

110V, 303A, 1.3mΩ N-channel Power SGT MOSFET

JMSH1101PE7

Features

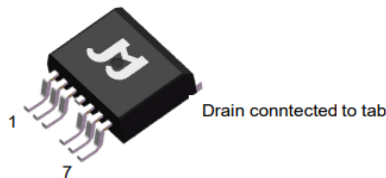
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔV_{ds} Tested
- Halogen-free; RoHS-compliant

Applications

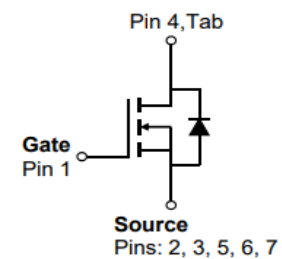
- Load Switch
- PWM Application
- Power Management

Product Summary

Parameters	Value	Unit
V_{DSS}	110	V
$V_{GS(th_Typ)}$	3.0	V
$I_D(@V_{GS}=10V)$	303	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	1.3	mΩ



TO-263-7L



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH1101PE7	SH1101P	1	Tape&Reel	TO-263-7L	800	4000

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	110	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	1765	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	W
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⁾	34	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.4	$^\circ\text{C/W}$

**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 = 250μA, V _{GS} = 0V	110	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 88V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.1	3.0	3.9	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	1.3	1.6	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	2.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 55V, f = 1MHz	8305	11626	15696	pF
C _{oss}	Output Capacitance		1123	1572	2122	pF
C _{rss}	Reverse Transfer Capacitance		25	35	47	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 55V, I _D = 20A	124	174	235	nC
Q _{gs}	Gate Source Charge		40	56	75	nC
Q _{gd}	Gate Drain("Miller") Charge		29	41	56	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 55V I _D = 20A, R _{GEN} = 3Ω	-	35	-	ns
t _r	Turn-On Rise Time		-	43	-	ns
t _{d(off)}	Turn-Off DelayTime		-	99	-	ns
t _f	Turn-Off Fall Time		-	51	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	303	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	1211	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	-	104	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	341	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 55\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 34.3\text{A}$, $V_{DD} = 0\text{V}$ 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

