

Description

Features

- Trench LV MOSFET technology
- Fast switching
- High density cell design for low $R_{ds(on)}$

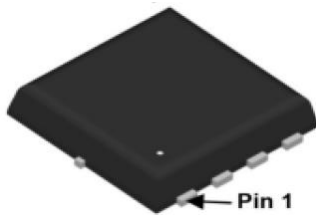
Application

- Load Switch
- High current load application
- Power management

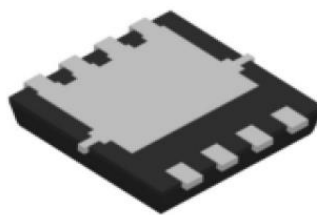
V_{DS}	20	V
$R_{ds(on),typ}@V_{gs}=4.5V$	4.7	$m\Omega$
$R_{ds(on),typ}@V_{gs}=2.5V$	6.6	$m\Omega$
I_D	50	A



Top View

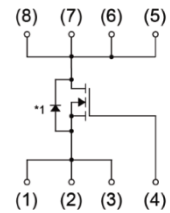


Bottom View



Pin Configuration

- (1) Source
(2) Source
(3) Source
(4) Gate
(5) Drain
(6) Drain
(7) Drain
(8) Drain
*1 Body Diode



Package Marking and Ordering Information

Part	Marking	Package	Packing	Reel Size	Tape Width	Qty
CMT2050K	T2050K	PDFN3.3*3.3	Reel	NA	NA	5000pcs

Key Performance Parameters

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_{D@Tc=25^{\circ}C}$	Continuous Drain Current, $V_{GS}=4.5V$	50	A
$I_{D@Tc=100^{\circ}C}$	Continuous Drain Current, $V_{GS}=4.5V$	30	A
I_{DM}	Pulsed Drain Current ¹	200	A
EAS	Single Pulse Avalanche Energy ⁴	77	mJ
$PD@Tc=25^{\circ}C$	Total Power Dissipation	29	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_j	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ	Max	Units
R _{θJA}	Thermal Resistance Junction-Ambient	65	72	°C/W
R _{θJC}	Thermal Resistance Junction-Case	3.9	4.3	°C/W

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

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
BVDSS	Drain-Source Breakdown Voltage	20	--	--	V	V _{GS} =0V, I _D =250uA
RDS(ON)	Static Drain-Source On-Resistance	--	4.7	6.6	mΩ	V _{GS} =4.5V, I _D =20A
		--	6.6	9		V _{GS} =2.5V, I _D =10A
V _{GS(th)}	Gate Threshold Voltage	0.5	0.8	1.2	V	V _{GS} =V _{DS} , I _D =250uA
IDSS	Drain-Source Leakage Current	--	--	1	uA	V _{DS} =20V, V _{GS} =0V, T _J =25°C
		--	--	10	uA	V _{DS} =16V, V _{GS} =0V, T _J =125°C
IGSS	Gate-Source Leakage Current	--	--	±100	nA	V _{GS} =±10V, V _{DS} =0V
g _{fs}	Forward Transconductance	--	100	--	S	V _{DS} =5V, I _D =20A
R _g	Gate Resistance	--	3.0	--	Ω	V _{DS} =0V, V _{GS} =0V, f=1MHz
Q _g	Total Gate Charge ^{2,3}	--	65	--	nC	V _{DS} =10V, V _{GS} =4.5V, I _D =20A
Q _{gs}	Gate-Source Charge ^{2,3}	--	15	--		
Q _{gd}	Gate-Drain Charge ^{2,3}	--	13	--		
T _{d(on)}	Turn-On Delay Time ^{2,3}	--	9	--	ns	V _{DD} =10V, V _{GS} =4.5V, R _G =3Ω I _D =20A
T _r	Rise Time ^{2,3}	--	13	--		
T _{d(off)}	Turn-Off Delay Time ^{2,3}	--	67	--		
T _f	Fall Time ^{2,3}	--	16	--		
C _{iss}	Input Capacitance	--	2020	--	pF	V _{DS} =10V, V _{GS} =0V, f=1MHz
C _{oss}	Output Capacitance	--	320	--		
C _{rss}	Reverse Transfer Capacitance	--	270	--		

Diode Characteristics

Symbol	Parameter	Conditions	Typ	Max	Units
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	--	50	A
I _{sm}	Pulsed Source Current		--	200	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =5A, T _J =25°C	--	1.1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.
4. The EAS test condition is V_{DD}=15V, V_{GS}=4.5V, L=0.5mH.

