N-Channel Power MOSFET MEM2502SG

General Description

MEM2502, the silicon N-channel Enhanced VDMOSFETs, is obtained by the high density Trench technology. Which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is SOP8, which accords with the RoHS standard.

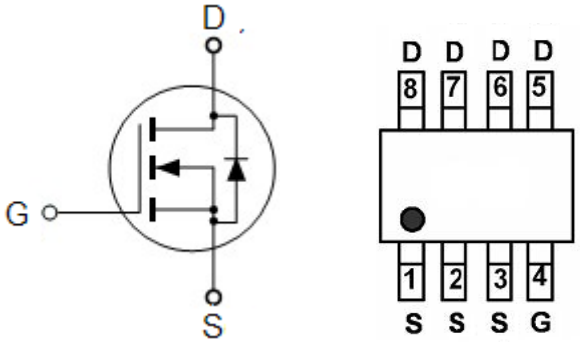
Features

- Low On-Resistance 60V/16A

  $R_{DS(ON)}$ =7mΩ@ V_{GS}=10V,I_D=8A

  $R_{DS(ON)}$ =8.5mΩ@ V_{GS}=4.5V,I_D=8A
- Fast switching
- Low gate charge
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- Surface mount package:SOP8

Pin Configuration



Typical Application

- Power switch circuit of adaptor and charger.

Maximum Ratings (Ta=25℃)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	60	V
Drain Current	T_A=25℃	I_D	16	A
	T_A=100℃		8	
Pulsed Drain Current		I_{DM}[1]	64	A
Gate-Source Voltage		V_{GS}	±20	V
Single Pulse Avalanche Energy		E_{AS}[2]	320	mJ
Peak Diode Recovery		dv/dt [3]	3.0	V/ns
Total Power Dissipation	T_A=25℃	Pd	1.78	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	150, -55~150	℃
Maximum soldering temperature		T_L	300	℃

Thermal Characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Ambient[3]	$R_{\theta JA}$	70	℃/W