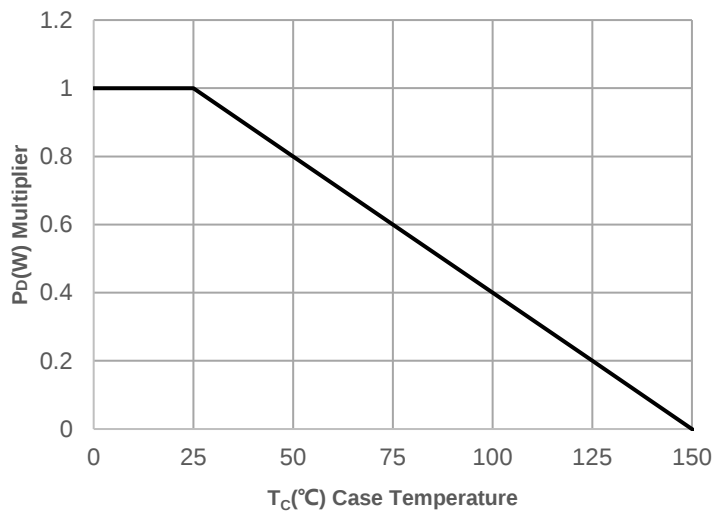


Figure 2: Current De-rating

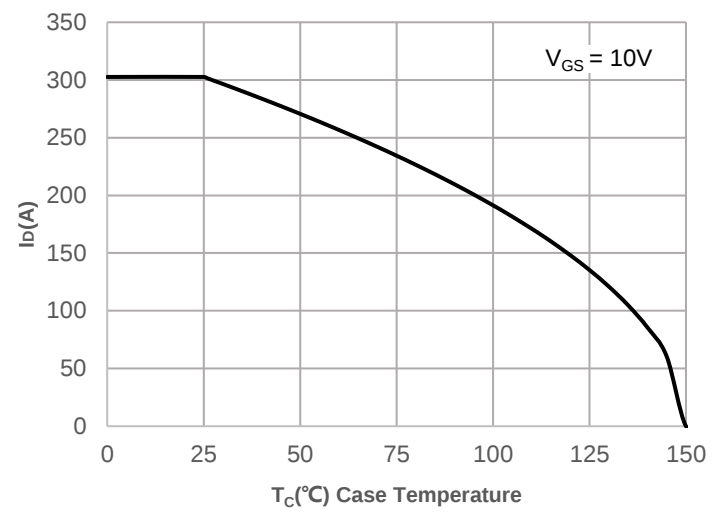