Typical Performance Characteristics

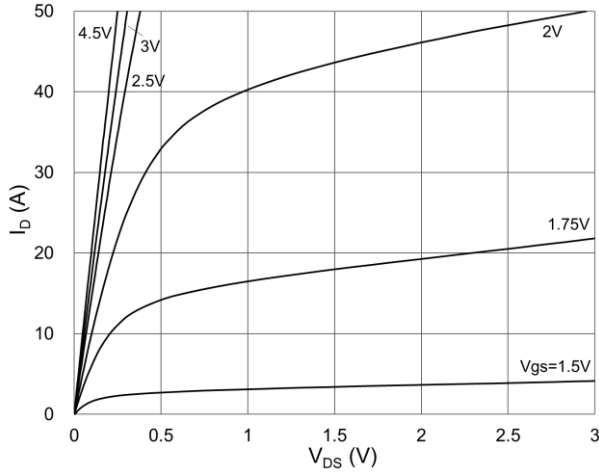
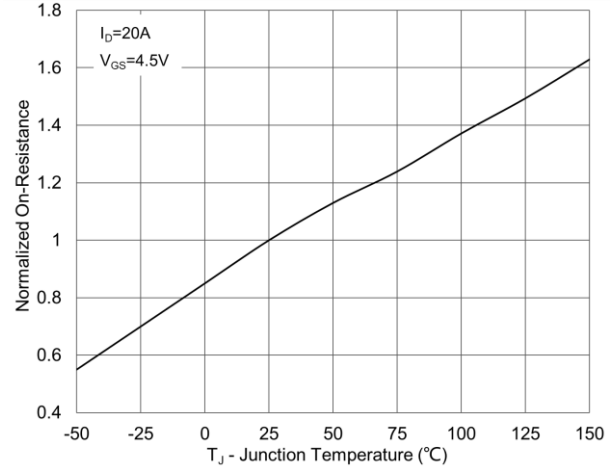
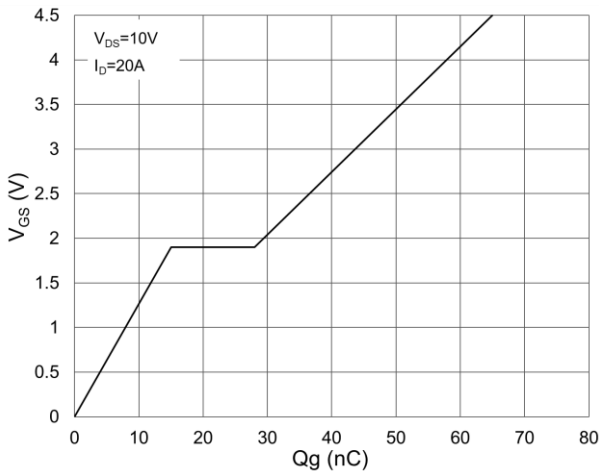
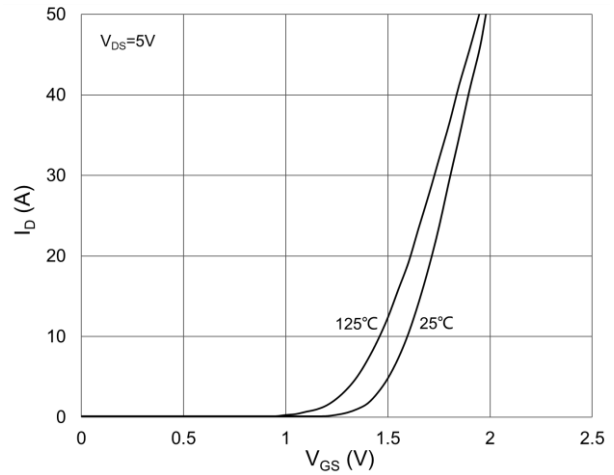
