

**Features**

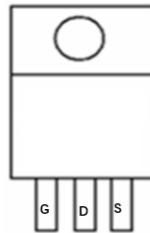
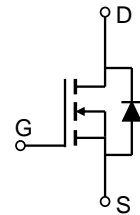
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- 100% UIS Tested
- 100%  $\Delta V_{ds}$  Tested
- Halogen-free; RoHS-compliant
- Pb-free plating

**Applications**

- Load Switch
- PWM Application
- Power Management

**Product Summary**

Parameters	Value	Unit
$V_{DSS}$	70	V
$V_{GS(th\_Typ)}$	3.0	V
$I_D (@V_{GS}=10V)$	84	A
$R_{DS(ON\_Typ)} (@V_{GS}=10V)$	6.1	mΩ
$R_{DS(ON\_Typ)} (@V_{GS}=8.0V)$	6.6	mΩ


**TO-220-3L Top View**

**Pin Assignment**

**Schematic Diagram**
**Ordering Information**

Device	Marking	MSL	Form	Package	Tube(pcs)	Per Carton (pcs)
JMTC068N07A	JMTC068N07A	NA	Tube	TO-220-3L	50	5000

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

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-to-Source Voltage	70	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	A
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	Refer to Fig.4	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	206	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 <sup>(3)</sup>	68	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.0	$^\circ\text{C/W}$

