CRSM028N06N4Z

SkyMOS4 N-MOSFET 60V, 2.3mΩ, 80A

Features

- Uses CRM(CQ) advanced SkyMOS4 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

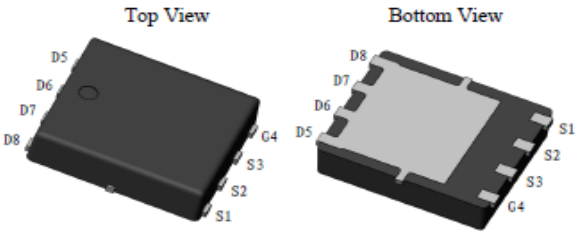
Product Summary

V_{DS}	60V
$R_{DS(on).typ}$	2.3mΩ
I_D	80A

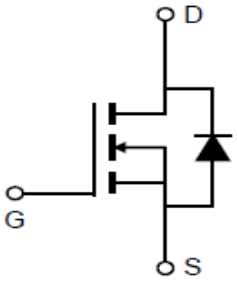
100% DVDS Tested
100% Avalanche Tested

Applications

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



CRSM028N06N4Z



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM028N06N4Z	SM028N06N4Z	PDFN5*6	Tape	N/A	N/A	4000/5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	60	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 140 80 87	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 = 42A, Rg=25Ω)[1]	E_{AS}	441	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	83	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°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 =42A, VGS = 10V.
2.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.50	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	56	

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}	65	-	-	V	V_{GS}=0V, I_D=250μA
Gate threshold voltage	$V_{GS(th)}$	2.0	-	3.4	V	V_{DS}=V_{GS},I_D=250μA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=60V,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	$R_{DS(on)}$	-	2.30	2.80	mΩ	VGS=10V, ID=50A
Transconductance	g_{fs}	-	191.4	-	S	V_{DS}=5V, I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	1985	3971	5957	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Output Capacitance	C_{oss}	692	1385	2077		
Reverse Transfer Capacitance	C_{rss}	18	37	73		
Gate Total Charge	Q_G	30	60.4	90	nC	V_{GS}=10V, V_{DS}=30V, I_D=50A
Gate-Source charge	Q_{gs}	11	22.1	33		
Gate-Drain charge	Q_{gd}	3	7.6	15		
Turn-on delay time	$t_{d(on)}$	7	14.1	28	ns	V_{GS}=10V, V_{DD}=30V, R_{G_ext}=2.7Ω,ID=50A
Rise time	t_r	20	40.1	60		
Turn-off delay time	$t_{d(off)}$	25	51.1	76		
Fall time	t_f	14	29.8	44		
Gate resistance	R_G	-	3.0	5	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.88	1.4	V	V_{GS}=0V,I_{SD}=50A
Body Diode Reverse Recovery Time	t_{rr}	-	47.7	-	ns	I_F=50A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	46.2	-	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

