

## Features

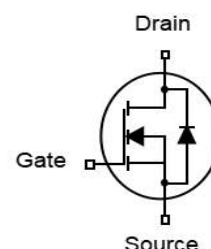
- N-Channel
- Excellent Gate Charge × R<sub>DS(on)</sub> (FOM)
- Ultra-low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)
- 100% EAS Tested

$V_{DS}$	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	2.9	mΩ
$R_{DS(on),TYP@ V_{GS}=4.5V}$	3.5	mΩ
$I_D$	100	A

DFN5x6



Part ID	Package Type	Marking	Packing
ZTG022N04G	DFN5x6	ZTG022N04G	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	40	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 2)	$T_C = 25^\circ\text{C}$ 400	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous (Note 1)	$T_C = 25^\circ\text{C}$	100	A
		$T_C = 100^\circ\text{C}$	68	A
$P_D$	Maximum Power Dissipation	67	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.85	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient (Note 4)	52	°C/W	
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed (Note 3)	110	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	40	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, 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	1.2	1.7	2.2	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	--	2.9	3.5	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	--	3.5	5.0	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note 5)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz	--	1846	--	pF
C <sub>oss</sub>	Output Capacitance		--	606	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	28	--	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	7.2	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	--	28	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	4.5	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	5.6	--	nC
<b>Switching Characteristics (Note 5)</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, R <sub>L</sub> =1.0Ω, R <sub>G</sub> =6.0Ω, V <sub>GS</sub> =10V	--	9	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	50	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	44.9	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	76	--	ns
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>S</sub>	Diode Forward Current (Note 3)		--	--	100	A
V <sub>SD</sub>	Forward on voltage (Note 6)	I <sub>S</sub> =1A, V <sub>GS</sub> =0V	--	--	1.0	V
T <sub>rr</sub>	Reverse Recovery Time (Note 4)	T <sub>J</sub> =25°C, I <sub>D</sub> =15A di/dt=100A/μs	--	40	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	27	--	nC

**Notes:**

- The max drain current rating is limited by T<sub>JMAX</sub>
- Repetitive Rating: Pulse width limited by maximum junction temperature
- L = 0.5 mH, V<sub>DD</sub> = 50V, I<sub>AS</sub> = 21A, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25 °C
- Mount on minimum PCB layout