Figure 3: Normalized Maximum Transient Thermal Impedance

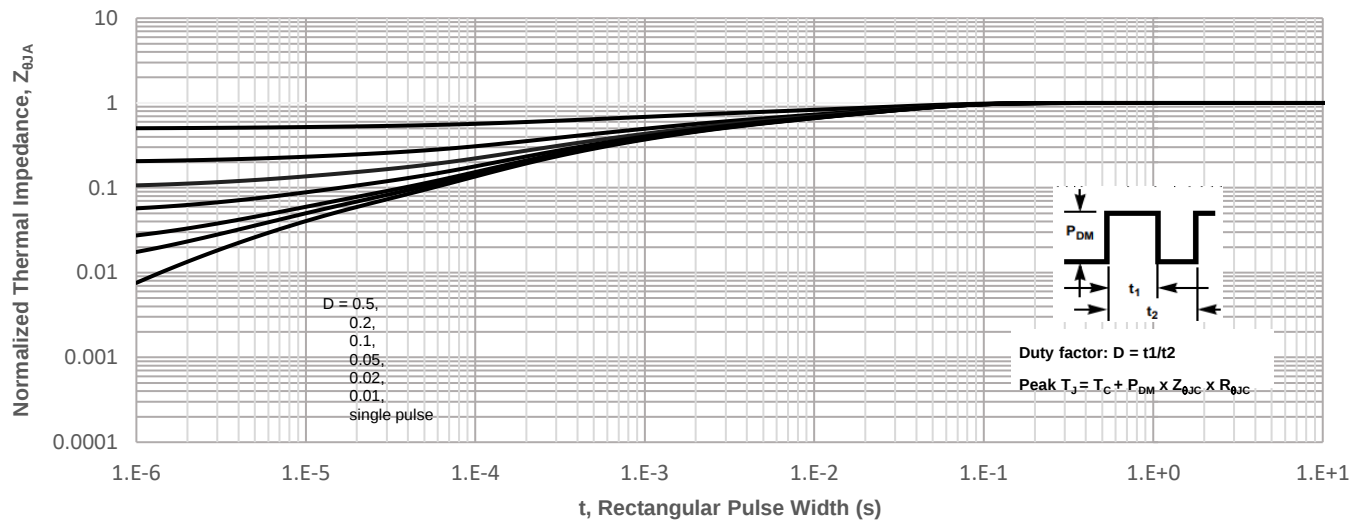
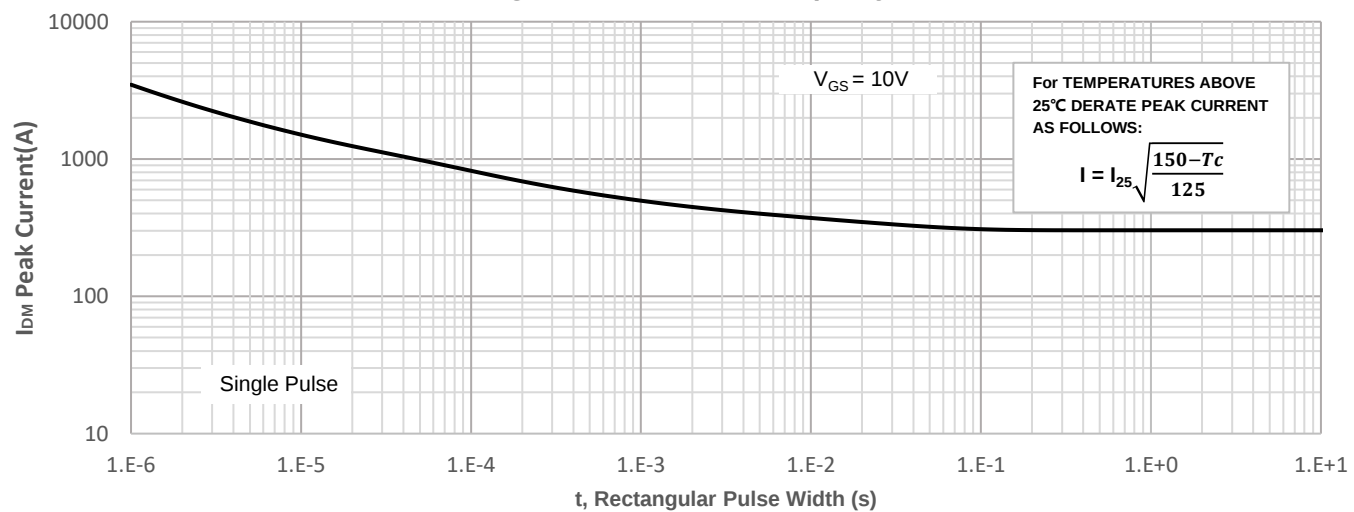