Electrical Characteristics

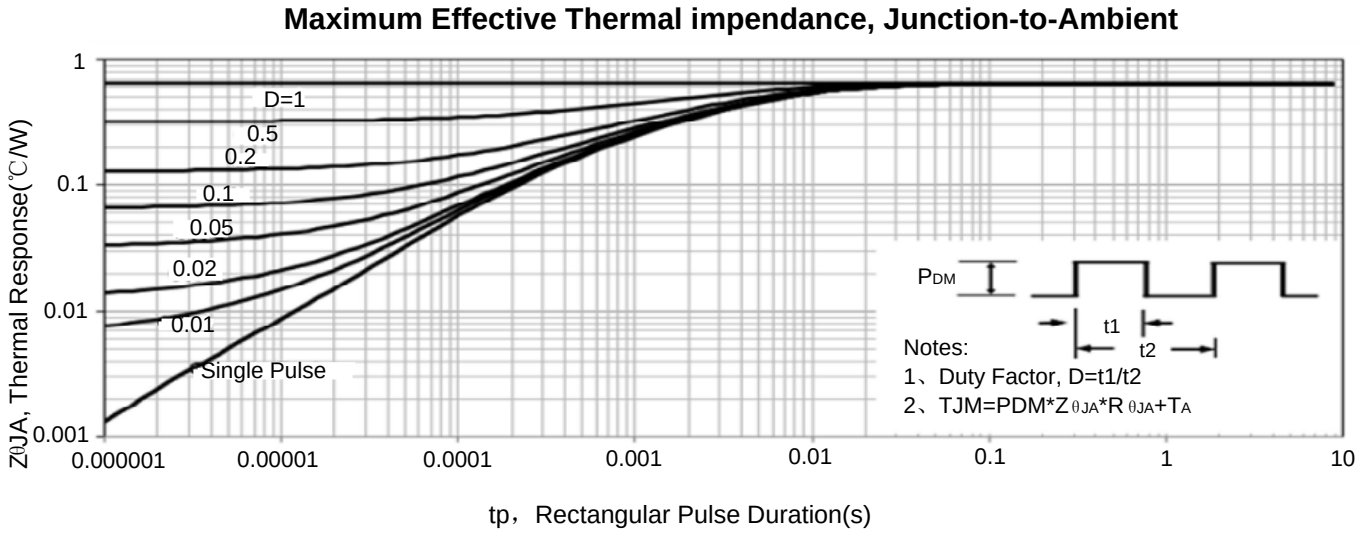
Parameter		Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	60	-	-	V
Gate Threshold Voltage		$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	1.0	-	3.0	V
Gate-Body Leakage		I_{GSS}	V_{DS}=0V，V_{GS}=20V	-	-	100	nA
			V_{DS}=0V，V_{GS}=-20V	-	-	-100	nA
Zero Gate Voltage Drain Current	T_A=25℃	I_{DSS}	V_{DS}=60V V_{GS}=0V	-	-	1	μA
	T_A=125℃		V_{DS}=48V V_{GS}=0V	-	-	100	μA
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=8A	-	7	10	mΩ
			V_{GS}=4.5V, I_D=8A		8.5	12	mΩ
Forward Trans conductance		g_{FS}	V_{DS} =15V, I_D= 8A	-	65	-	S
Drain-Source Diode Forward Continuous Current		Is	V_{GS}=0V	-	-	16	A
Source-drain (diode forward) voltage		V_{SD}	V_{GS}=0V,I_S=8A	0.5	-	1.5	V
Dynamic Characteristics							
Input Capacitance		Ciss	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	-	4398	-	pF
Output Capacitance		Coss		-	296	-	
Reverse Transfer Capacitance		Crss		-	220	-	
Switching Characteristics							
Turn-On Delay Time		td(on)	V_{DD} = 30 V, R_G = 9.1Ω V_{GS} = 10V, I_D = 8A	-	25.3	-	ns
Rise Time		tr		-	95.7	-	
Turn-Off Delay Time		td(off)		-	154	-	
Fall-Time		tf		-	77.9	-	
Total Gate Charge		Qg	V_{DD} = 30V, V_{GS} = 10V, I_D = 8A		88.8	-	nc
Gate-Source Charge		Qgs		-	17.3	-	
Gate-Drain Charge		Qgd		-	17.4	-	

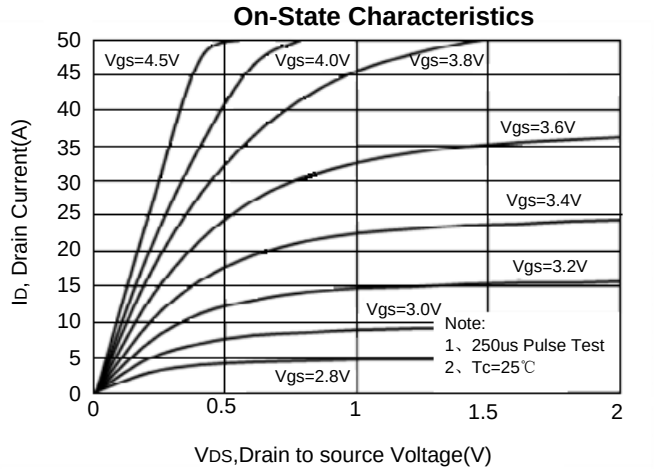
1、Repetitive rating, pulse width limited by junction temperature.

