

Features

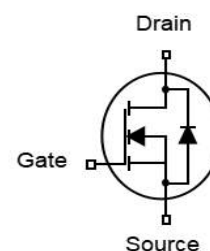
- N-Channel
- Excellent Gate Charge × R_{DS(on)} (FOM)
- Very low on -resistance
- RoHS compliant
- Halogen-free
- 100% EAS Tested

V_{DS}	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	4.2	mΩ
$R_{DS(on),TYP@ V_{GS}=4.5V}$	6.4	mΩ
I_D	55	A

DFN3x3



Part ID	Package Type	Marking	Packing
ZTG045N04Q	DFN3x3	ZTG045N04Q	5000pcs/Reel



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

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)				
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)	$T_C=25^\circ\text{C}$ 304	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous (Note 1)	$T_C=25^\circ\text{C}$	55	A
		$T_C=100^\circ\text{C}$	35	A
P_D	Maximum Power Dissipation	50	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.5	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient (Note 4)	45	°C/W	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 3)	72	mJ	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J=25°C (unless otherwise stated)						
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.7	2.4	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	4.2	5.2	mΩ
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A	--	6.4	7.5	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	1300	--	pF
C _{oss}	Output Capacitance		--	428	--	pF
C _{rss}	Reverse Transfer Capacitance		--	28	--	pF
R _g	Gate Resistance	f=1MHz	--	4.1	--	Ω
Q _g	Total Gate Charge	V _{DS} =20V, I _D =20A, V _{GS} =10V	--	19	--	nC
Q _{gs}	Gate-Source Charge		--	5	--	nC
Q _{gd}	Gate-Drain Charge		--	3.1	--	nC
Switching Characteristics						
T _{d(on)}	Turn-on Delay Time	V _{DD} =20V, R _L =1.0Ω, R _G =6.0Ω, V _{GS} =10V	--	6.5	--	ns
T _r	Turn-on Rise Time		--	48.5	--	ns
T _{d(off)}	Turn-Off Delay Time		--	30	--	ns
T _f	Turn-Off Fall Time		--	12	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
I _S	Diode Forward Current (Note 1)		--	--	55	A
V _{SD}	Forward on voltage	I _S =20A, V _{GS} =0V	--	0.7	--	V
T _{rr}	Reverse Recovery Time	T _J =25°C, I _D =20A di/dt=100A/μs	--	32	--	ns
Q _{rr}	Reverse Recovery Charge		--	23	--	nC

Notes:

- The max drain current rating is package limited
- Repetitive Rating: Pulse width limited by maximum junction temperature
- L = 0.5 mH, V_{DD} = 20 V, I_{AS} = 17 A, R_G = 50 Ω, Starting T_J = 25 °C
- Mount on minimum PCB layout

