华润微电子(重庆)有限公司

CRSM070N12N3Z

SkyMOS3 N-MOSFET 120V, 6mΩ, 80A

Features

- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

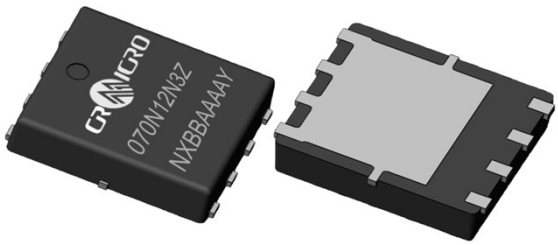
- Motor control and drive
- Battery management System
- UPS (Uninterrupible Power Supplies)

Product Summary

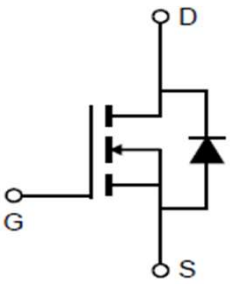
V_{DS}	120V
$R_{DS(on).typ}$	6mΩ
I_D	80A

100% DVDS Tested
100% Avalanche Tested

RoHS HF



CRSM070N12N3Z



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM070N12N3Z	070N12N3Z	DFN5X6	Tape&Reel	N/A	N/A	5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	120	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 100 80 64	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	320	A
Avalanche energy, single pulse (I_D = 40A, Rg=25Ω)[1]	E_{AS}	405	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	119	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

※. Notes:
1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =40A, VGS = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.05	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	52	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	120	-	-	V	V_{GS}=0V, I_D=250uA
		120	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=120V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	6.0	7.0	mΩ	VGS=10V, ID=40A
Transconductance	g_{fs}	45.25	90.5	181	S	V_{DS}=5V, I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	2747	4120	6180	pF	V_{GS}=0V, V_{DS}=60V, f=1MHz
Output Capacitance	C_{oss}	339	508	762		
Reverse Transfer Capacitance	C_{rss}	8	16	32		
Gate Total Charge	Q_G	39	58.2	87.3	nC	V_{GS}=10V, V_{DS}=60V, I_D=40A
Gate-Source charge	Q_{gs}	17	24.8	37.2		
Gate-Drain charge	Q_{gd}	5	10.1	20.2		
Turn-on delay time	$t_{d(on)}$	-	19.8	-	ns	V_{GS}=10V, V_{DD}=60V, R_{G_ext}=2.7Ω
Rise time	t_r	-	42.1	-		
Turn-off delay time	$t_{d(off)}$	-	32.2	-		
Fall time	t_f	-	13.8	-		
Gate resistance	R_G	-	1.0	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.86	1.4	V	V_{GS}=0V,I_{SD}=40A
Body Diode Reverse Recovery Time	t_{rr}	-	68.2	-	ns	I_F=40A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	142.2	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

