

## Features

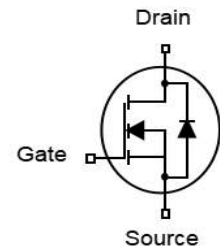
- N-Channel
- Low FOM  $R_{DS(on)} \times Q_{gd}$
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant
- 100% EAS Tested

$V_{DS}$	100	V
$R_{DS(on),TYP@ V_{GS}=10V}$	3.8	mΩ
$R_{DS(on),TYP@ V_{GS}=4.5V}$	4.5	mΩ
$I_D$	130	A

DFN5x6



Part ID	Package Type	Marking	Packing
ZTG038N10G	DFN5x6	ZTG038N10G	5000pcs/Reel



## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ , unless otherwise specified

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (<math>T_c=25^\circ\text{C}</math> Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	±20	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	100	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_{DM}$	Drain Current-Continuous@ Current-Pulsed (Note 3)	$T_c = 25^\circ\text{C}$ 520	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous (Note 2)	$T_c = 25^\circ\text{C}$	130	A
		$T_c = 100^\circ\text{C}$	94	A
$P_D$	Maximum Power Dissipation	131.5	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.95	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	50	°C/W	
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed (Note 1)	360	mJ	

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub>=25°C (unless otherwise stated)</b>						
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.4	1.9	2.4	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	3.8	4.5	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	--	4.5	5.9	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz	--	3995	--	pF
C <sub>oss</sub>	Output Capacitance		--	975	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	17	--	pF
R <sub>g</sub>	Gate Resistance f=1MHz	f=1MHz	--	0.9	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	--	65	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	14	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	10	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =50V, I <sub>D</sub> =40A, R <sub>G</sub> =6Ω, V <sub>GS</sub> =10V	--	14	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	20	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	50	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	22	--	ns
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>SD</sub>	Source-Drain Current (Body Diode)		--	--	130	A
V <sub>SD</sub>	Forward on voltage	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	--	--	1.2	V
T <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =20A, di/dt=100A/μs	--	48	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	210	--	nC

**Notes**

- L=0.5mH, V<sub>DD</sub>=50V, Start T<sub>J</sub>=25°C.
- Limited by maximum junction temperature.
- Repetitive Rating: Pulse width limited by maximum junction temperature.

