CMSH1070M

100V N-Channel SGT

Description

Features

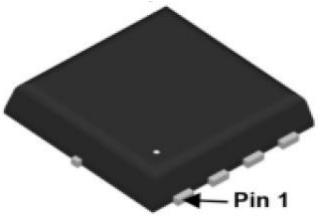
- Advanced trench cell design
- Low thermal resistance
- Low FOM

Application

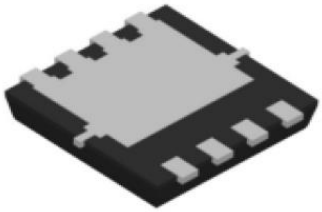
- Synchronous rectification
- DC-DC Converter
- Ideal for high-frequency switching

V_{DS}	100	V
$R_{ds(on),typ}$@V_{gs}=10V	5.6	mΩ
$R_{ds(on),typ}$@V_{gs}=4.5V	7.5	mΩ
I_D	70	A

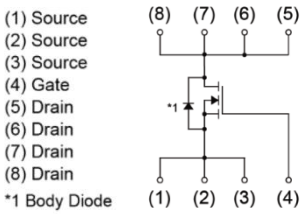
Top View



Bottom View



Pin Configuration



Package Marking and Ordering Information

Part	Marking	Package	Packing	Reel Size	Tape Width	Qty
CMSH1070M	SH1070M	PDFN5*6	Reel	NA	NA	5000pcs

Key Performance Parameters

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
ID@Tc=25℃	Continuous Drain Current, V_{GS}=10V	70	A
ID@Tc=100℃	Continuous Drain Current, V_{GS}=10V	58	A
IDM	Pulsed Drain Current[1]	280	A
EAS	Single Pulse Avalanche Energy[4]	226	mJ
PD@Tc=25℃	Total Power Dissipation	104	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_j	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	50	65	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	1.0	1.2	℃/W

Electrical Characteristics (T_J=25 ℃, Unless otherwise noted)

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
BVDSS	Drain-Source Breakdown Voltage	100	110	--	V	V_{GS}=0V, I_D=250uA
$R_{DS(ON)}$	Static Drain-Source On-Resistance	--	5.6	7.5	mΩ	V_{GS}=10V, I_D=20A
		--	7.5	11	mΩ	V_{GS}=4.5V, I_D=10A
$V_{GS(th)}$	Gate Threshold Voltage	1.2	1.9	2.5	V	V_{GS}=V_{DS}, I_D=250uA
IDSS	Drain-Source Leakage Current	--	--	1	uA	V_{DS}=100V, V_{GS}=0V, T_J=25℃
		--	--	10	uA	V_{DS}=80V, V_{GS}=0V, T_J=55℃
IGSS	Gate-Source Leakage Current	--	--	±100	nA	V_{GS}=±20V, V_{DS}=0V
gfs	Forward Transconductance	--	81	--	S	V_{DS}=10V, I_D=20A
Rg	Gate Resistance	--	1.5	--	Ω	V_{DS}=0V, V_{GS}=0V, f=1MHz
Qg	Total Gate Charge [2,3]	--	33	--	nC	V_{DS}=50V, V_{GS}=10V, I_D=20A
Qgs	Gate-Source Charge[2,3]	--	6.4	--		
Qgd	Gate-Drain Charge[2,3]	--	9	--		
$Td_{(on)}$	Turn-On Delay Time[2,3]	--	14	--	ns	V_{DD}=50V, V_{GS}=10V, R_G=6Ω I_D=20A
T_r	Rise Time[2,3]	--	15	--		
$Td_{(off)}$	Turn-Off Delay Time[2,3]	--	28	--		
T_f	Fall Time[2,3]	--	16	--		
Ciss	Input Capacitance	--	2608	--	pF	V_{DS}=50V, V_{GS}=0V, f=1MHz
Coss	Output Capacitance	--	950	--		
Crss	Reverse Transfer Capacitance	--	32	--		

Diode Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Is	Continuous Source Current	VG=VD=0V, Force Current	--	--	70	A
Ism	Pulsed Source Current		--	--	280	A
Trr	Body Diode Reverse Recovery Time	IF=13A, di/dt=100A/us	--	51	--	ns
Qrr	Body Diode Reverse Recovery Charge		--	92	--	nC
V_{SD}	Diode Forward Voltage	VGS=0V, I_S=1A, TJ=25℃	--	--	1.0	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 data shows Max. rating. The test condition is V_{DD}=50V, V_{GS}=10V, L=0.5mH.