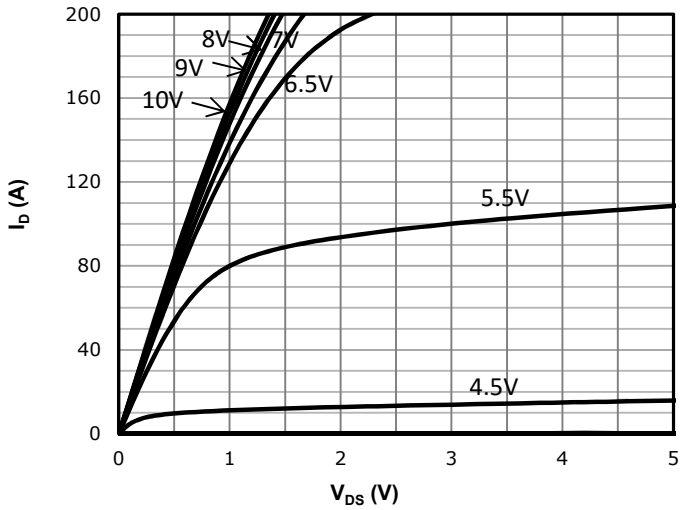


Fig 2: Transfer Characteristics

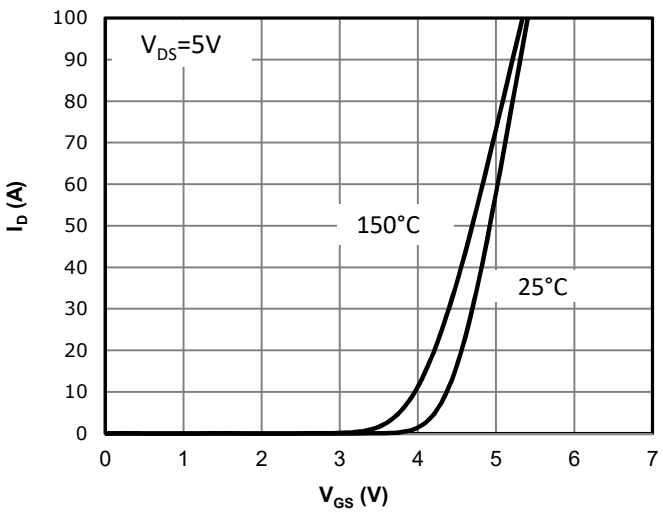


Fig 3: Rds(on) vs Drain Current and Gate Voltage

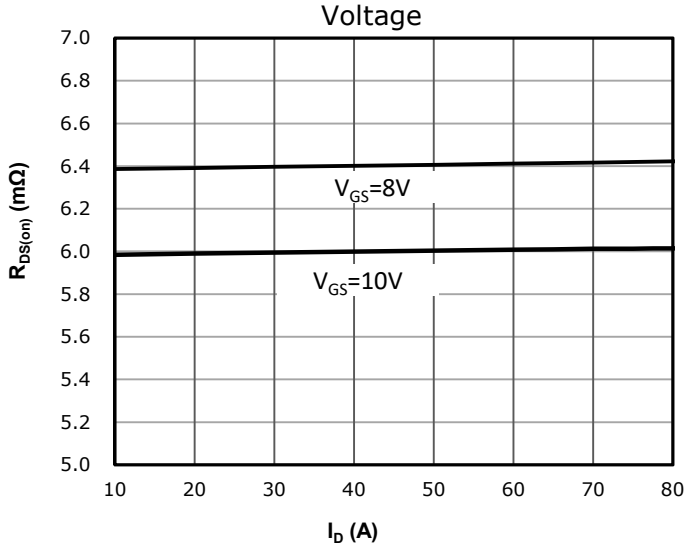