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

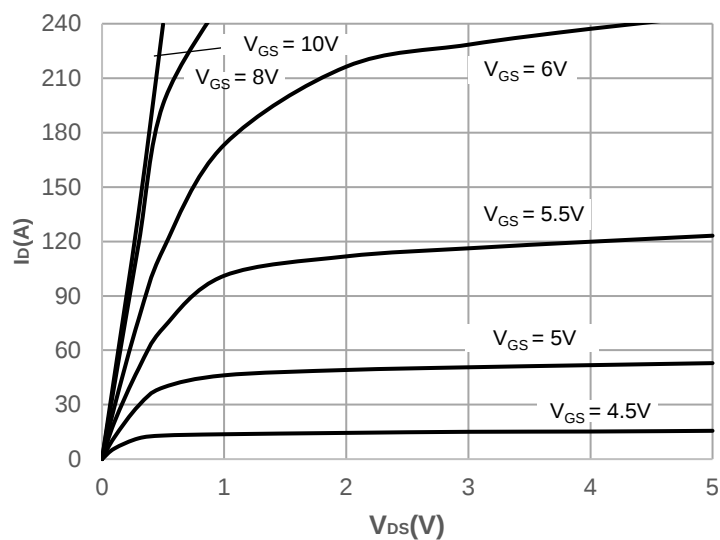


Figure 6: Typical Transfer Characteristics

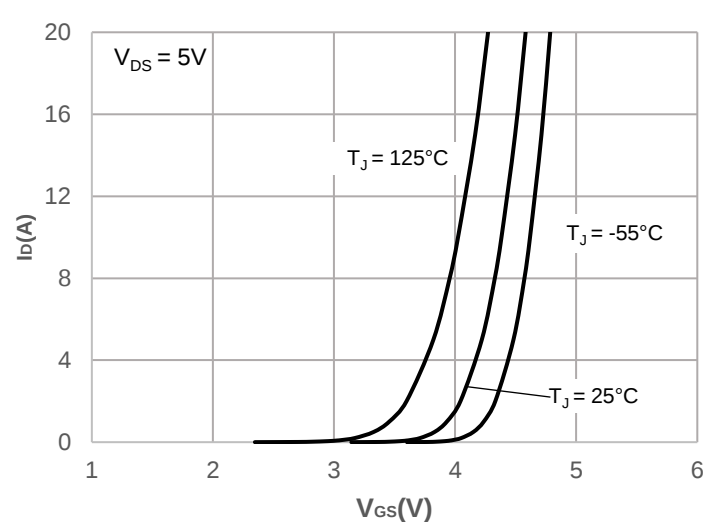


Figure 7: On-resistance vs. Drain Current