Typical Performance Characteristics

Fig1 Output Characteristics

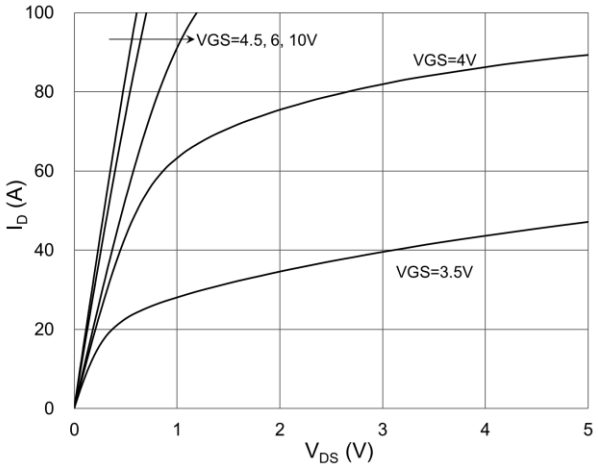


Fig2 Normalized R_{DSON} vs. T_J

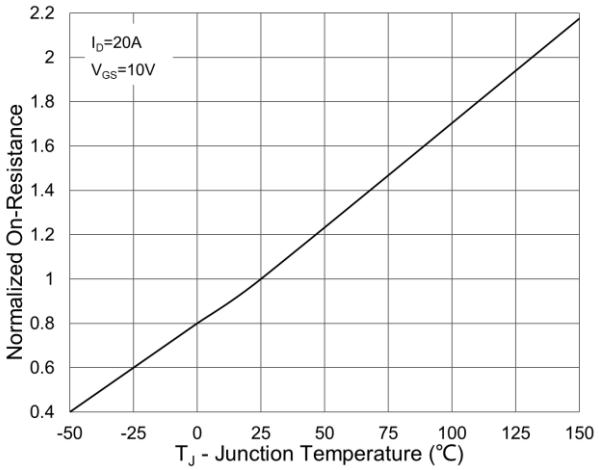


Fig3 Gate Charge Waveform

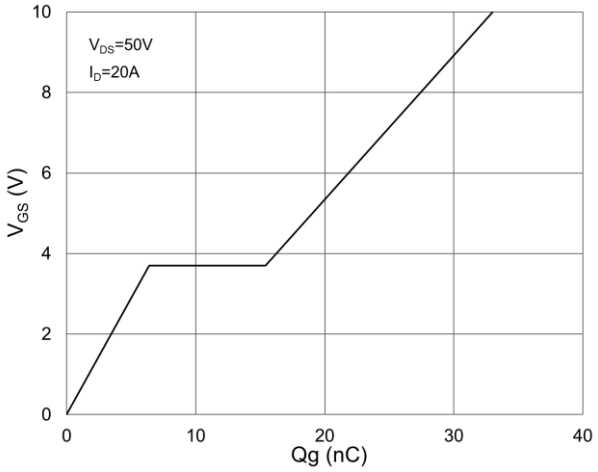


Fig4 Transfer Characteristics