Fig 4: Rds(on) vs Gate Voltage

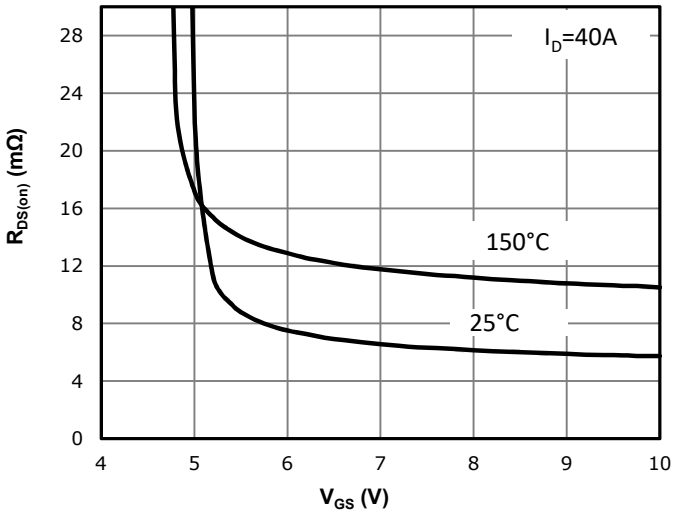


Fig 5: Rds(on) vs. Temperature

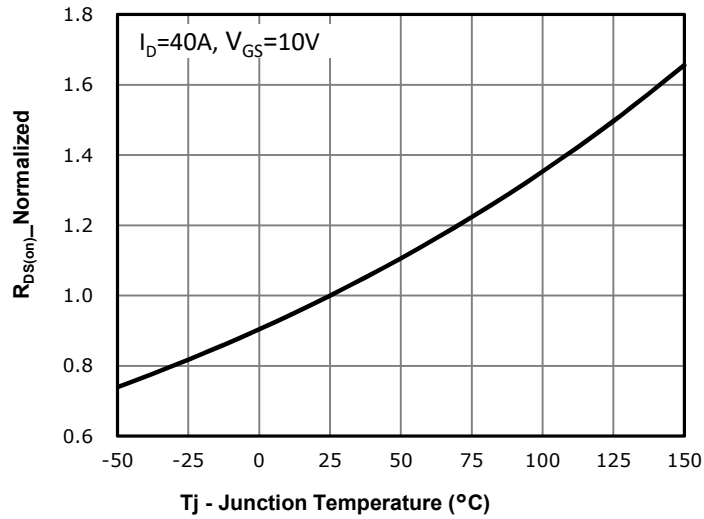


Fig 6: Vgs(th) vs. Temperature

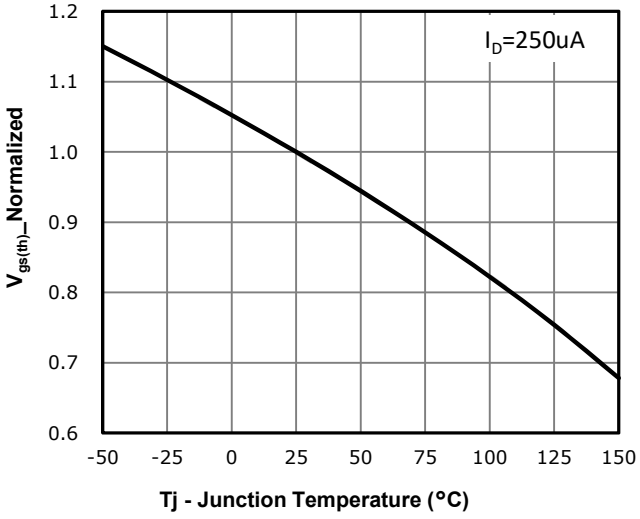