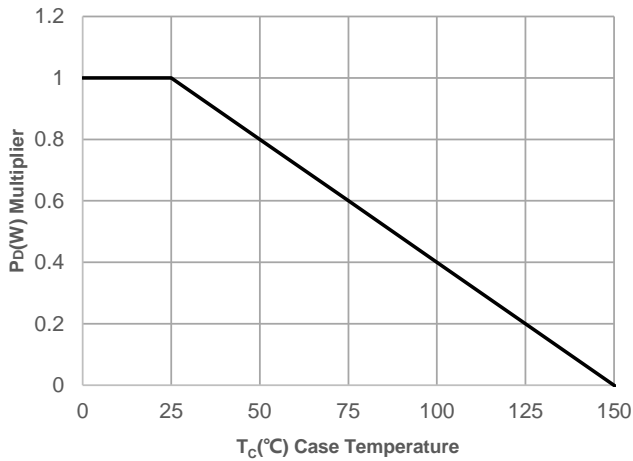
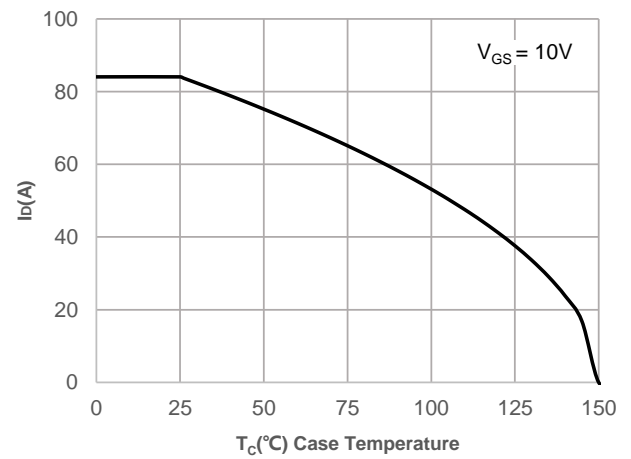
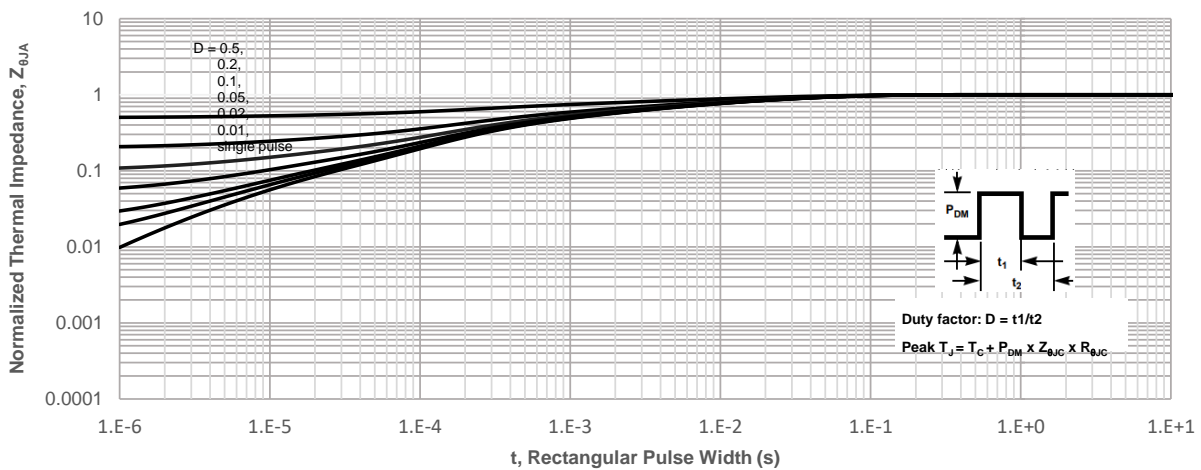
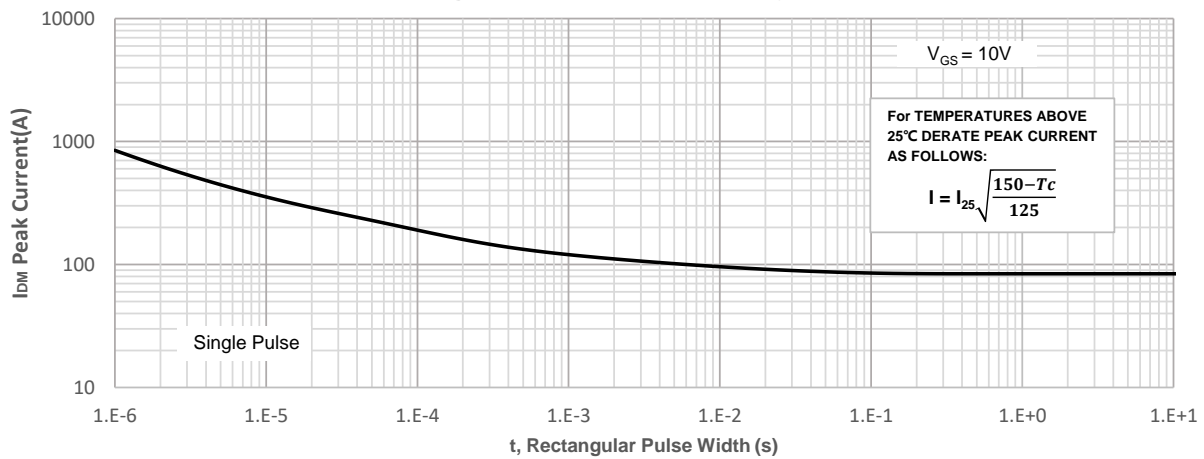
**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	70	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 70V, V <sub>GS</sub> = 0V	-	-	1.0	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.1	3.0	3.9	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A	-	6.1	8.0	mΩ
		V <sub>GS</sub> = 8V, I <sub>D</sub> = 20A	-	6.6	8.5	mΩ
Dynamic Characteristics						
R <sub>g</sub>	Gate Resistance	f = 1MHz	-	0.9	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 35V, f = 1MHz	3902	5463.0	7375	pF
C <sub>oss</sub>	Output Capacitance		178	250	337	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		142	199	268	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 10V V <sub>DS</sub> = 35V, I <sub>D</sub> = 30A	67	94	128	nC
Q <sub>gs</sub>	Gate Source Charge		22	30	41	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		17	24	33	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 35V I <sub>D</sub> = 30A, R <sub>GEN</sub> = 3Ω	-	20	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	30	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	45	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	14	-	ns
Body Diode Characteristics						
I <sub>S</sub>	Maximum Continuous Body Diode Forward Current		-	-	84	A
I <sub>SM</sub>	Maximum Pulsed Body Diode Forward Current		-	-	336	A
V <sub>SD</sub>	Body Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> = 30A, di/dt = 100A/us	21	30	41	ns
Qrr	Body Diode Reverse Recovery Charge		-	41.8	-	nC