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

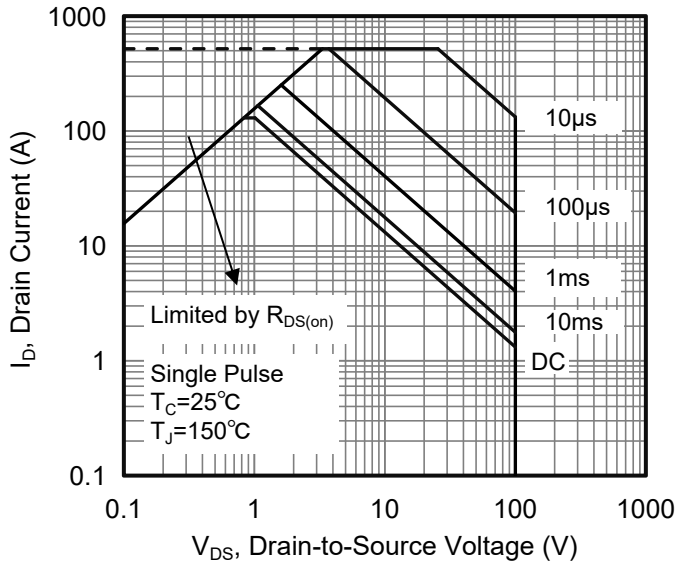


Figure 1. Maximum Safe Operating Area

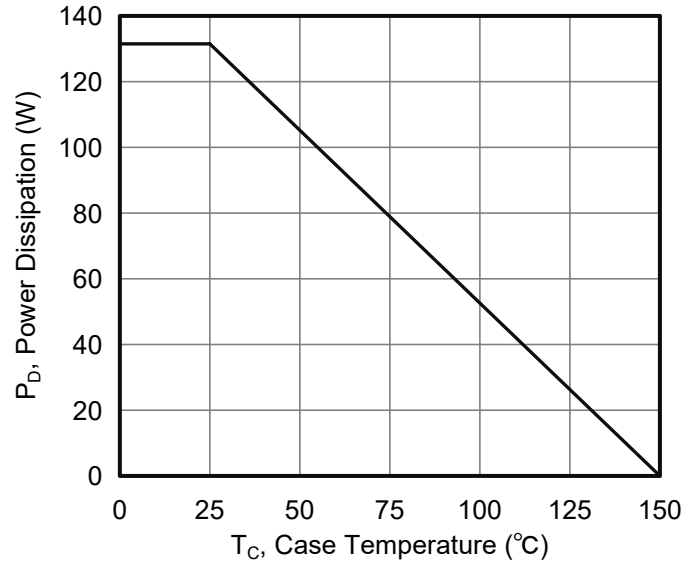


Figure 4. Maximum Power Dissipation vs Case Temperature

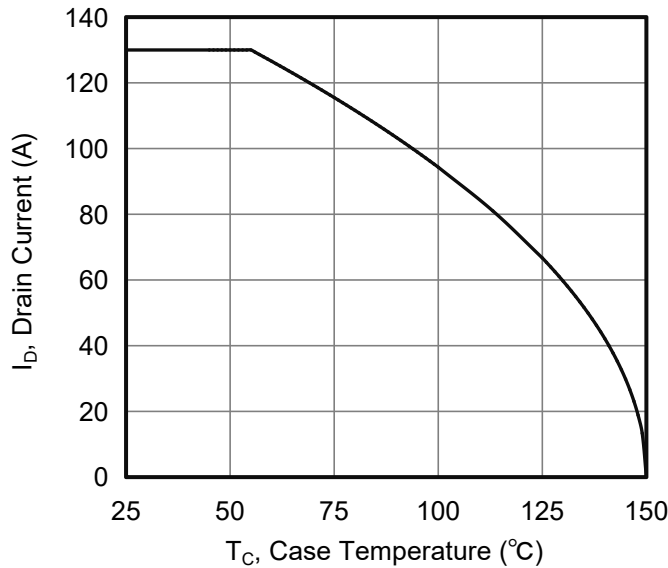


Figure 2. Maximum Continuous Drain Current vs Case Temperature

