

60V, 14A, 9.4mΩ N-channel Power SGT MOSFET
JMSL0608PP
Features

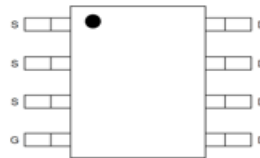
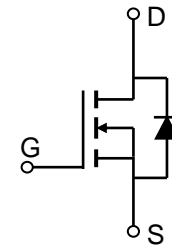
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔV_{ds} Tested
- Halogen-free; RoHS-compliant
- Pb-free plating

Applications

- Load Switch
- PWM Application
- Power Management

Product Summary

Parameters	Value	Unit
V_{DSS}	60	V
$V_{GS(th)_{Typ}}$	1.7	V
$I_D(@V_{GS}=10V)$	14	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	7.9	mΩ
$R_{DS(ON)_{Typ}}(@V_{GS}=4.5V)$	9.4	mΩ


SOP-8

Pin Assignment

Schematic Diagram
Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSL0608PP	SL0608P	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	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	14
		$T_A = 100^\circ\text{C}$	10
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	74	mJ
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	2.8
		$T_A = 100^\circ\text{C}$	1
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⁾	65	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽⁴⁾	45	

**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	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$	-	-	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	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.7	2.3	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance ⁽⁵⁾	$V_{GS} = 10\text{V}, I_D = 12\text{A}$	-	7.9	9.9	m Ω
		$V_{GS} = 4.5\text{V}, I_D = 6\text{A}$	-	9.4	11.7	m Ω
Dynamic Characteristics						
R_g	Gate Resistance	$f = 1\text{MHz}$	-	2	-	Ω
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V}, f = 1\text{MHz}$	841	1178	1590	pF
C_{oss}	Output Capacitance		367	513	693	pF
C_{rss}	Reverse Transfer Capacitance		24	34	45	pF
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ to } 4.5\text{V}$ $V_{DS} = 30\text{V}, I_D = 15\text{A}$	15	21	29	nC
Q_{gs}	Gate Source Charge		-	3.9	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4.7	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	$V_{GS} = 10\text{V}, V_{DD} = 30\text{V}$ $I_D = 15\text{A}, R_{GEN} = 3\Omega$	-	7	-	ns
t_r	Turn-On Rise Time		-	24	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	22	-	ns
t_f	Turn-Off Fall Time		-	6	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	14	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	55	A
V_{SD}	Body Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = 12\text{A}$	-		1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 15\text{A}, di/dt = 100\text{A}/\mu\text{s}$	23	32	43	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	24	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 30\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 7\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. $R_{\theta JA}$ is measured with the device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 4. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.
 5. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.



