

30V, 10.9A, 8.7mΩ N-channel Power SGT MOSFET
JMSL0315PP
Features

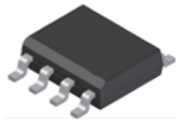
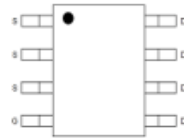
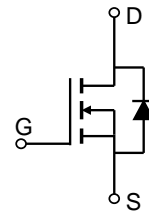
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔV_{ds} Tested
- Halogen-free; RoHS-compliant
- Pb-free plating

Applications

- Load Switch
- PWM Application
- Power Management

Product Summary

Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th_Typ)}$	1.6	V
$I_D(@V_{GS}=10V)$	10.9	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	8.7	mΩ
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	13.9	mΩ


SOP-8

Pin Assignment

Schematic Diagram
Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSL0315PP-13	SL0315P	3	Tape&Reel	SOP-8	4000	48000

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	10.9
		$T_A = 100^\circ\text{C}$	6.9
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	26	mJ
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	2.1
		$T_A = 100^\circ\text{C}$	0.8
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽³⁾	60	



**Electrical Characteristics** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.1	1.6	2.1	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance ⁽⁴⁾	$V_{GS} = 10\text{V}, I_D = 10\text{A}$	-	8.7	11.4	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 6\text{A}$	-	13.9	18.0	$\text{m}\Omega$
Dynamic Characteristics						
R_g	Gate Resistance	$f = 1\text{MHz}$	-	2.2	-	Ω
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 15\text{V}, f = 1\text{MHz}$	-	470	705	pF
C_{oss}	Output Capacitance		-	292	438	pF
C_{rss}	Reverse Transfer Capacitance		-	7.0	-	pF
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 15\text{V}, I_D = 10\text{A}$	-	8.3	-	nC
Q_{gs}	Gate Source Charge		-	1.9	-	nC
Q_{gd}	Gate Drain ("Miller") Charge		-	1.6	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DD} = 15\text{V}$ $I_D = 10\text{A}, R_{GEN} = 3\Omega$	-	4.6	-	ns
t_r	Turn-On Rise Time		-	12	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	12	-	ns
t_f	Turn-Off Fall Time		-	2.8	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	11	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	43	A
V_{SD}	Body Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = 10\text{A}$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$	10	19	29	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	8.3	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 15\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 4.2\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.