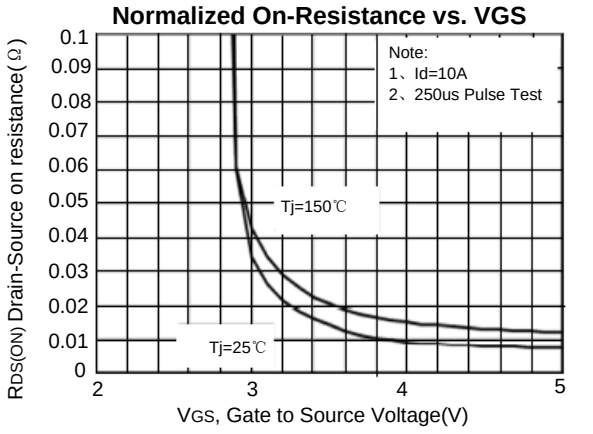
2、L=10.0mH, I_D=8A, Start T_J=25℃

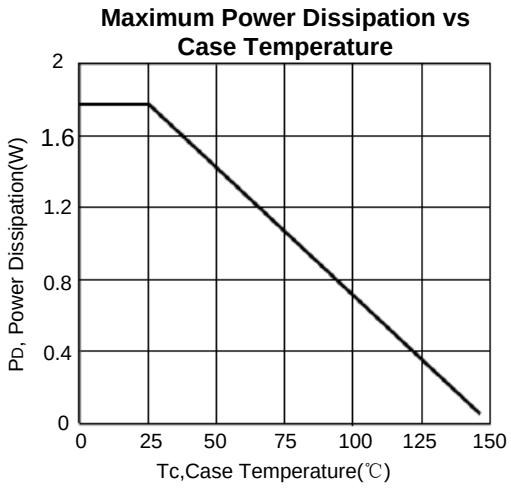
3、I_{SD} =8A, di/dt≤100A/us, VDD≤BV_{DS}, Start T_J=25℃

