CRSM038N10N4

SkyMOS4 N-MOSFET 100V, 3.2mΩ, 100A

Features

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

Applications

- Synchronous Rectification for AC/DC Quick Charger
- UPS (Uninterrupible Power Supplies)

Product Summary

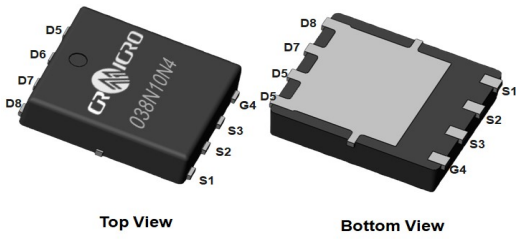
V_{DS}	100V
$R_{DS(on)@10V\ typ}$	3.2mΩ
I_D	100A

100% Avalanche Tested

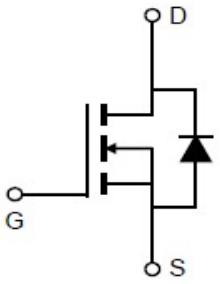
100% DVDS Tested

RoHS HF

DFN5*6 Cu Clip Bond



Top View Bottom View



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM038N10N4	038N10N4	DFN5X6 clip	Tape&Reel	N/A	N/A	4000/5000

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C(Silicon limit) T_C = 25°C(Package limit) T_C = 100°C(Silicon limit))	I_D	 138 100 87	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	400	A
Avalanche energy, single pulse (L=0.3mH, Rg=25Ω)	E_{AS}	189	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	139	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

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	0.5	0.9	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	55	°C/W	-

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}	100	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.2	3	3.8	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=100V,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	$R_{DS(on)}$	-	3.2	3.8	mΩ	VGS=10V,I_D=50A
Transconductance	g_{fs}	-	148.8	-	S	V_{DS}=5V,I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	2000	4211	6317	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	400	848	1272		
Reverse Transfer Capacitance	C_{rss}	10	34	68		
Gate Total Charge	Q_G	20	67	100.5	nC	V_{GS}=10V, V_{DS}=50V, I_D=50A, f=1MHz
Gate-Source charge	Q_{gs}	10	23	35		
Gate-Drain charge	Q_{gd}	6	12	23		
Turn-on delay time	$t_{d(on)}$	10	22	40	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=2.7Ω
Rise time	t_r	40	92	190		
Turn-off delay time	$t_{d(off)}$	20	40	80		
Fall time	t_f	40	82	170		
Gate resistance	R_G	0.5	1.6	3.2	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}	-	0.82	1.4	V	V_{GS}=0V,I_{SD}=50A
Body Diode Continuous Forward Current	Is	-	-	100	A	TC = 25°C
Body Diode Pulsed Current	Is pulse	-	-	400	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	30	65	129	ns	I_F=50A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	60	120	240	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

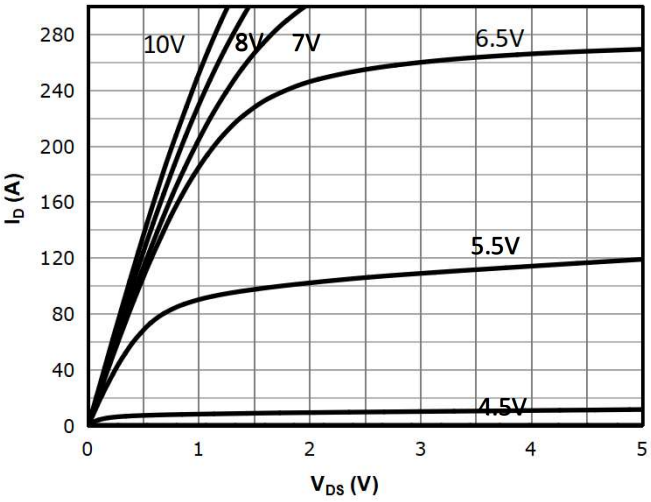
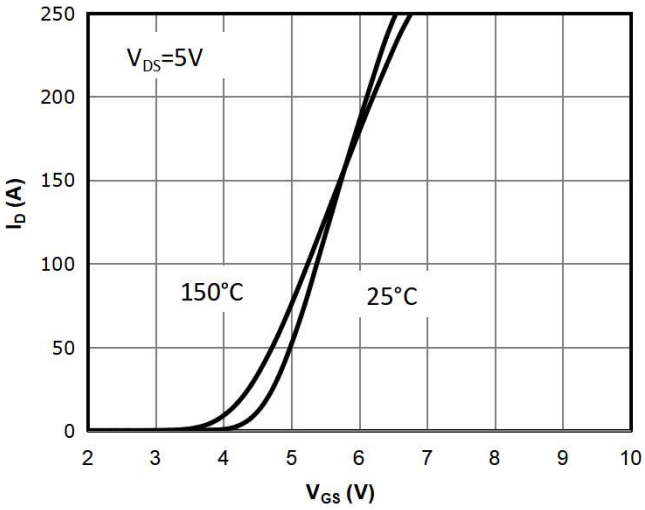