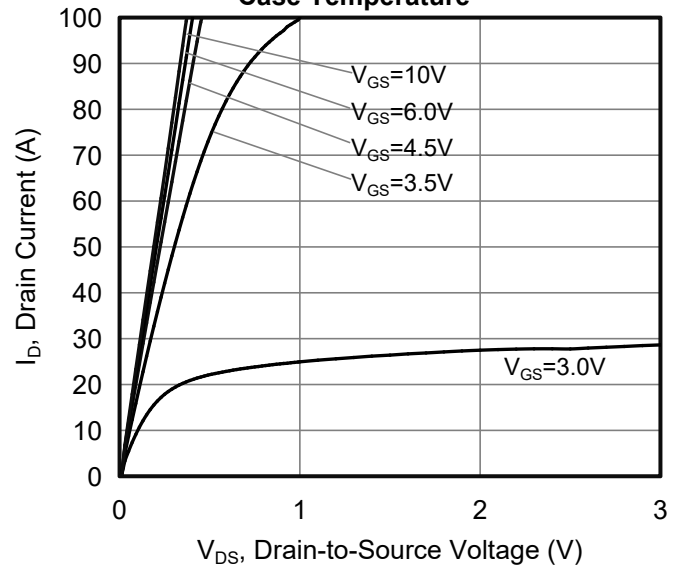


Figure 5. Typical output Characteristics

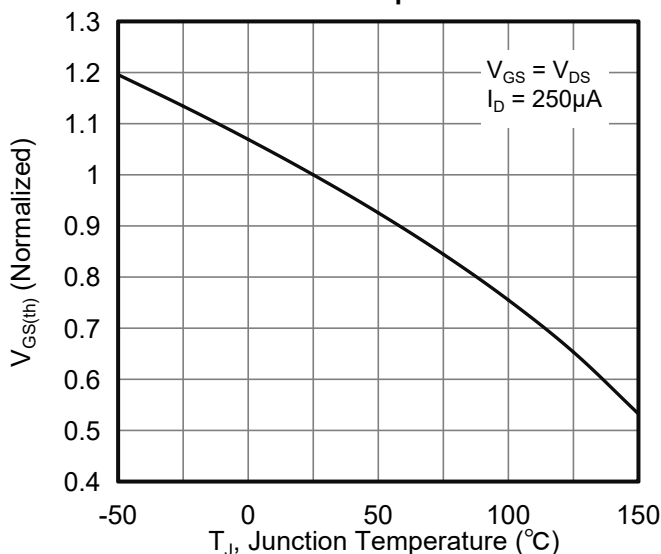


Figure 3. Normalized Threshold Voltage vs Junction Temperature

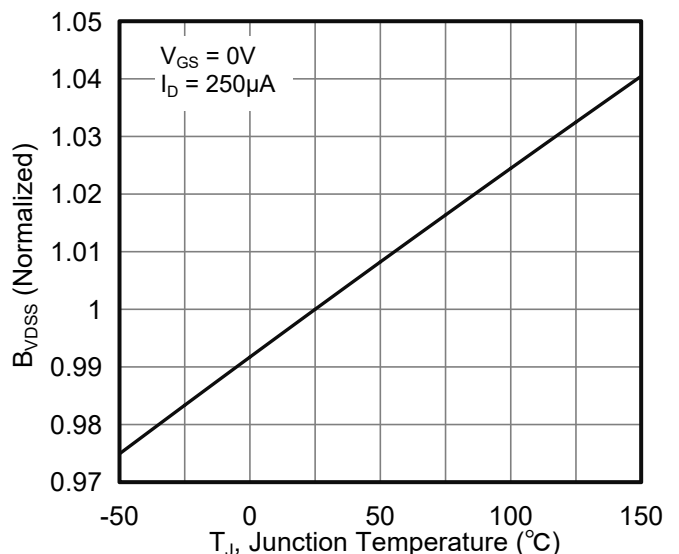
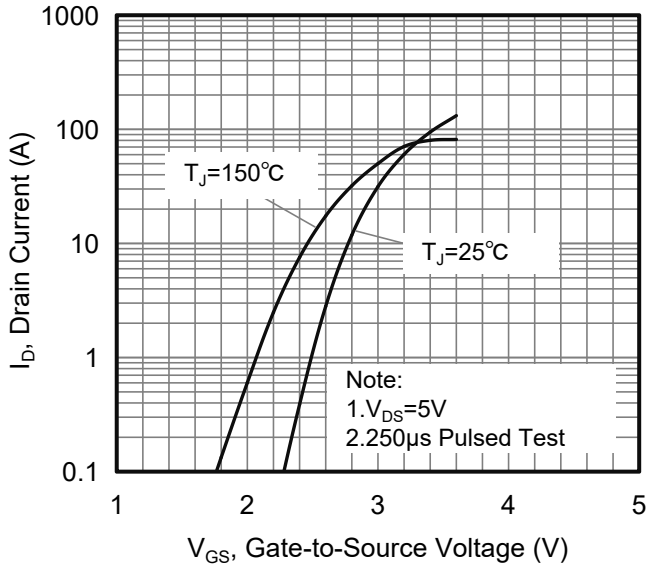
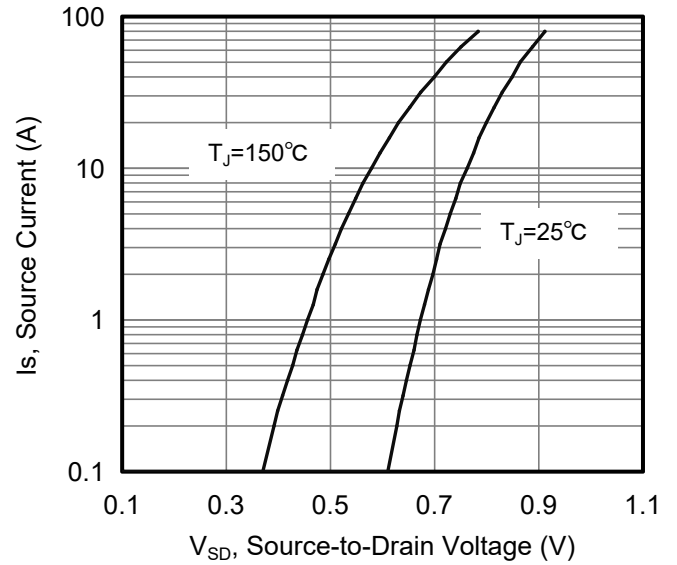