**Electrical Characteristics Diagrams**

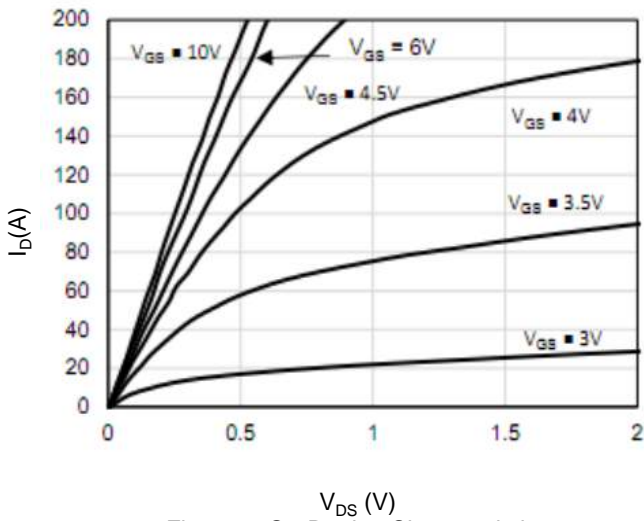


Figure 1: On-Region Characteristics

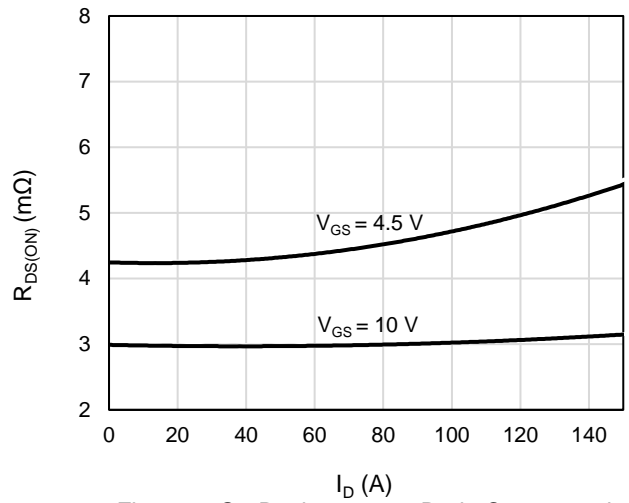


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

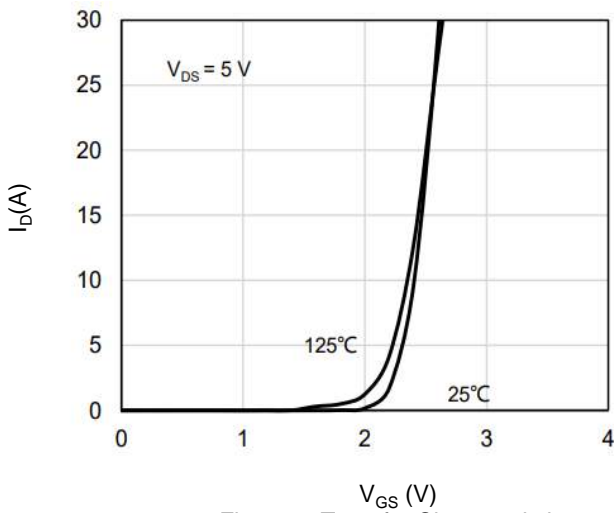


Figure 2: Transfer Characteristics

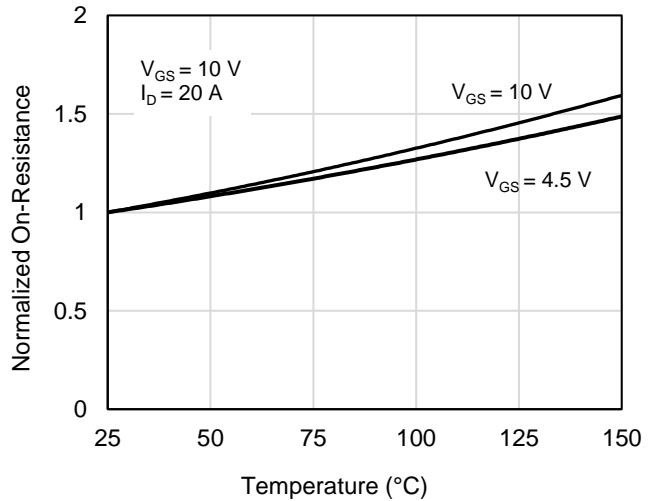