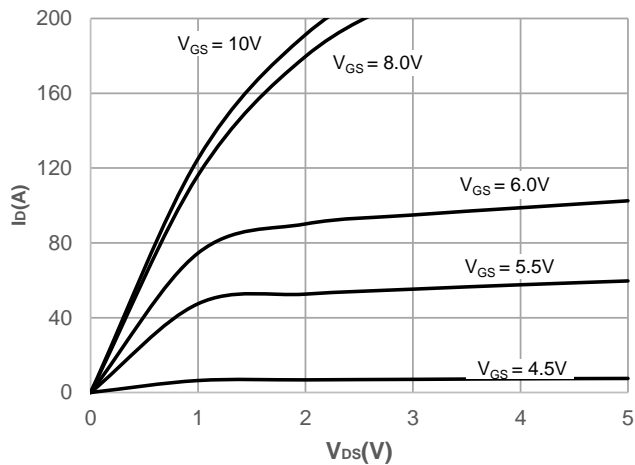
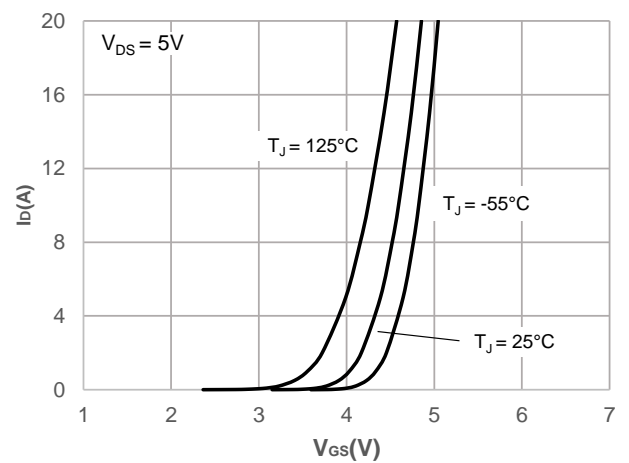
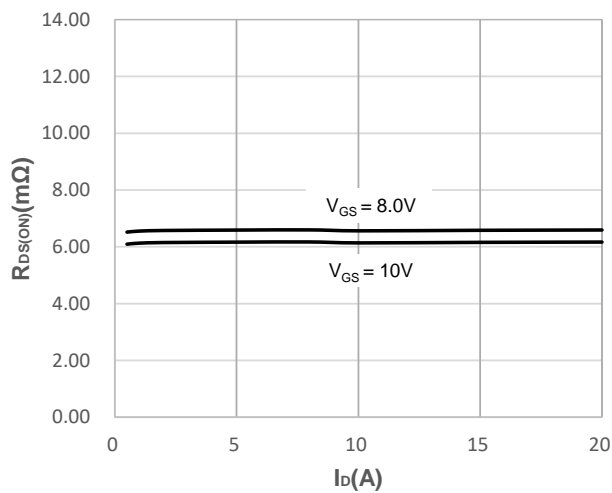
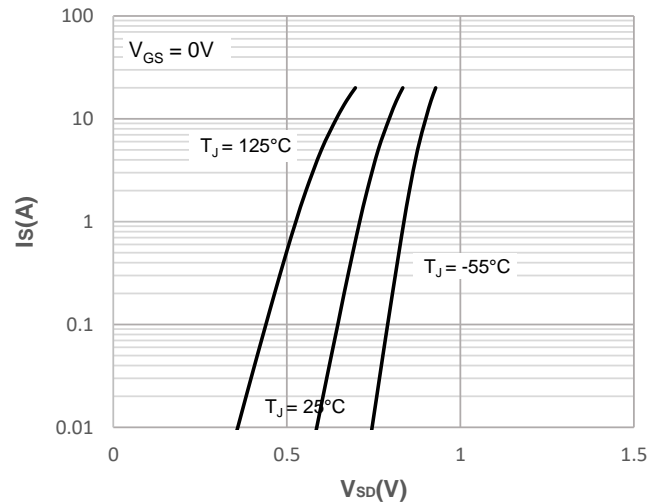
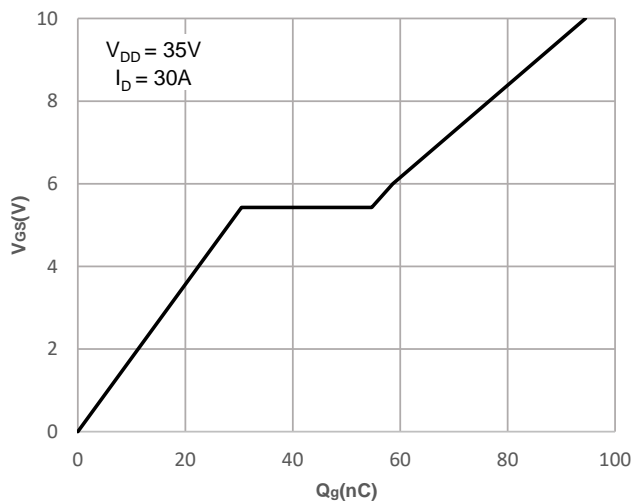
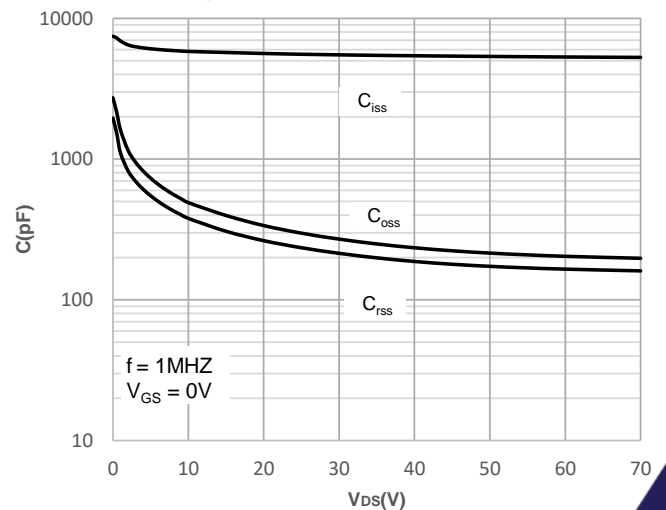
- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2.  $E_{AS}$  condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 35\text{V}$ ,  $V_G = 10\text{V}$ ,  $R_G = 25\text{ohm}$ ,  $L = 0.5\text{mH}$ ,  $I_{AS} = 28.7\text{A}$ ,  $V_{DD} = 0\text{V}$  during time in avalanche.
  3.  $R_{\theta JA}$  is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB.
  4. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$ .