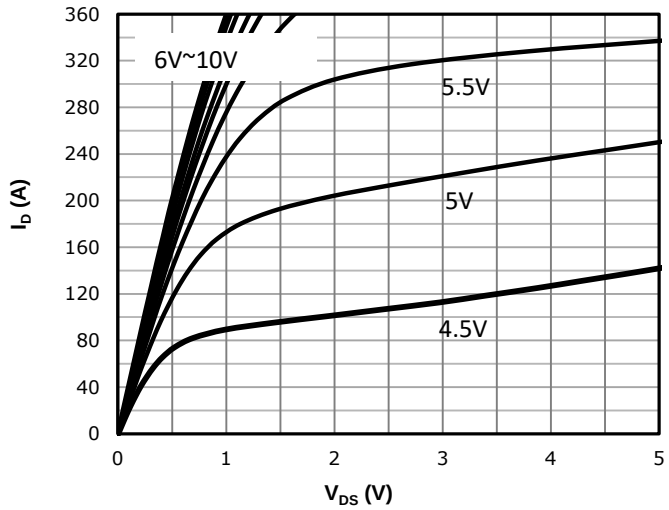


Fig 2: Transfer Characteristics

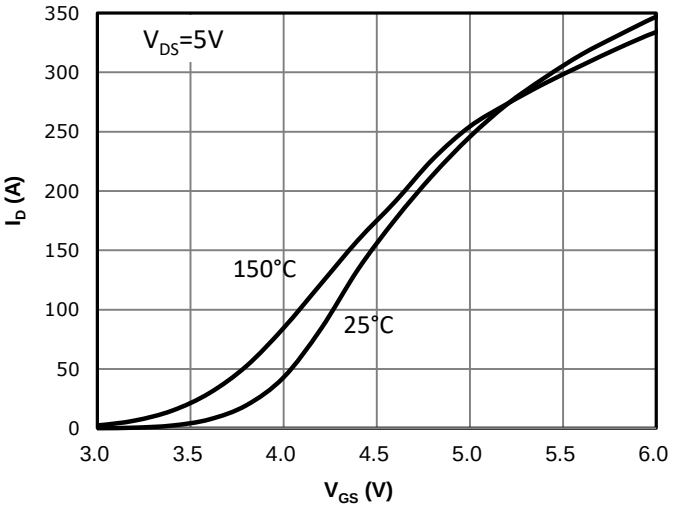


Fig 3: Rds(on) vs Drain Current and Gate Voltage

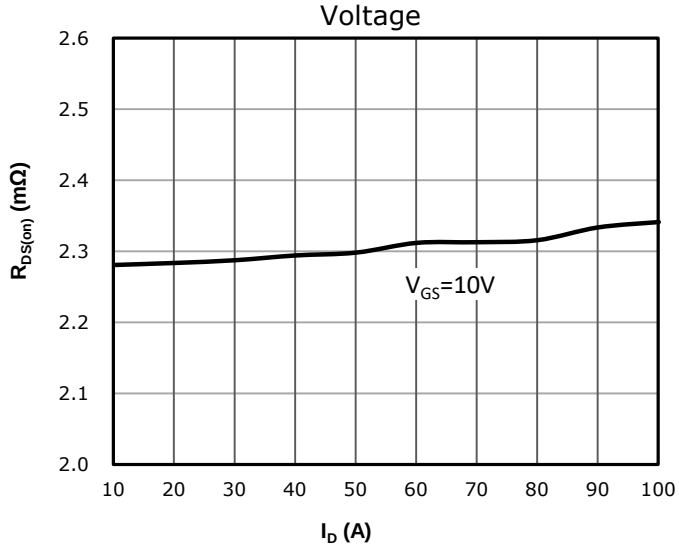


