

Features

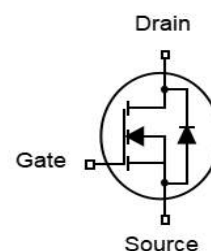
- N-Channel
- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Halogen Free
- 100% EAS Tested

V_{DS}	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	3.8	m Ω
$R_{DS(on),TYP@ V_{GS}=4.5V}$	5.8	m Ω
I_D	60	A

DFN3x3



Part ID	Package Type	Marking	Packing
ZTG038N04Q	DFN3x3	ZTG038N04Q	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	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1)	$T_C = 25^\circ\text{C}$ 240	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	60	A
		$T_C = 70^\circ\text{C}$	39	A
P_D	Maximum Power Dissipation (Note 3)	$T_C = 25^\circ\text{C}$	40	W
		$T_C = 70^\circ\text{C}$	30	W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 2)	85	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
IDSS	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =10V, I _D =10A	--	3.8	4.9	mΩ
RDS(on)	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =8A	--	5.8	7.5	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	892	--	pF
Coss	Output Capacitance		--	553	--	pF
Crss	Reverse Transfer Capacitance		--	30	--	pF
Rg	Gate resistance	f=1MHz		3.5		Ω
Qg	Total Gate Charge	V _{DS} =20V, I _D =50A, V _{GS} =10V	--	16.5	--	nC
Qgs	Gate-Source Charge		--	4.3	--	nC
Qgd	Gate-Drain Charge		--	2.1	--	nC
Switching Characteristics						
Td(on)	Turn-on Delay Time	V _{DD} =20V, I _A =50A, R _G =3Ω, V _{GS} =10V	--	6.3	--	ns
Tr	Turn-on Rise Time		--	2.5	--	ns
Td(off)	Turn-Off Delay Time		--	25	--	ns
Tf	Turn-Off Fall Time		--	3.5	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
IS	Diode Forward Current		--	--	60	A
VSD	Forward on voltage (Note 3)	I _S = 1A, V _{GS} =0V	--	--	1.2	V
Trr	Reverse Recovery Time	T _J =25°C, I _F =50A	--	40	--	ns
Qrr	Reverse Recovery Charge	di/dt=100A/μs	--	22	--	nC

Notes:

- 1.Repetitive rating; pulse width limited by max. junction temperature.
- 2.T_J=25°C, V_G=10V, R_G=25Ω, L=0.5 mH
- 3.P_d is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