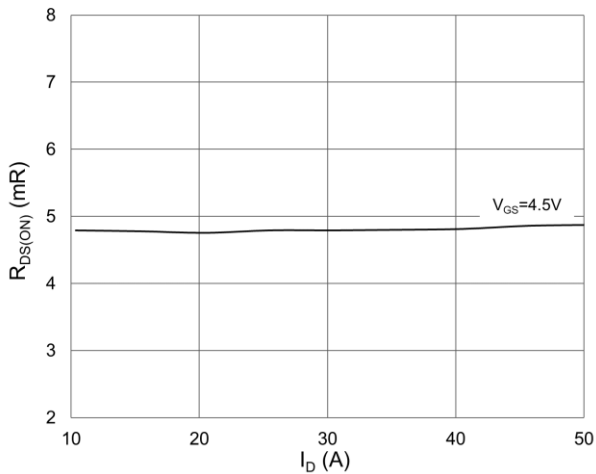
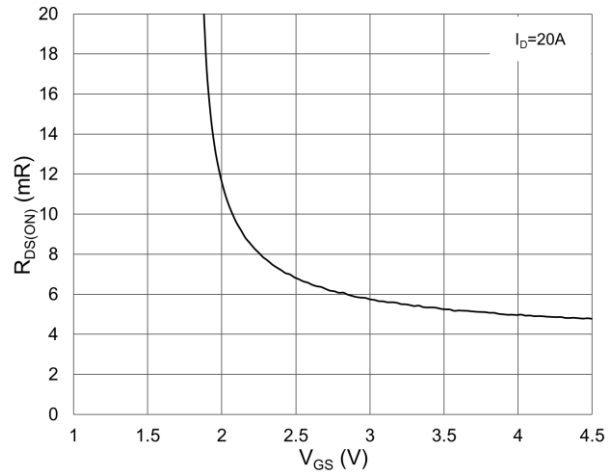
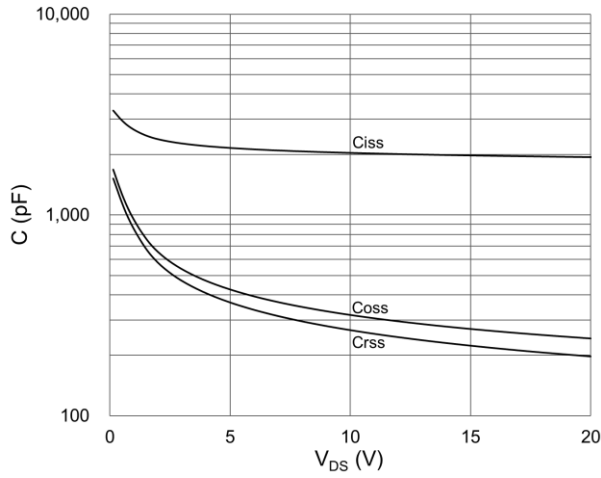
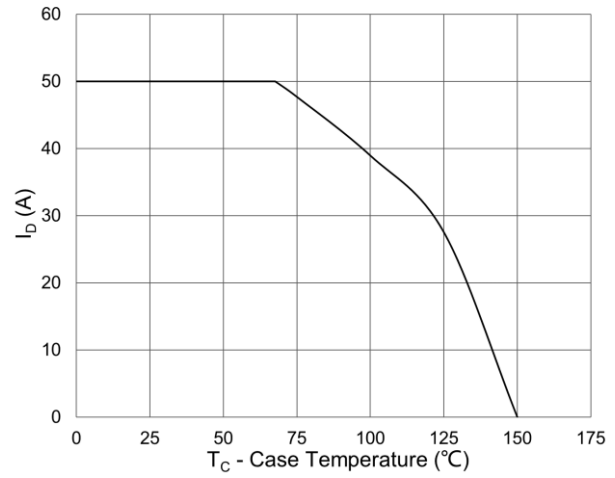
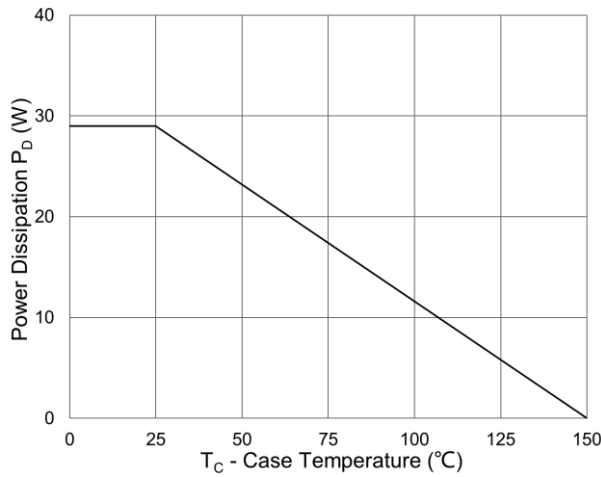