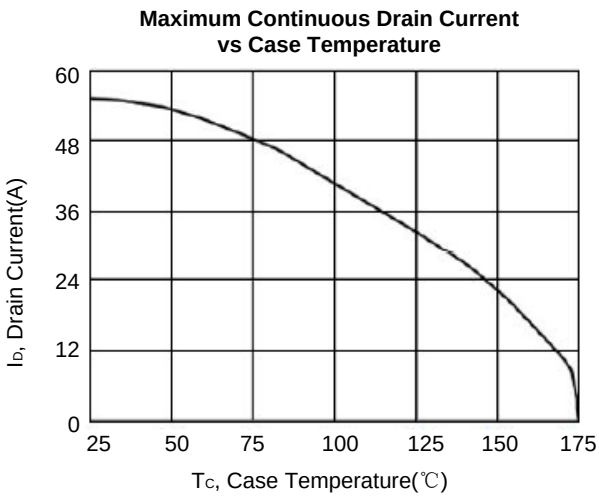
Typical performance characteristics



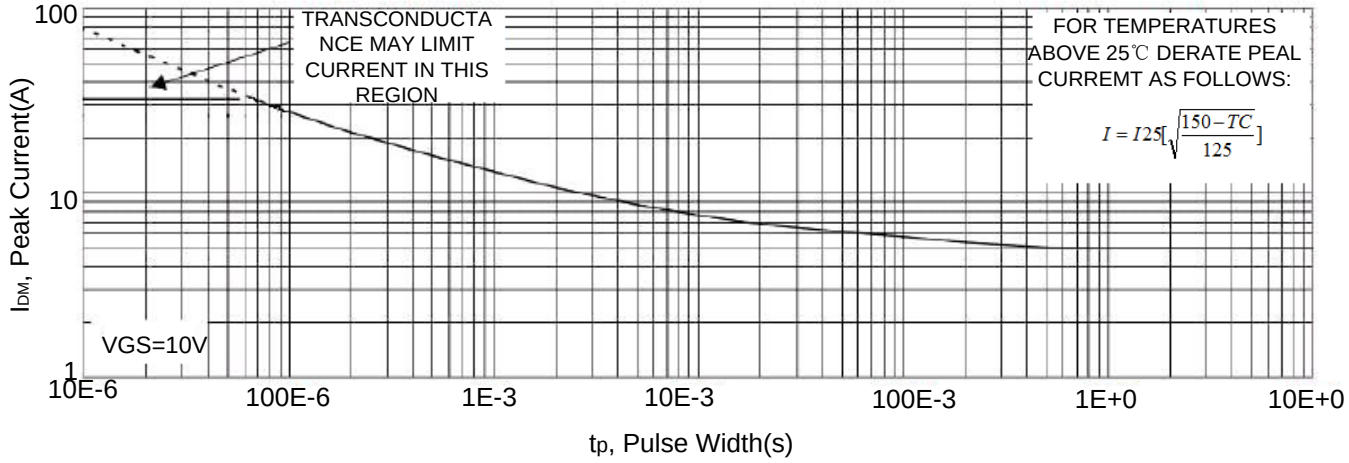




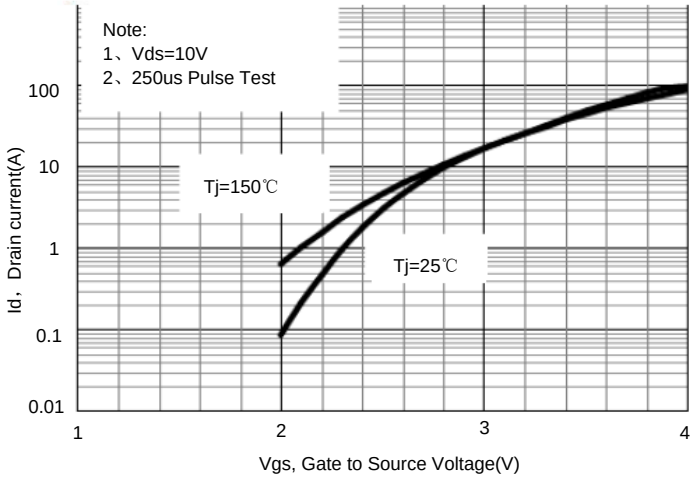




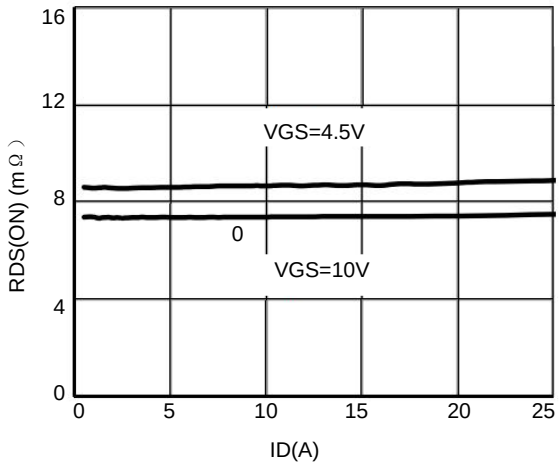
Maximum Peak Current Capability



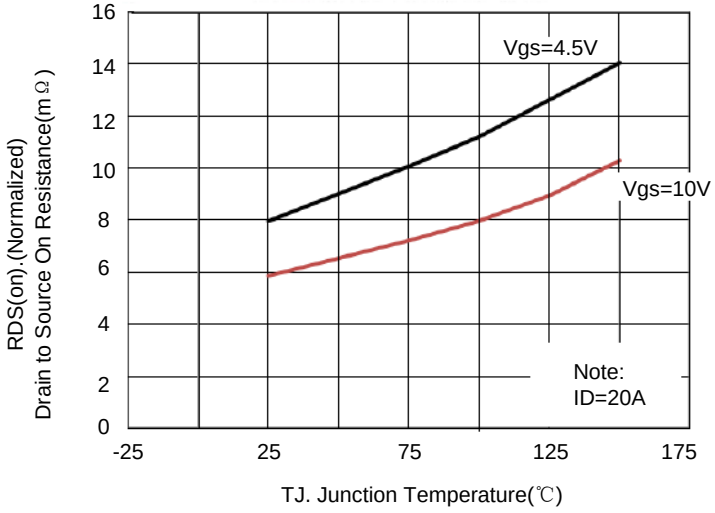
Typical Transfer Characteristics



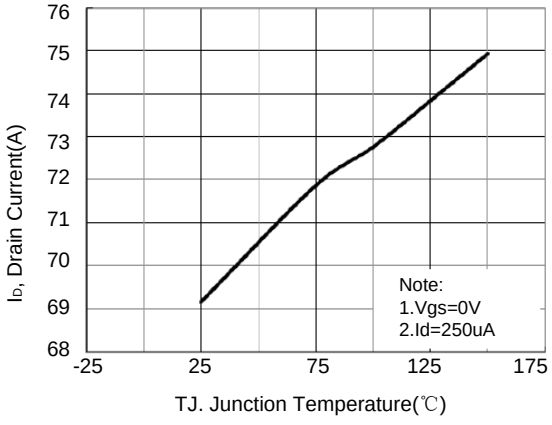
Typical Drain to Source ON Resistance vs Drain Current