Fig 2: Transfer Characteristics



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

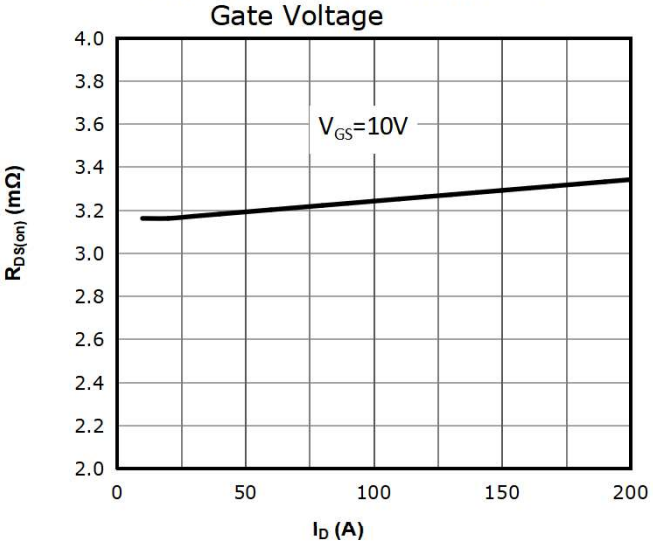


Fig 4: Rds(on) vs. Gate Voltage

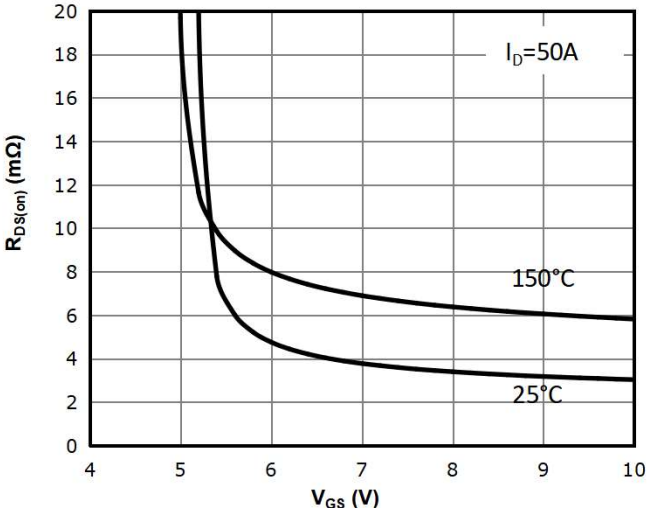


Fig 5: Rds(on) vs. Temperature

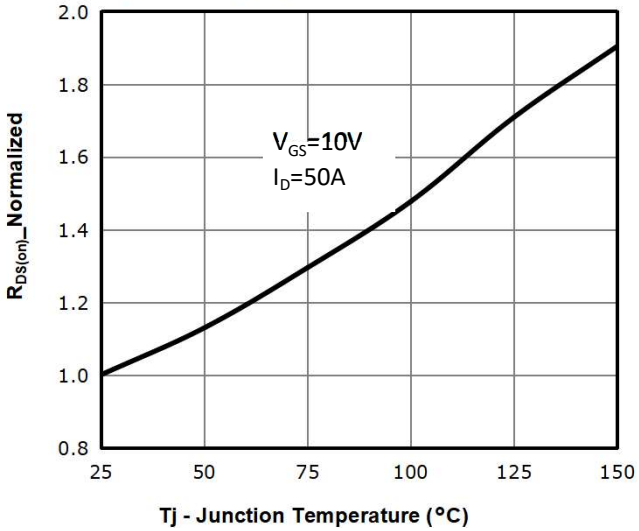
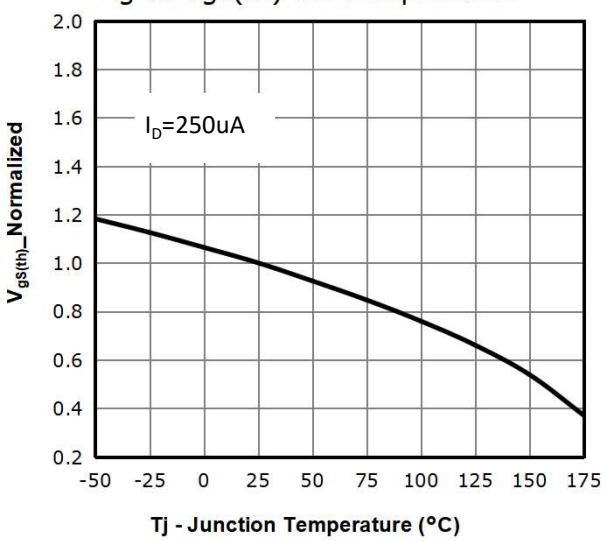