## Typical Performance Characteristics

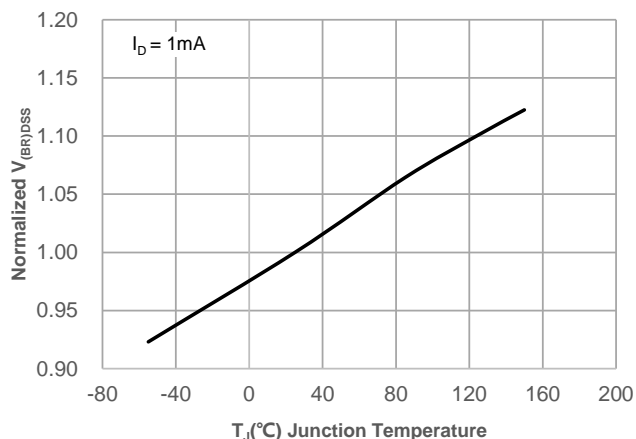
**Figure 1: Power De-rating**

**Figure 2: Current De-rating**

**Figure 3: Normalized Maximum Transient Thermal Impedance**

**Figure 4: Peak Current Capacity**


## Typical Performance Characteristics

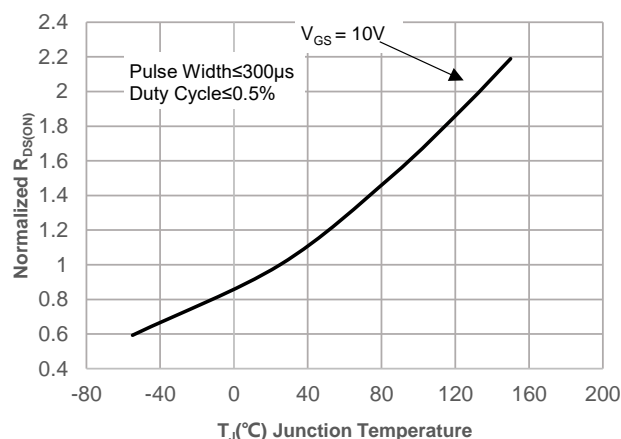
**Figure 5: Output Characteristics**

**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

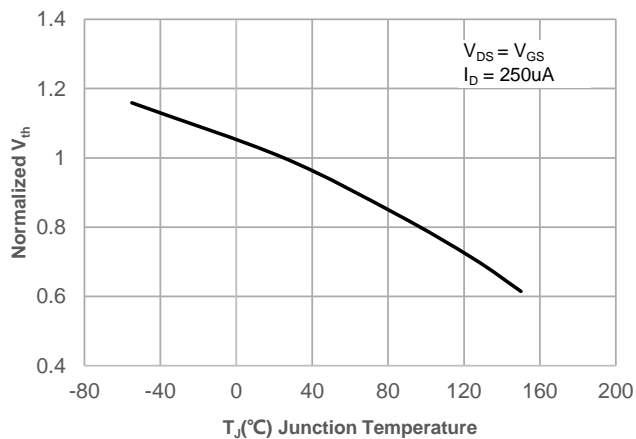
**Figure 11: Normalized Breakdown voltage vs. Junction Temperature**



