华润微电子(重庆)有限公司

CRSM011N04N6Q

SkyMOS6 N-MOSFET 40V, 0.85mΩ, 290A

Features

- Uses CRM(CQ) advanced SkyMOS6 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified

Product Summary

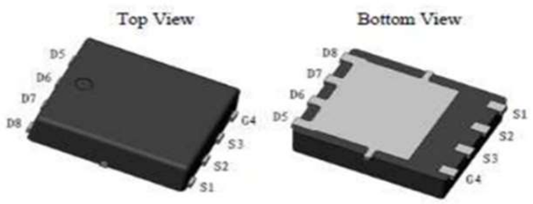
V_{DS}	40V
$R_{DS(on).typ}$	0.85mΩ
I_D	290A

100% DVDS Tested
100% Avalanche Tested

Applications

- 12 V Automotive Motors control systems
- Ultra high performance power switching

RoHS HF



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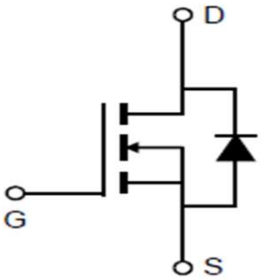


Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM011N04N6Q	011N04N6Q	PDFN5*6	Tape&reel	N/A	N/A	4000pcs/ 5000pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	40	V
Continuous drain current	I_D		A
T_C = 25°C (Silicon limit)		290	
T_C = 100°C (Silicon limit)		207	
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	1160	A
Avalanche energy, single pulse (I_D = 56A, Rg=25Ω)[1]	E_{AS}	794	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	153	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

※. Notes:

1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =56A, VGS = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.98	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	47	

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}	40	-	-	V	V_{GS}=0V, I_D=250uA
		40	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.6	3.0	3.4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=40V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	0	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$		0.85	1.1	mΩ	VGS=10V, ID=20A
Transconductance	g_{fs}	-	131.0	-	S	V_{DS}=5V, I_D=20A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	4670	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	-	1300	-		
Reverse Transfer Capacitance	C_{rss}	-	87	-		
Gate Total Charge	Q_G	-	70.1	-	nC	V_{GS}=10V, V_{DS}=20V, I_D=20A
Gate-Source charge	Q_{gs}	-	24.6	-		
Gate-Drain charge	Q_{gd}	-	13.3	-		
Turn-on delay time	$t_{d(on)}$	-	18.1	-	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=3Ω ID=20A
Rise time	t_r	-	40.2	-		
Turn-off delay time	$t_{d(off)}$	-	47.3	-		
Fall time	t_f	-	14.9	-		
Gate resistance	R_G	-	2.0	-	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}	-	0.76	1.2	V	V_{GS}=0V,I_{SD}=20A
Body Diode Reverse Recovery Time	t_{rr}	-	49.4	-	ns	I_F=20A,dI/dt=100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	-	49.9	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