Electrical Characteristics Diagrams

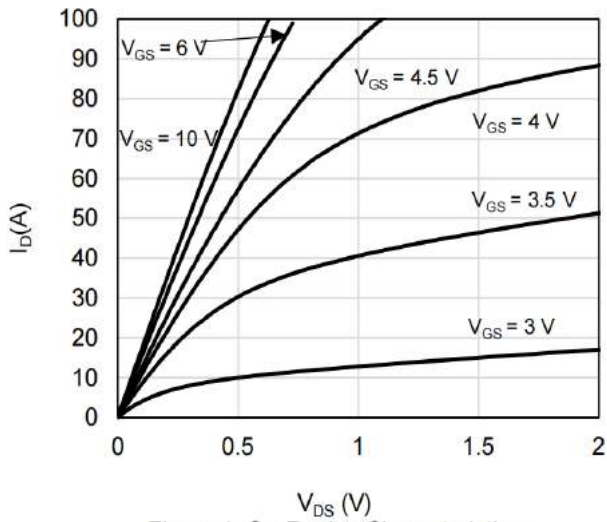


Figure 1: On-Region Characteristics

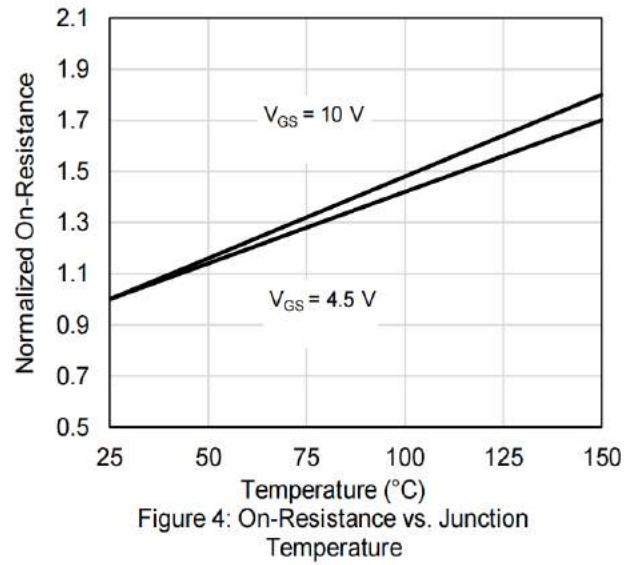


Figure 4: On-Resistance vs. Junction Temperature

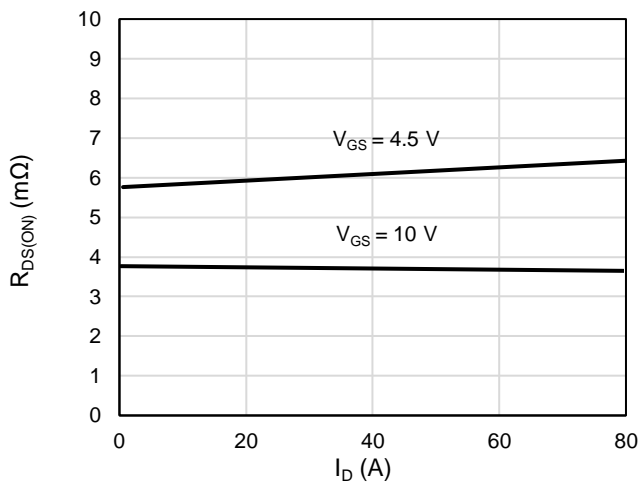


Figure 2: On-Resistance vs. Drain Current and Gate Voltage