Typical Performance Characteristics

Figure 1: Power De-rating

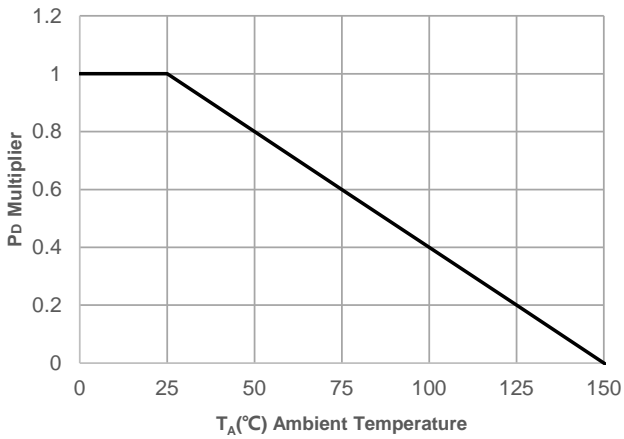


Figure 2: Current De-rating

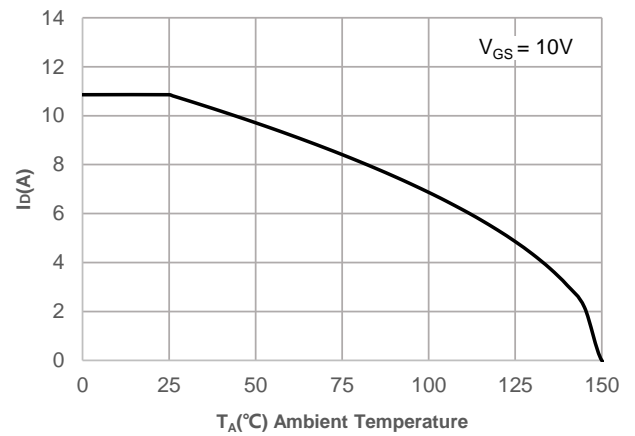


Figure 3: Normalized Maximum Transient Thermal Impedance

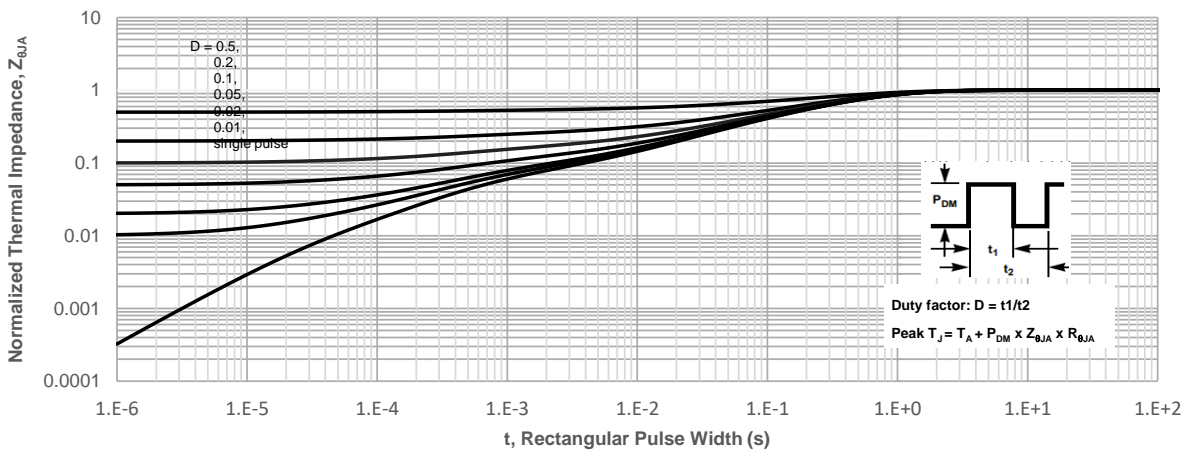
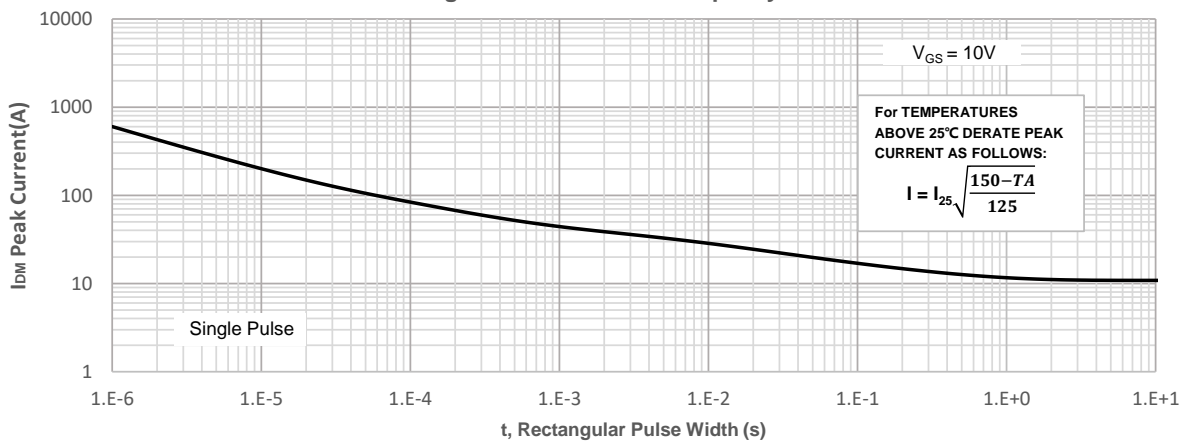