Figure 5: On-Resistance vs. Junction Temperature

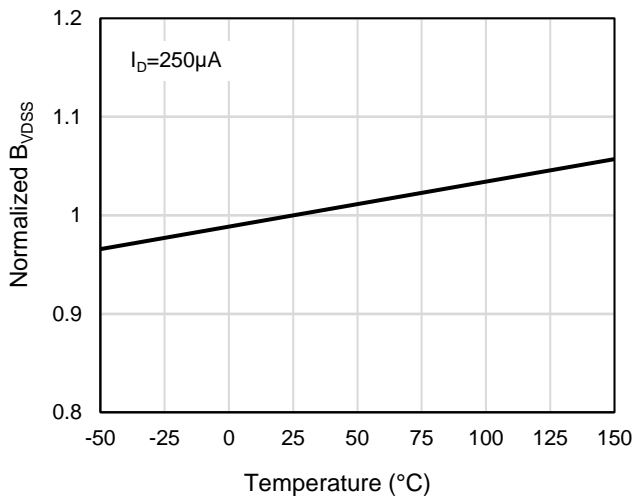


Figure 3: Breakdown Voltage vs. Junction Temperature

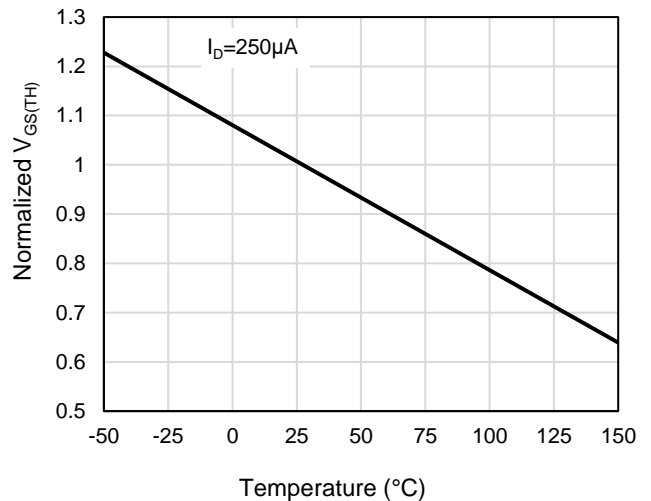


Figure 6: Threshold Voltage vs. Junction Temperature

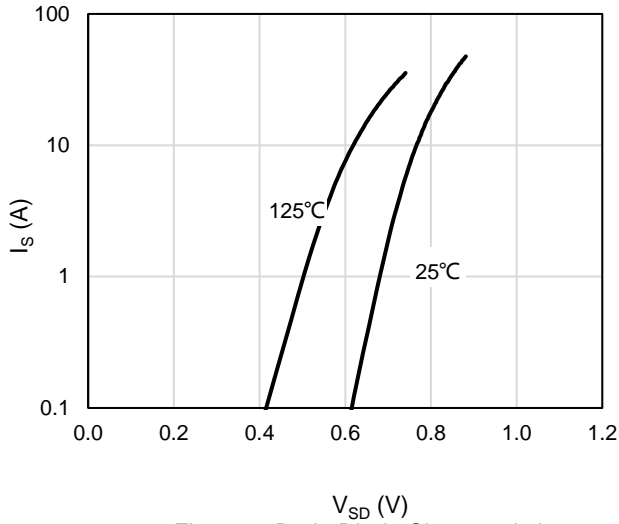


Figure 7: Body-Diode Characteristics