Electrical Characteristics Diagrams

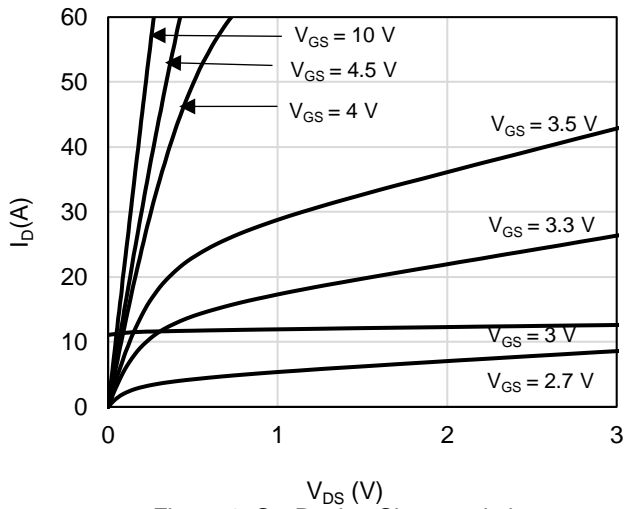


Figure 1: On-Region Characteristics

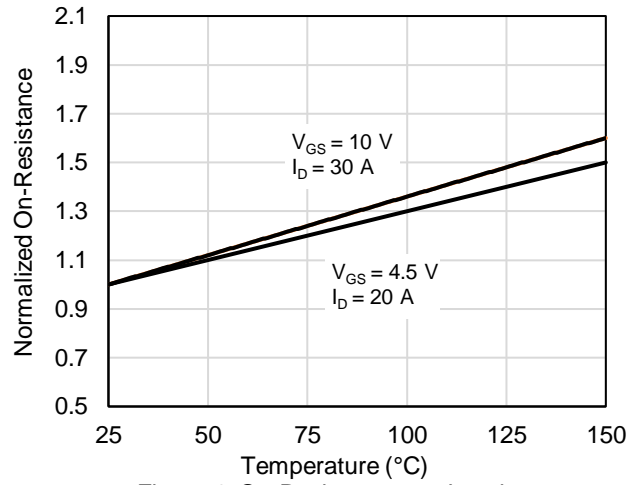


Figure 4: On-Resistance vs. Junction Temperature

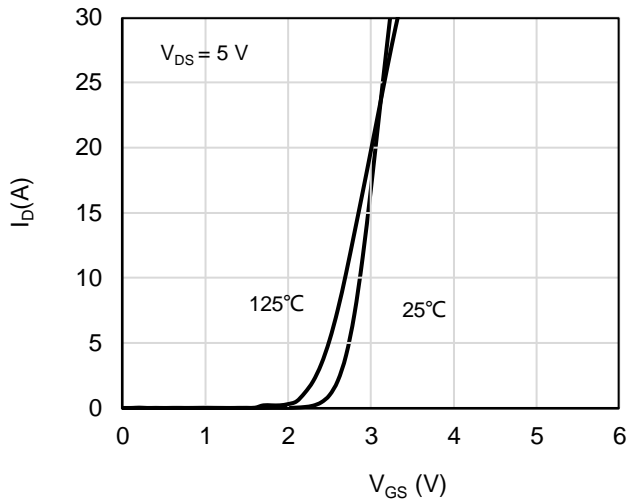


Figure 2: Transfer Characteristics

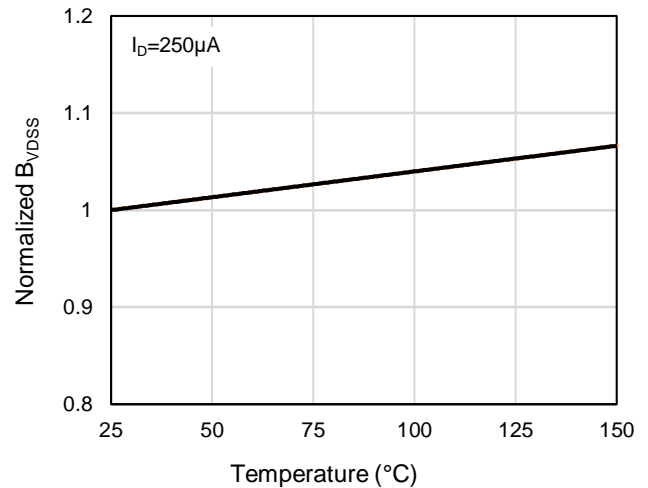