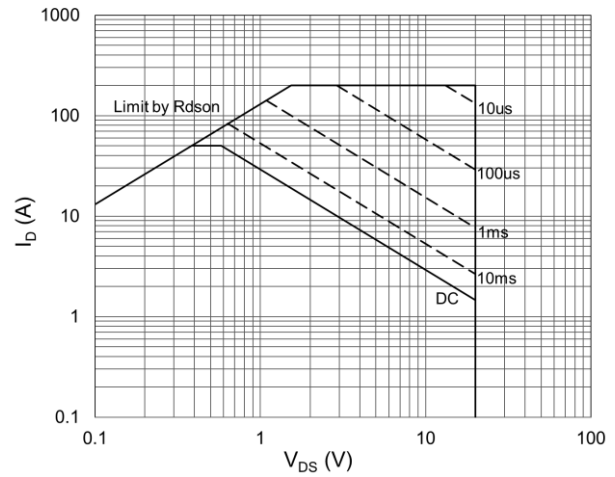
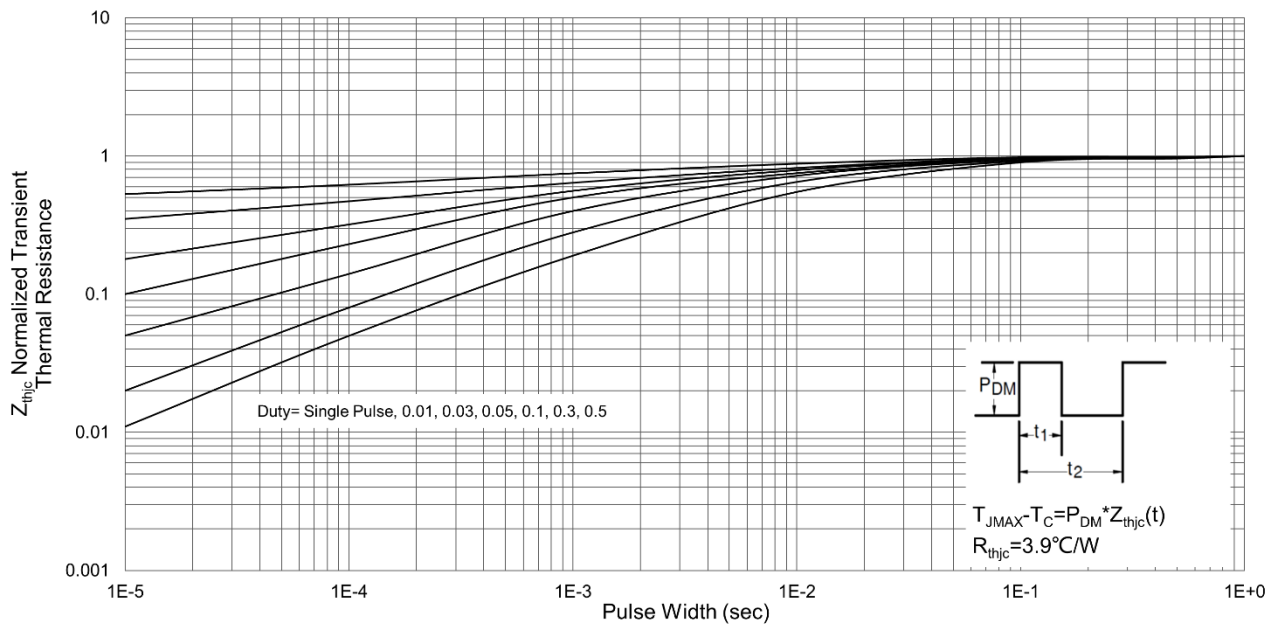
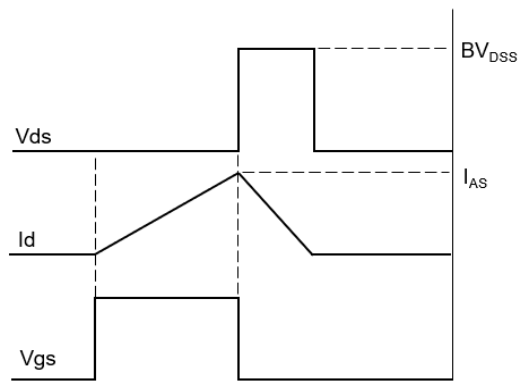
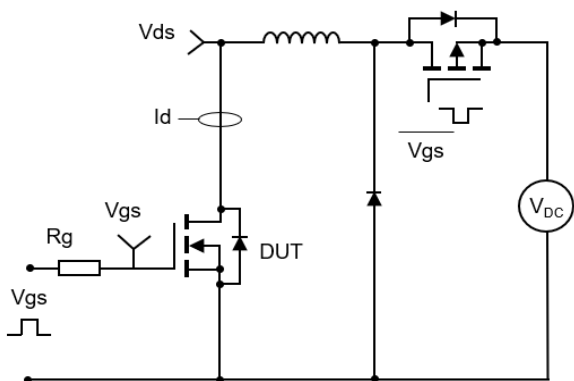
Fig1 Output Characteristics