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

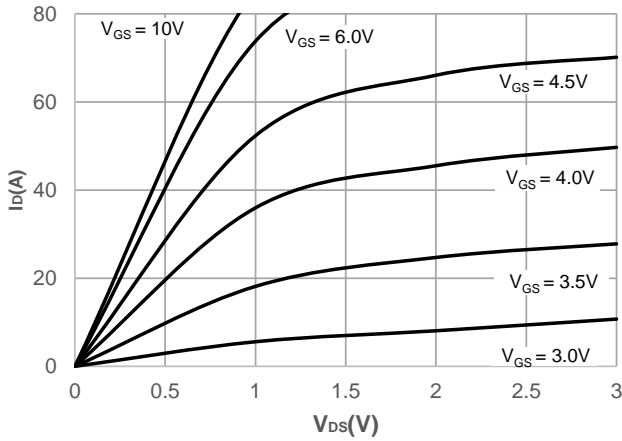


Figure 6: Typical Transfer Characteristics

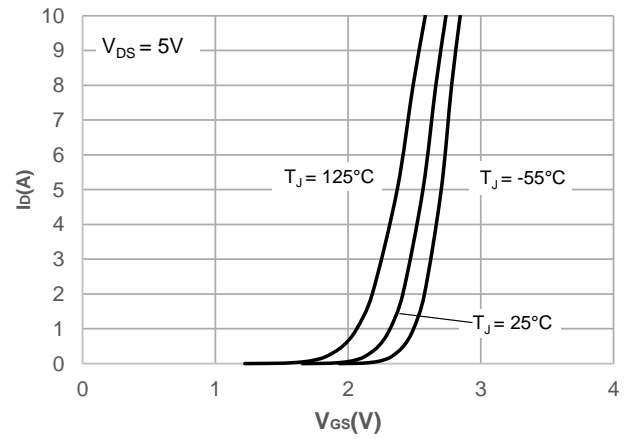


Figure 7: On-resistance vs. Drain Current

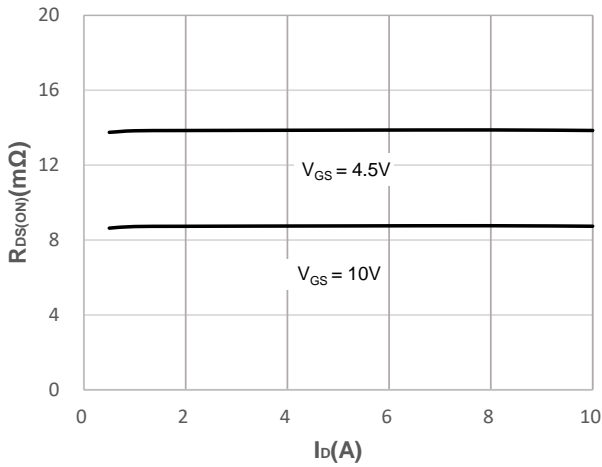


Figure 8: Body Diode Characteristics

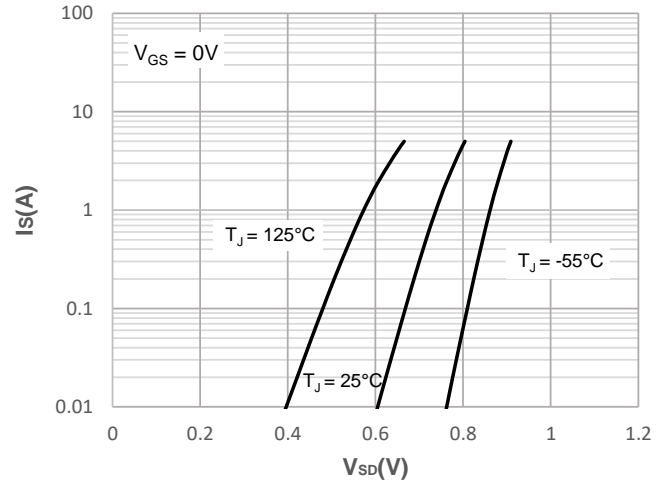


Figure 9: Gate Charge Characteristics

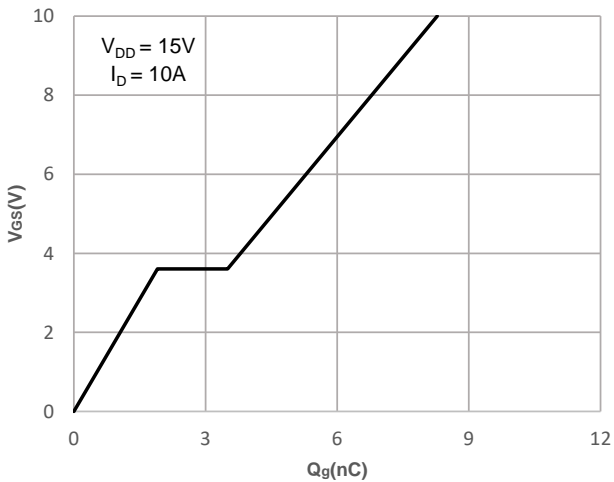
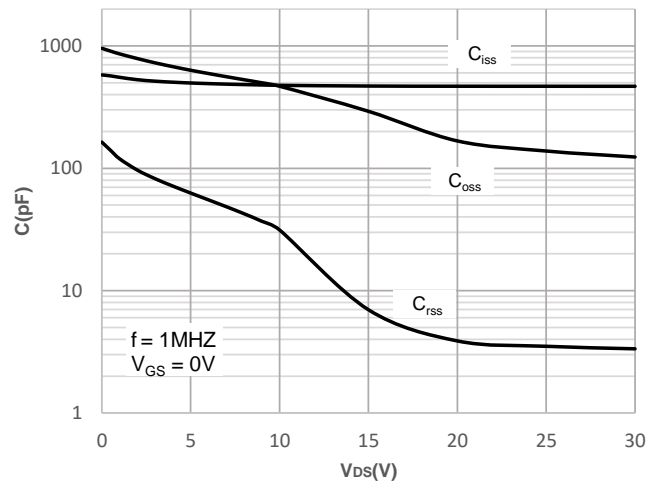