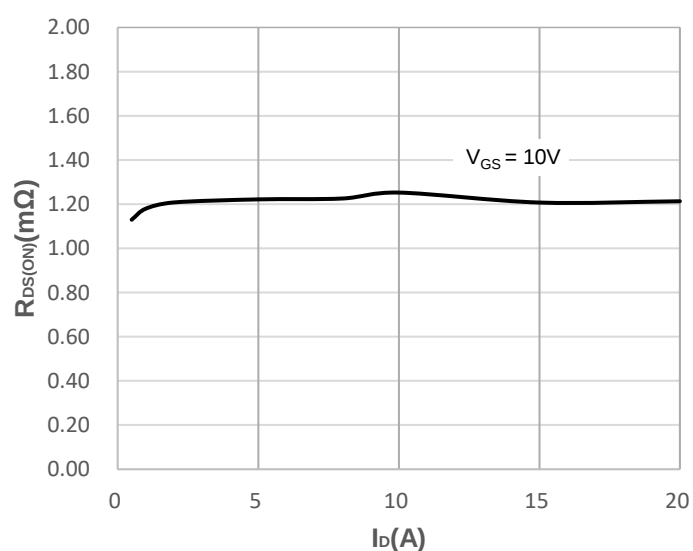


Figure 8: Body Diode Characteristics

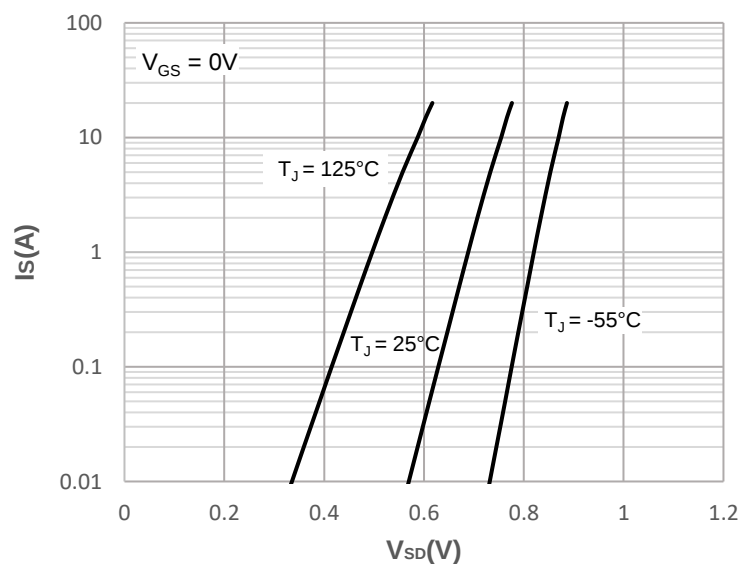


Figure 9: Gate Charge Characteristics

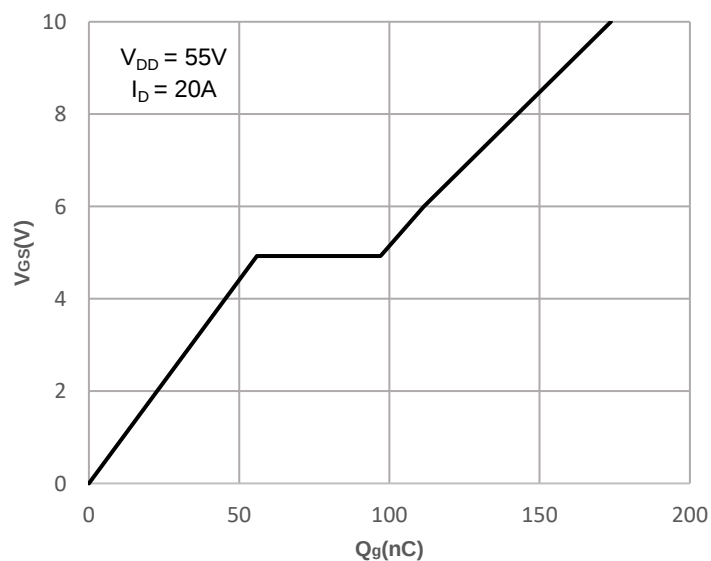
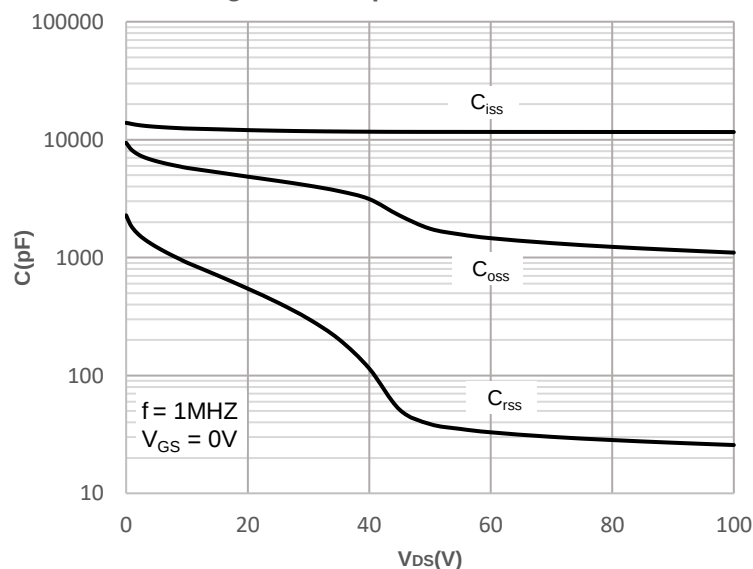