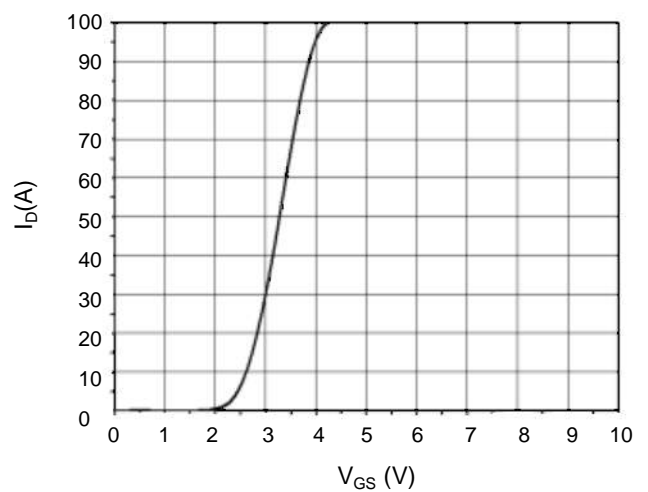


Figure 5: Transfer Characteristics

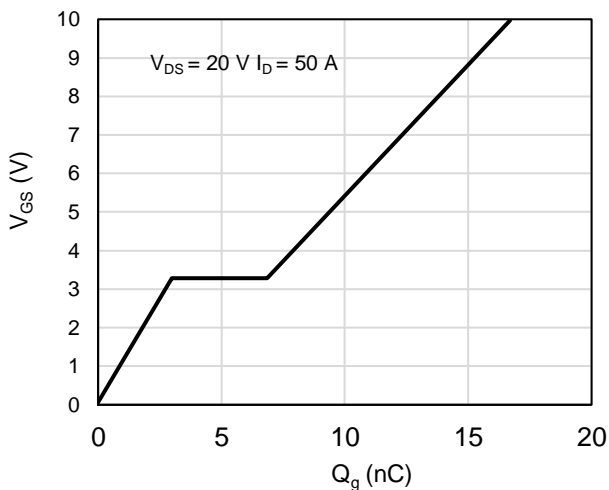


Figure 3: Gate-Charge Characteristics

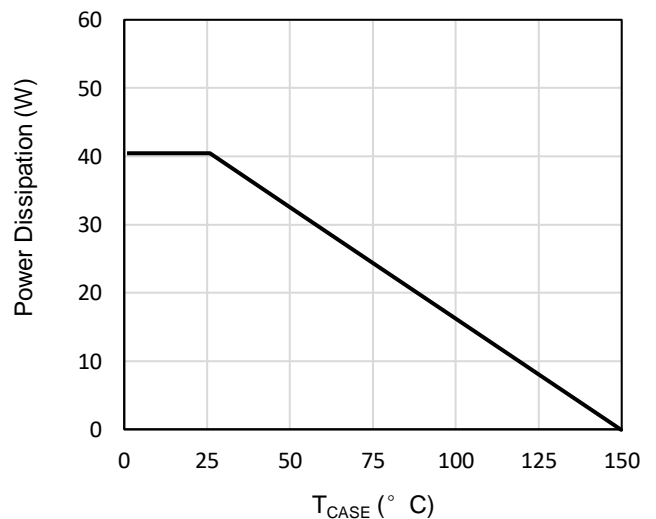


Figure 6: Power De-rating

Electrical Characteristics Diagrams

