

Product Summary

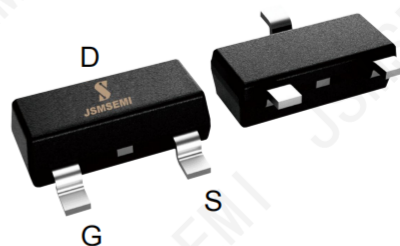
- V_{DS} 150V
- I_D 4.0A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<300m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

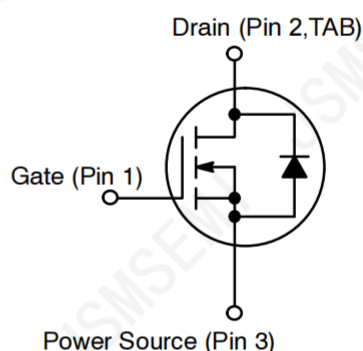
- Trench Power MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



SOT-23-3L



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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	4.0	A
	$T_C=100^\circ\text{C}$		2.0	
Pulsed Drain Current ¹		I_{DM}	15	A
Single Pulse Avalanche Energy ²		EAS	1.25	mJ
Total Power Dissipation	$T_C=25^\circ\text{C}$	P_D	3	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	85	$^\circ\text{C/W}$

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	150	-	-	V
Gate-body Leakage current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^{\circ}C$	I_{DSS}	$V_{DS} = 150V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^{\circ}C$			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.5	2	2.5	V
Drain-Source on-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4A$	-	245	300	m Ω
Forward Transconductance ⁴		g_{fs}	$V_{DS} = 10V, I_D = 4A$	-	25	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = 75V, V_{GS} = 0V, f = 1MHz$	-	450	-	pF
Output Capacitance		C_{oss}		-	23	-	
Reverse Transfer Capacitance		C_{rss}		-	14	-	
Gate Resistance		R_g	$f = 1MHz$	-	1.5	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = 10V, V_{DS} = 75V, I_D=1.5A$	-	8.2	-	nC
Gate-Source Charge		Q_{gs}		-	1.5	-	
Gate-Drain Charge		Q_{gd}		-	2.2	-	
Turn-on Delay Time		$t_{d(on)}$	$V_{GS} = 10V, V_{DD}=75V, R_G = 6\Omega, I_D= 1A, R_G = 75\Omega$	-	8.2	-	ns
Rise Time		t_r		-	10.2	-	
Turn-off Delay Time		$t_{d(off)}$		-	20.5	-	
Fall Time		t_f		-	15.3	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current	$T_C=25^{\circ}C$	I_S	-	-	-	4.0	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 5A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