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

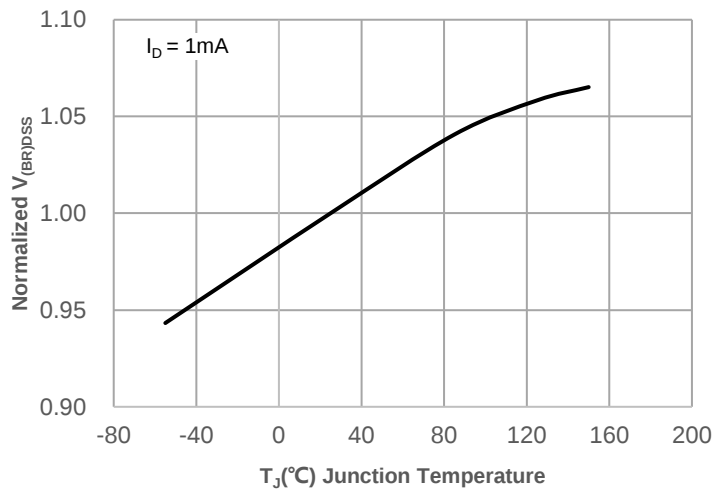


Figure 12: Normalized on Resistance vs. Junction Temperature

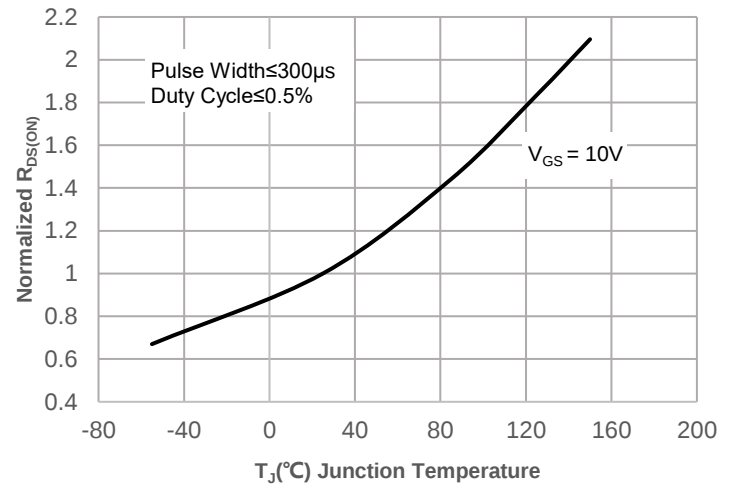


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

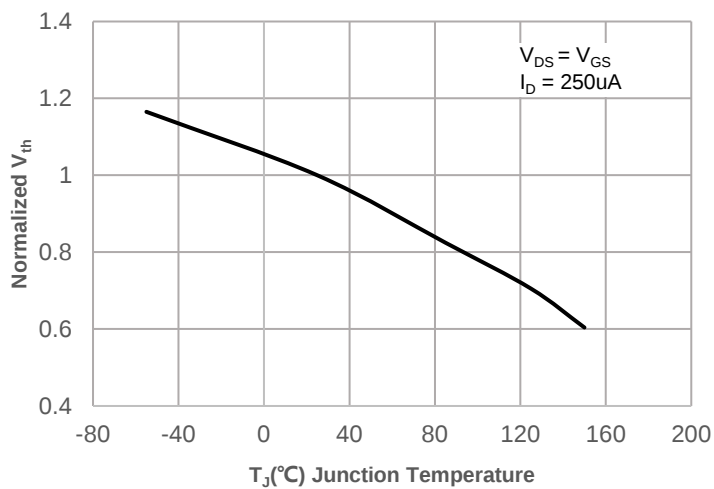


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

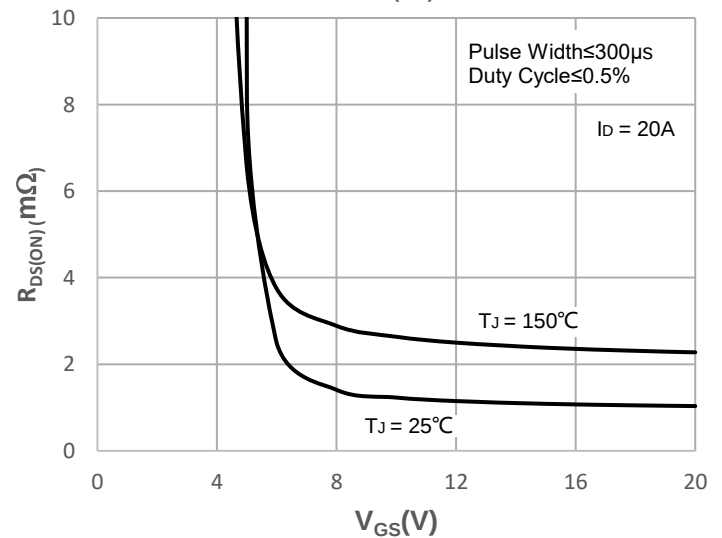
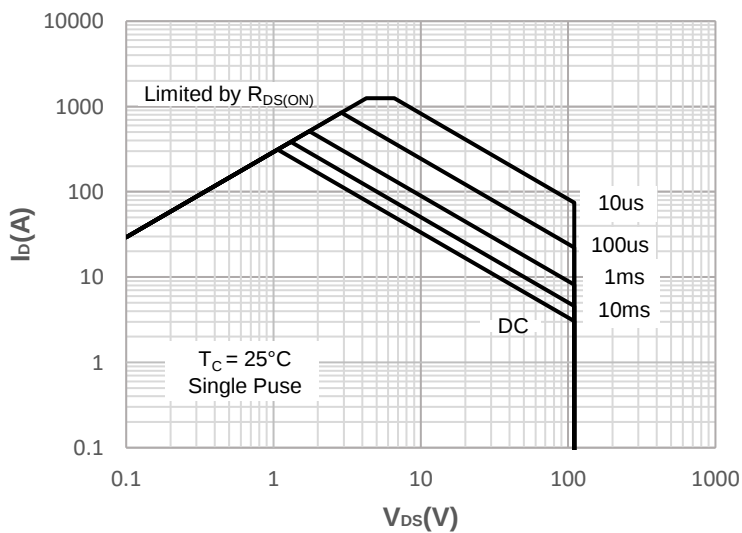