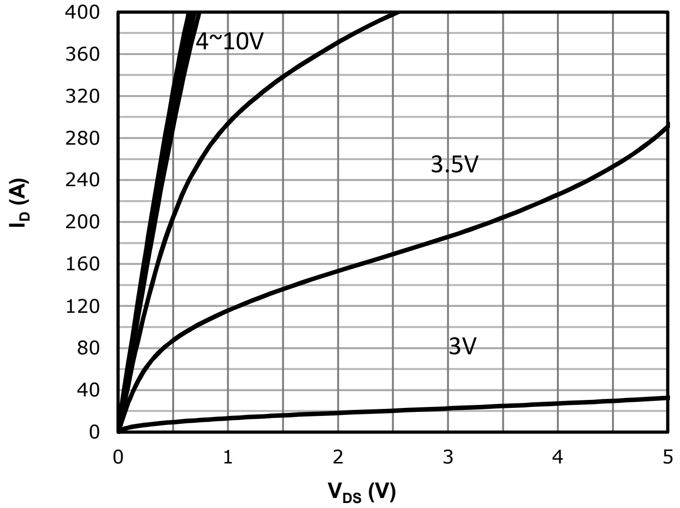


Fig 2: Transfer Characteristics

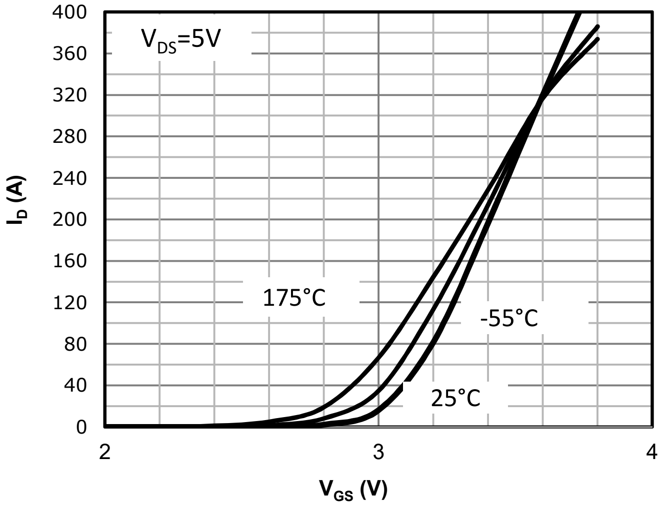


Fig 3: Rds(on) vs Drain Current and Gate Voltage

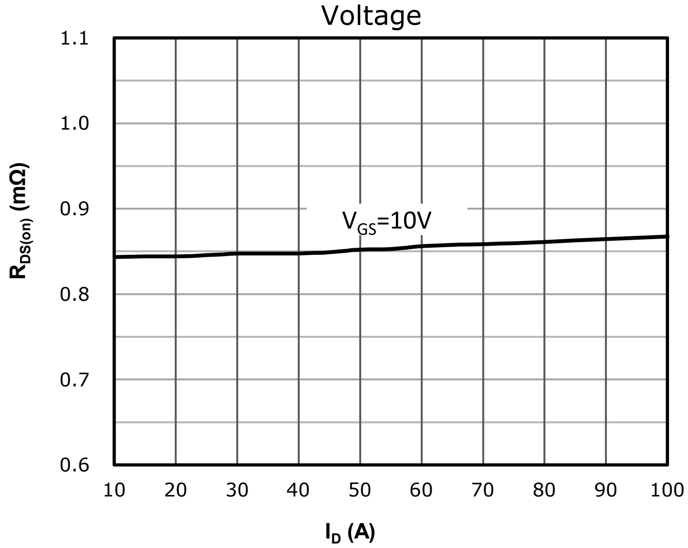