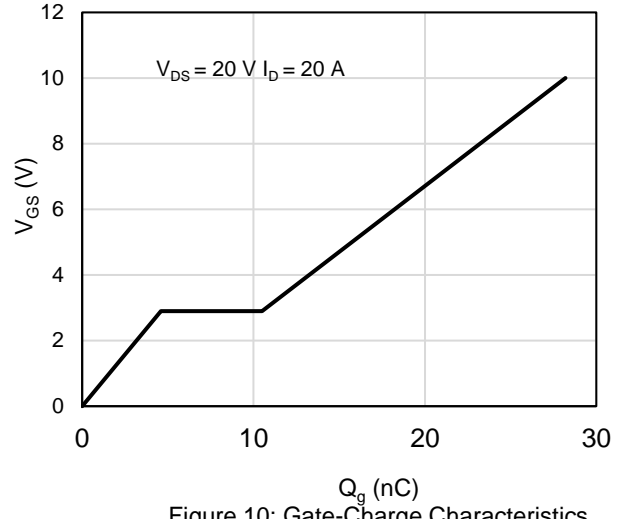


Figure 10: Gate-Charge Characteristics

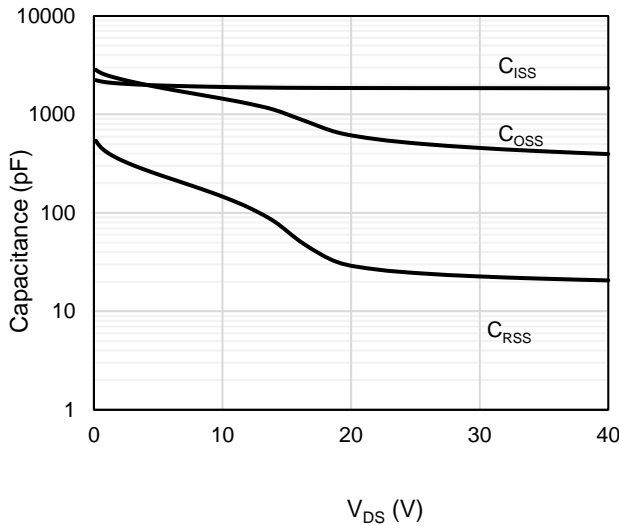


Figure 8: Capacitance Characteristics

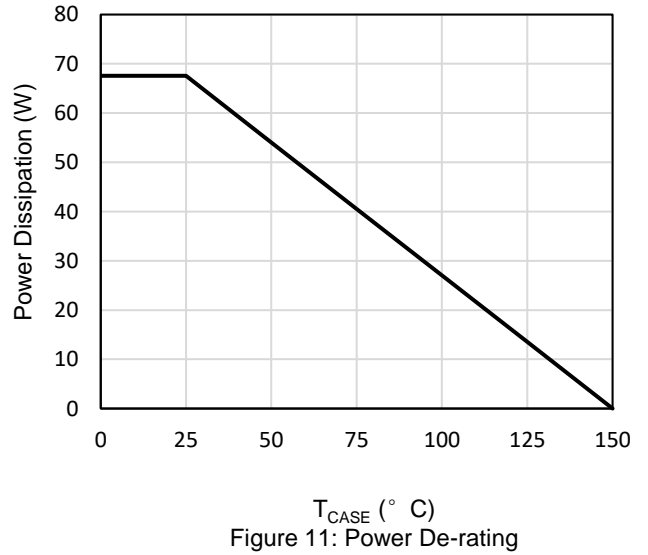


Figure 11: Power De-rating

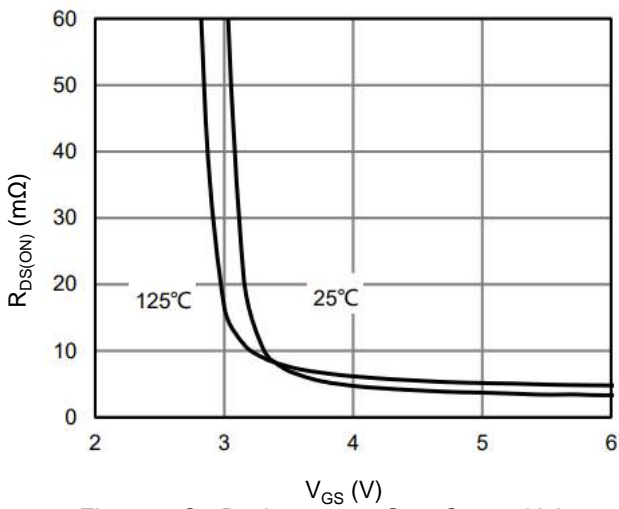


Figure 9: On-Resistance vs. Gate-Source Voltage