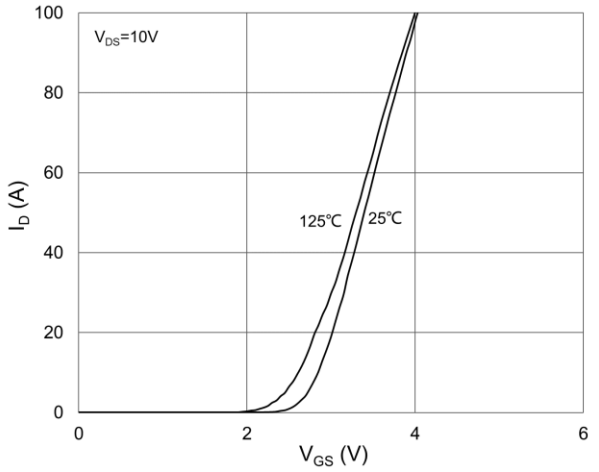


Fig5 Rds(on) vs. Drain Current and Gate Voltage

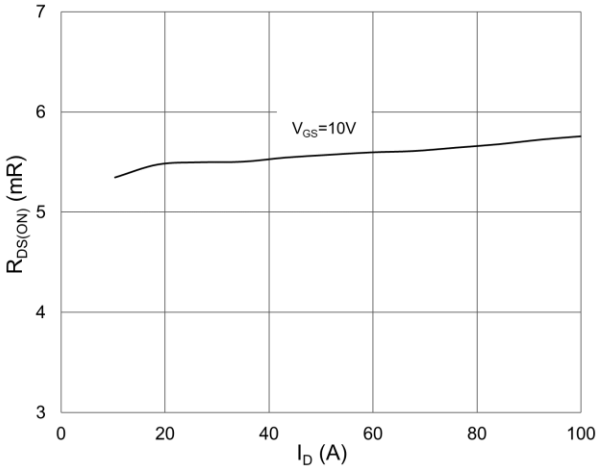


Fig6 Rds(on) vs. Gate Voltage

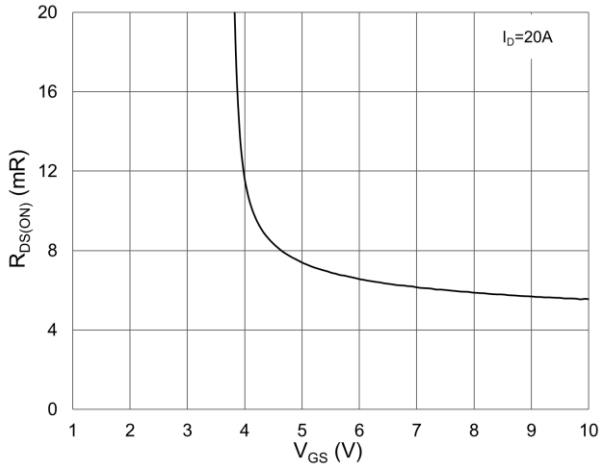


Fig7 Capacitance Characteristics

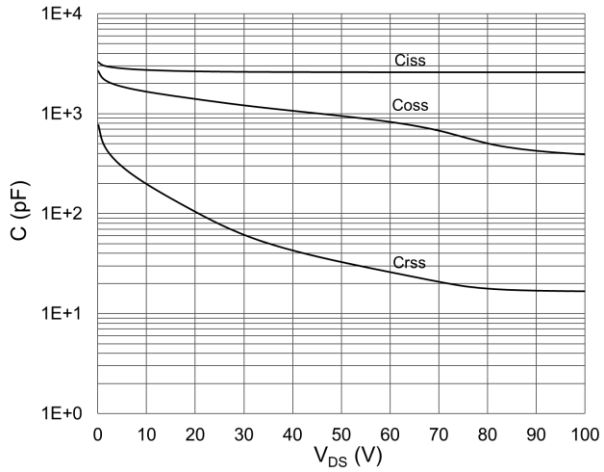