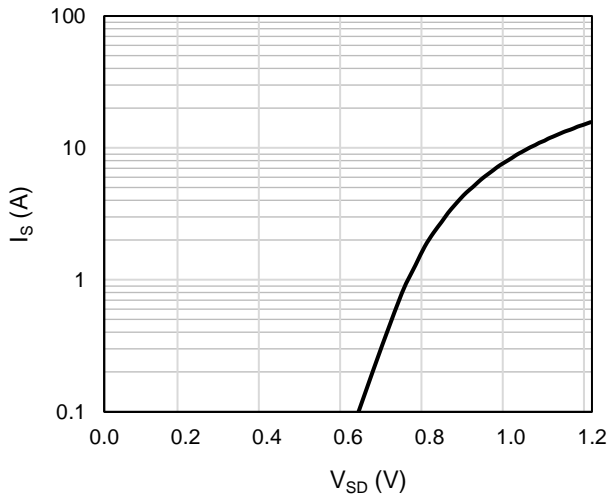


Figure 7: Body-Diode Characteristics

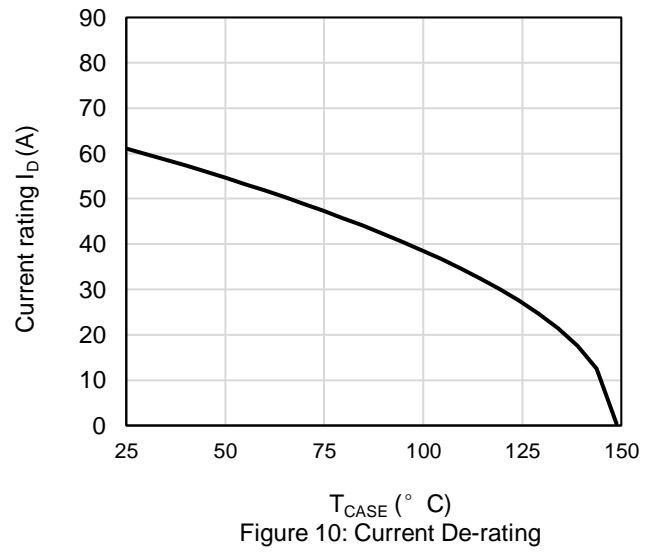


Figure 10: Current De-rating

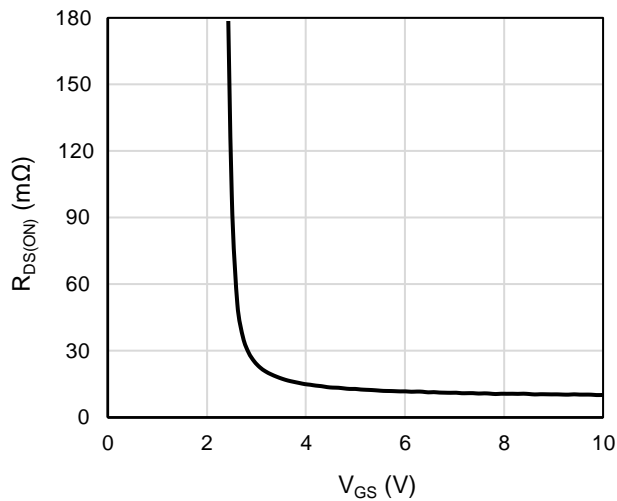


Figure 8: On-Resistance vs. Gate-Source Voltage

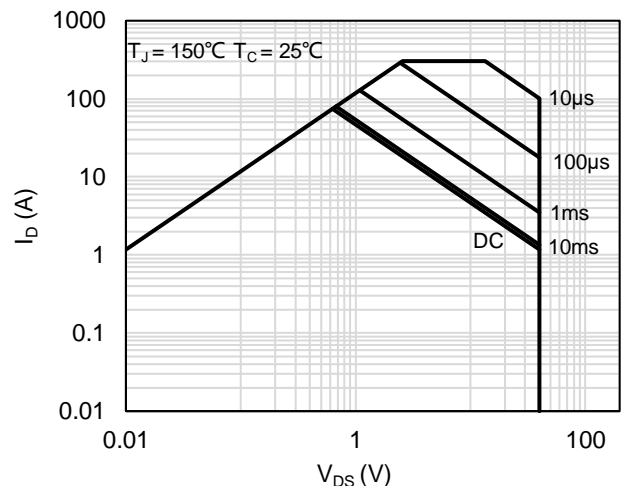