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVds vs. Temperature

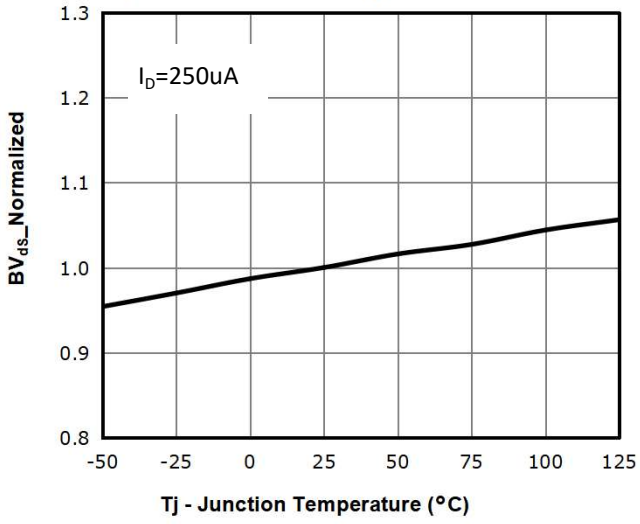


Fig 8: Capacitance Characteristics

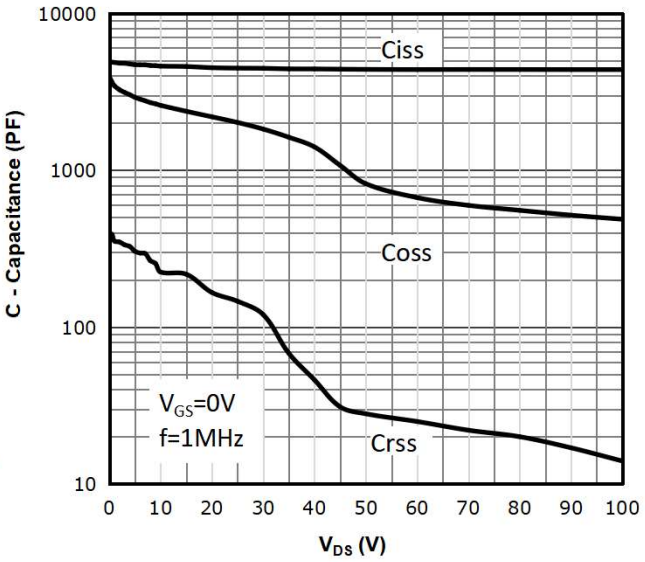


Fig 9: Gate Charge Characteristics