Typical Performance Characteristics

Figure 1: Power De-rating

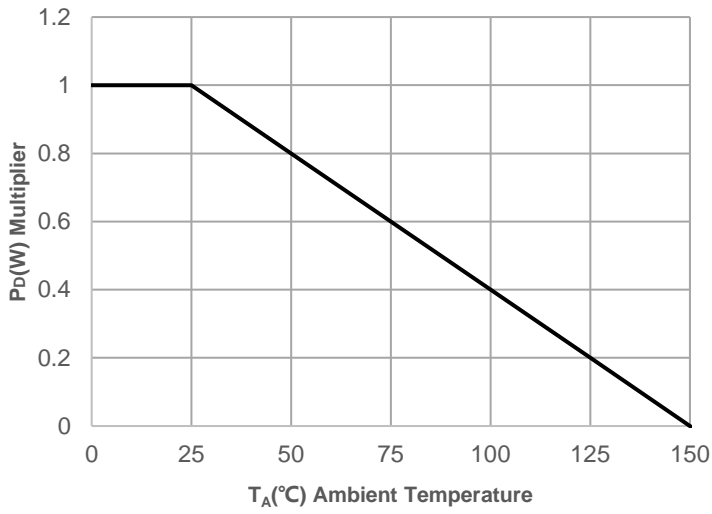


Figure 2: Current De-rating

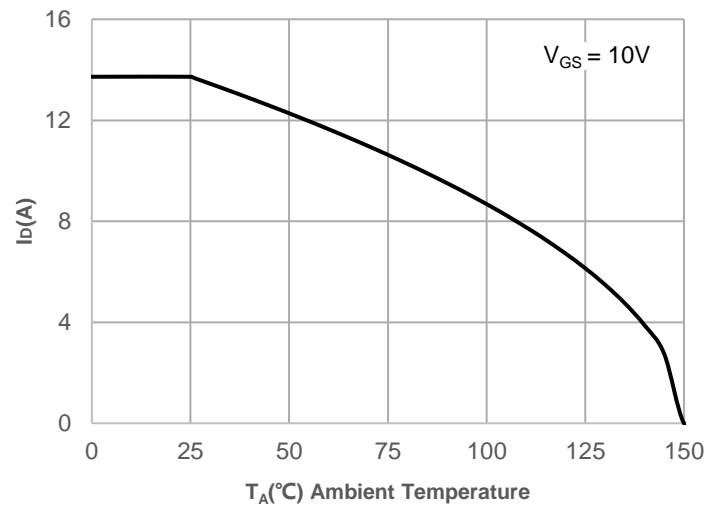