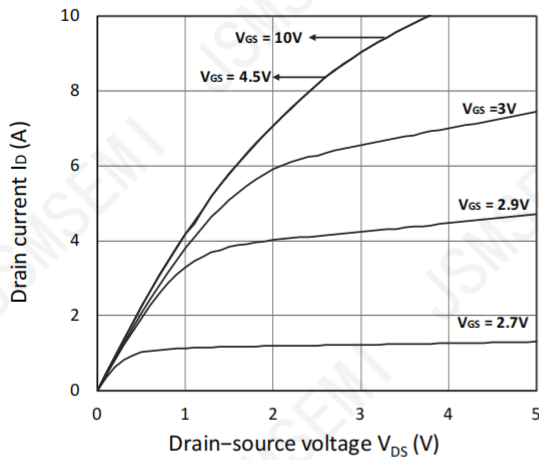


Figure 1. Output Characteristics

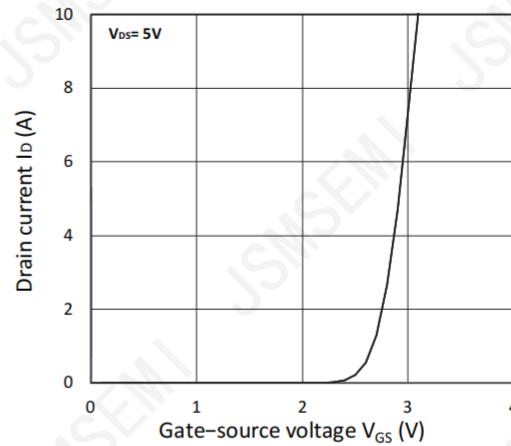


Figure 2. Transfer Characteristics

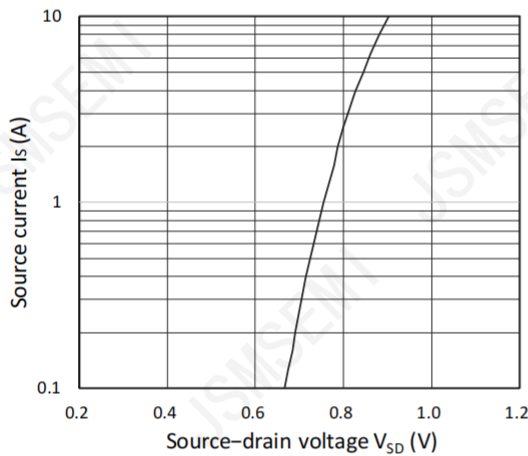


Figure 3. Forward Characteristics of Reverse

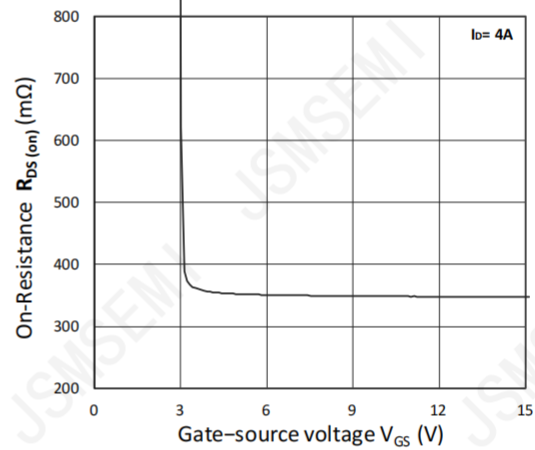


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

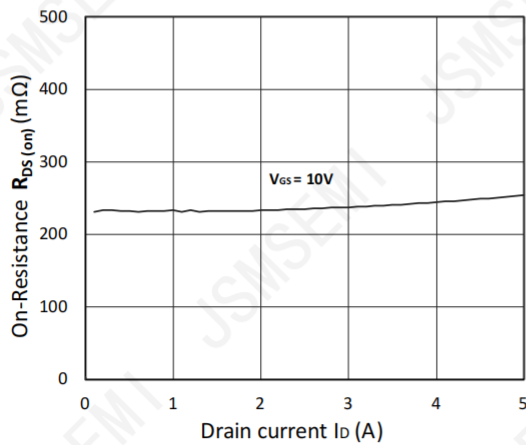