Fig 4: Rds(on) vs Gate Voltage

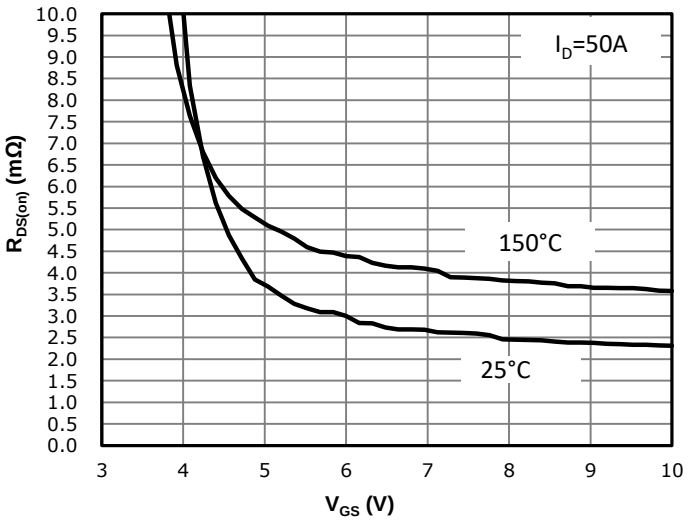


Fig 5: Rds(on) vs. Temperature

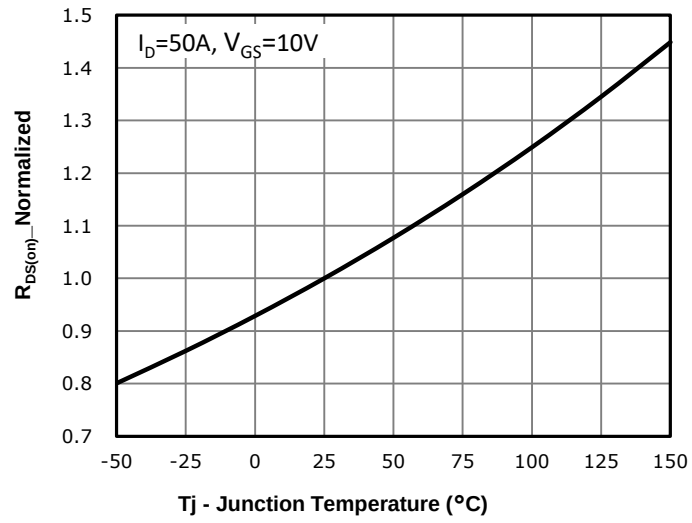
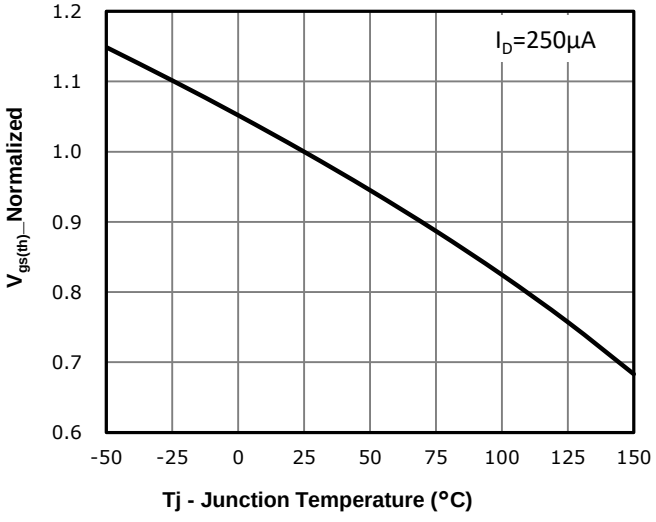