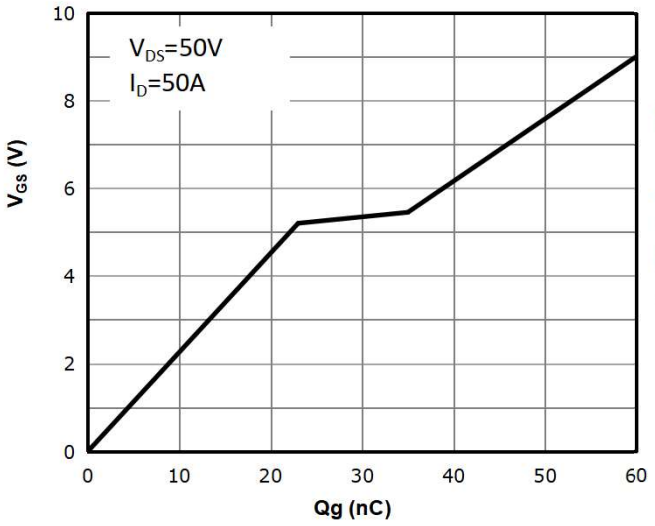


Fig 10: Body-diode Forward Characteristics

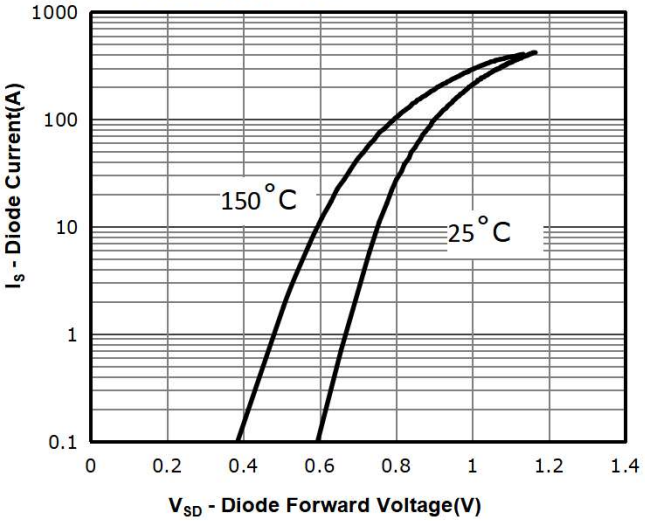


Fig 11: Power Dissipation

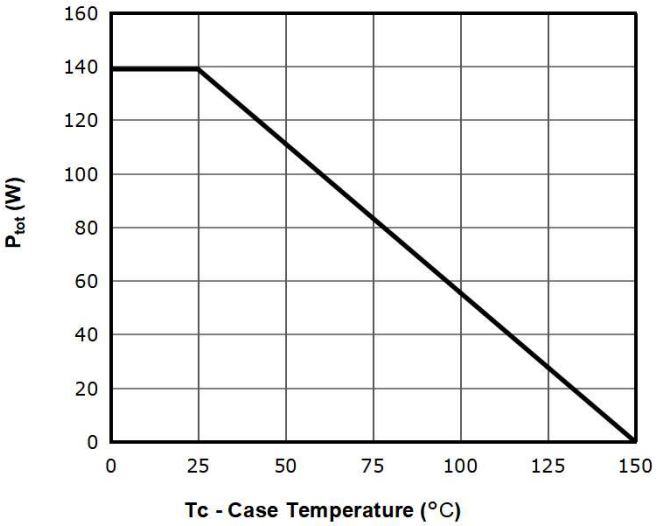
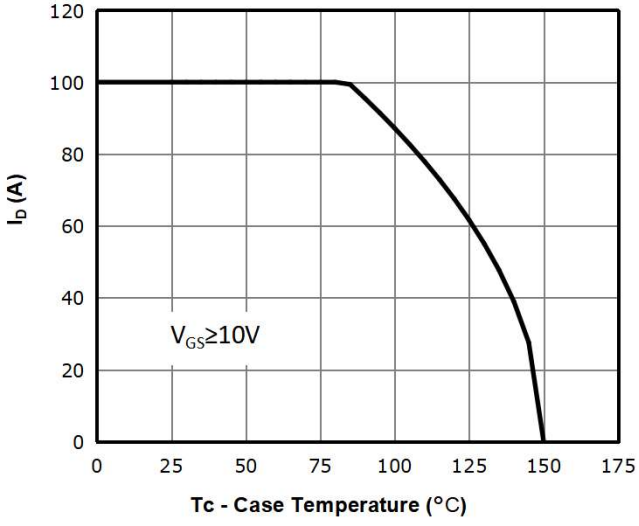