Fig8 Drain Current Derating

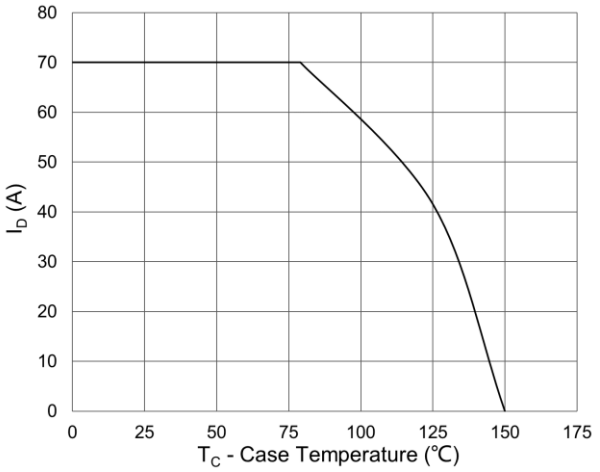


Fig9 Power Dissipation

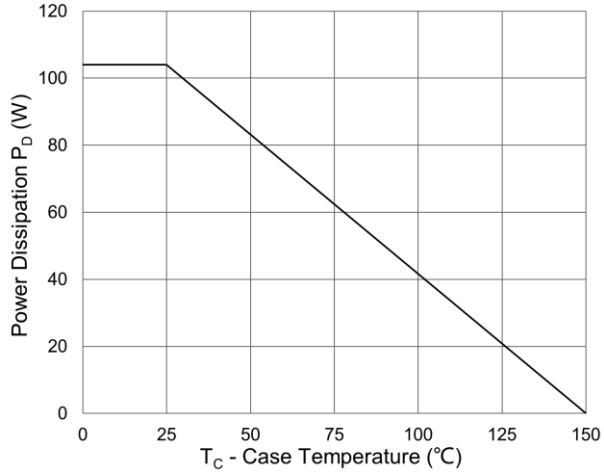


Fig10 Source-Drain Diode Forward Characteristics

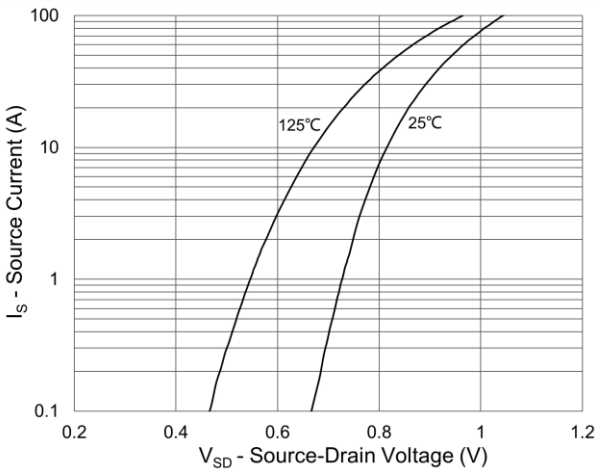


Fig11 Normalized Threshold Voltage vs. T_J