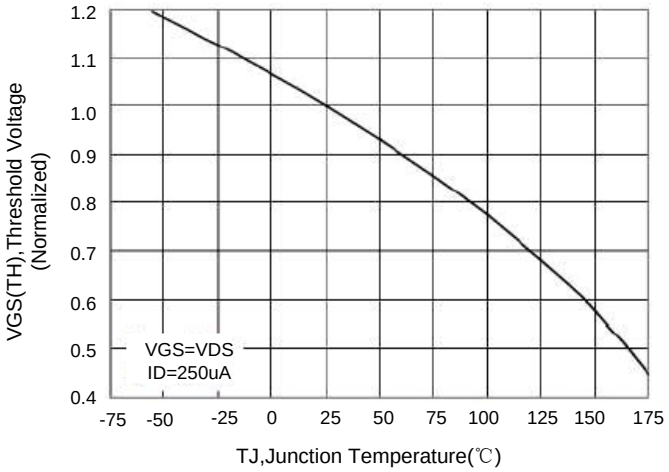
Typical Drain to Source ON Resistance vs Junction Temperature



Maximum Forward Bias Safe Operating Area



Typical Threshold Voltage vs Junction Temperature



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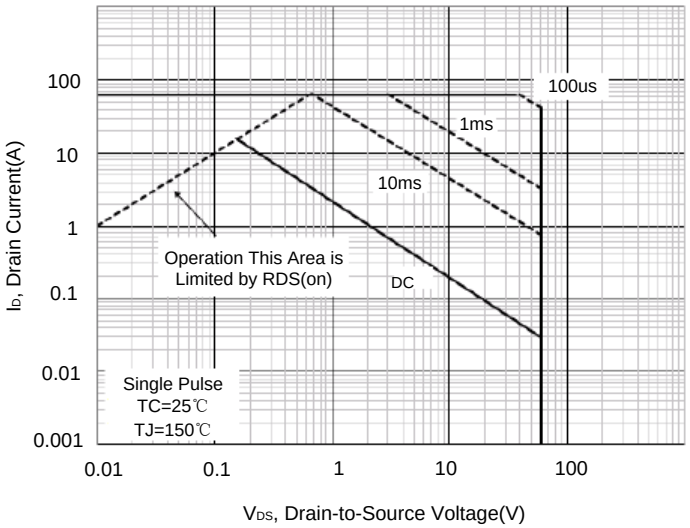
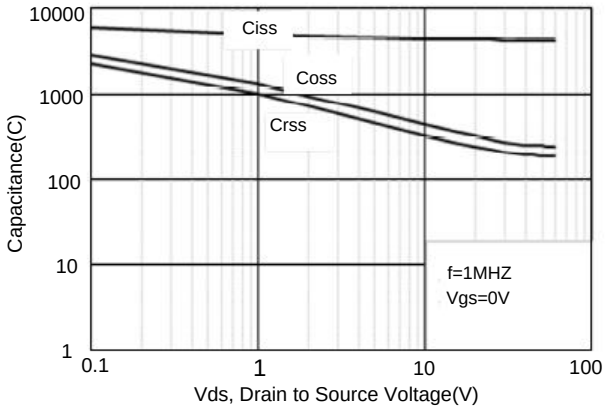
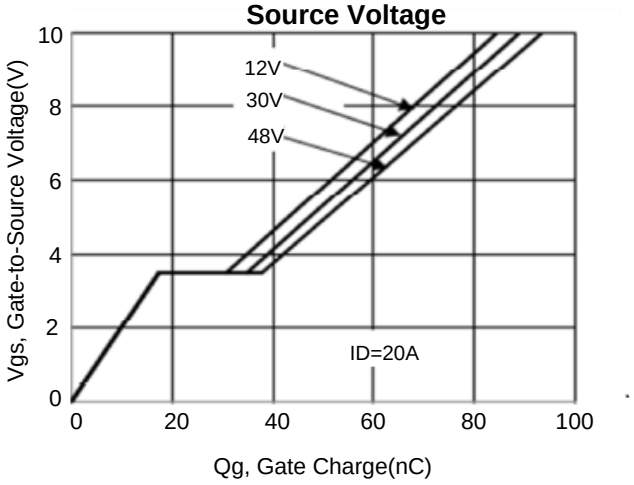