Fig 4: Rds(on) vs Gate Voltage

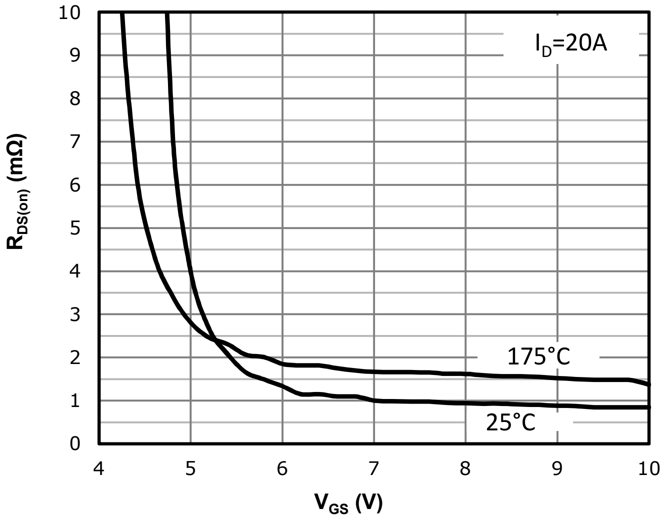


Fig 5: Rds(on) vs. Temperature

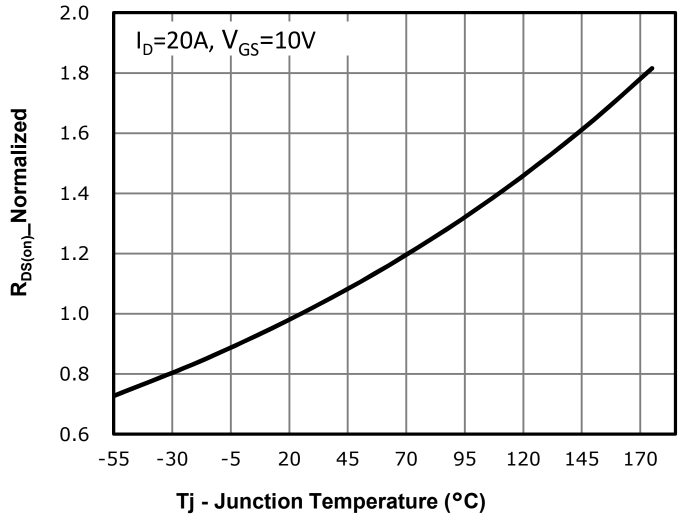


Fig 6: Vgs(th) vs. Temperature

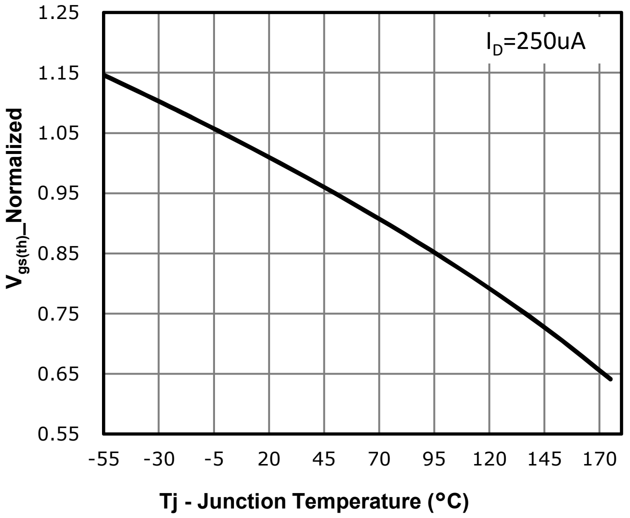