Fig 7: BVdss vs. Temperature

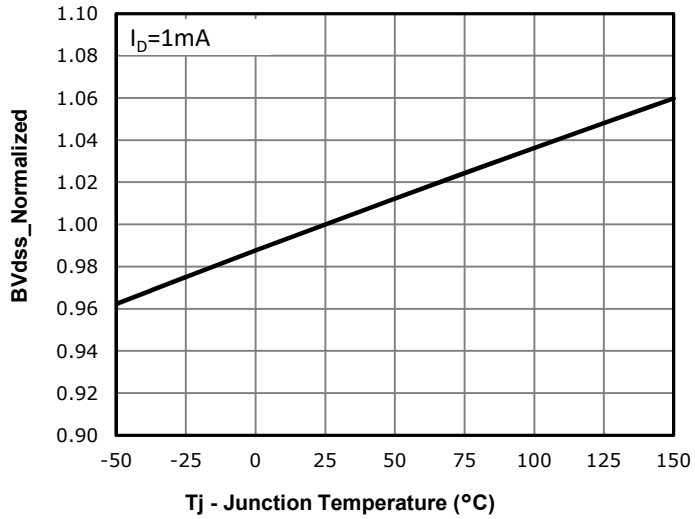


Fig 8: Capacitance Characteristics

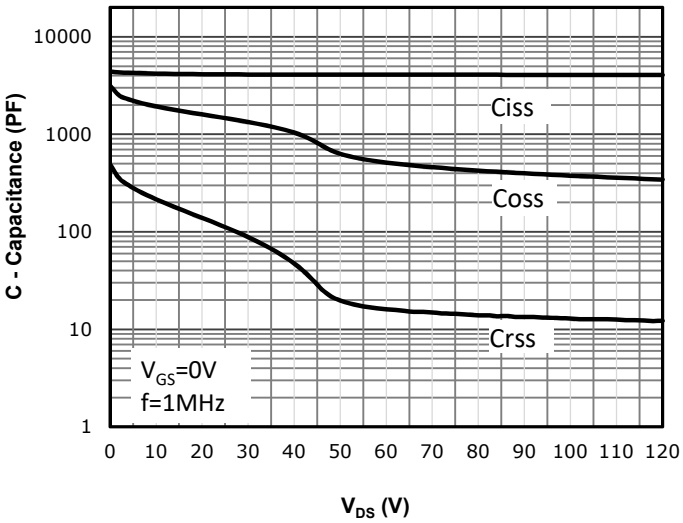


Fig 9: Gate Charge Characteristics