Figure 5: Breakdown Voltage vs. Junction Temperature

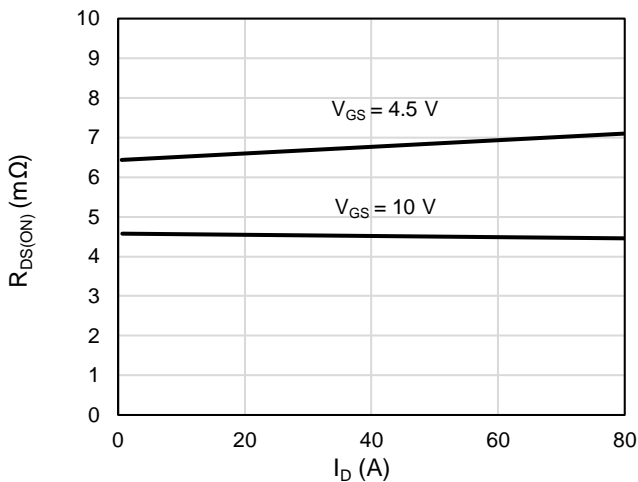


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

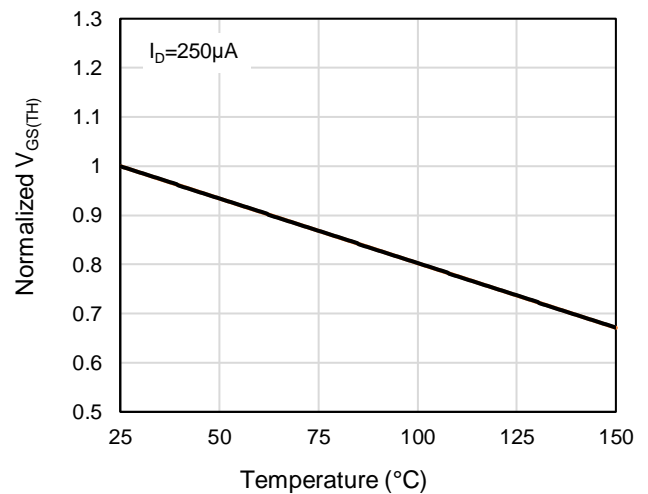


Figure 6: Threshold Voltage vs. Junction Temperature

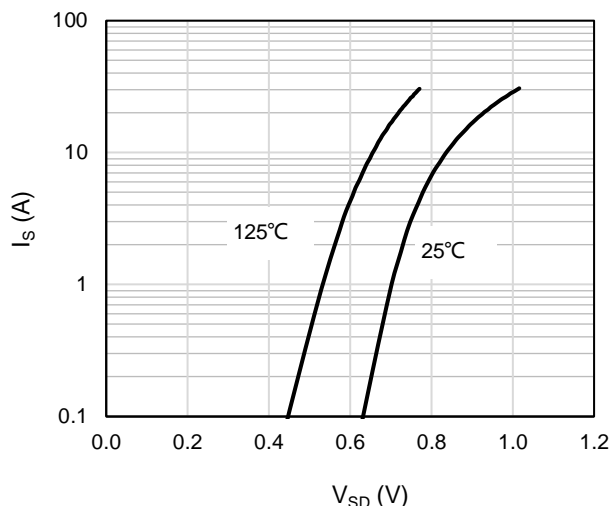


Figure 7: Body-Diode Characteristics