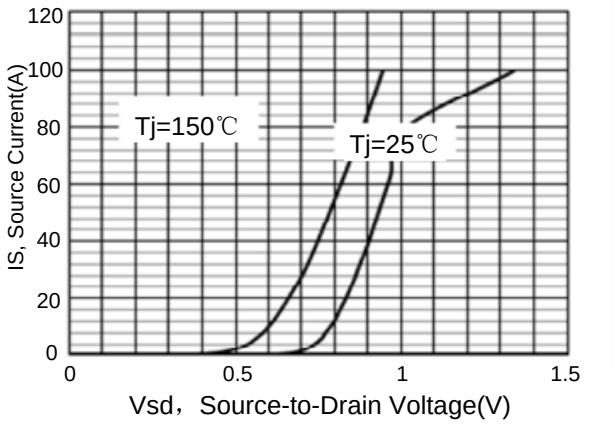
Typical Capacitance vs Drain-to-Source Voltage



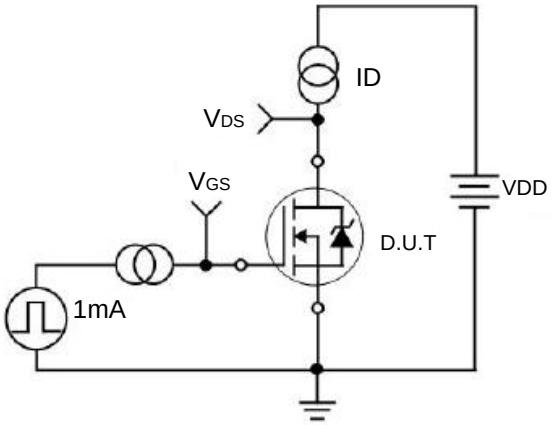
Typical Gate Charge vs Gate-to-Source Voltage



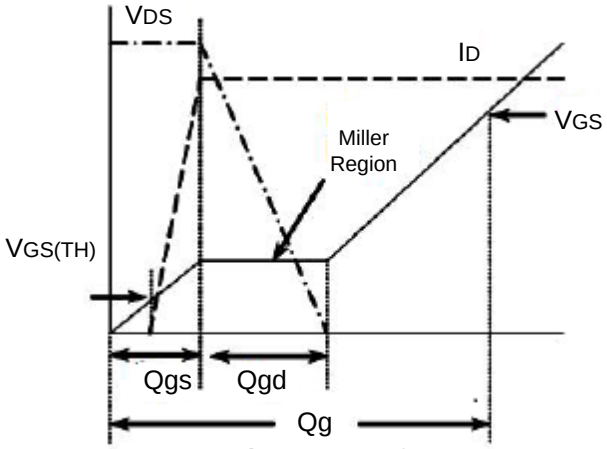
Typical Body Diode Transfer Characteristics