Figure 3: Normalized Maximum Transient Thermal Impedance

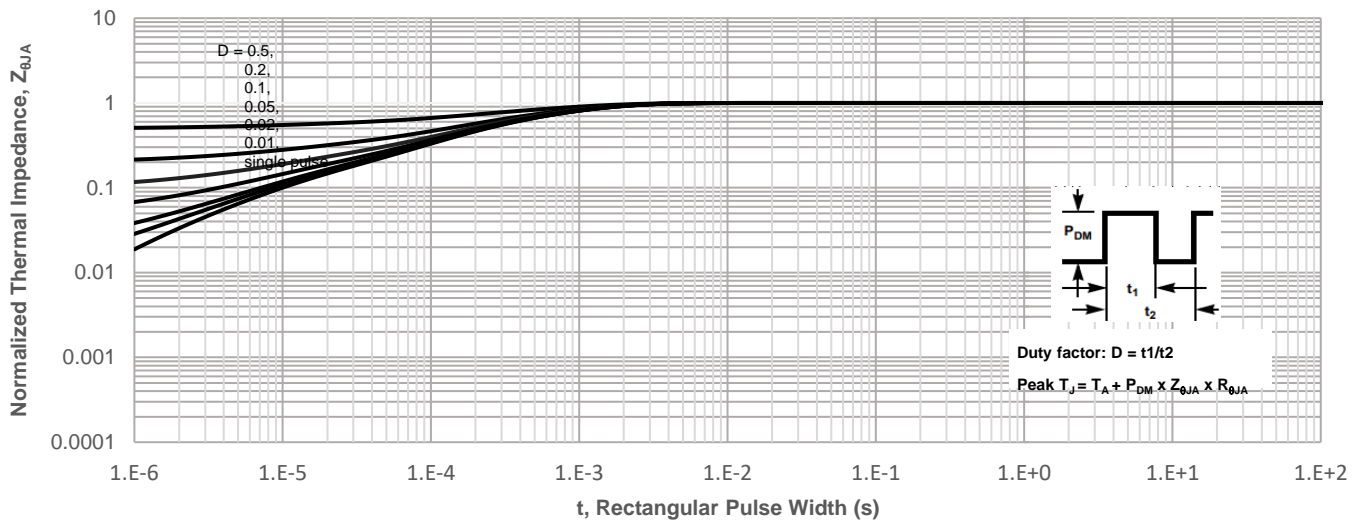
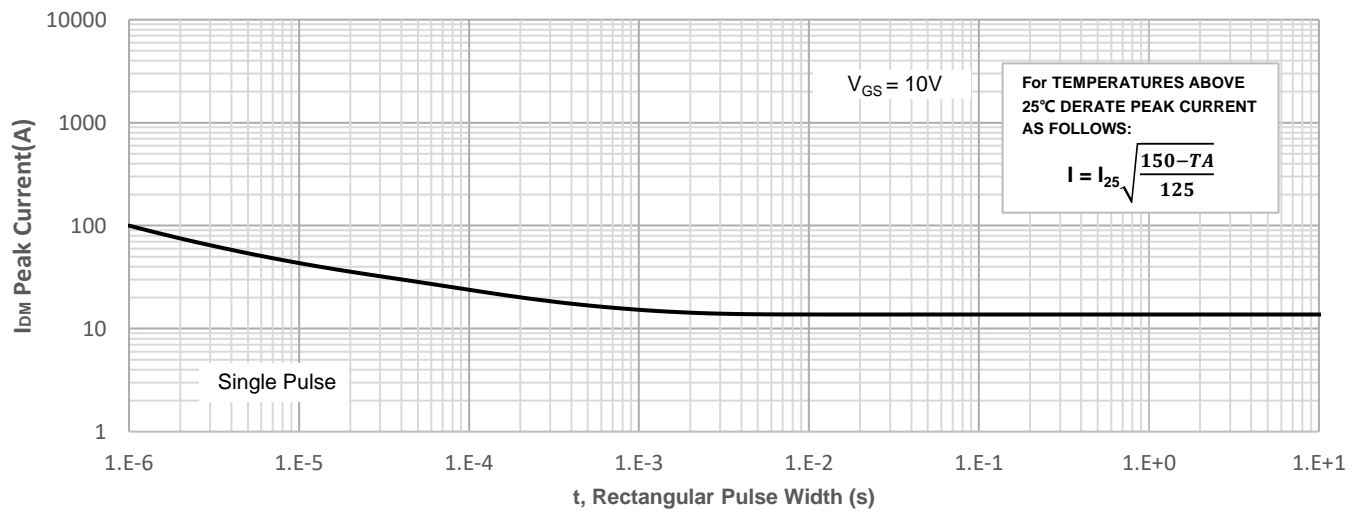