Figure 11: Maximum Forward Biased Safe Operating Area

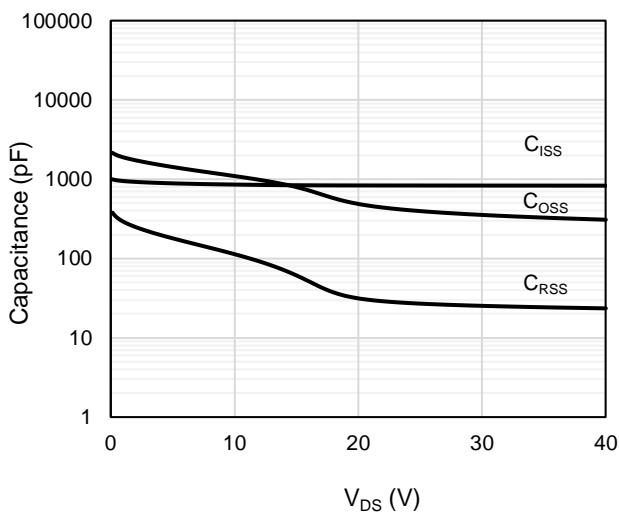


Figure 9: Capacitance Characteristics

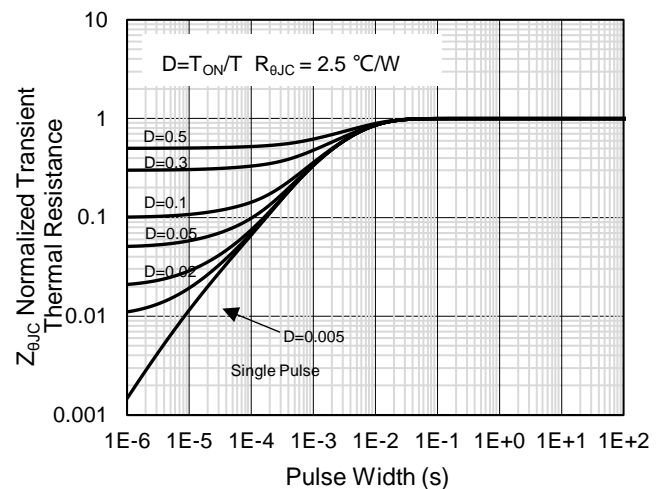
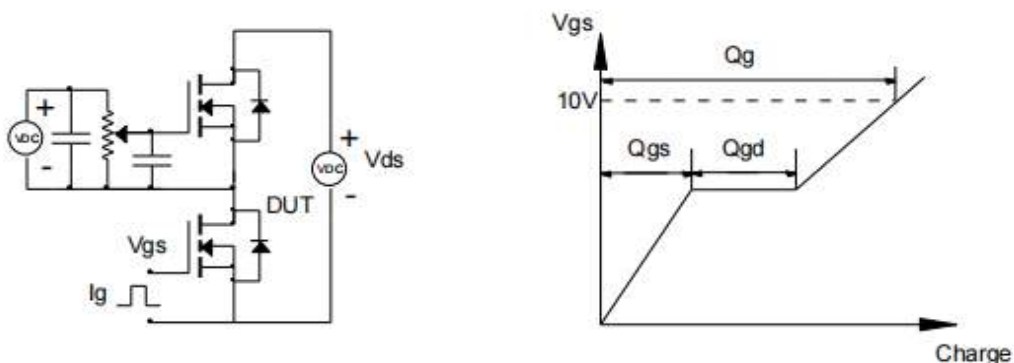


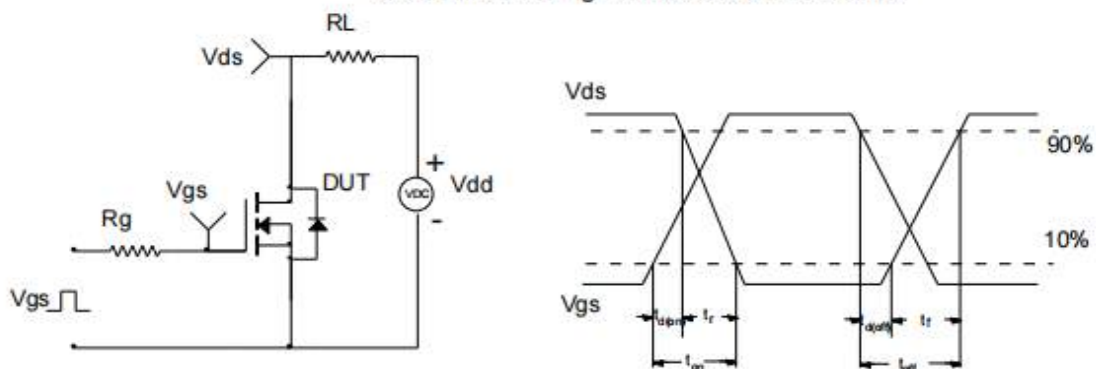
Figure 12: Normalized Maximum Transient Thermal Impedance