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

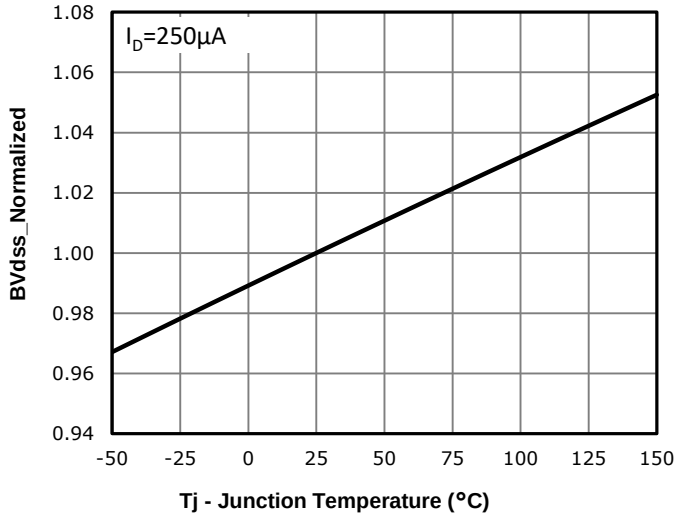


Fig 8: Capacitance Characteristics

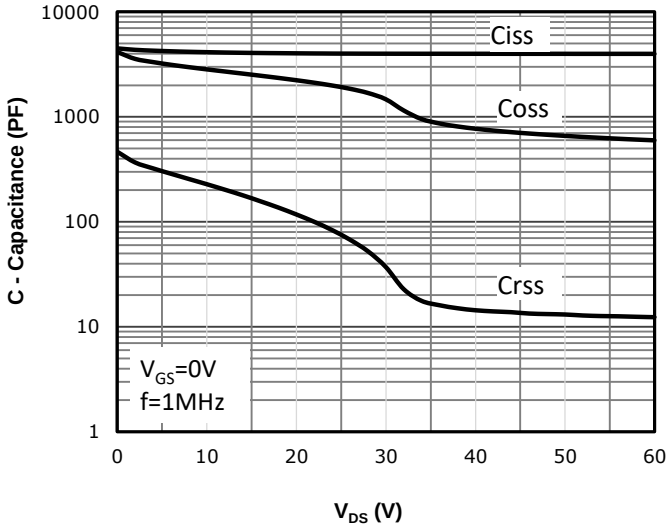


Fig 9: Gate Charge Characteristics

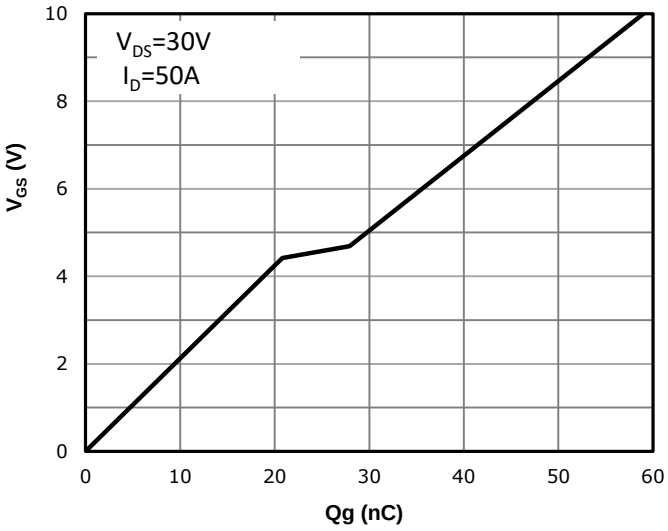


Fig 10: Body-diode Forward Characteristics

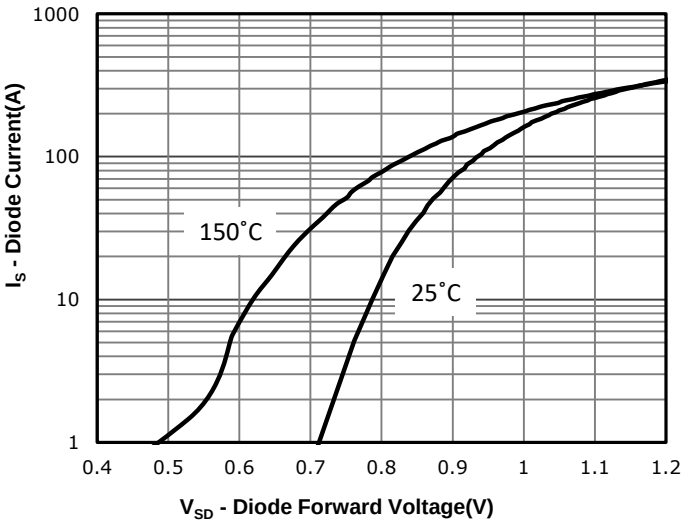


Fig 11: Power Dissipation

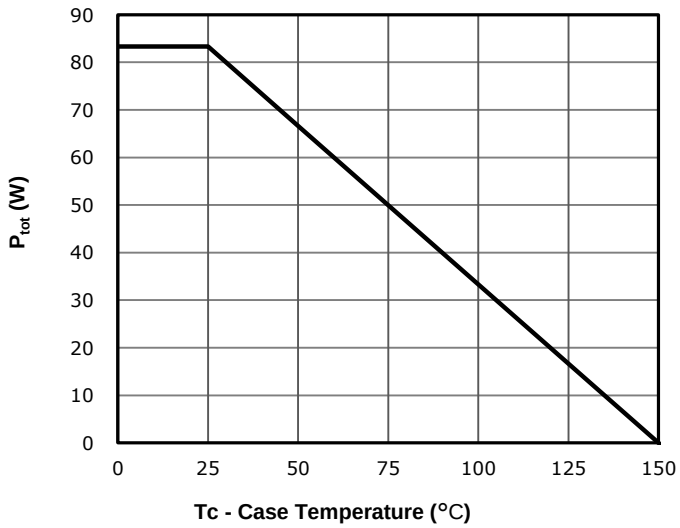
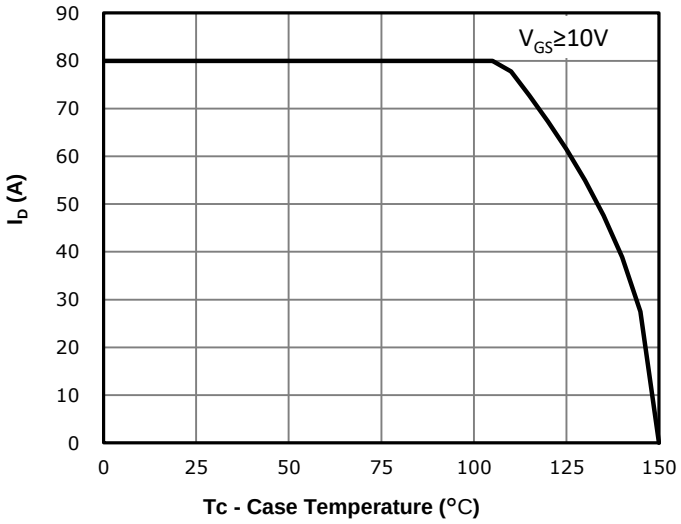