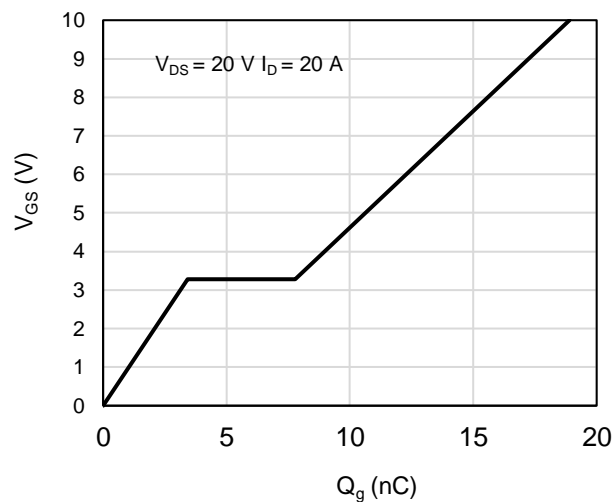


Figure 10: Gate-Charge Characteristics

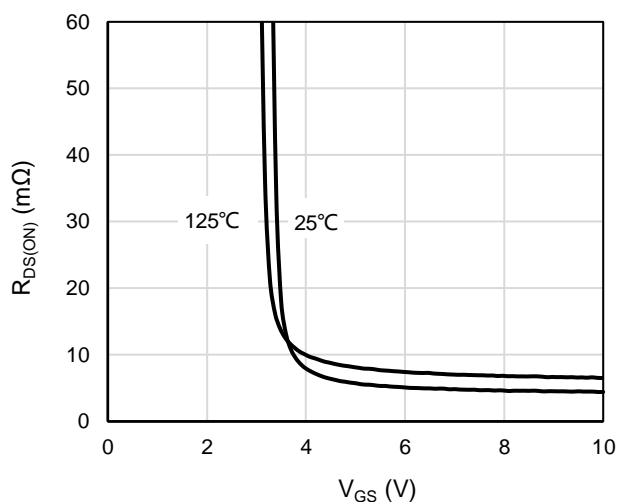


Figure 8: On-Resistance vs. Gate-Source Voltage

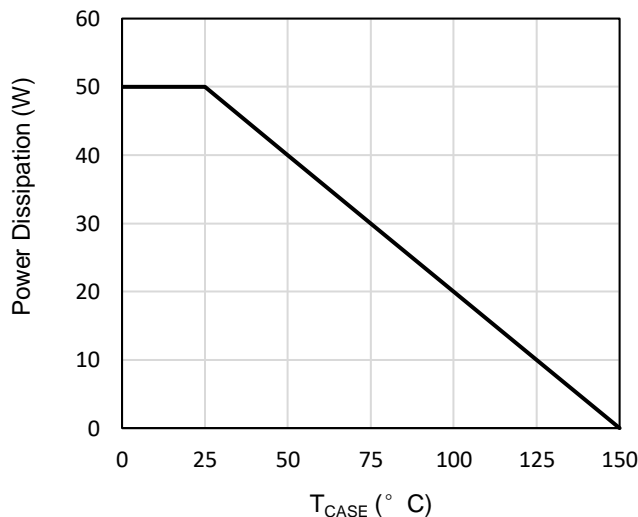


Figure 11: Power De-rating

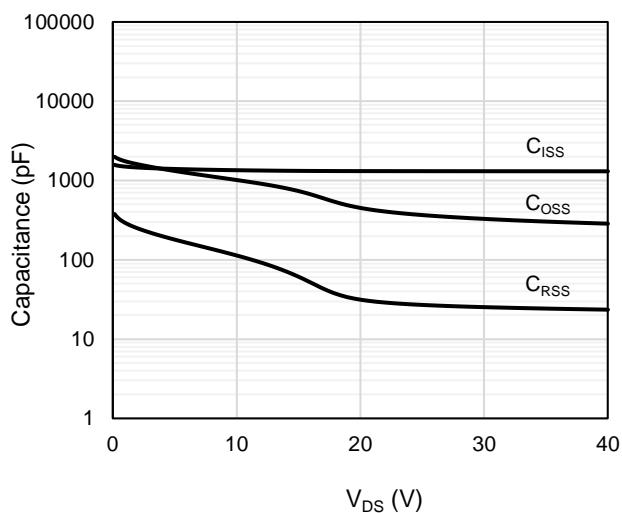


Figure 9: Capacitance Characteristics

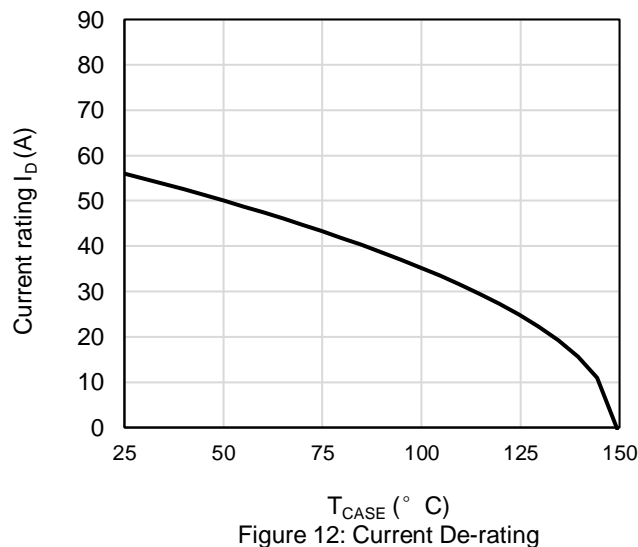