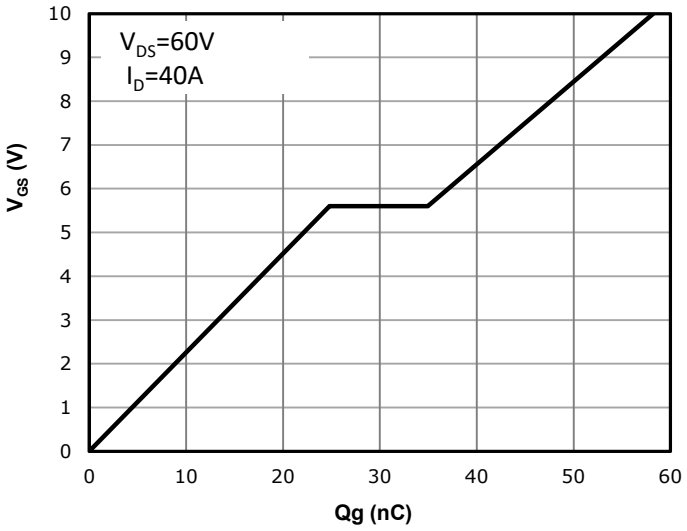


Fig 10: Body-diode Forward Characteristics

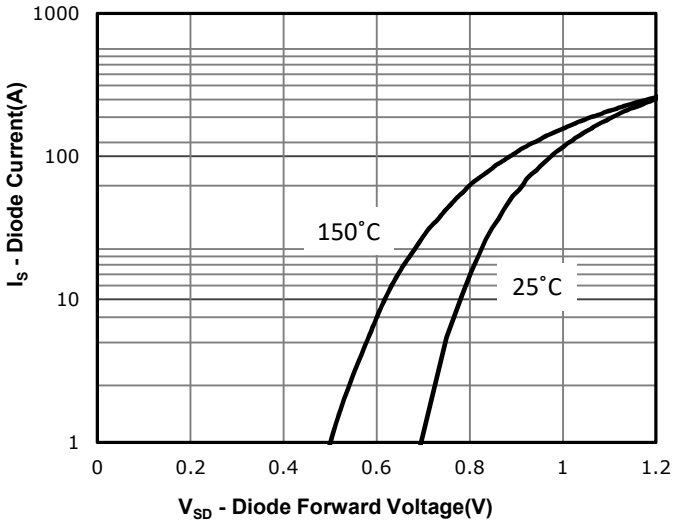


Fig 11: Power Dissipation

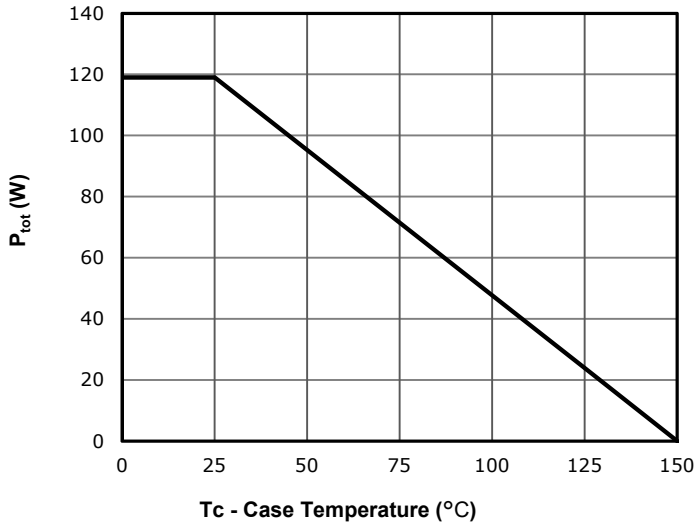


Fig 12: Drain Current Derating