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

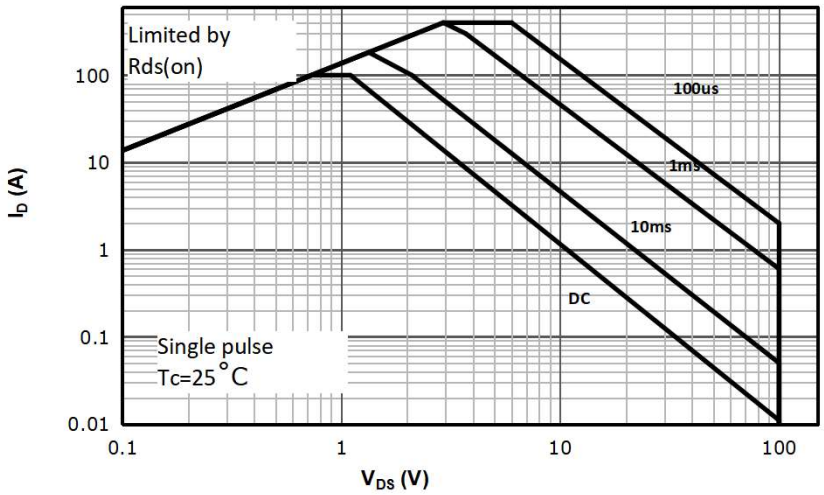
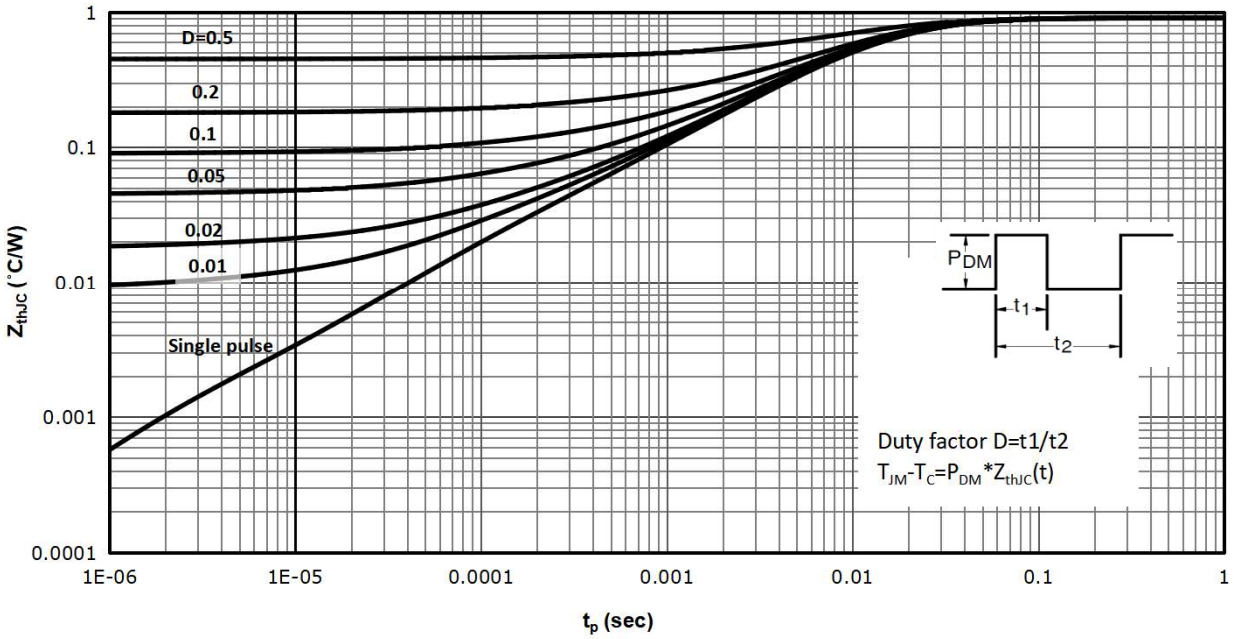