Figure 12: Current De-rating

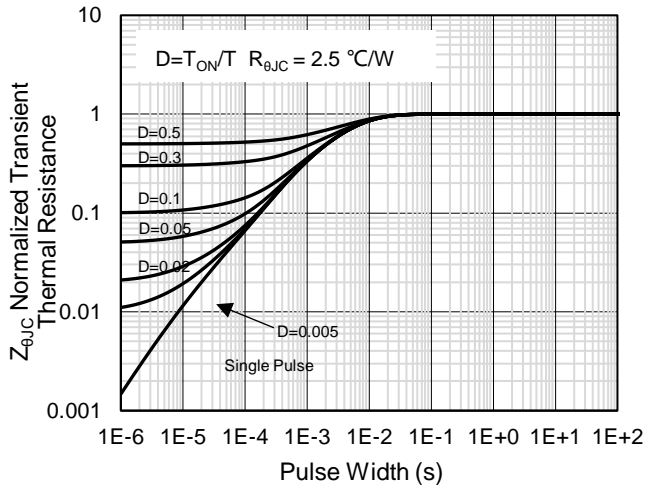


Figure 13: Normalized Maximum Transient Thermal Impedance

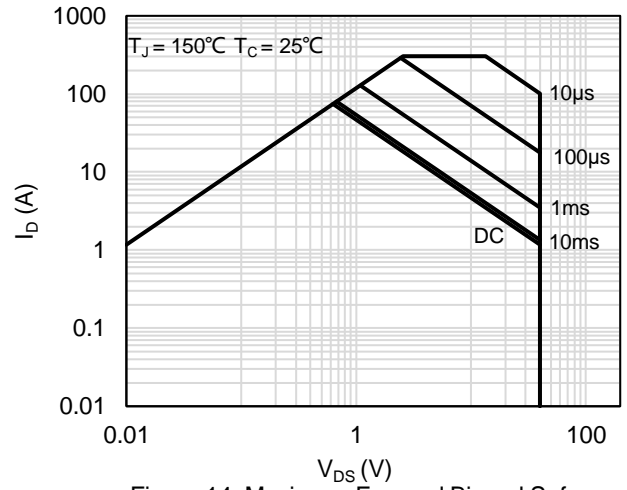
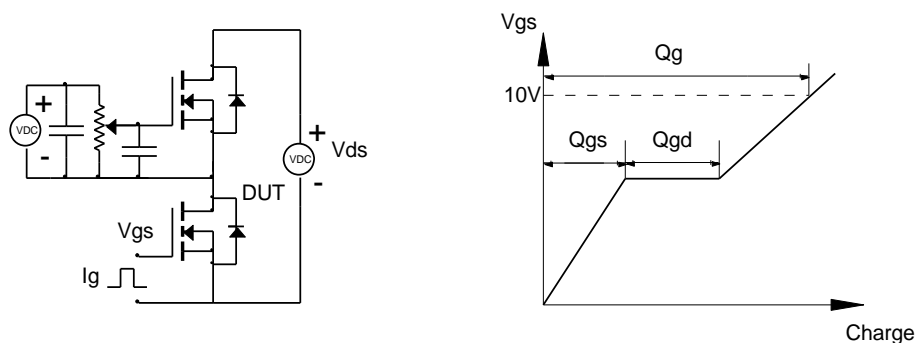


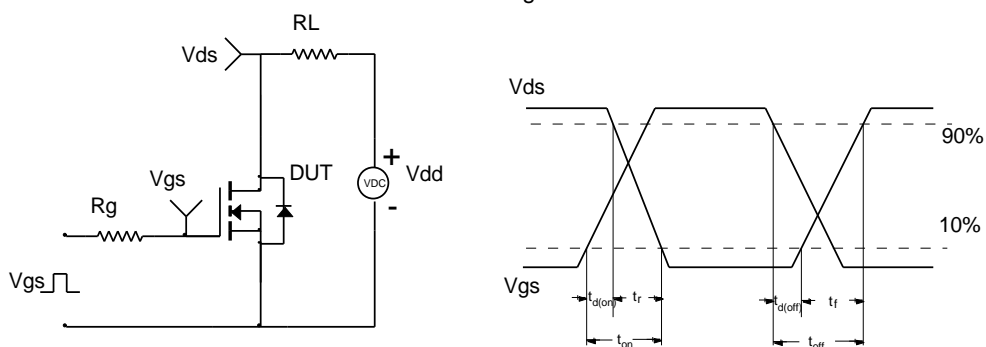
Figure 14: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