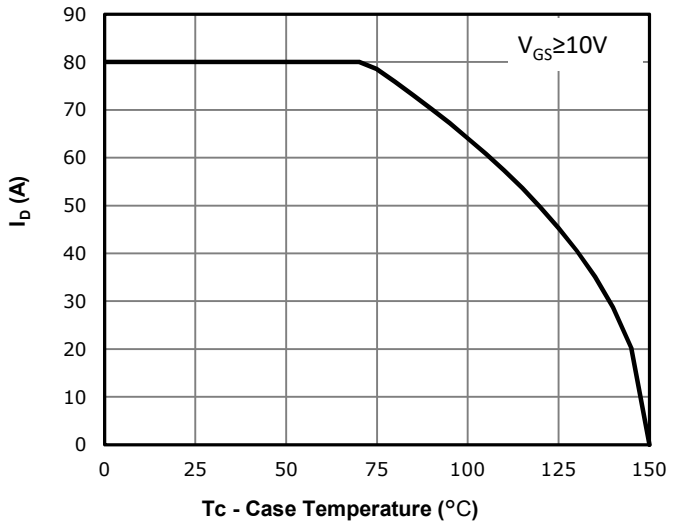


Fig 13: Safe Operating Area

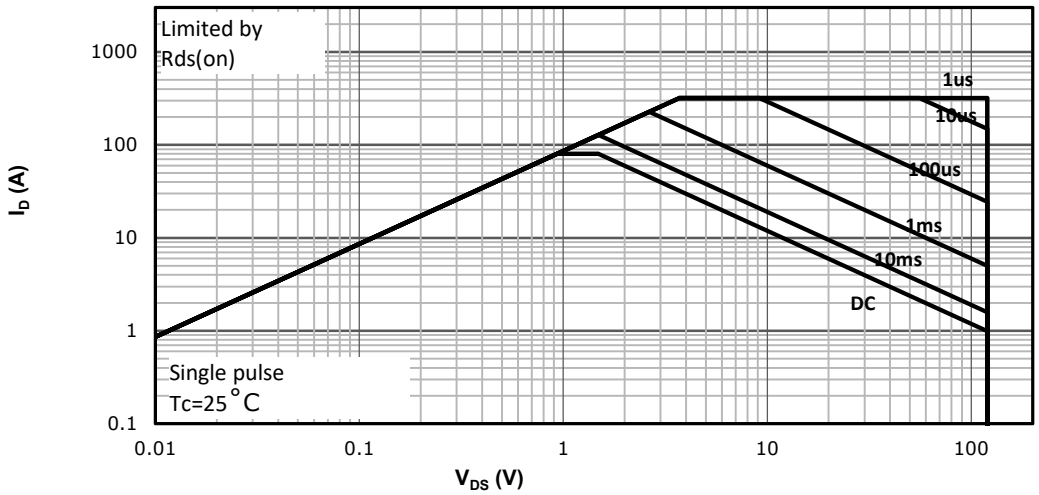
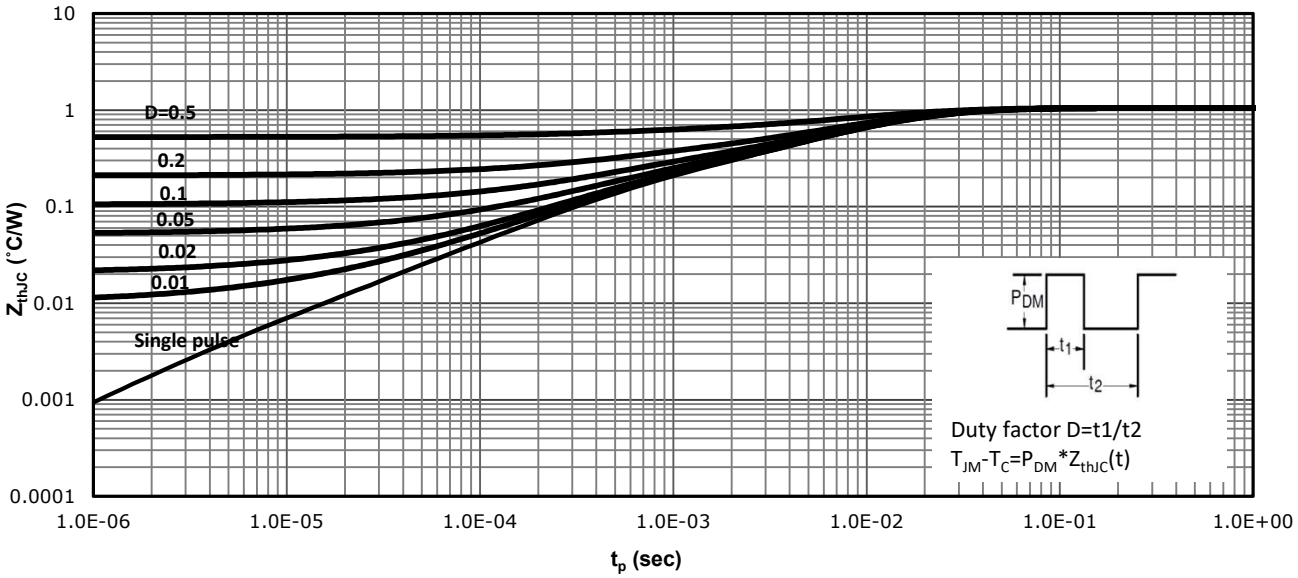
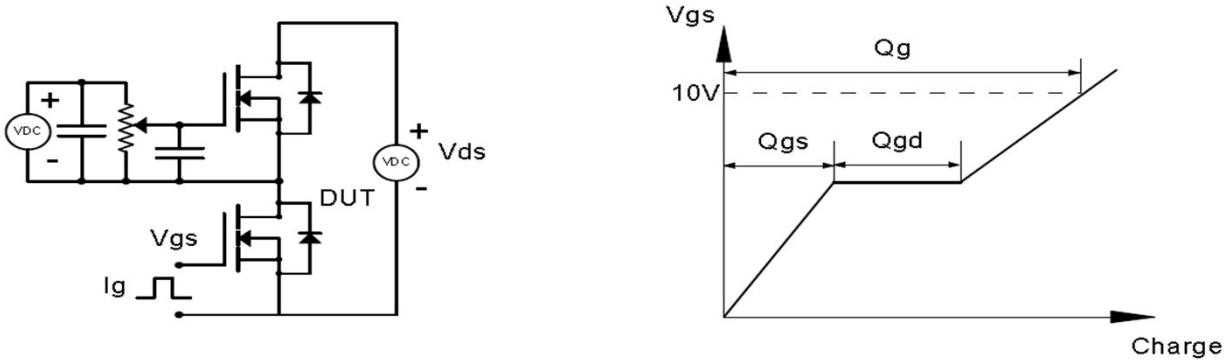