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

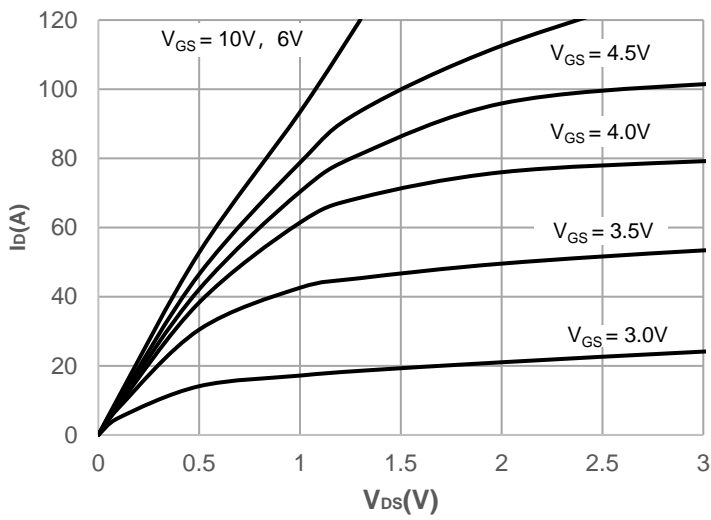


Figure 6: Typical Transfer Characteristics

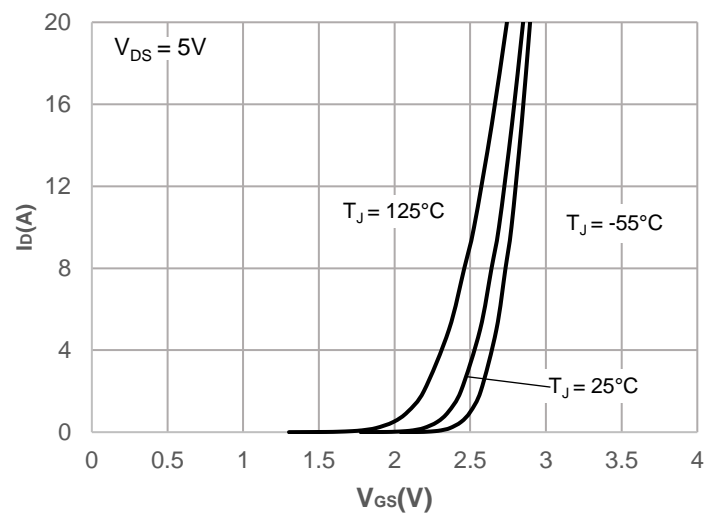


Figure 7: On-resistance vs. Drain Current