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

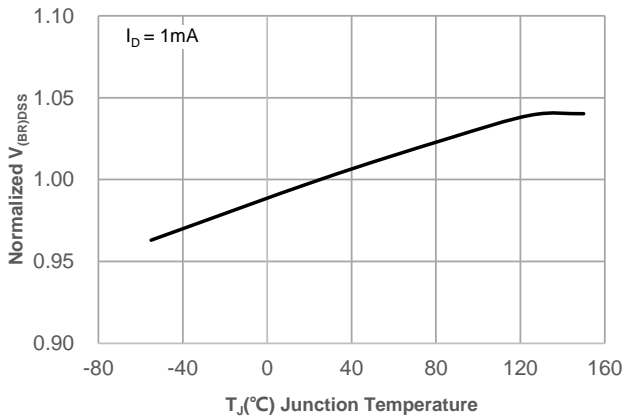


Figure 12: Normalized on Resistance vs. Junction Temperature

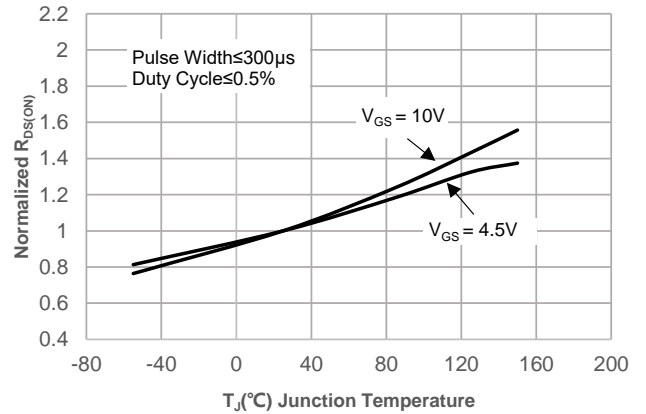


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

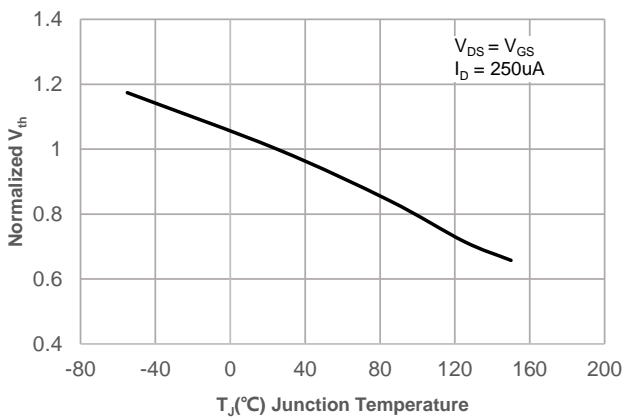


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

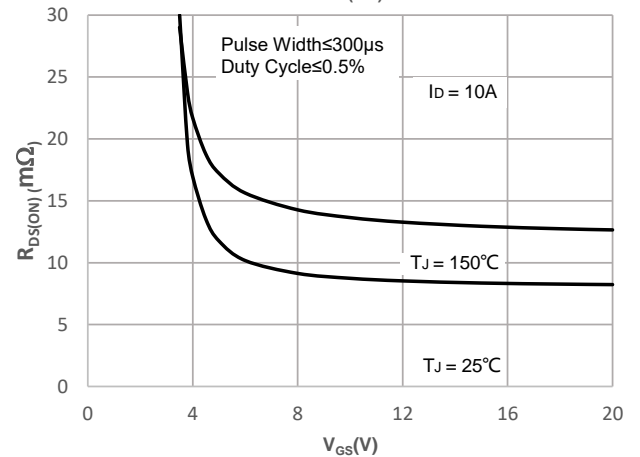
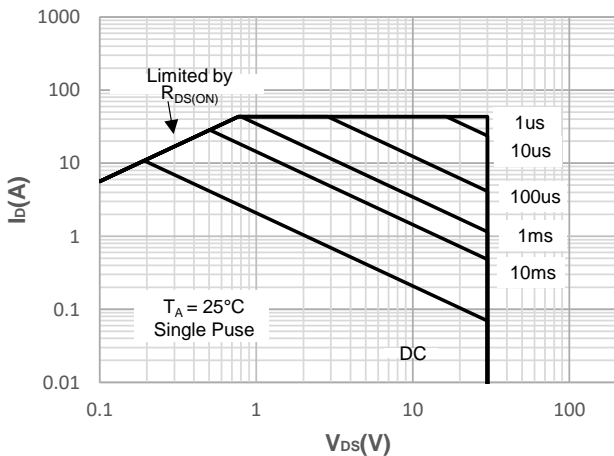