Fig 14: Max. Transient Thermal Impedance

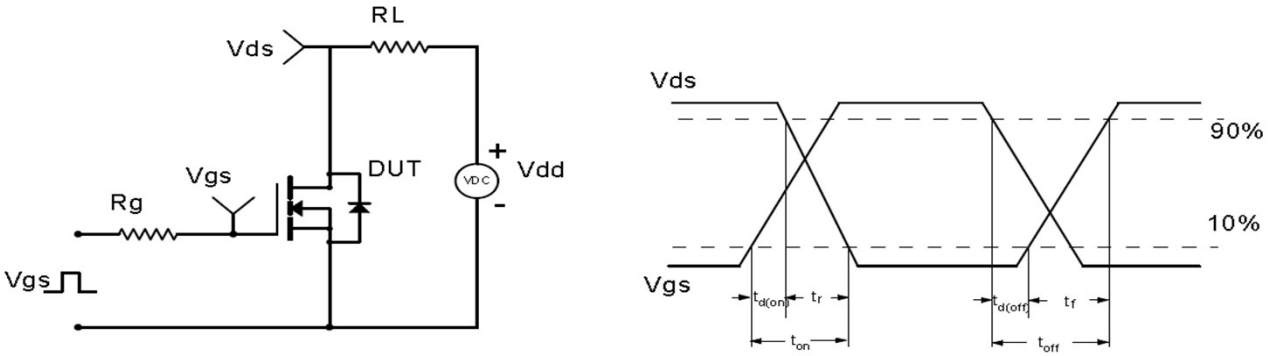


Test Circuit & Waveform

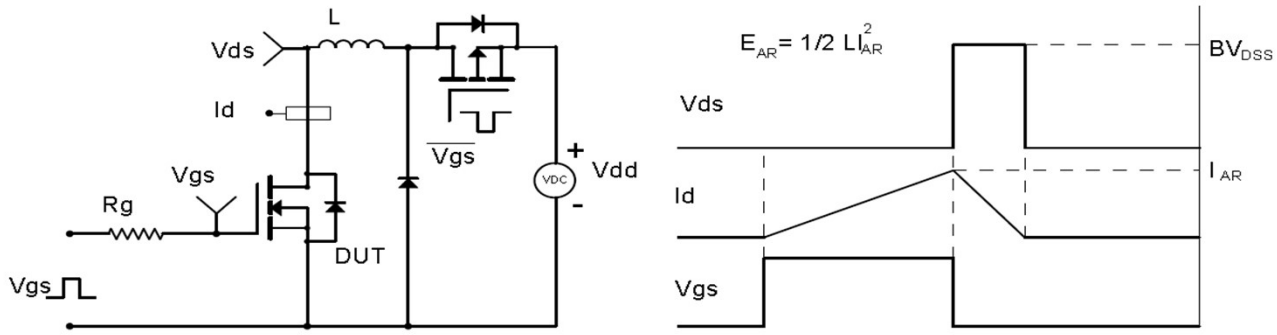
Gate Charge Test Circuit & Waveform



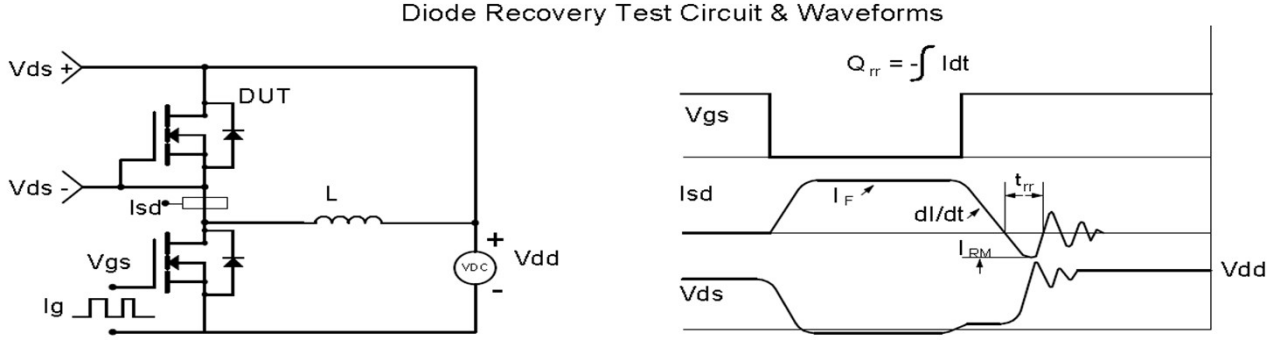
Resistive Switching Test Circuit & Waveforms