Fig2 Normalized $R_{DS(on)}$ vs. T_J

Fig3 Gate Charge Waveform

Fig4 Transfer Characteristics

Fig5 $R_{ds(on)}$ vs. Drain Current and Gate Voltage

Fig6 $R_{ds(on)}$ vs. Gate Voltage


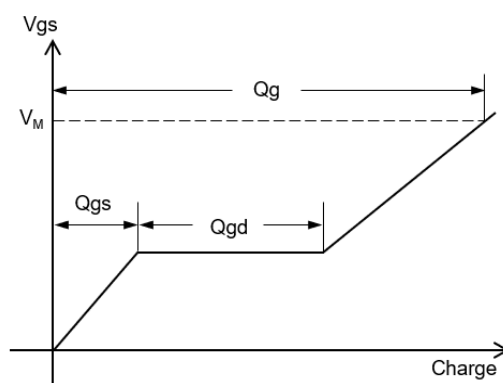
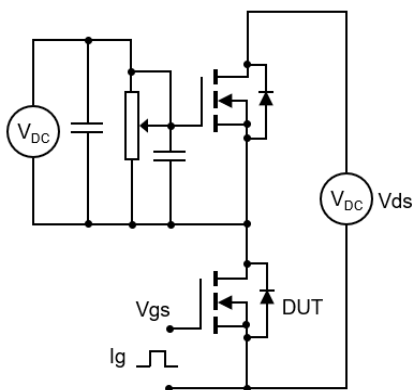
Fig7 Capacitance Characteristics

Fig8 Drain Current Derating

Fig9 Power Dissipation

Fig10 Maximum Safe Operation Area

Fig11 Normalized Transient Impedance


Test Circuit & Waveform

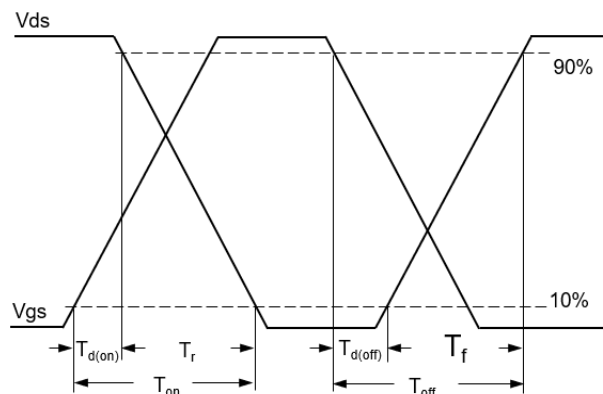
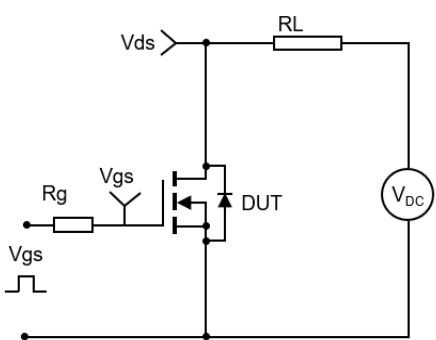
1. Unclamped Inductive Switching Test Circuit & Waveforms