Fig 7: BVdss vs. Temperature

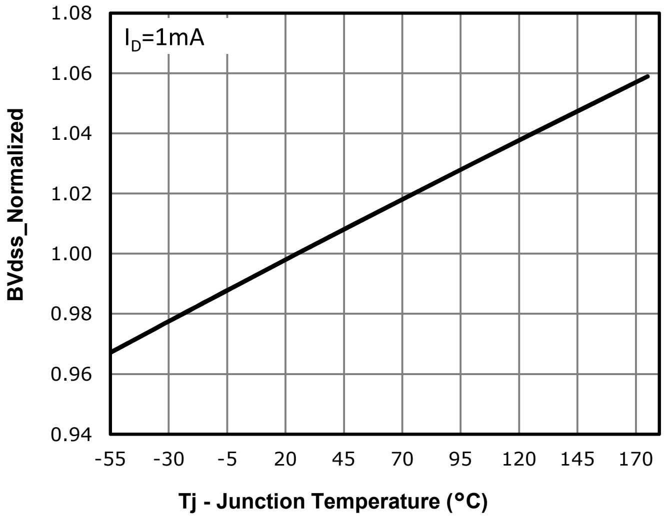


Fig 8: Capacitance Characteristics

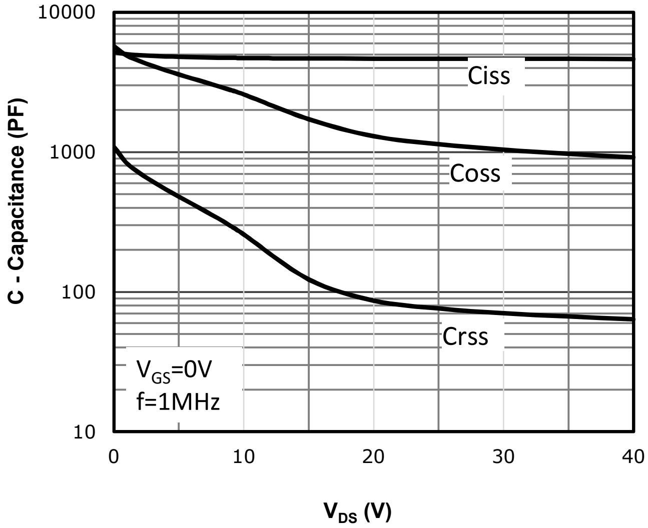


Fig 9: Gate Charge Characteristics