Figure 15: Maximum Safe Operating Area



Test Circuit

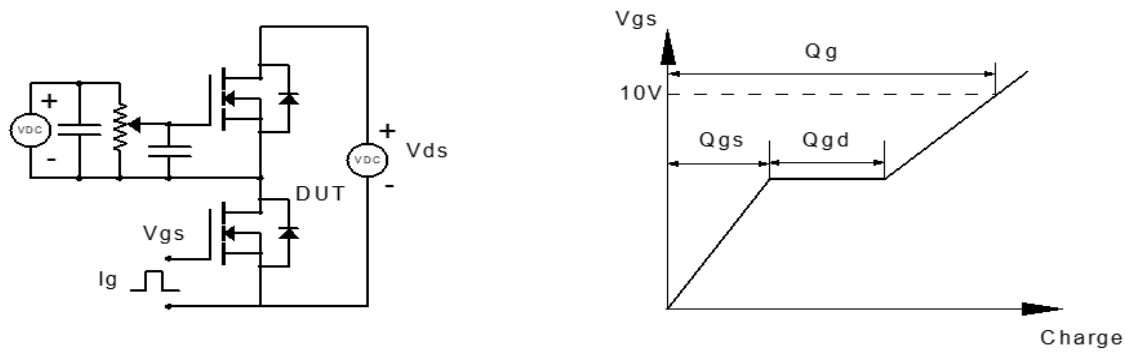


Figure 1: Gate Charge Test Circuit & Waveform

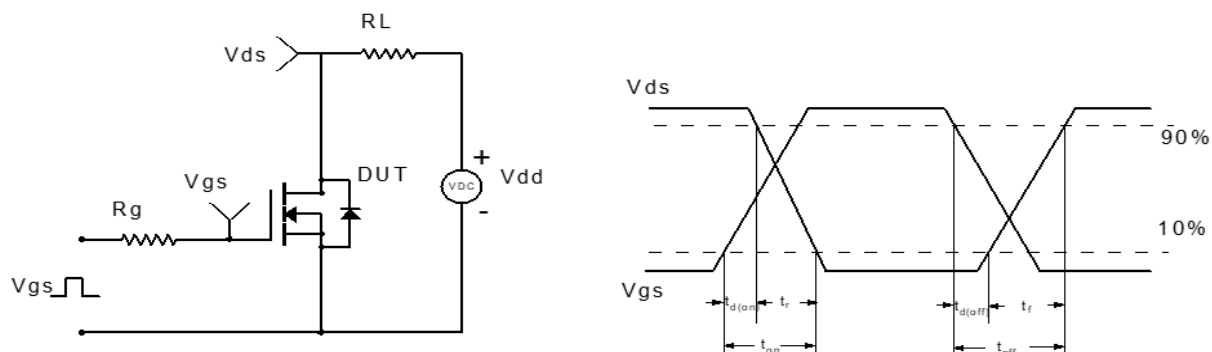


Figure 2: Resistive Switching Test Circuit & Waveform

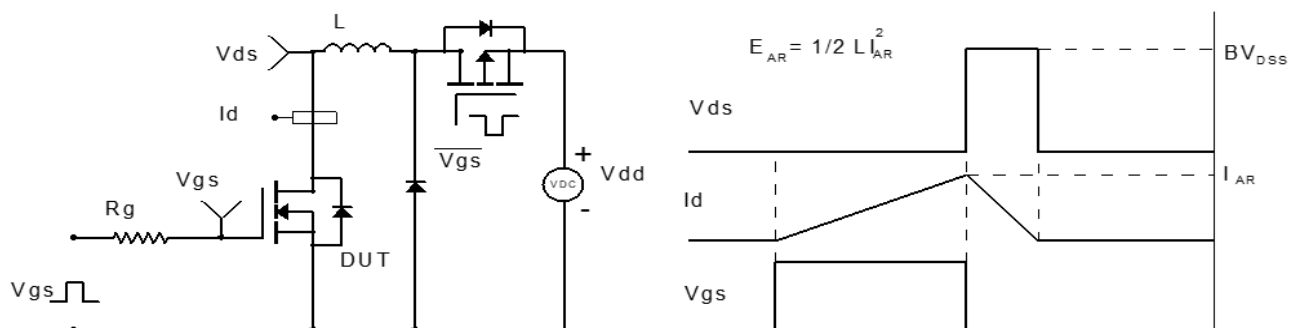


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

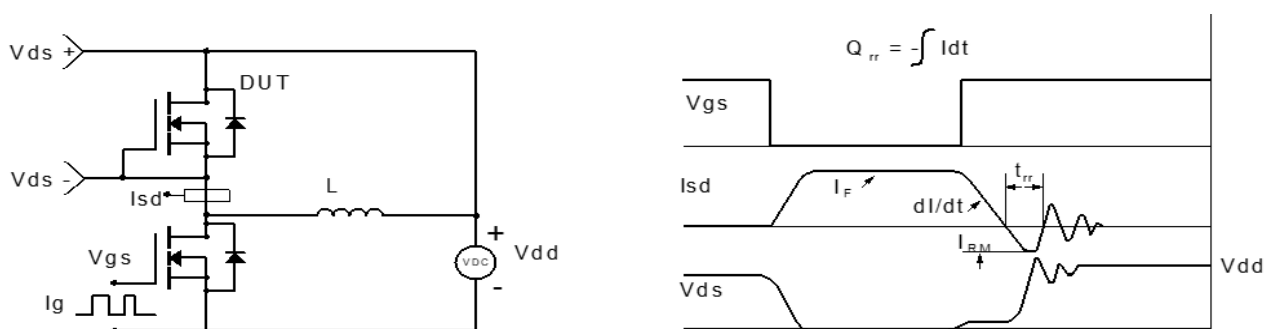
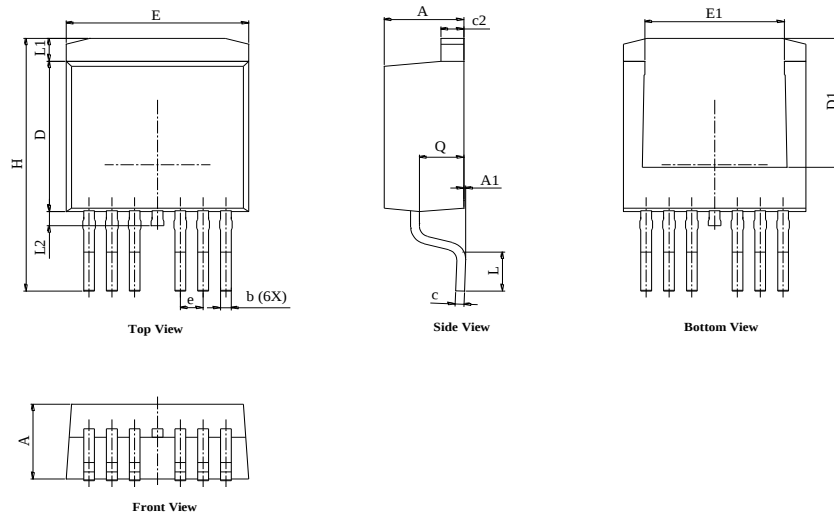


Figure 4: Diode Recovery Test Circuit & Waveform



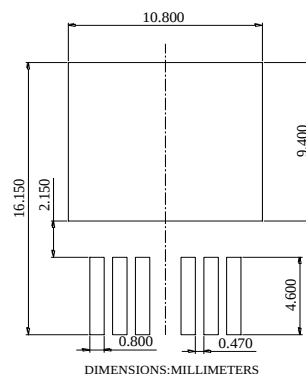
Package Mechanical Data(TO-263-7L)

Package Outline



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24	4.44	4.64
A1	0.00	0.10	0.25
b	0.50	0.60	0.70
c	0.40	0.50	0.60
c2	1.15	1.27	1.40
D	8.82	8.92	9.02
D1	7.65 REF.		
E	9.96	10.16	10.36
E1	6.80	7.80	8.00
e	1.27 BSC		
H	14.61	15.00	15.88
L	1.78	2.32	2.80
L1	1.36 REF.		
L2	1.20 REF.		
L3	0.25 BSC		
Q	2.30	2.48	2.70

Recommended Soldering Footprint



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