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

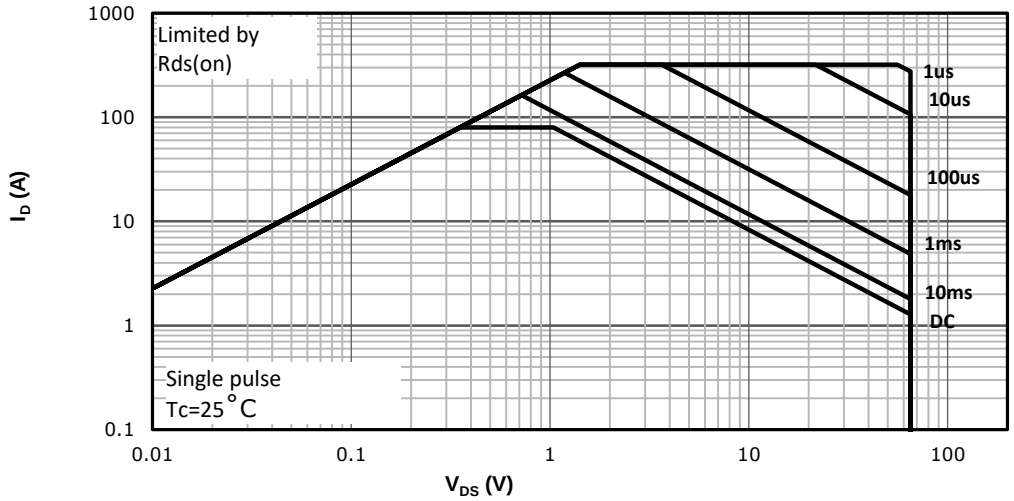
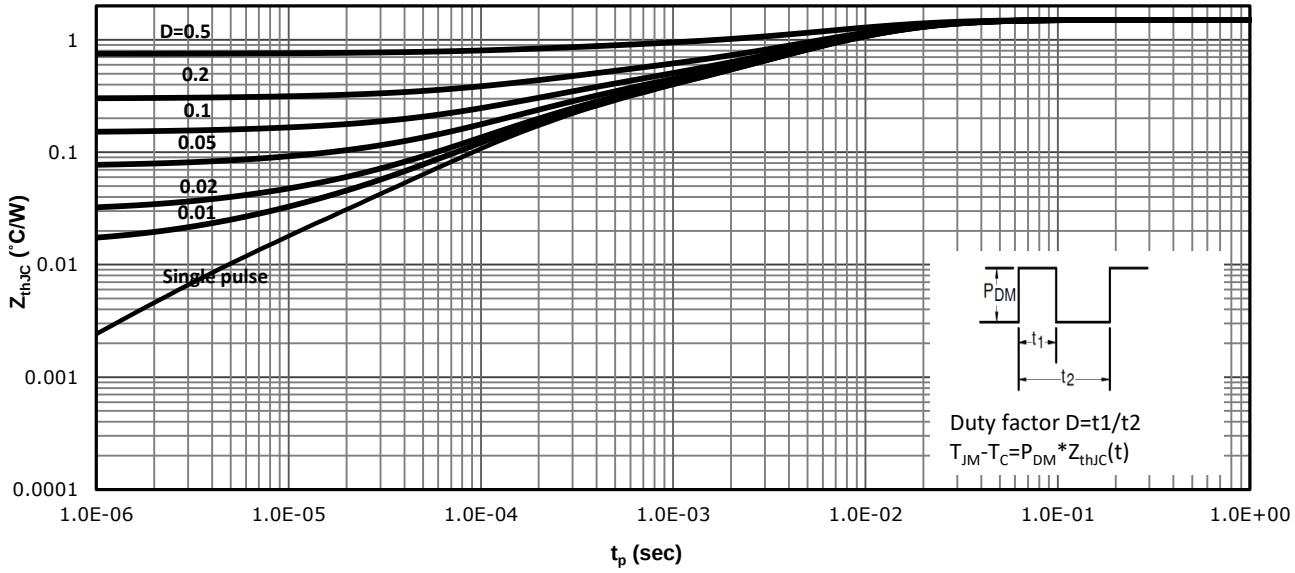