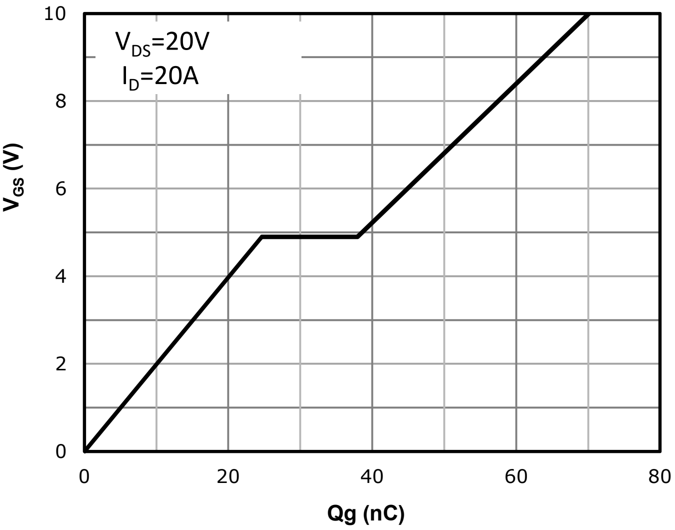


Fig 10: Body-diode Forward Characteristics

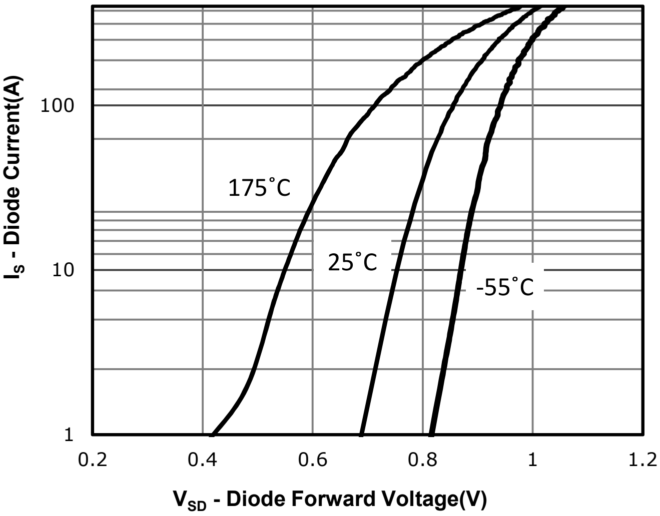


Fig 11: Power Dissipation

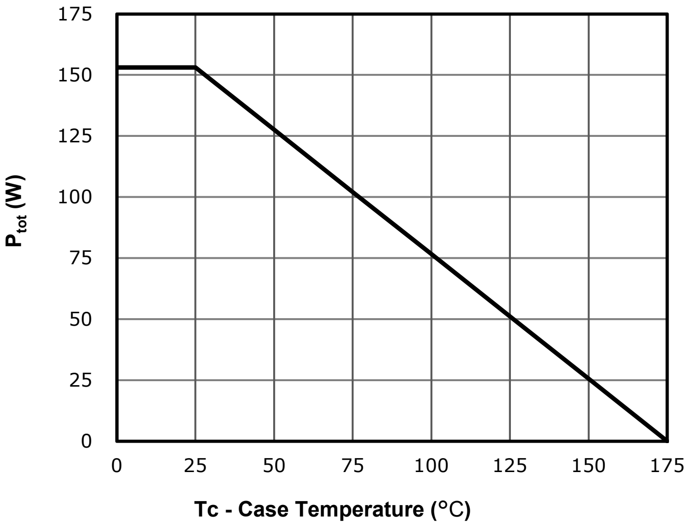


Fig 12: Drain Current Derating