Figure 6. Normalized Breakdown Voltage vs Junction Temperature

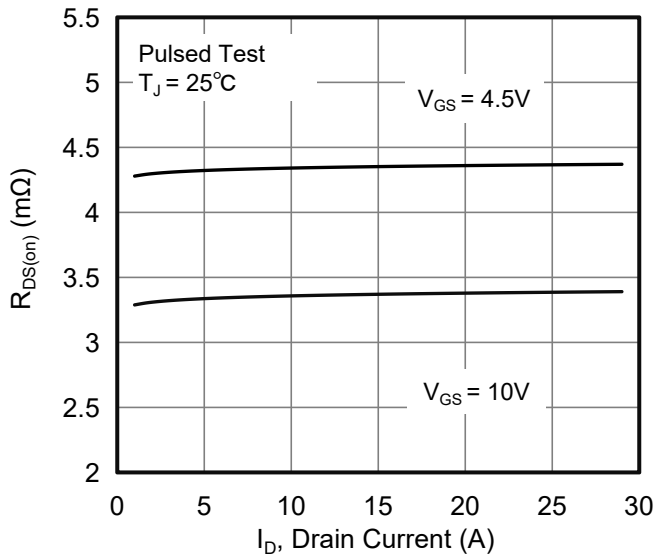
**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted



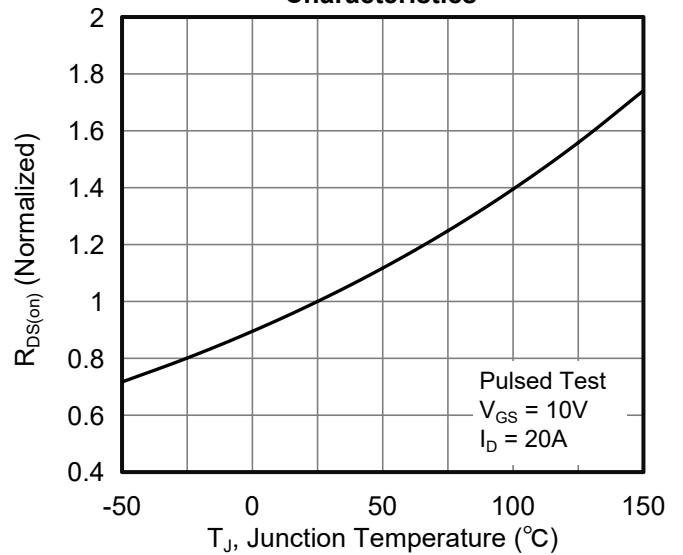
**Figure 7. Typical Transfer Characteristics**