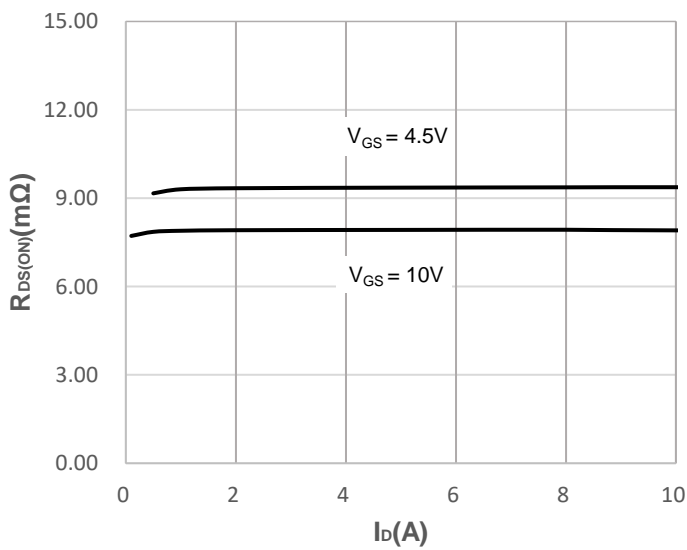


Figure 8: Body Diode Characteristics

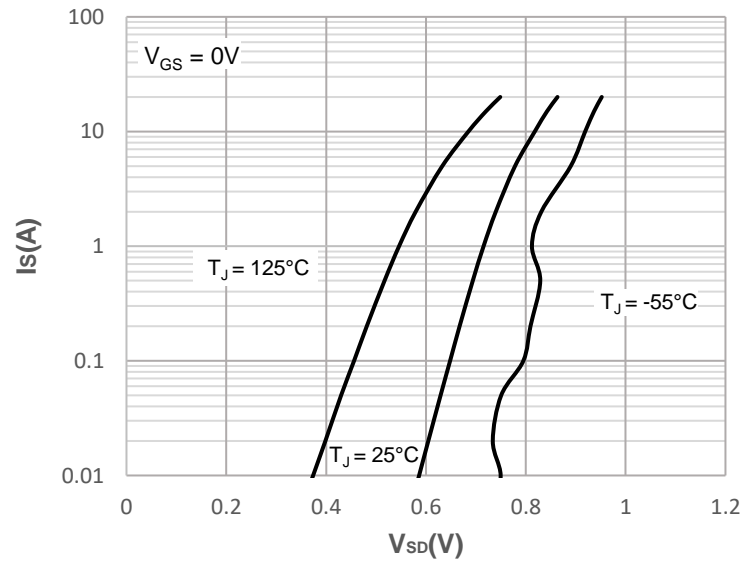


Figure 9: Gate Charge Characteristics

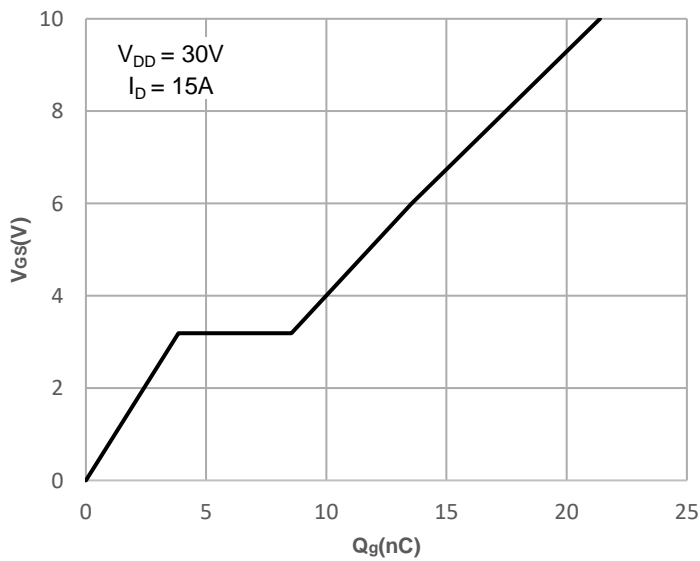
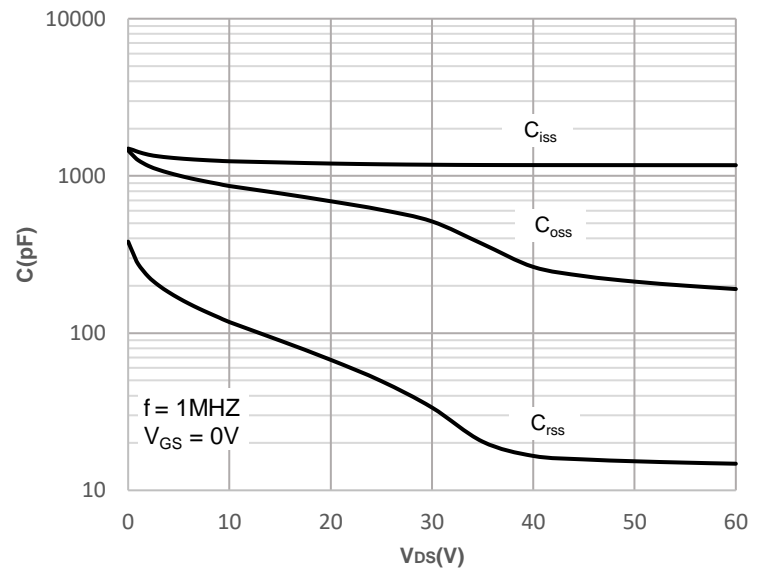