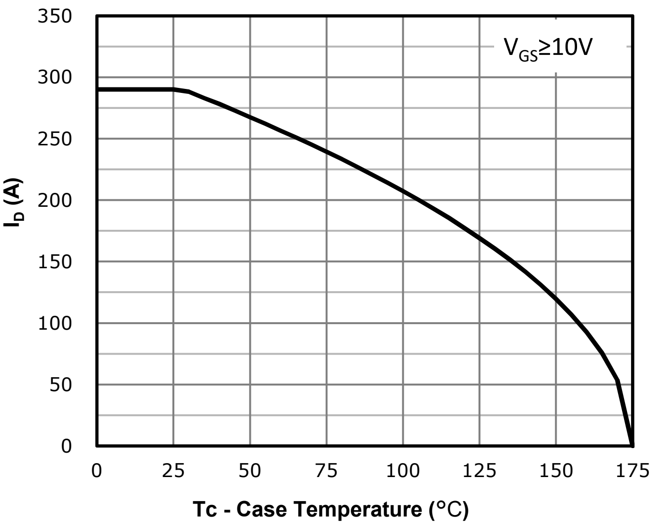


Fig 13: Safe Operating Area

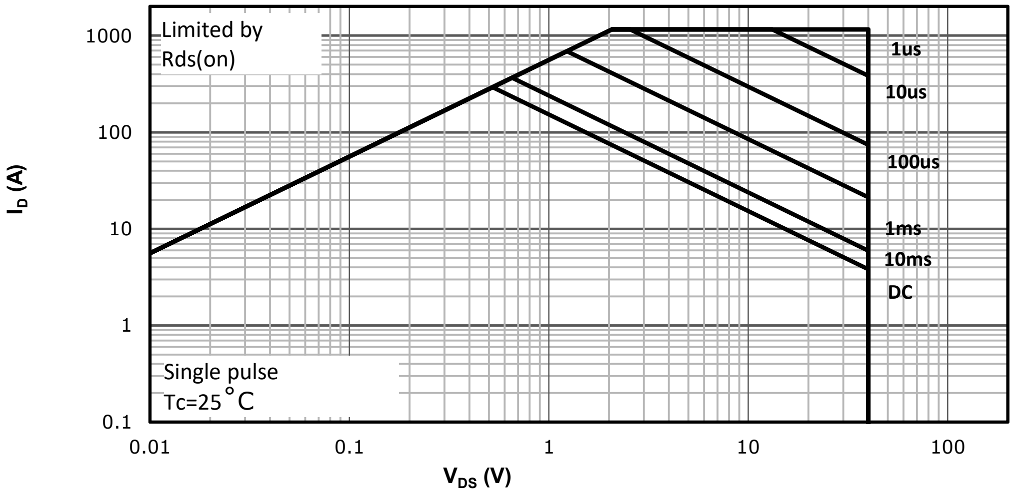
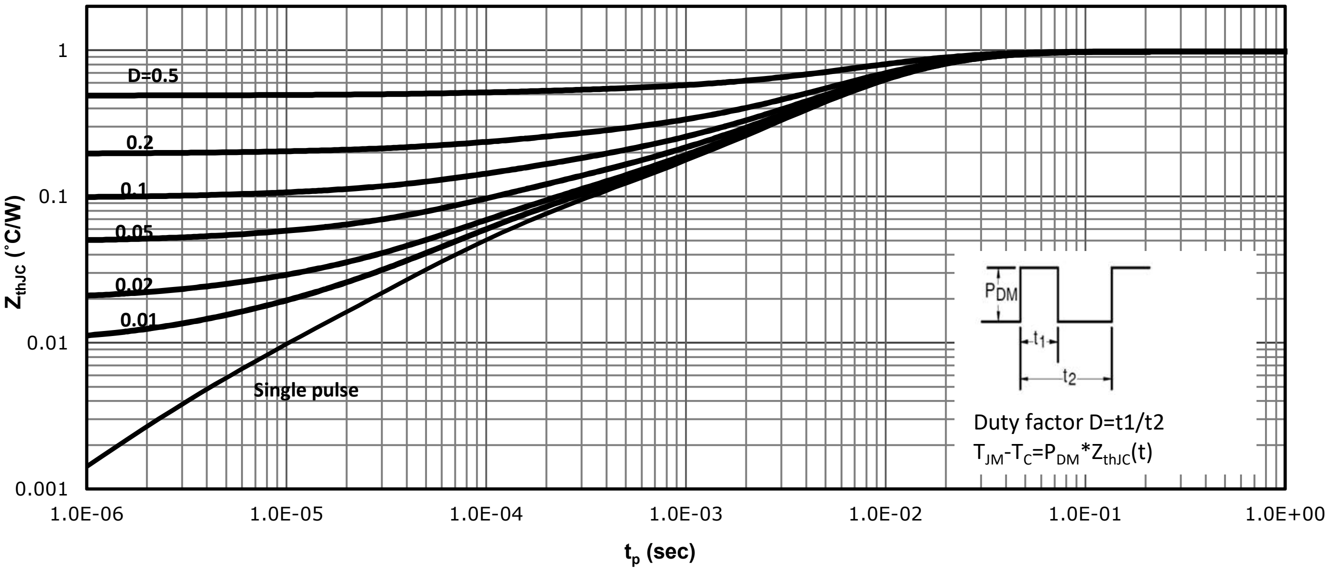
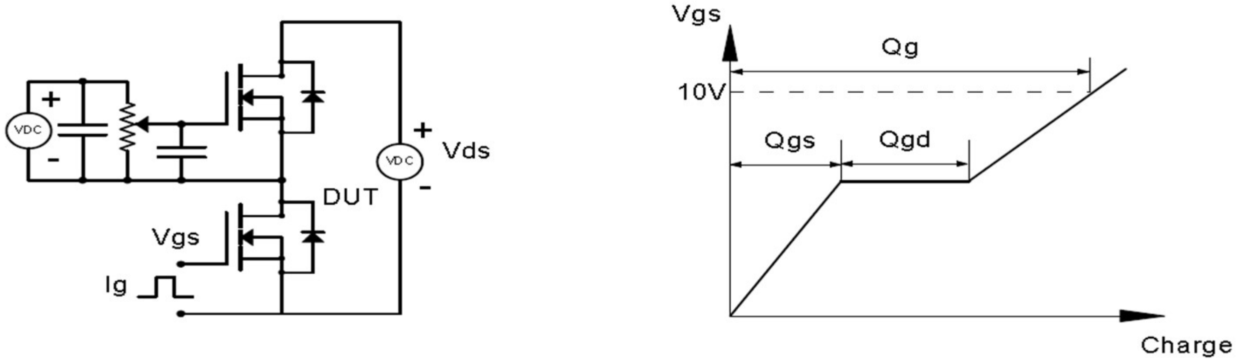