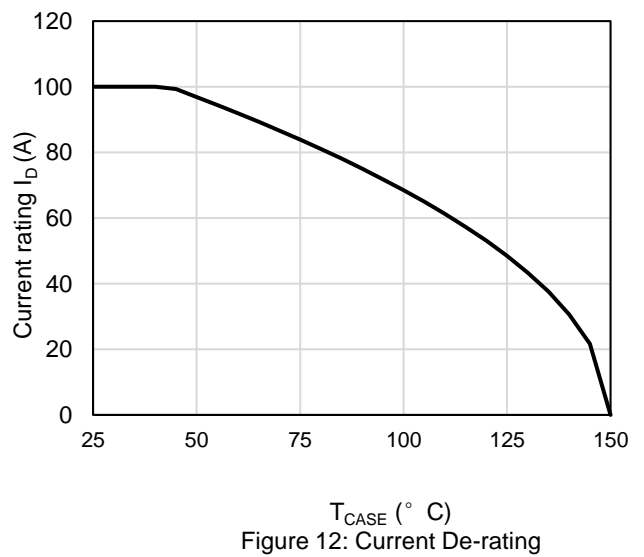


Figure 12: Current De-rating

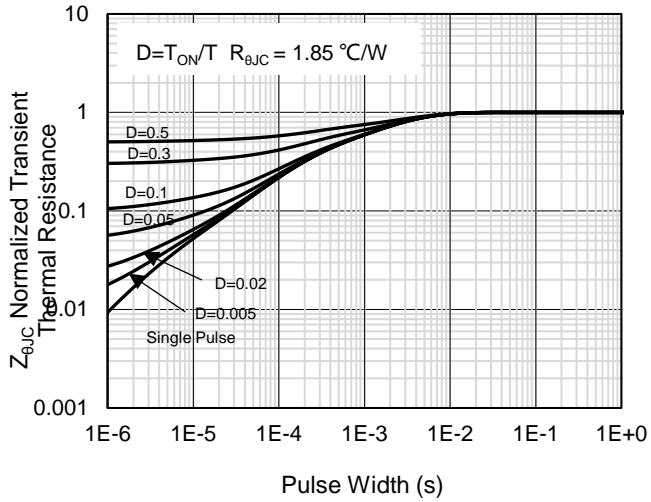


Figure 13: Normalized Maximum Transient Thermal Impedance

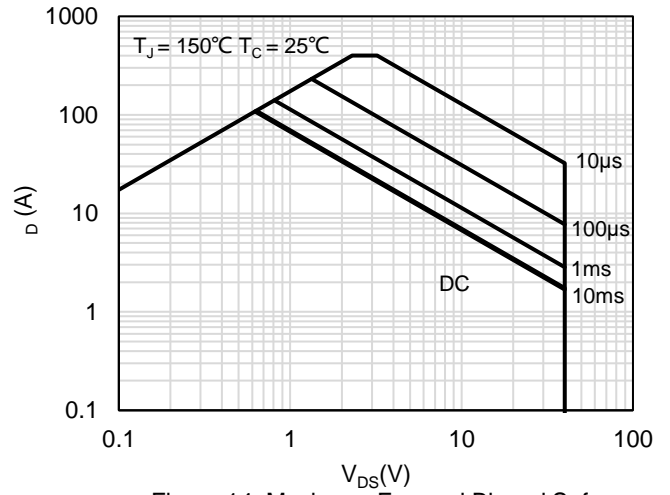
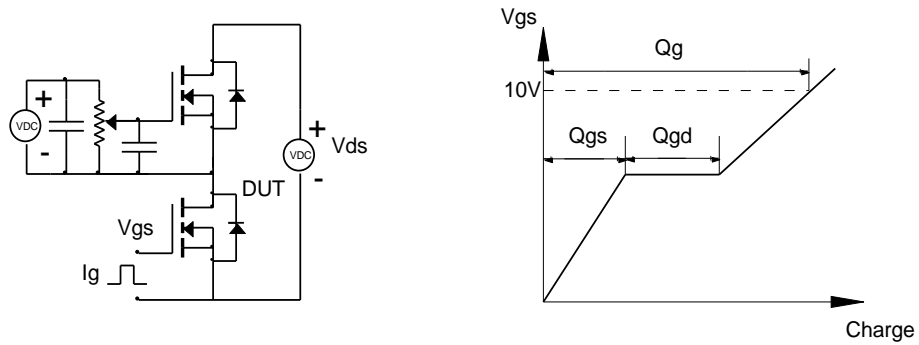


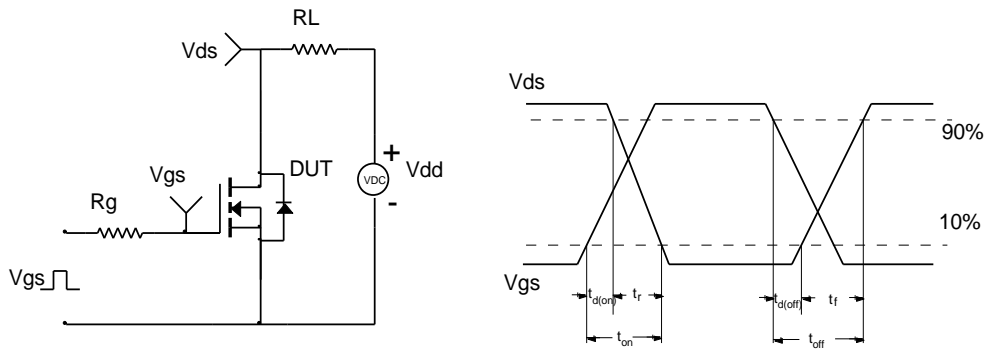
Figure 14: Maximum Forward Biased Safe Operating Area