Figure 15: Maximum Safe Operating Area



Test Circuit

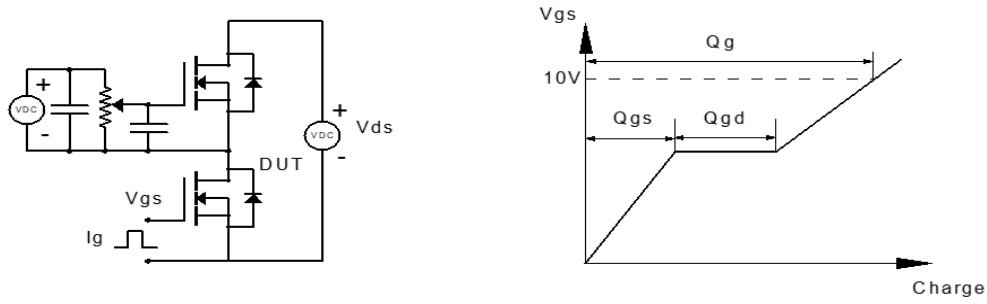


Figure 1: Gate Charge Test Circuit & Waveform

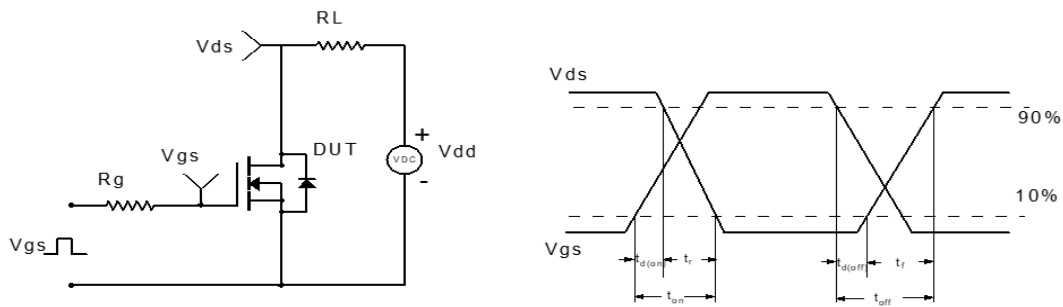


Figure 2: Resistive Switching Test Circuit & Waveform

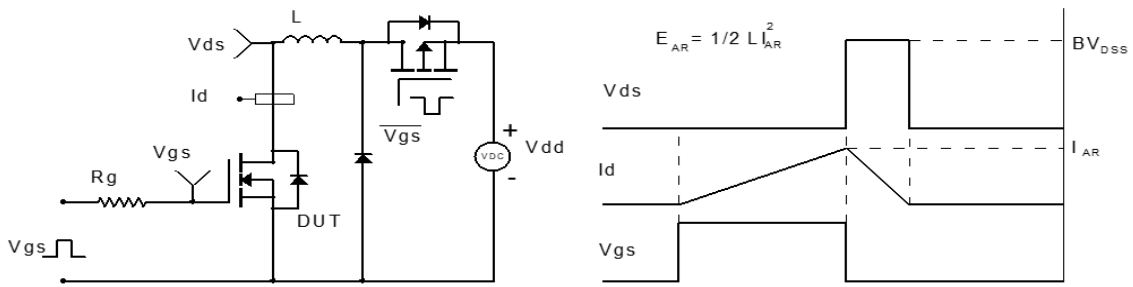


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

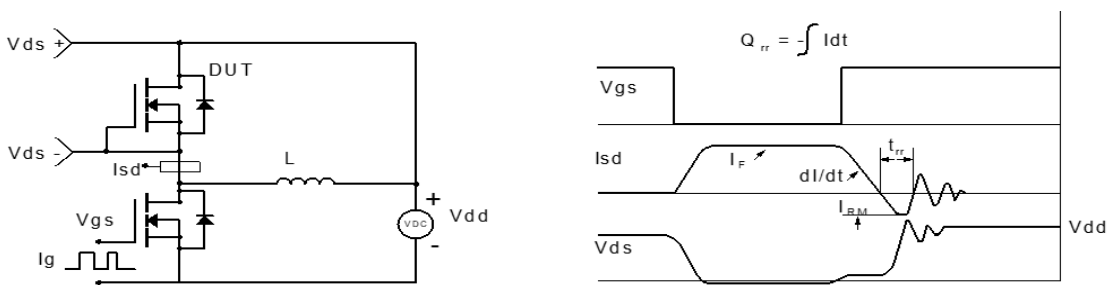