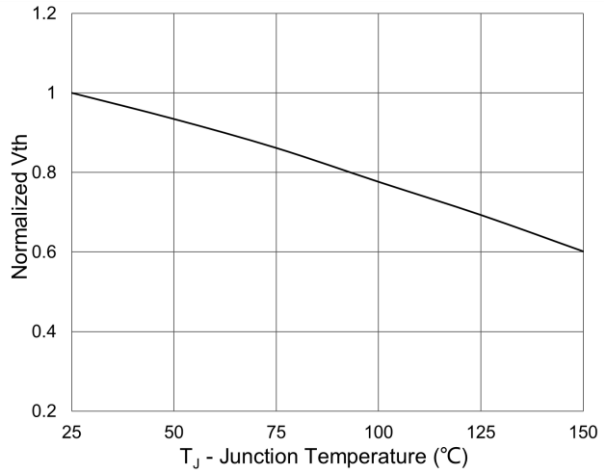


Fig12 Normalized Breakdown Voltage vs. T_J

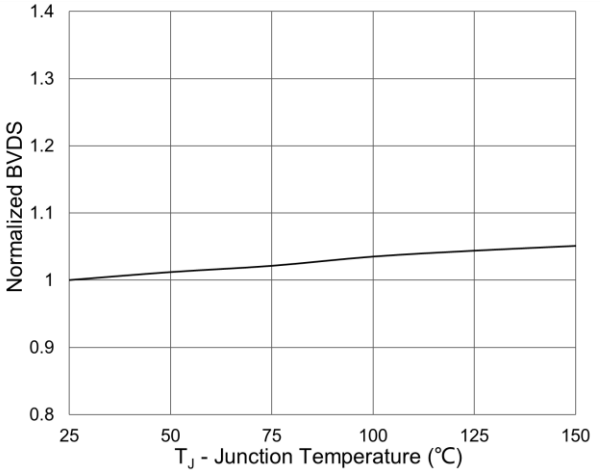


Fig13 Maximum Safe Operation Area

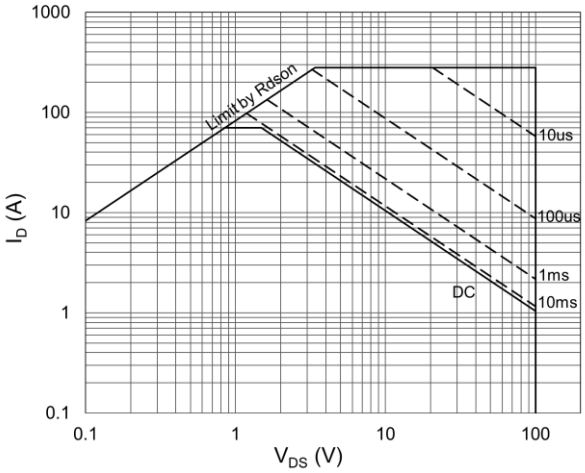
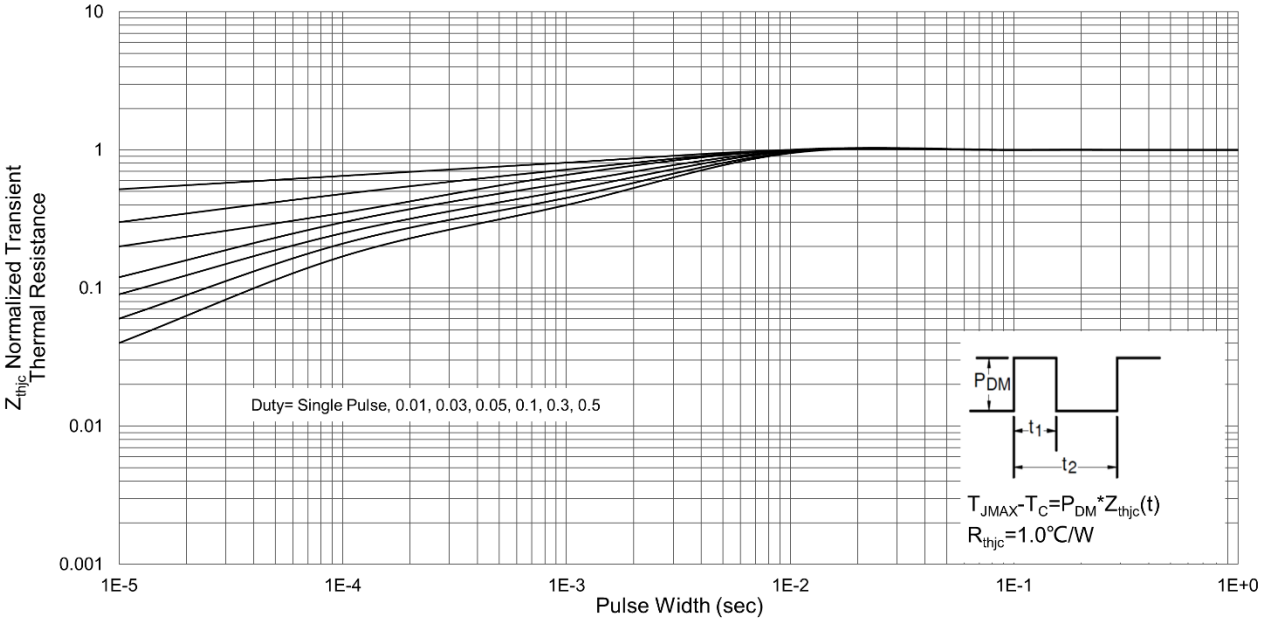
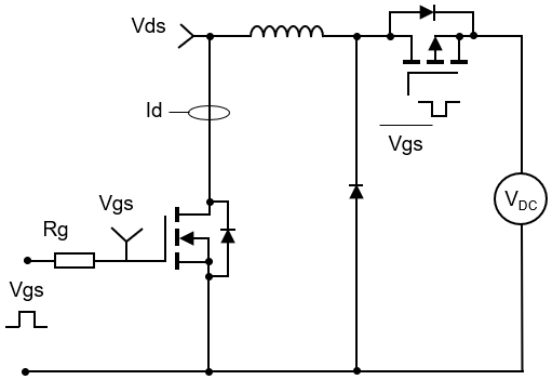