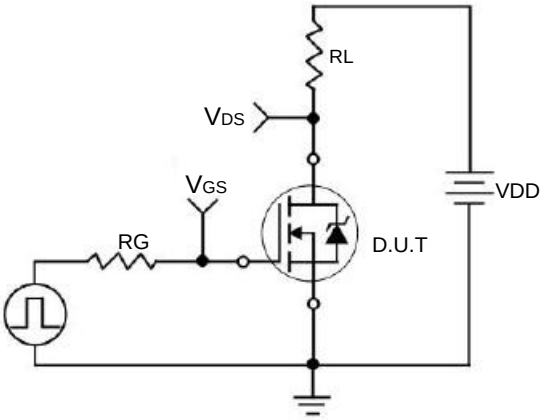
Test Circuit and Waveform



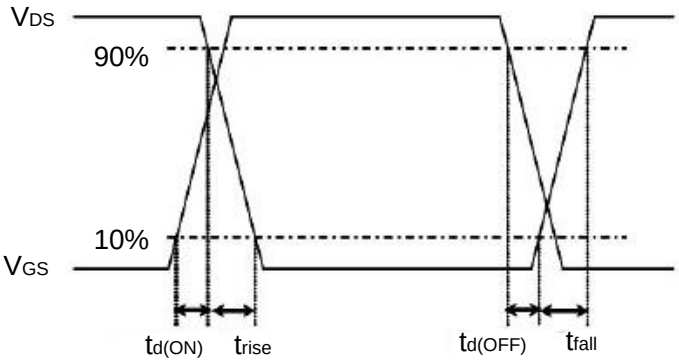
Gate charge Test Circut



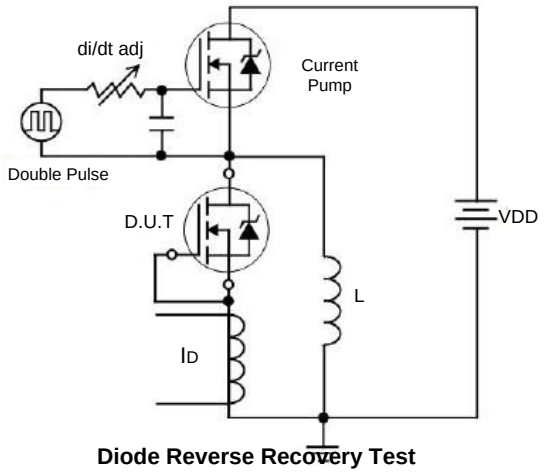
Gate Charge Waveform



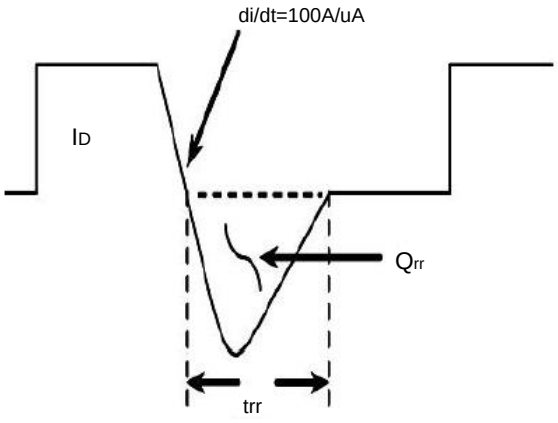
Resistive Switching Test Circuit



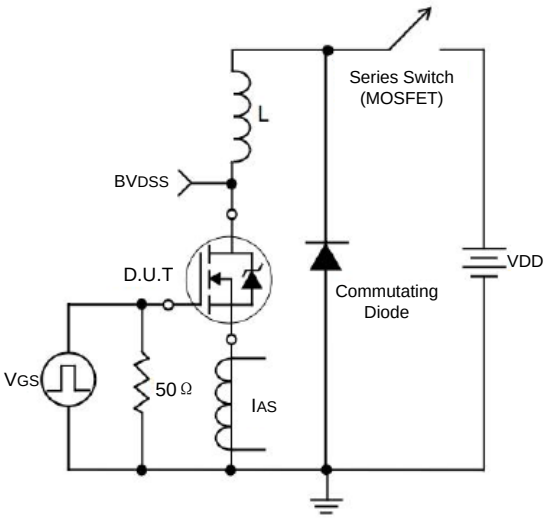
Resistive Switching Waveforms



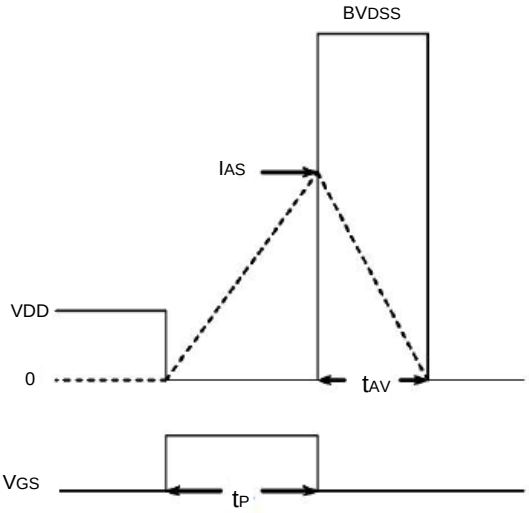
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit

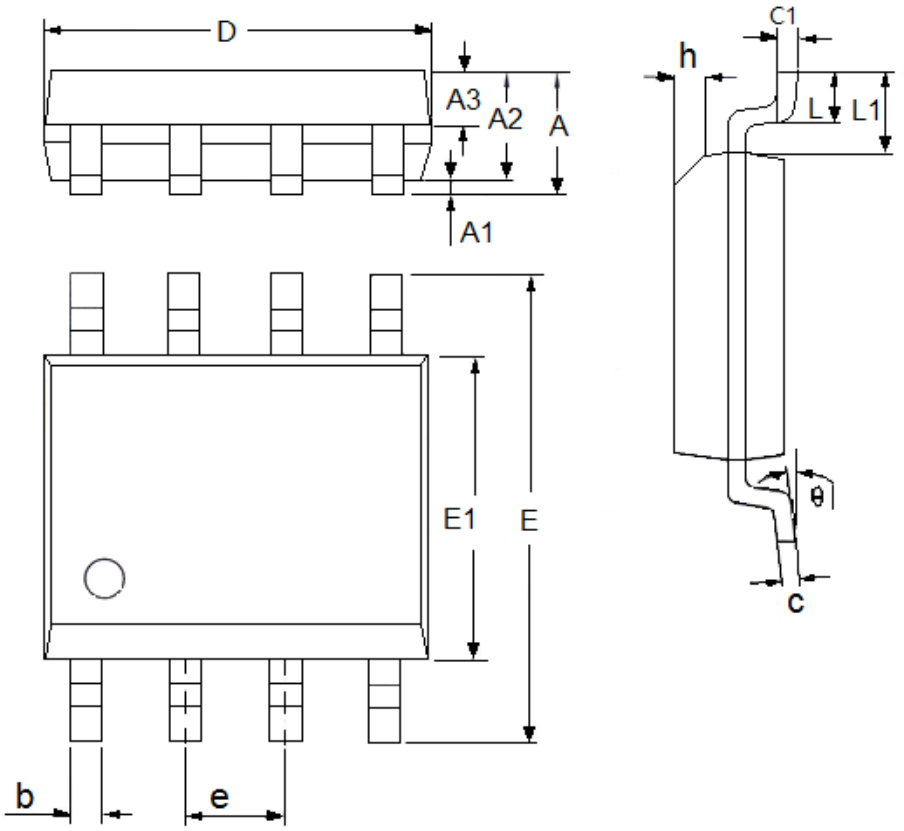


$$E_{AS} = \frac{I_{AS} S^2 L}{2}$$

Unclamped Inductive Switching Waveforms

Package Information

- **Package Type:SOP8**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.3	1.8	0.0512	0.0709
A1	0.05	0.25	0.002	0.0098
A2	1.25	1.65	0.0492	0.065
A3	0.5	0.7	0.0197	0.0276
b	0.3	0.51	0.0118	0.0201
c	0.17	0.25	0.0067	0.0098
D	4.7	5.1	0.185	0.2008
E	5.8	6.2	0.2283	0.2441
E1	3.8	4	0.1496	0.1575
e	1.27(TYP)		0.05(TYP)	
h	0.25	0.5	0.0098	0.0197
L	0.4	1.27	0.0157	0.05
L1	1.04(TYP)		0.0409(TYP)	
θ	0	8°	0	8°
c1	0.25(TYP)		0.0098(TYP)	

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