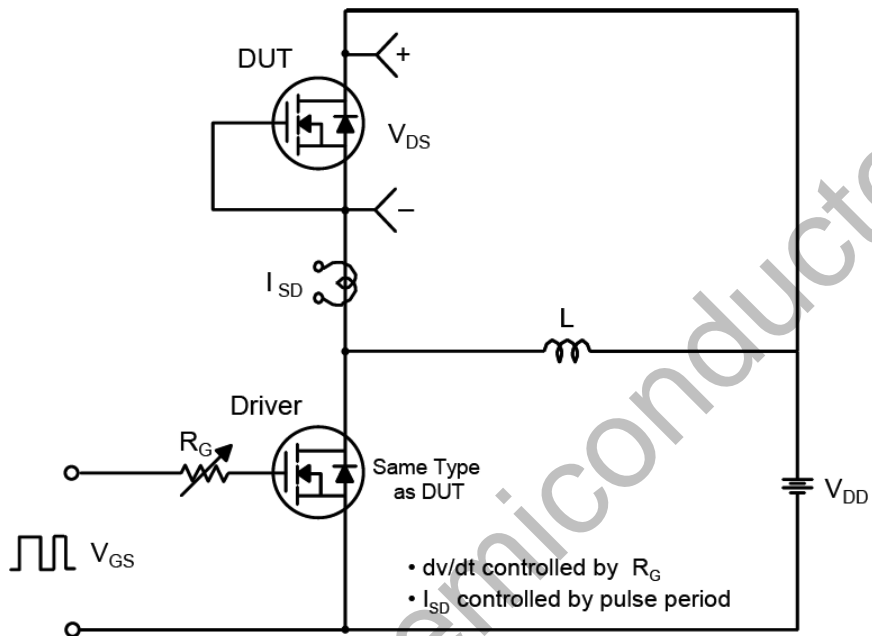
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



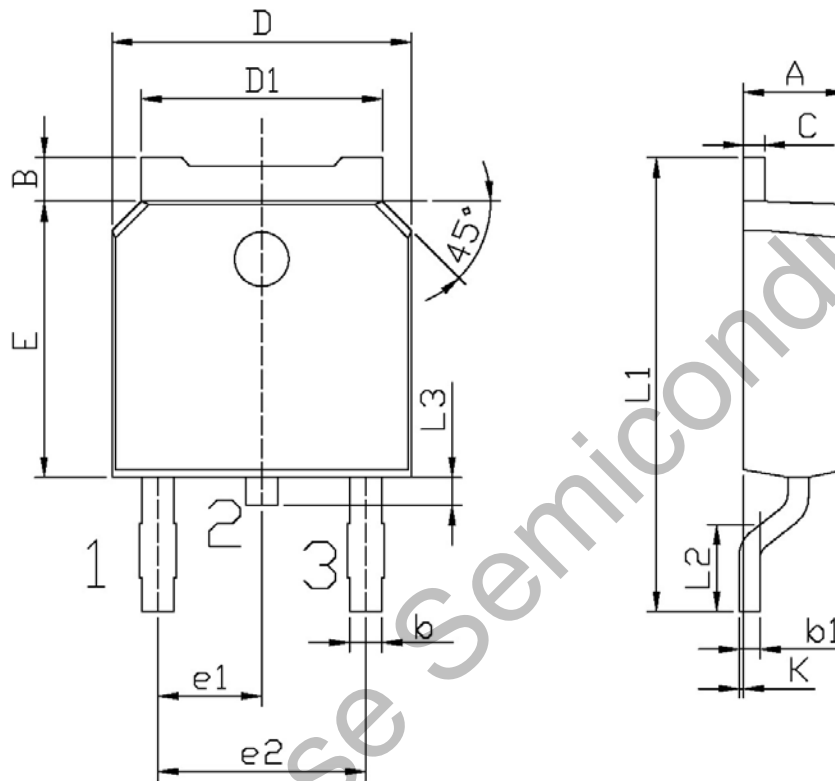
Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-252

Units: mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10