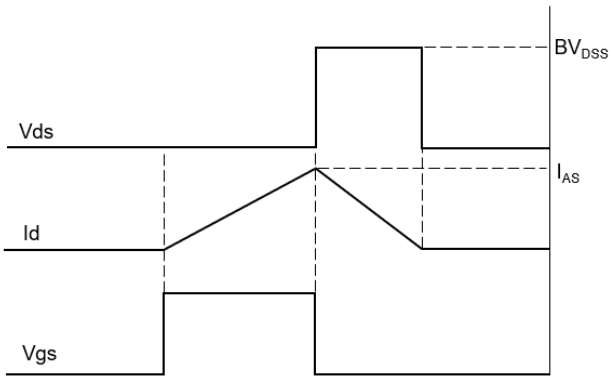
Fig14 Normalized Transient Impedance



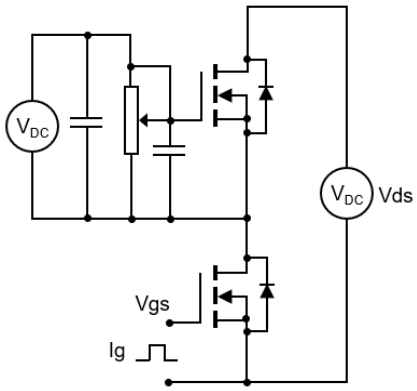
Test Circuit & Waveform

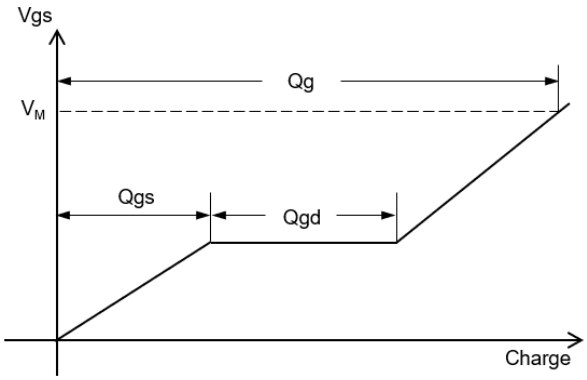
1. Unclamped Inductive Switching Test Circuit & Waveform