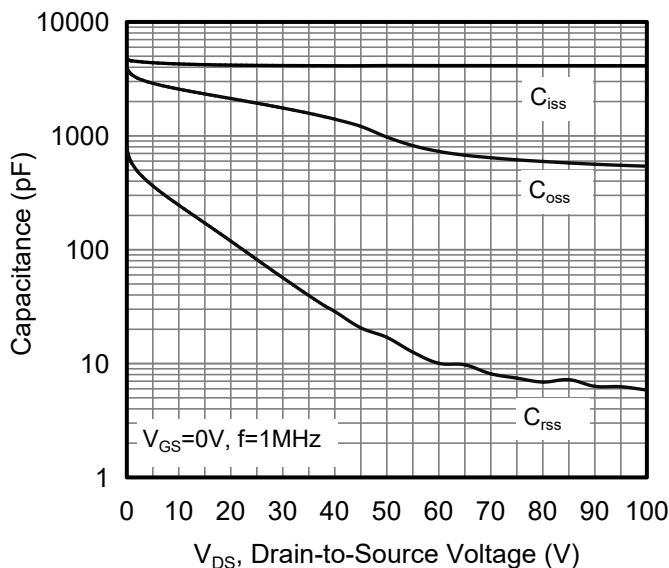
**Figure 10. Typical Body Diode Transfer Characteristics**



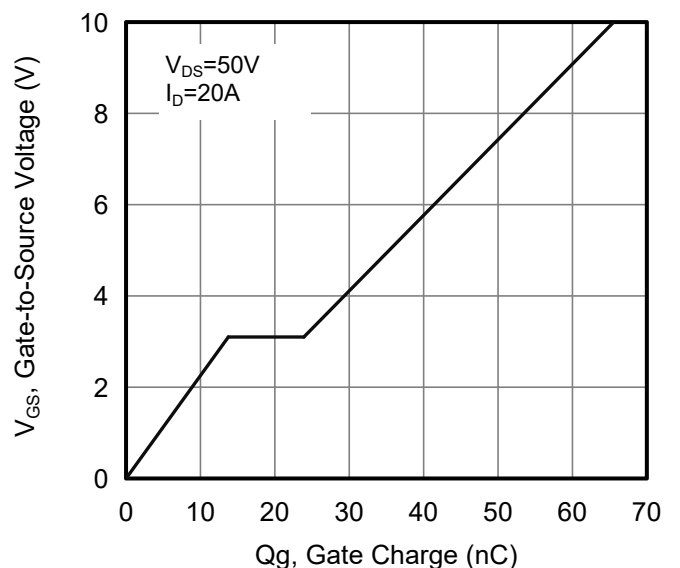
**Figure 8. Drain-to-Source On Resistance vs Drain Current**