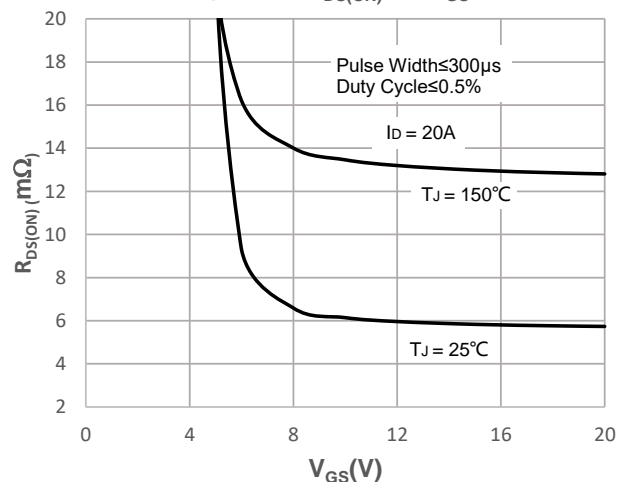
**Figure 12: Normalized on Resistance vs. Junction Temperature**



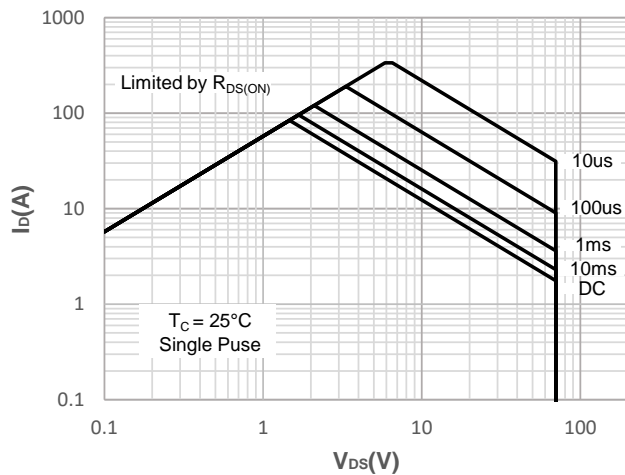
**Figure 13: Normalized Threshold Voltage vs. Junction Temperature**



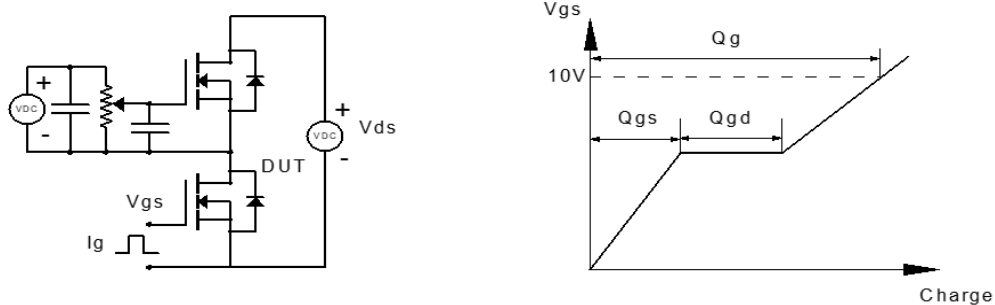
**Figure 14:  $R_{DS(ON)}$  vs.  $V_{GS}$**