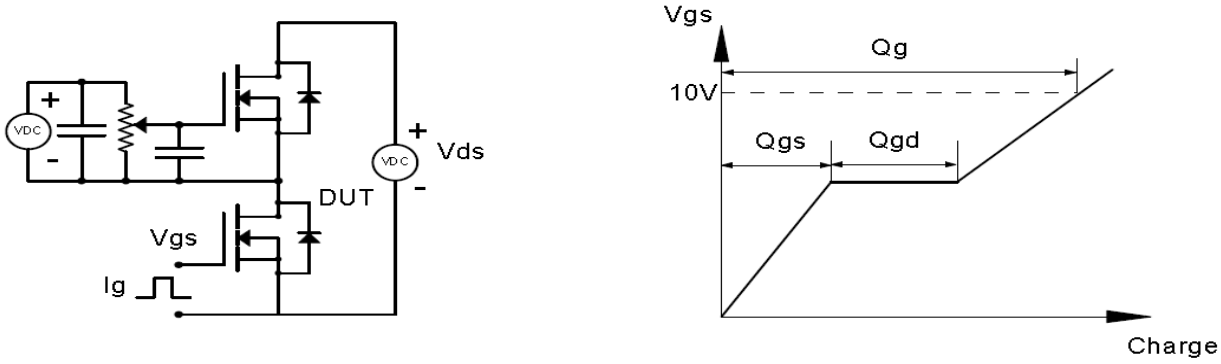
Fig 14: Max. Transient Thermal Impedance



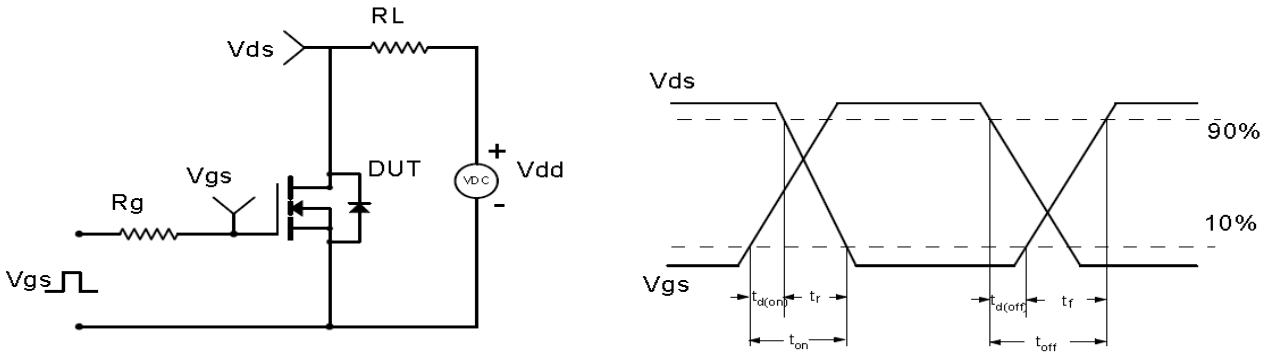
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Test Circuit & Waveform