Figure 5. $R_{DS(ON)}$ vs. I_D

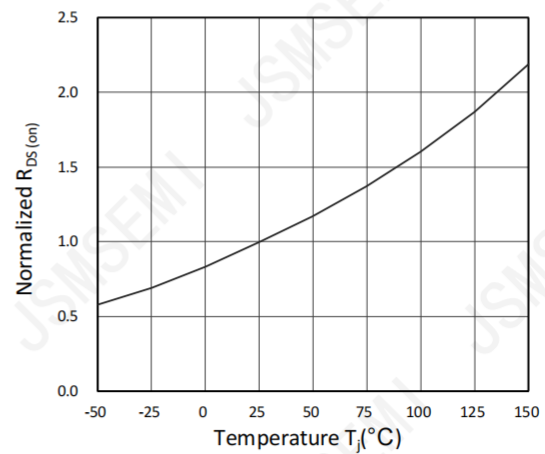


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

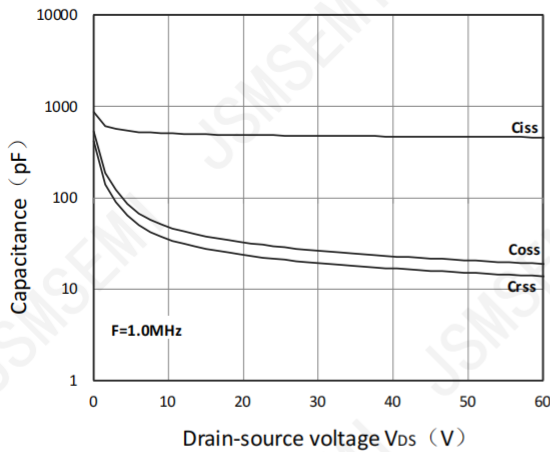


Figure 7. Capacitance Characteristics

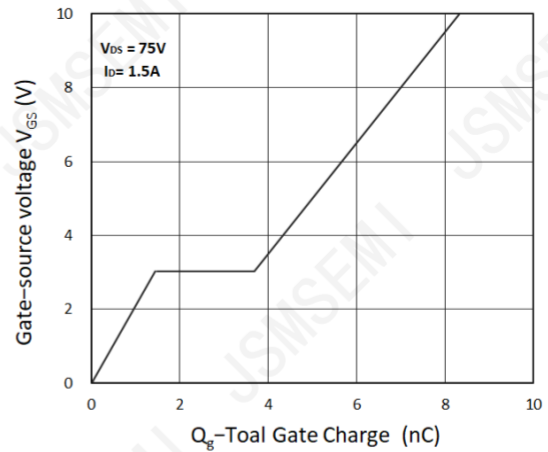


Figure 8. Gate Charge Characteristics

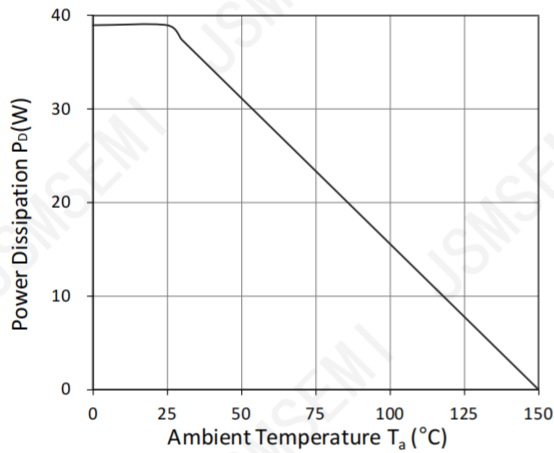


Figure 9. Power Dissipation