Fig 14: Max. Transient Thermal Impedance

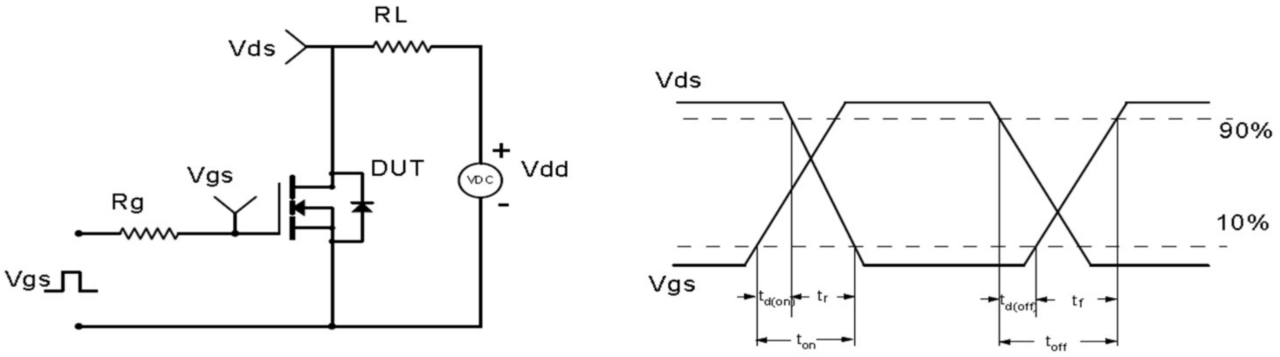


Test Circuit & Waveform

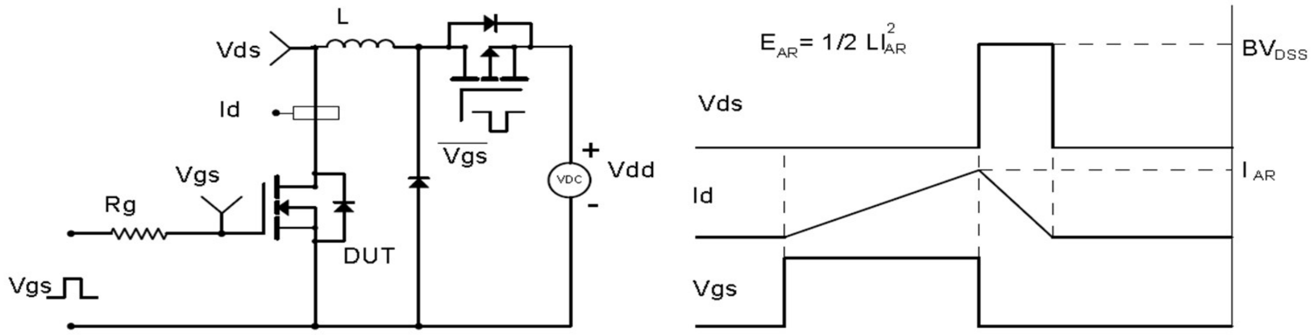
Gate Charge Test Circuit & Waveform



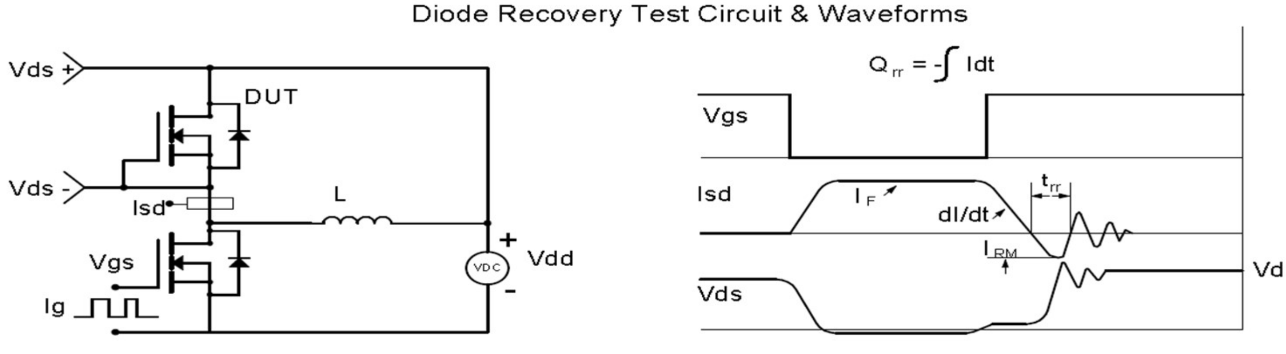
Resistive Switching Test Circuit & Waveforms