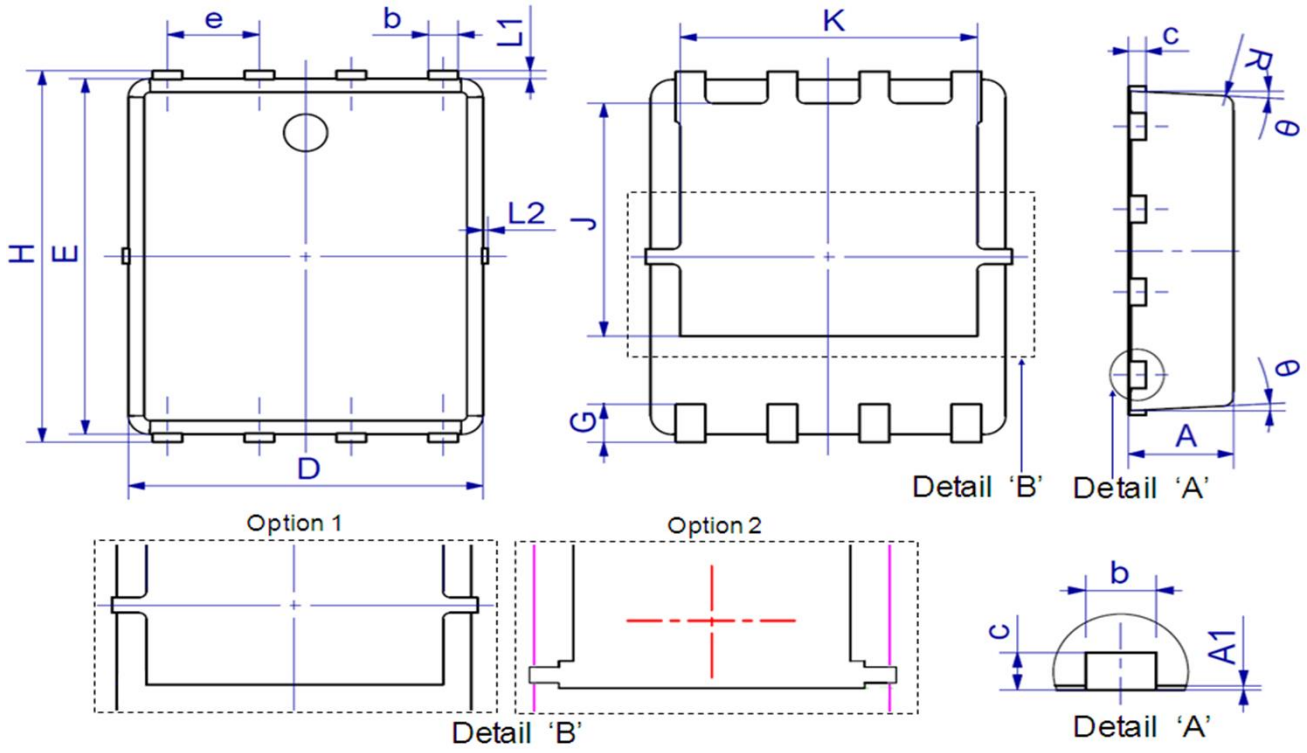
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: PDFN5*6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.80	1.20	0.031	0.047
A1	0.00	0.05	0.000	0.002
b	0.30	0.51	0.012	0.020
c	0.15	0.35	0.006	0.014
D	4.80	5.40	0.189	0.213
e	1.27 BSC		0.050 BSC	
E	5.66	6.06	0.223	0.239
G	0.30	0.71	0.012	0.028
H	5.90	6.35	0.232	0.250
J	3.32	3.92	0.131	0.154
K	3.61	4.25	0.142	0.167
L1	0.05	0.25	0.002	0.010
L2	0.00	0.15	0.000	0.006
R	0.25 REF		0.010 REF	
θ	0°	12°	0°	12°

Marking

NOTE:
NXBBAAAAY

N	—Wire Bond code
X	—Assembly location code
BB	—Fab code
AAAA	—Lot code
Y	—Bin code

Revision History

Revision	Date	Major changes
1.0	2023/11/21	Release of Preliminary version.

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semicondutor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

CRM(CQ) reserves the right to improve product design, function and reliability without notice.