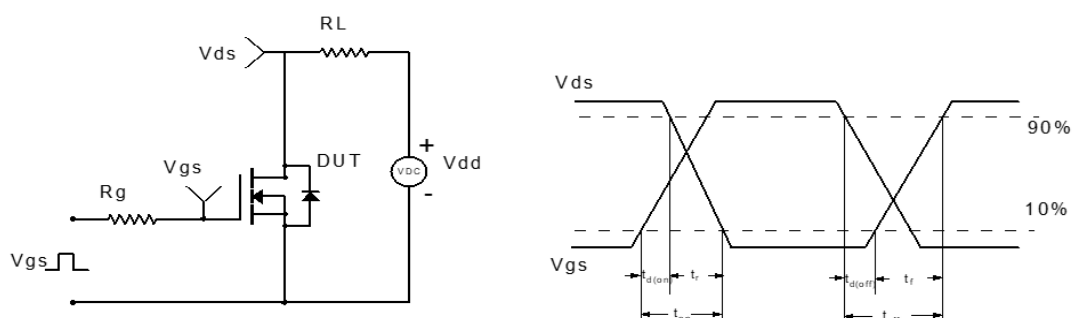
**Figure 15: Maximum Safe Operating Area**



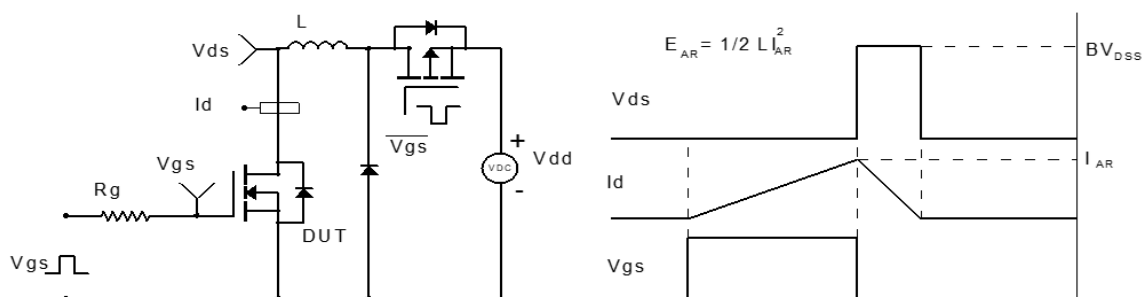
## Test Circuit



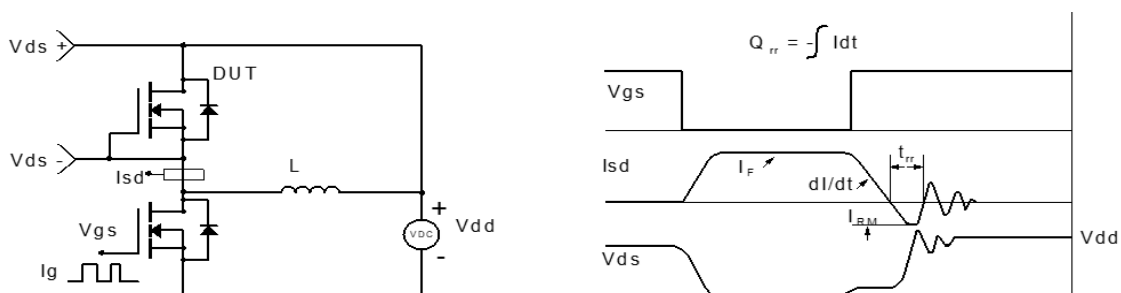
**Figure 1: Gate Charge Test Circuit & Waveform**



**Figure 2: Resistive Switching Test Circuit & Waveform**

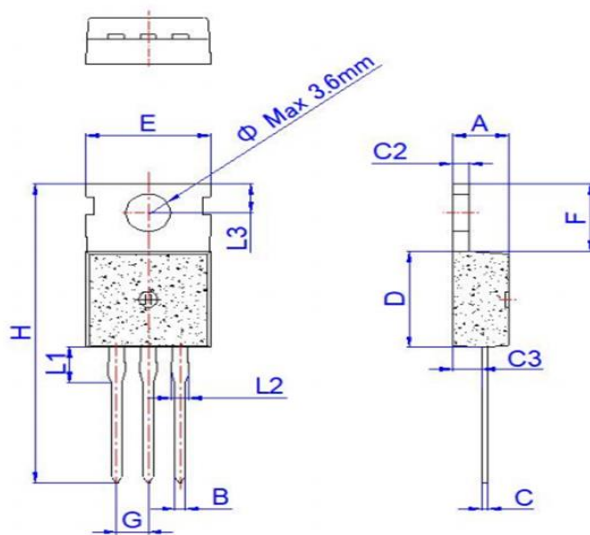


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



**Figure 4: Diode Recovery Test Circuit & Waveform**

## Package Mechanical Data(TO-220-3L)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

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