Test Circuit and Waveform

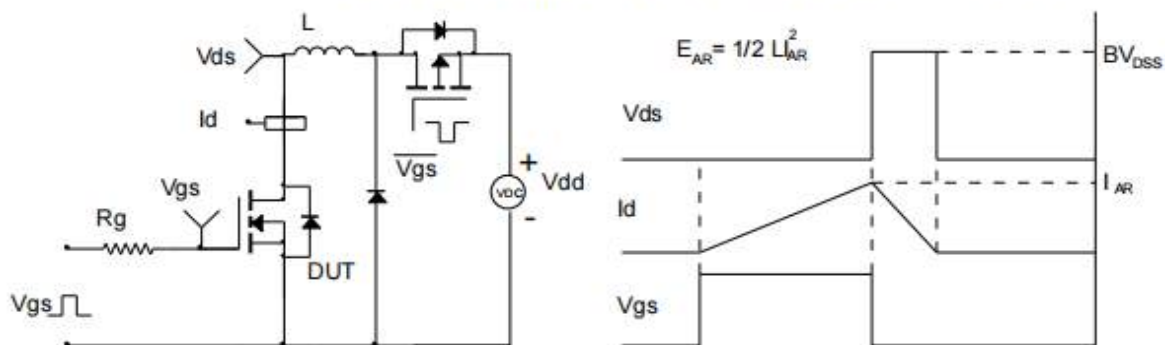
Gate Charge Test Circuit & Waveform



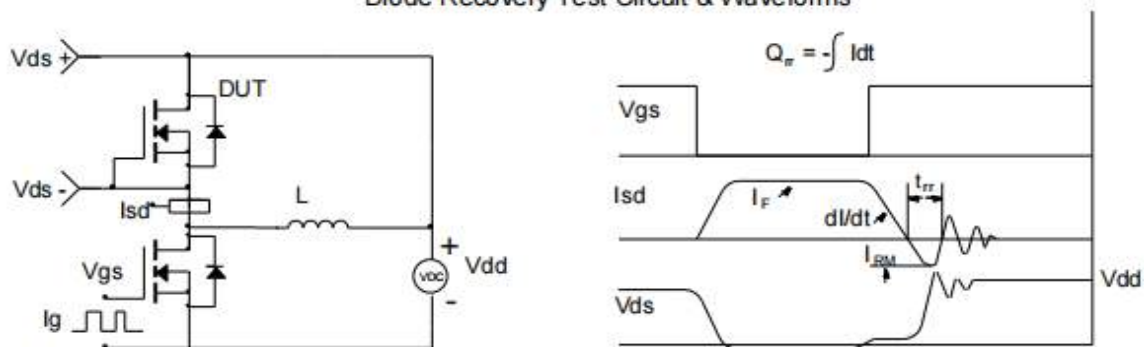
Resistive Switching Test Circuit & Waveforms



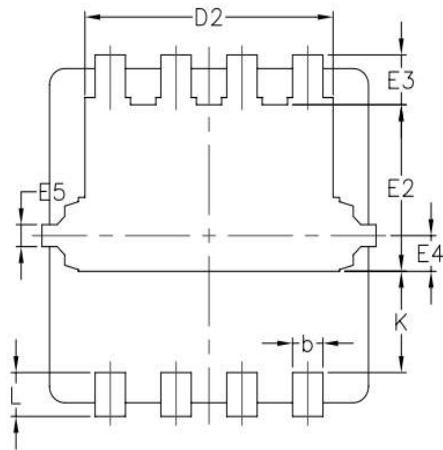
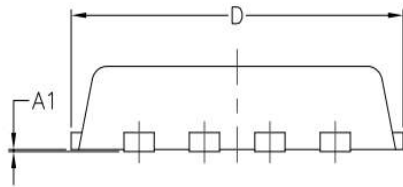
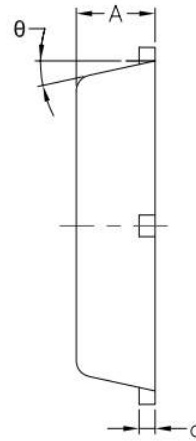
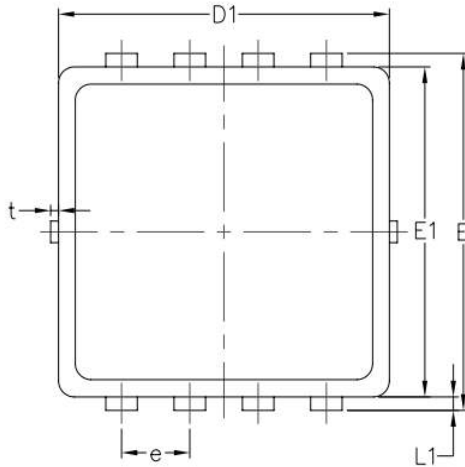
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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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