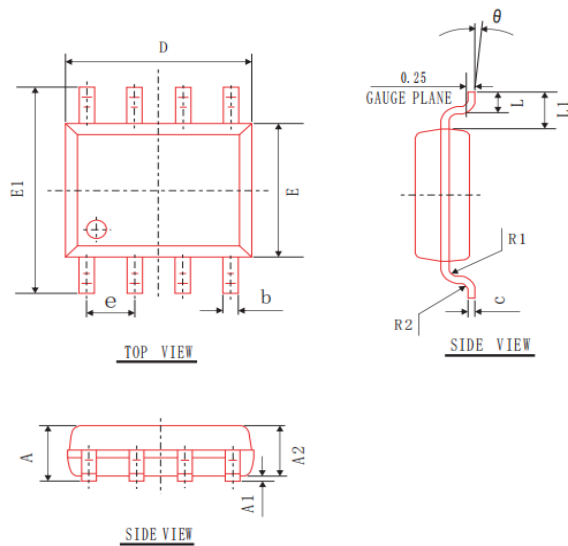


Figure 4: Diode Recovery Test Circuit & Waveform



Package Mechanical Data(SOP-8)

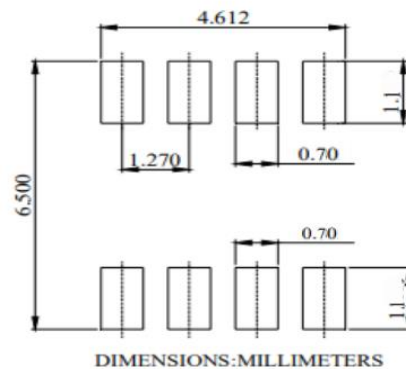
Package Outline



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L 1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		

Recommended Footprint



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