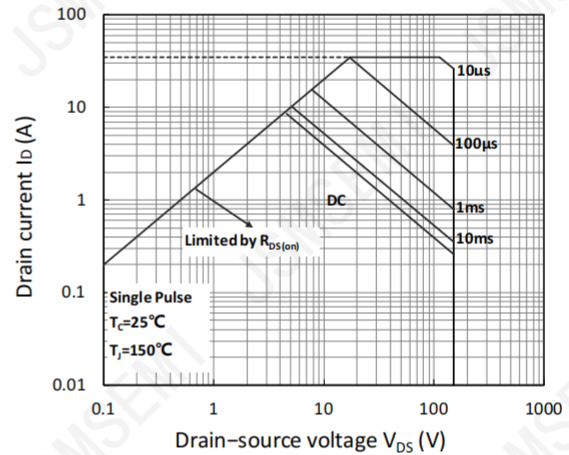


Figure 10. Safe Operating Area

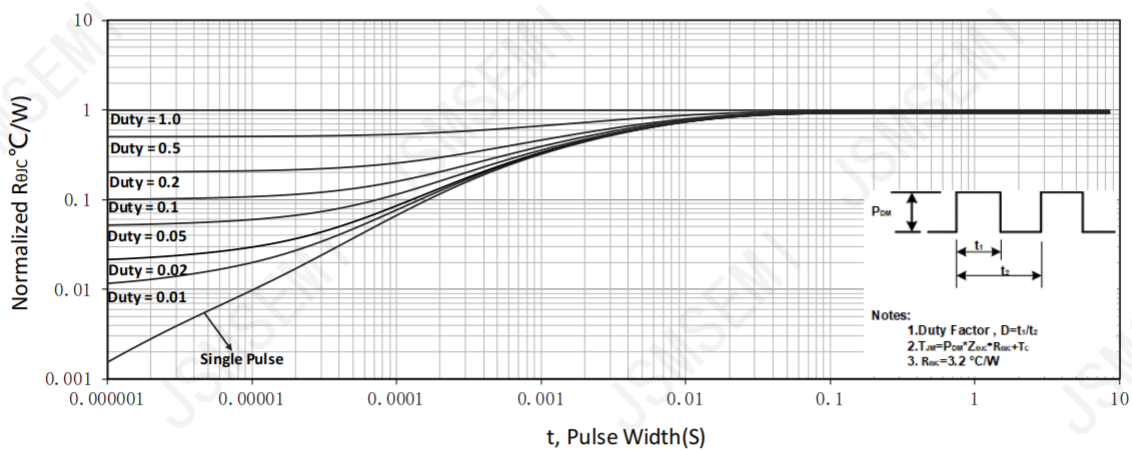


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

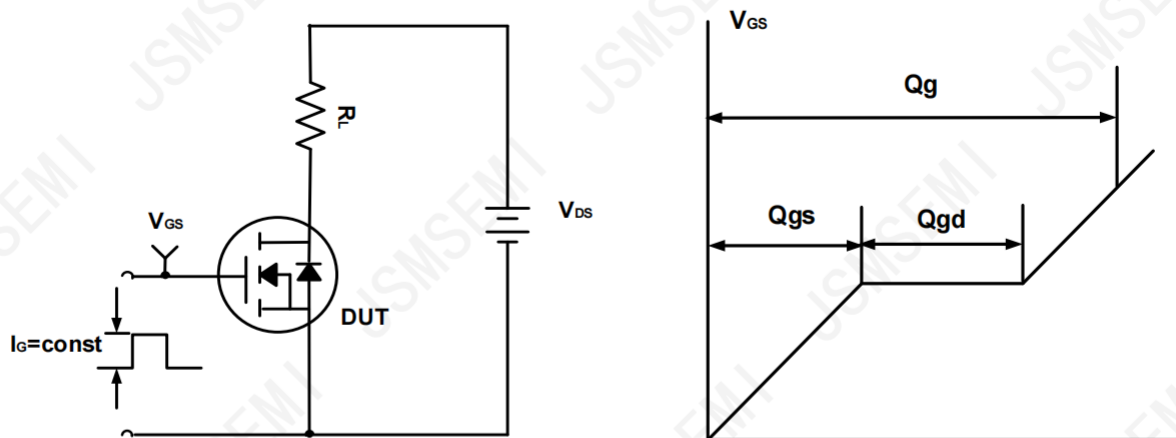


Figure A. Gate Charge Test Circuit & Waveforms

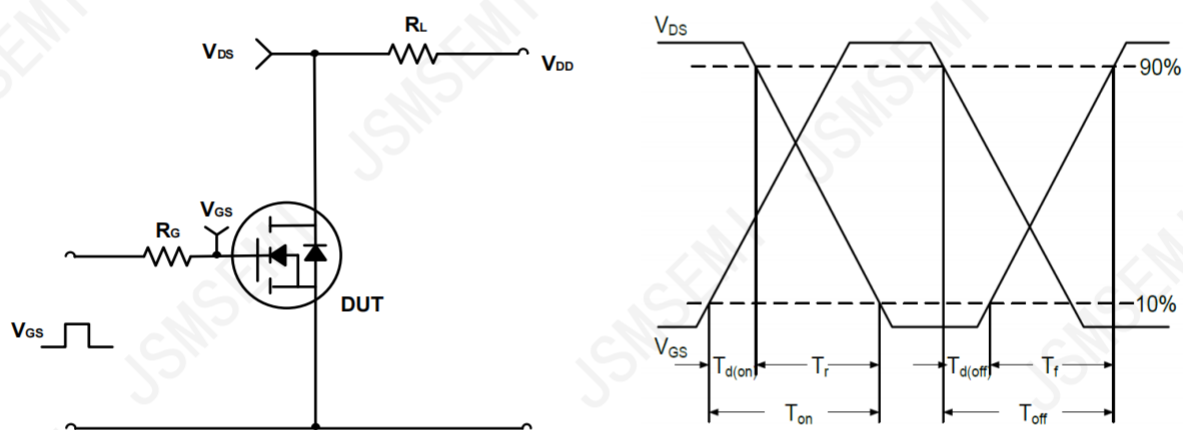


Figure B. Switching Test Circuit & Waveforms

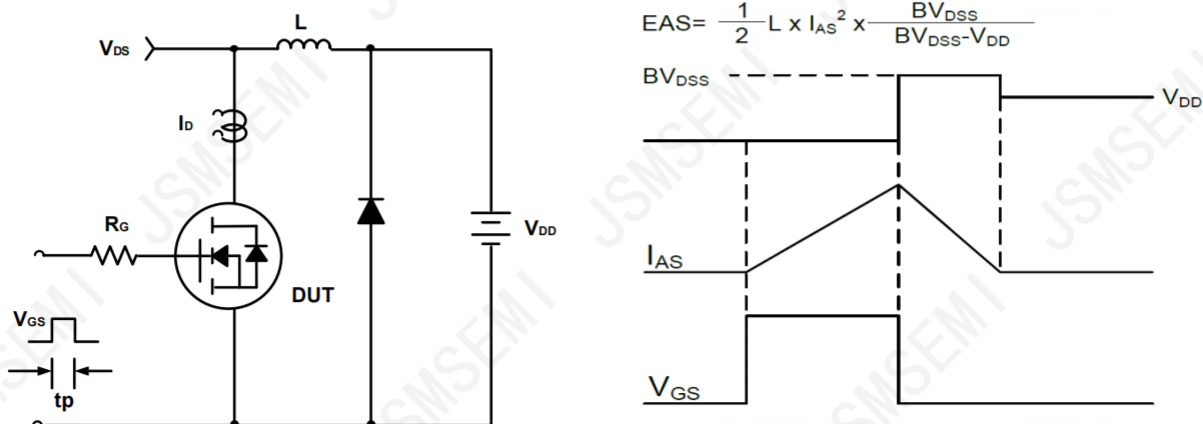