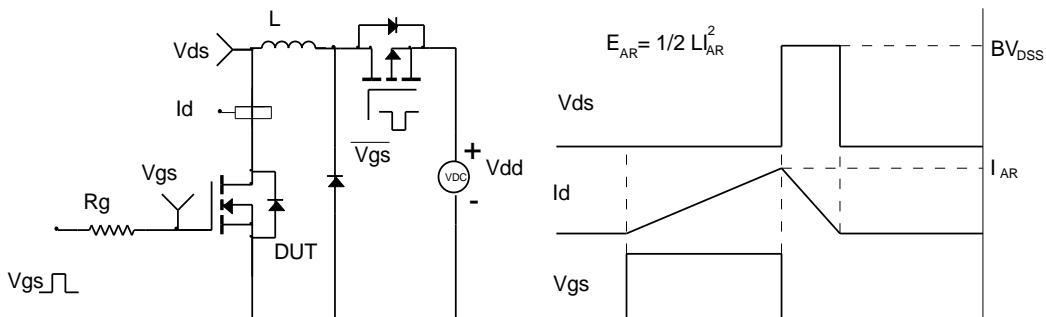
Gate Charge Test Circuit & Waveform



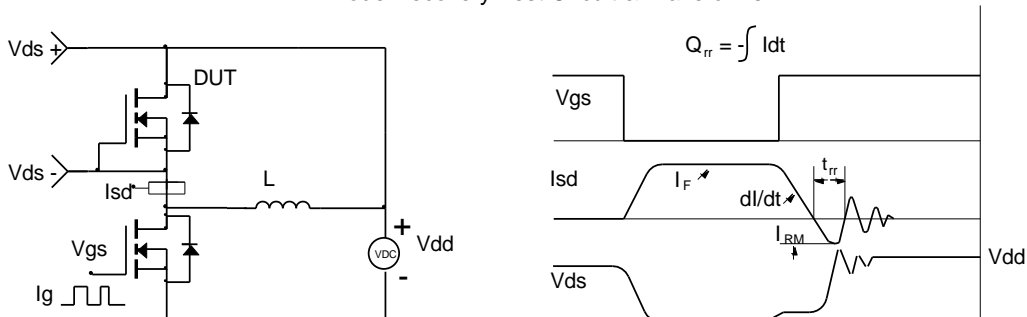
Resistive Switching Test Circuit & Waveforms



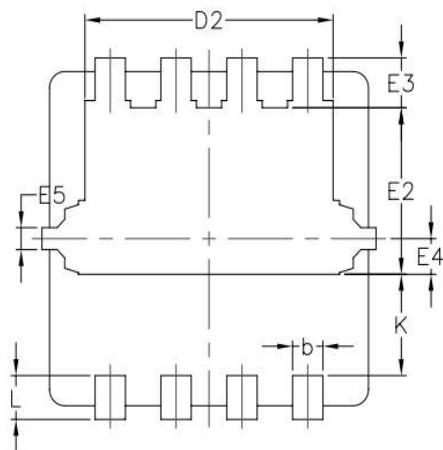
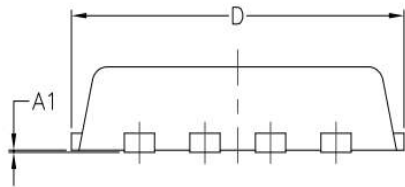
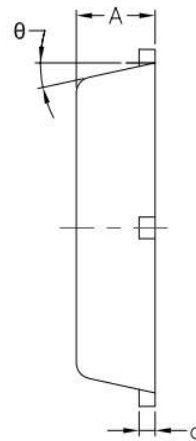
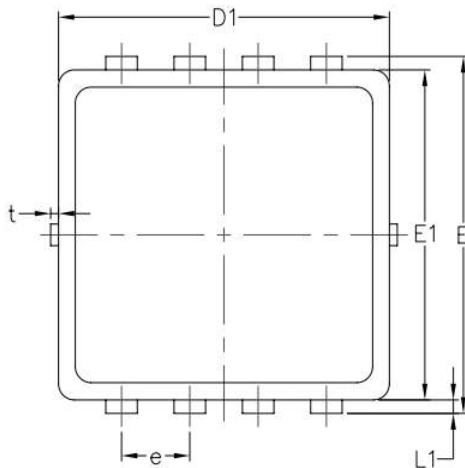
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



DFN3x3-8L Package Information



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.32	1.52	1.72
E3	0.28	0.46	0.65
E4	0.18	0.33	0.48
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.78	0.93	1.13
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°

Customer Service

Sales and Service:

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