## Test Circuit and Waveform

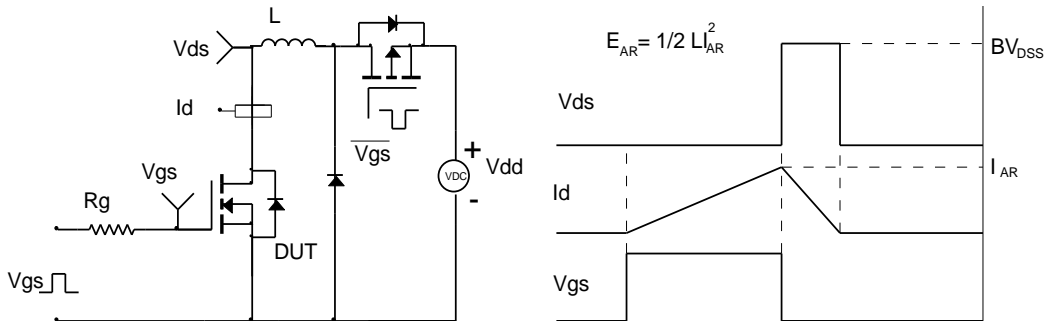
Gate Charge Test Circuit & Waveform



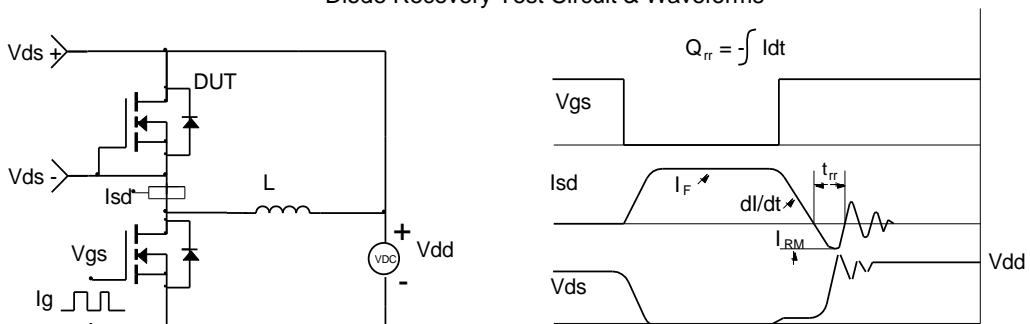
Resistive Switching Test Circuit & Waveforms



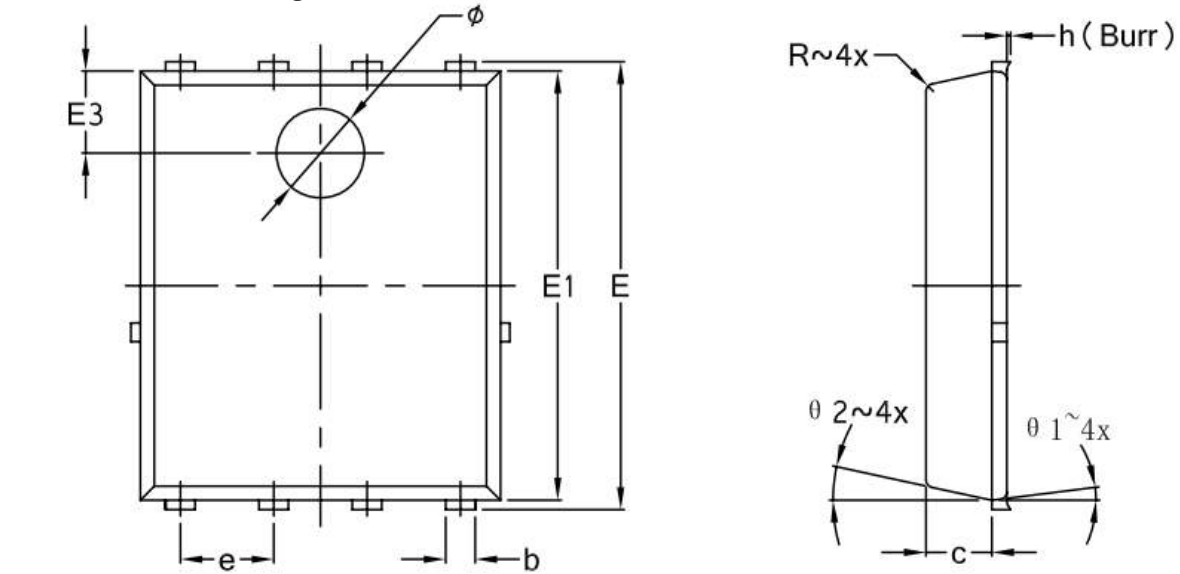
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



## DFN5x6-8L Package Information



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.35	0.46	0.0138	0.0181
c	0.84	0.95	0.0331	0.0374
D	4.83	5.37	0.1902	0.2114
D1	4.14	4.28	0.1630	0.1685
D2	4.83	4.97	0.1902	0.1957
E	6.03	6.13	0.2374	0.2413
E1	5.68	5.82	0.2236	0.2291
E2	1.65	—	0.0650	—
E3	1.03	1.17	0.0406	0.0461
e	1.27 BSC		0.0500 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.40	0.48	0.0157	0.0189
L2	0.40	0.48	0.0157	0.0189
H	3.315	3.475	0.1305	0.1368
I	—	0.16	—	0.0063
φ	1.13	1.27	0.0445	0.0500
R	0.10		0.0039	
θ1	7° REF		7° REF	
θ2	12° REF		12° REF	
h	0.08 MAX		0.0031	

## Customer Service

Sales and Service:

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