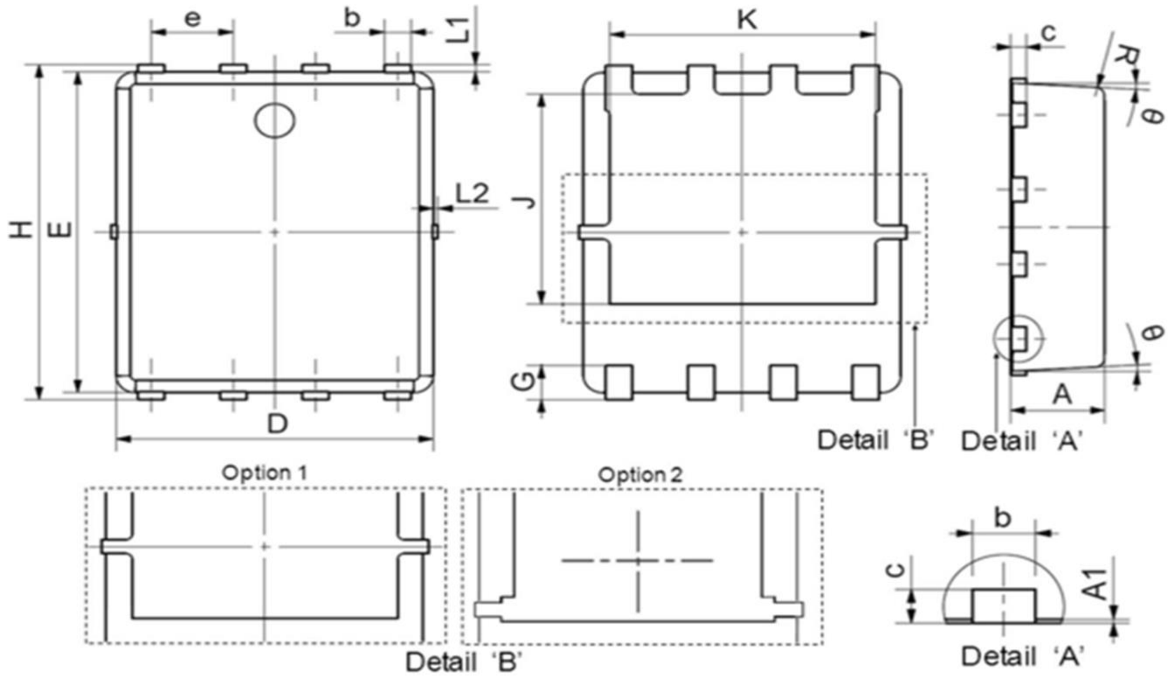
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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	5.65	6.06	0.222	0.239
G	0.30	0.86	0.012	0.034
H	5.90	6.35	0.232	0.250
J	3.25	3.92	0.128	0.154
K	3.61	4.40	0.142	0.173
L1	0.05	0.25	0.002	0.010
L2	0.00	0.22	0.000	0.009
R	0.25 REF		0.010 REF	
θ	0°	14°	0°	12°

Marking

NOTE:
NXBBAAAA-Y
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	2024/5/24	Release of Preliminary version.

Disclaimer

CRM reserves the right to change any product or information in this Specification at any time without prior notice.

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The product is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation/aerospace and life-support devices or systems.