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

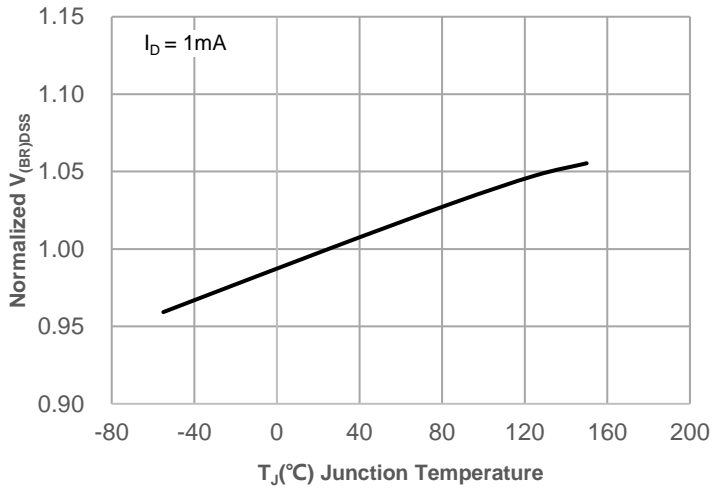


Figure 12: Normalized on Resistance vs. Junction Temperature

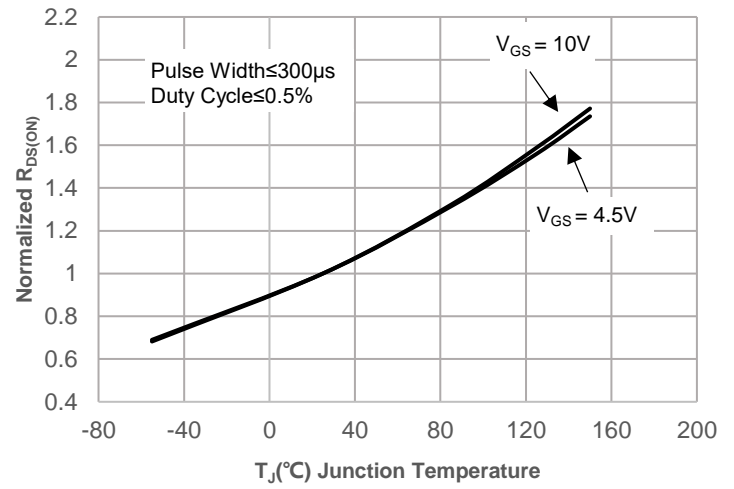


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

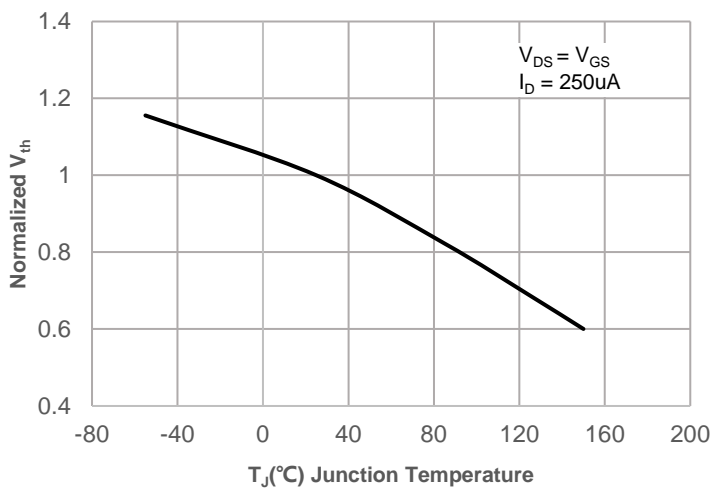


Figure 14: RDS(ON) vs. VGS

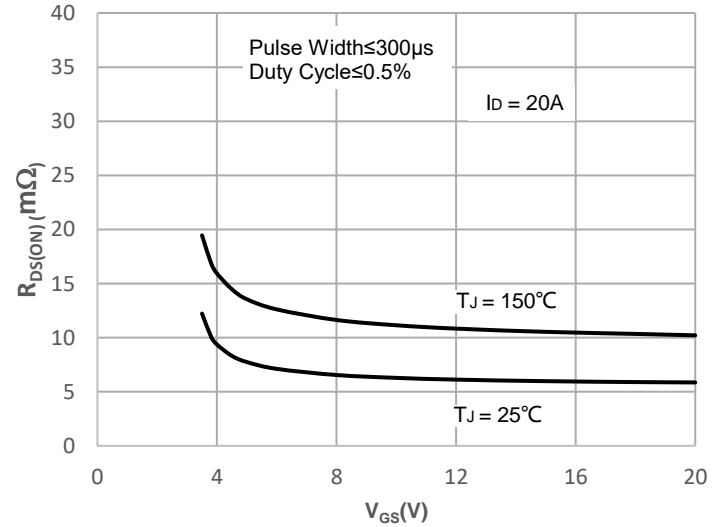
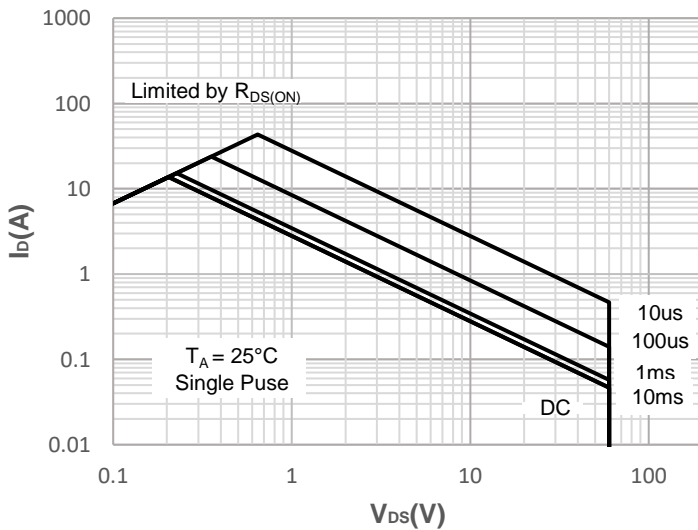