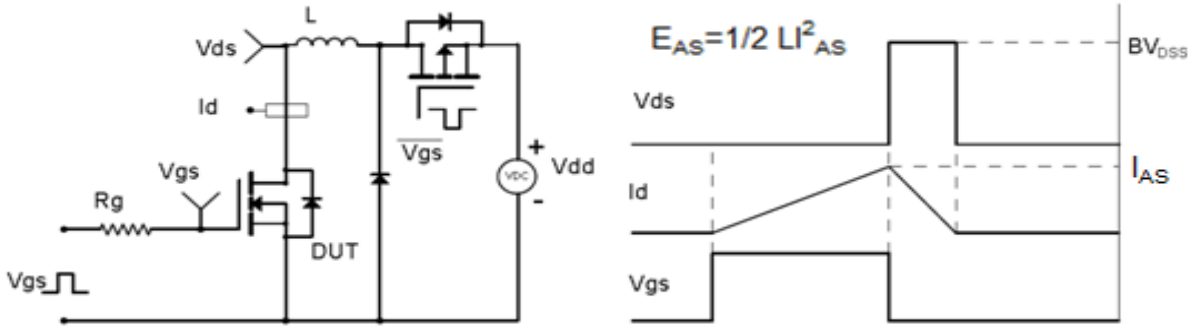
Gate Charge Test Circuit & Waveform



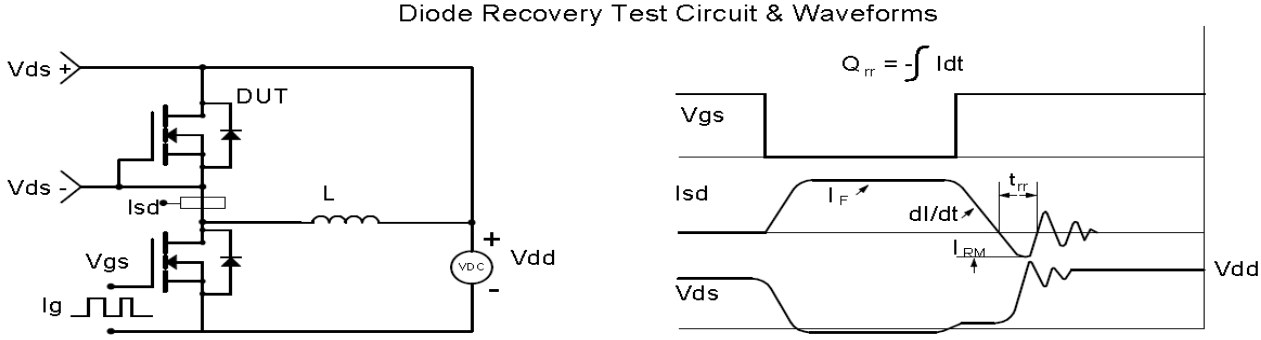
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

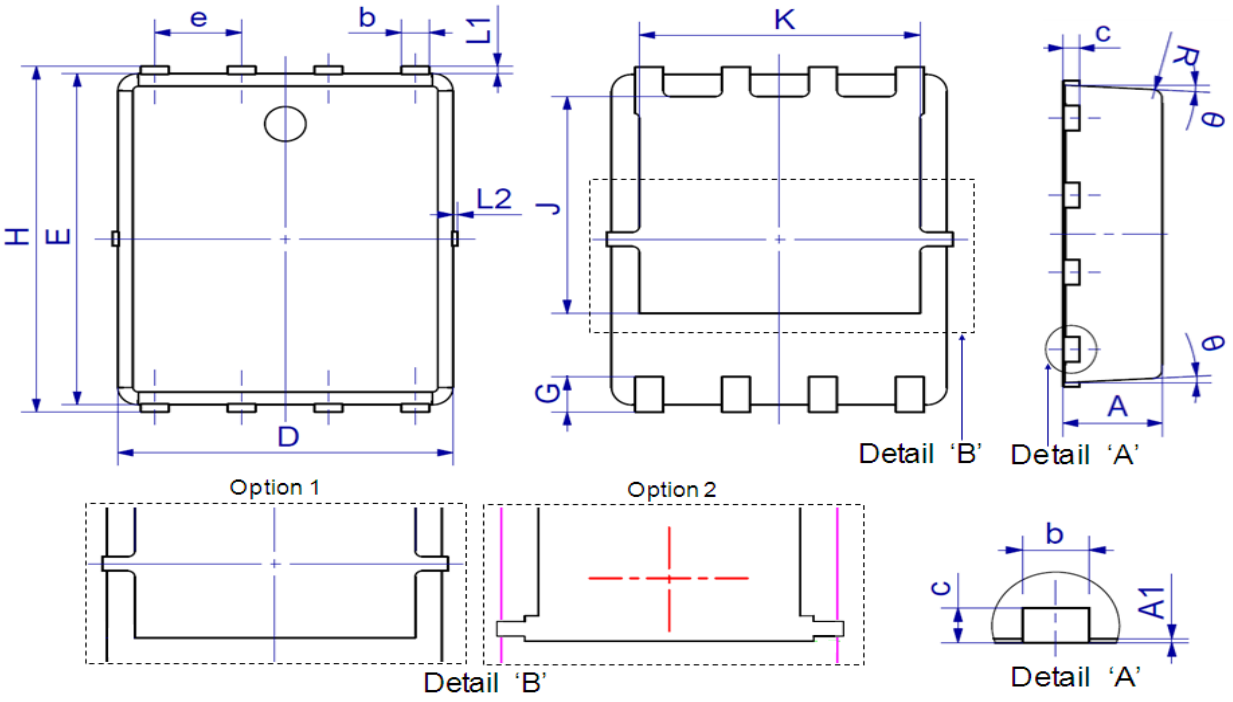


Diode Recovery Test Circuit & Waveforms



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Package Outline: PDFN5X6



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°

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Marking



NOTE:
NXBBAAAAY

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

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Revision History

Revision	Date	Major changes
1.0	2024/8/3	Release of Preliminary version.
2.0	2024/12/13	Update Marking

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.

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

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