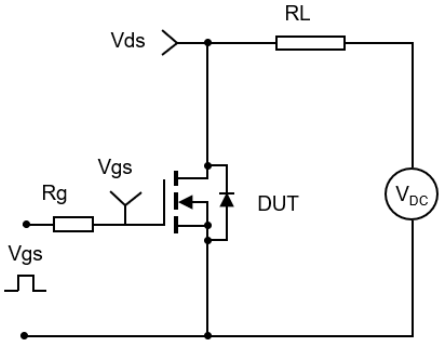


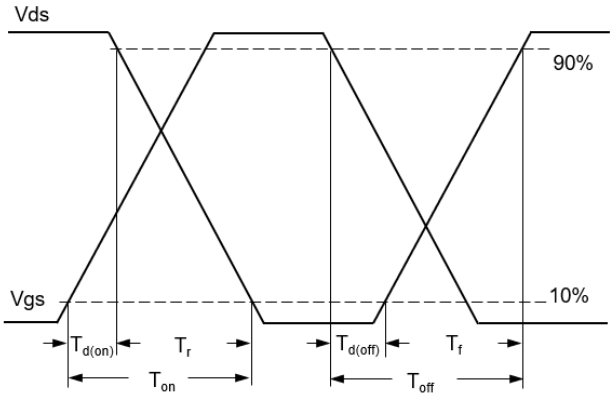
2. Gate Charge Test Circuit & Waveform



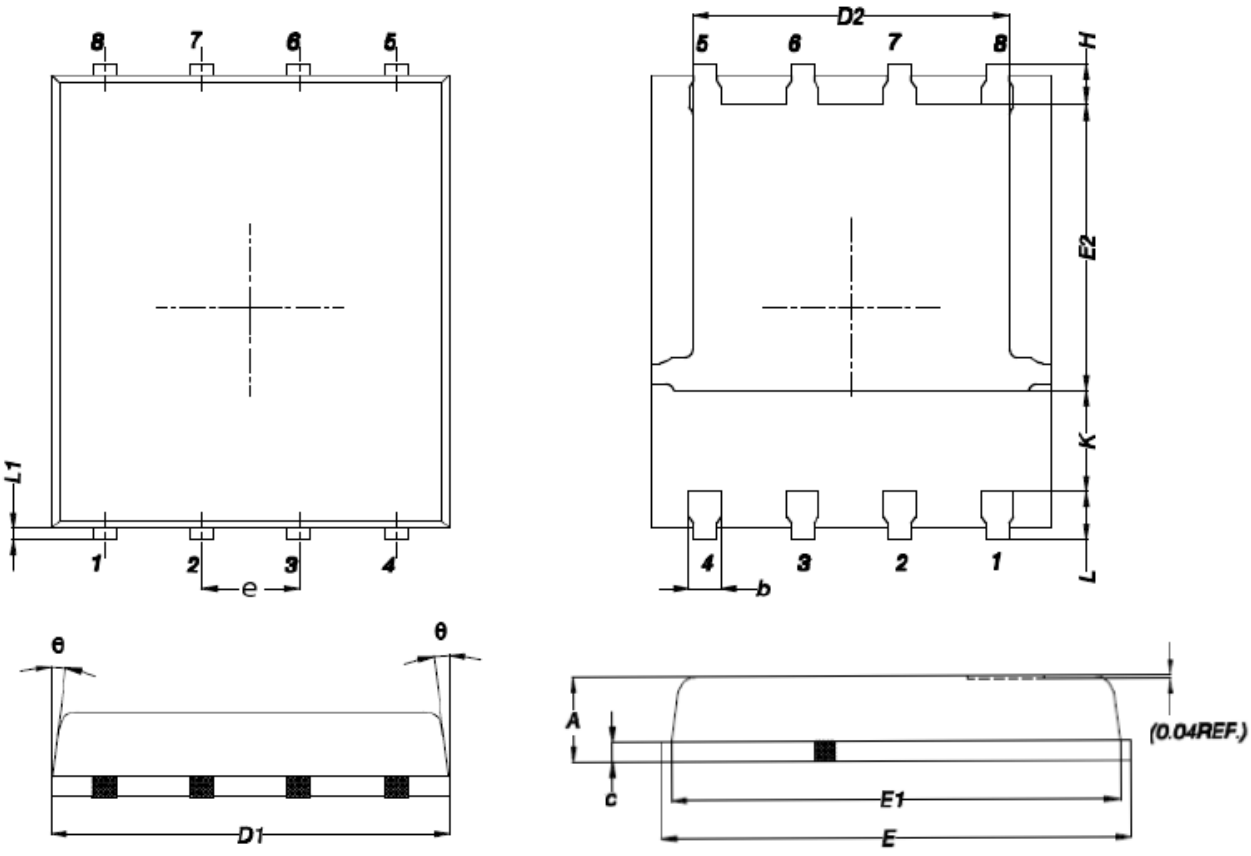


3. Resistive Switching Test Circuit & Waveform





PDFN5*6 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
θ	12°	0°	12°	0°