Figure 15: Maximum Safe Operating Area



Test Circuit

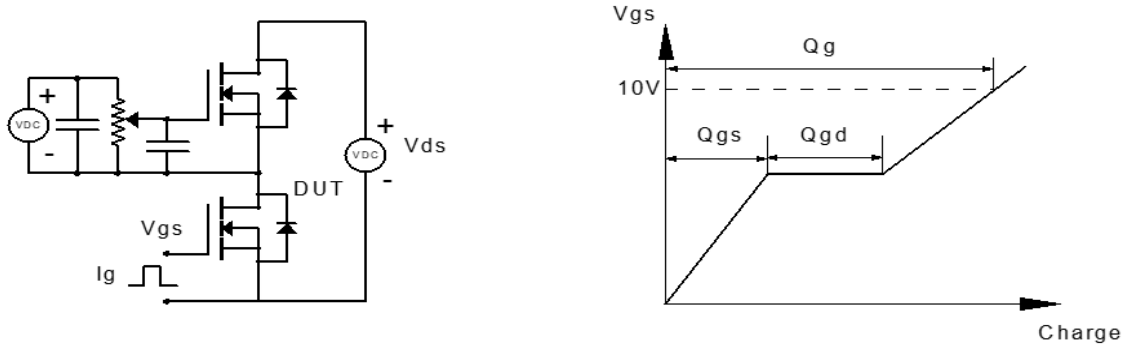


Figure 1: Gate Charge Test Circuit & Waveform

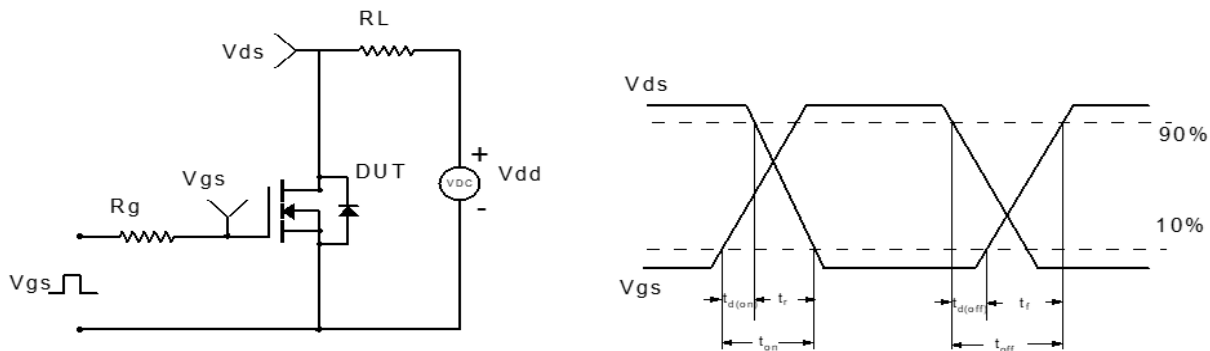


Figure 2: Resistive Switching Test Circuit & Waveform

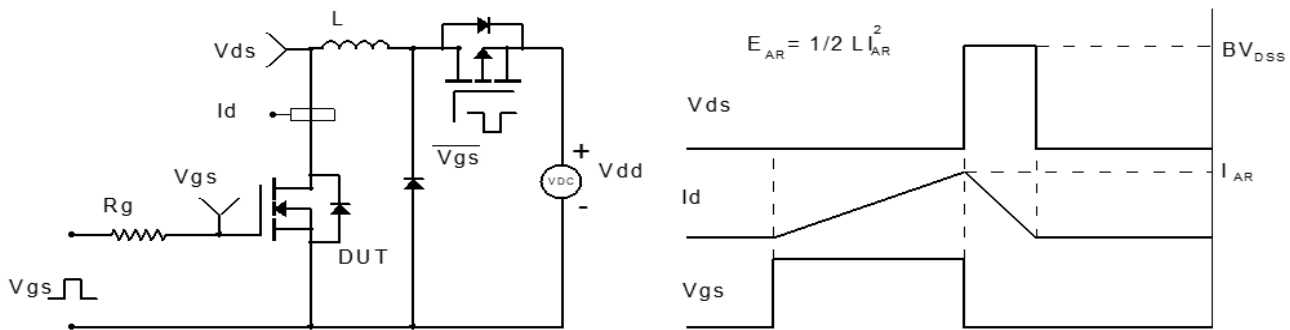


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

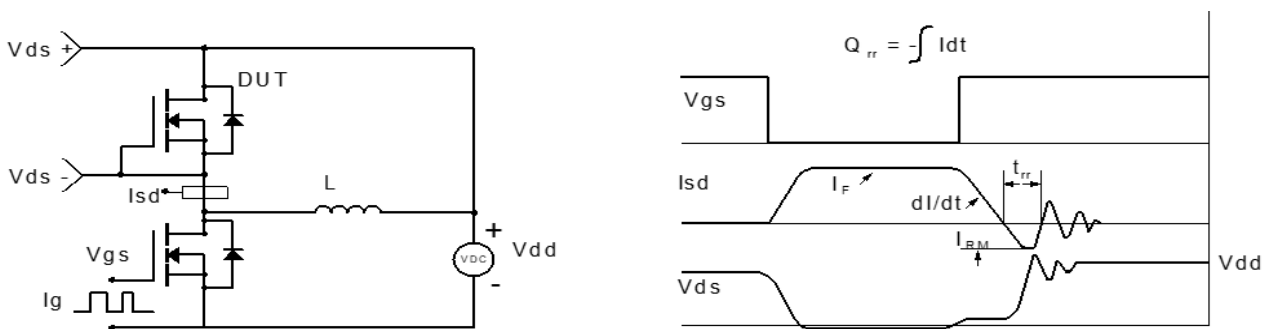
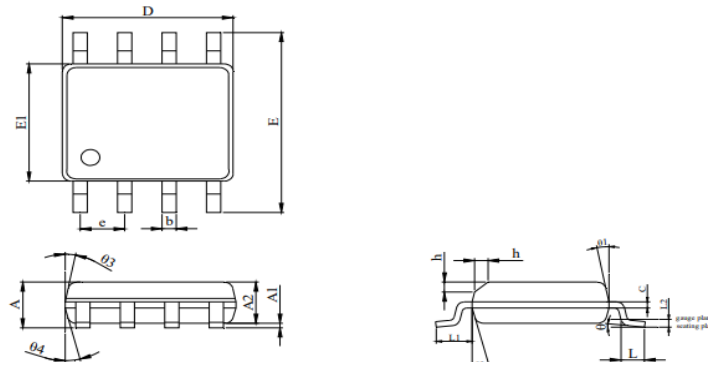


Figure 4: Diode Recovery Test Circuit & Waveform



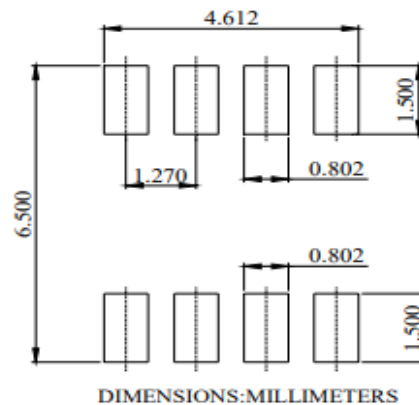
Package Mechanical Data(SOP-8)

Package Outline



DIM	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.35	1.50	1.65
A1	0.05	0.10	0.15
A2	1.35	1.40	1.50
b	0.38	--	0.50
c	0.17	--	0.25
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27(BSC)		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
h	0.30	0.40	0.50
θ	0°	--	8°
θ_1	10°	12°	14°
θ_2	8°	10°	12°
θ_3	10°	12°	14°
θ_4	8°	10°	12°

Recommended Footprint



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