**Figure 11. Normalized On Resistance vs Junction Temperature**



**Figure 9. Capacitance Characteristics**



**Figure 12. Typical Gate Charge vs Gate to Source Voltage**

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

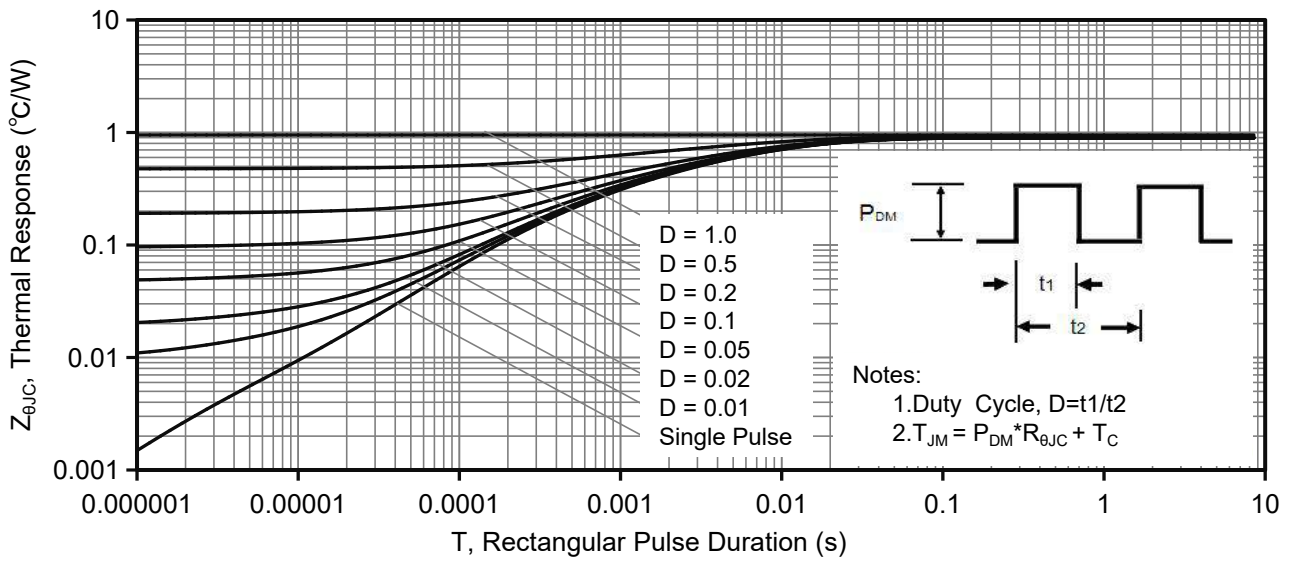


Figure 5. Maximum Effective Thermal Impedance, Junction to Case