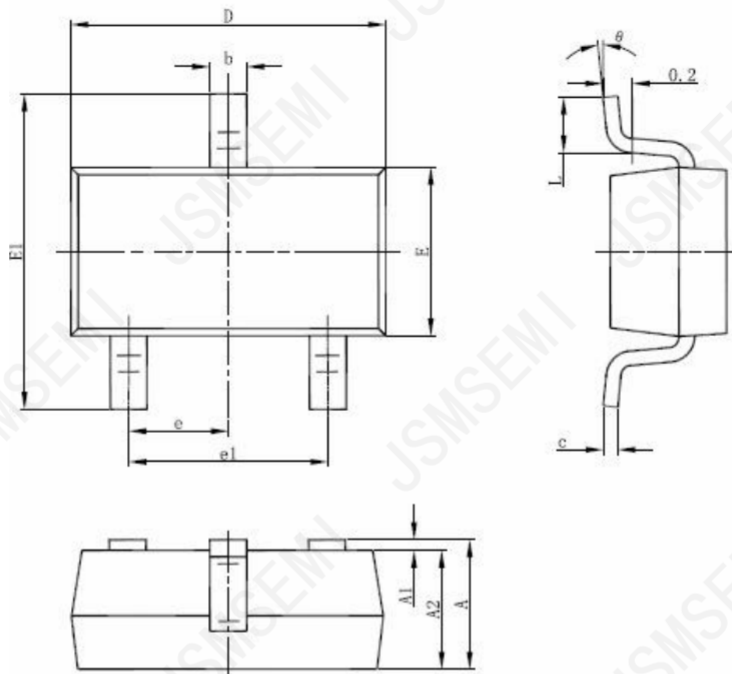


Figure C. Unclamped Inductive Switching Circuit & Waveforms

SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
C	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
JSM4N15G	SOT-23-3L	4N15	-55 to 150°C	1	T&R, 3000	Rohs

Revision History

Rev.	Change	Date
V1.0	Initial version	6/27/2021

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