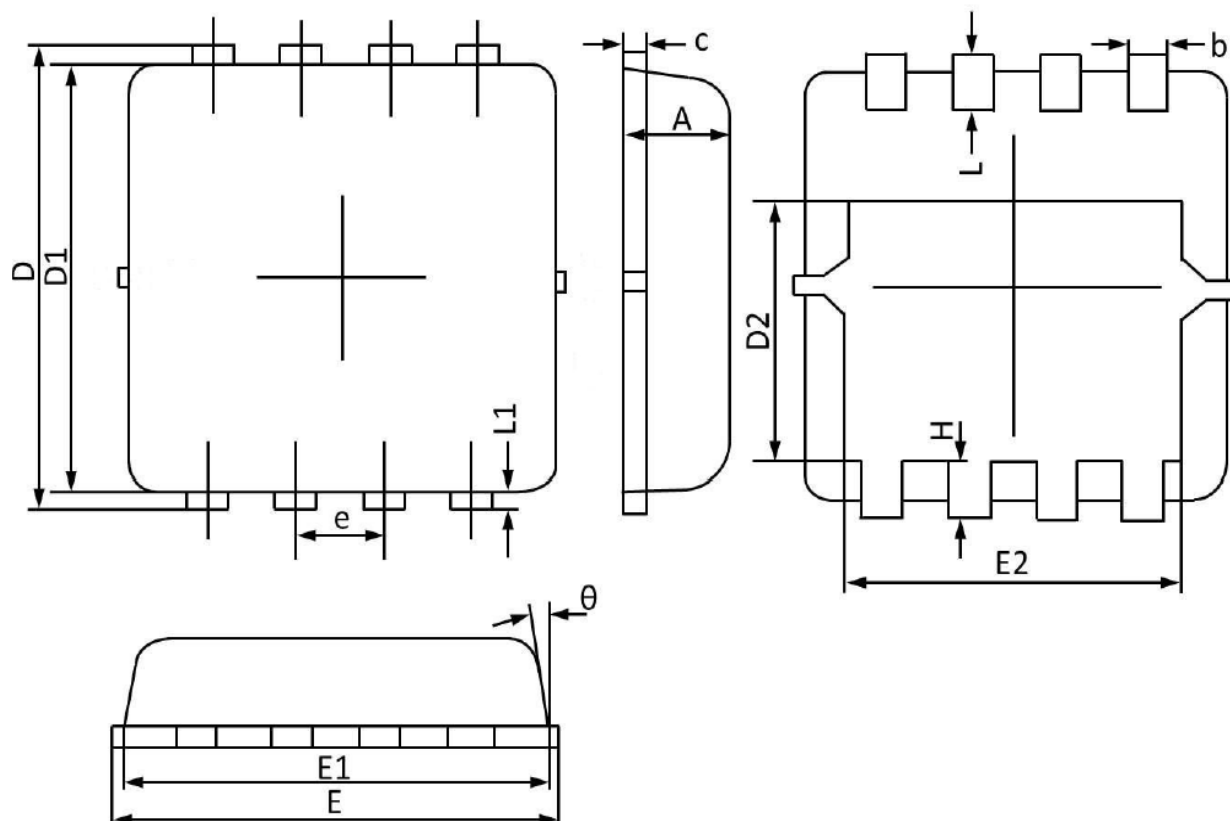
2. Gate Charge Test Circuit & Waveform



3. Resistive Switching Test Circuit & Waveform



PDFN3.3*3.3 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°