Figure A: Gate Charge Test Circuit and Waveform

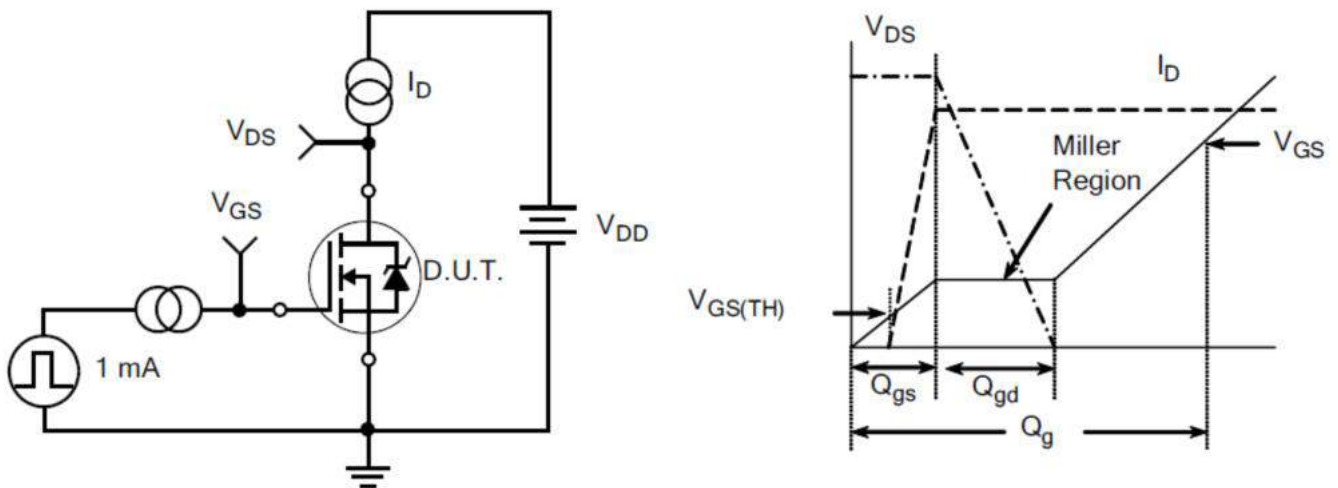


Figure B: Resistive Switching Test Circuit and Waveform

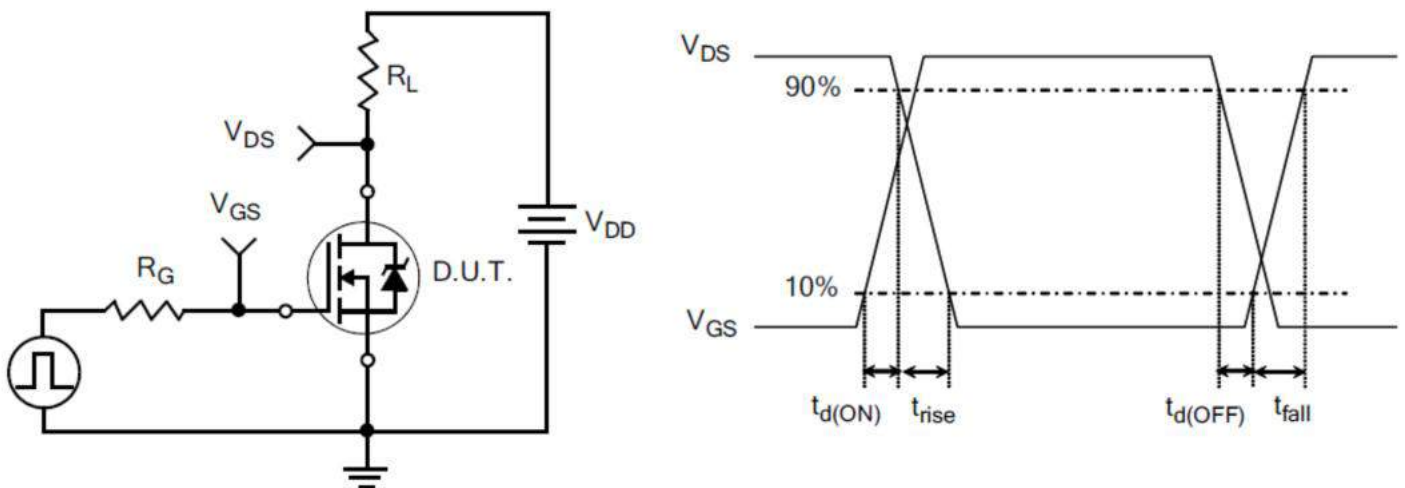
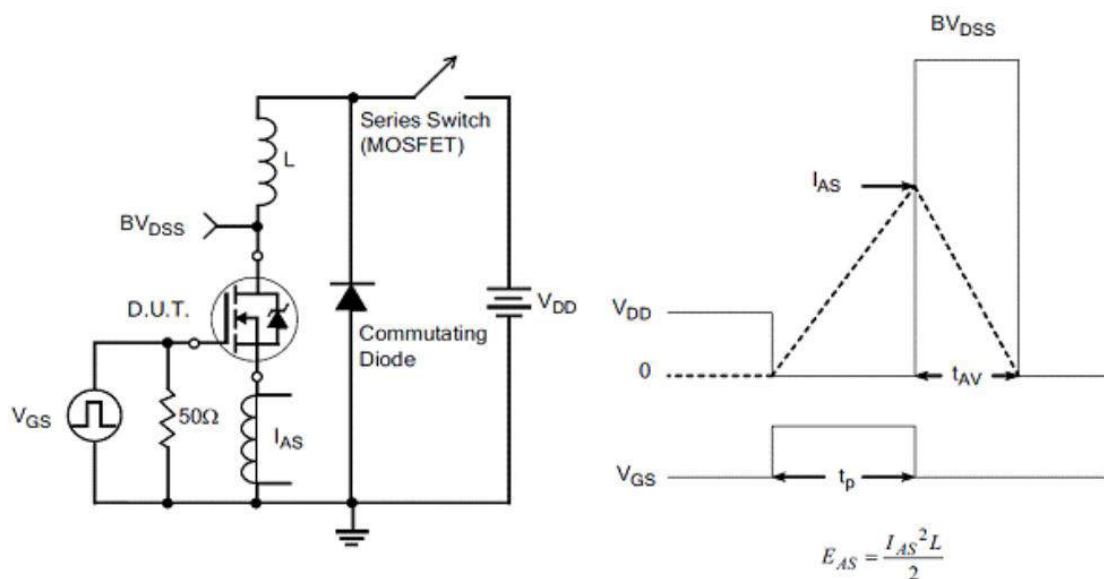
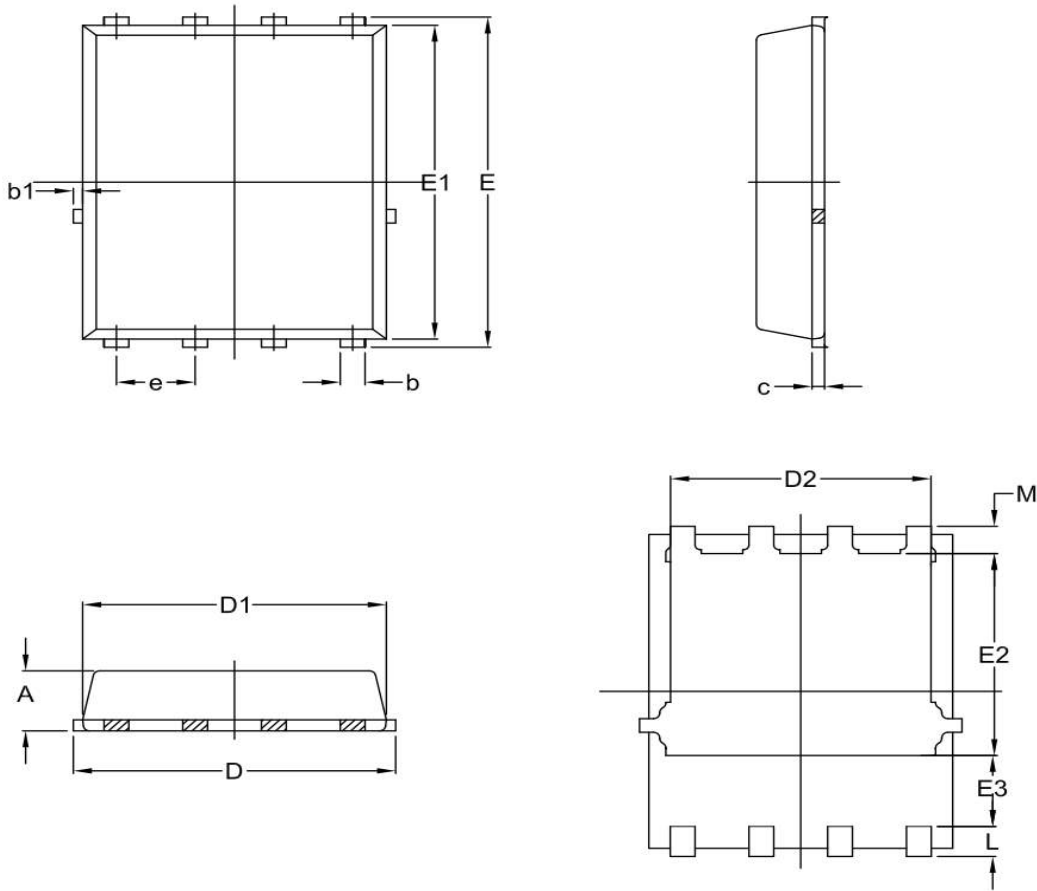


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



## DFN5x6-8L Package Information



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.20
b	0.30	0.40	0.50
b1	0.02	0.15	0.22
c	0.15	0.20	0.35
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.00	4.20	4.40
E	5.95	6.05	6.25
E1	5.65	5.75	5.85
E2	3.50	3.70	3.90
E3	1.10	/	/
e	1.27		
L	0.40	0.55	0.70
M	0.35	0.50	0.65

## Customer Service

Sales and Service:

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