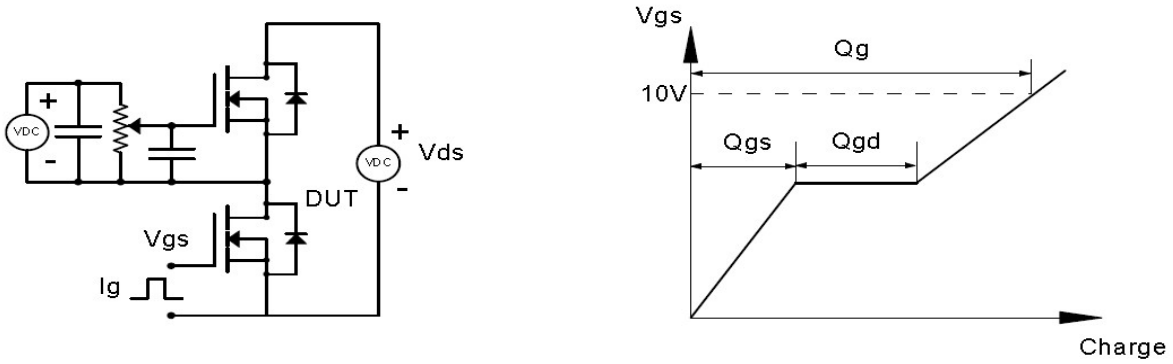
Fig 14: Max. Transient Thermal Impedance



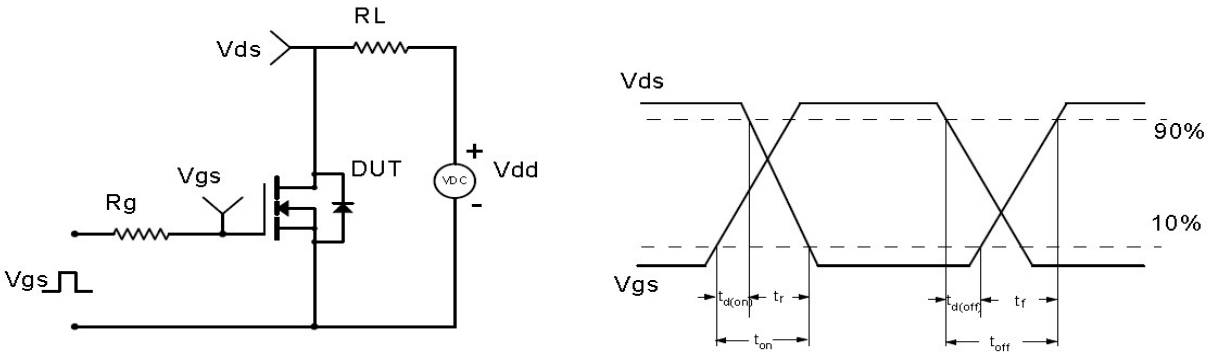
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Test Circuit & Waveform

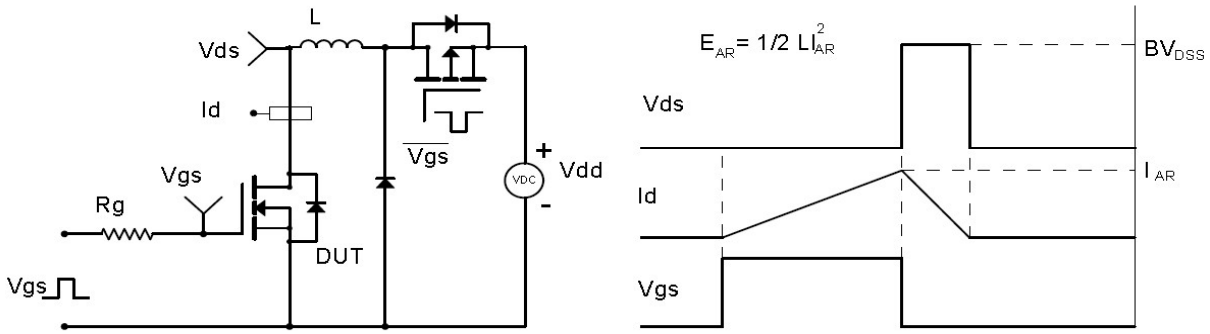
Gate Charge Test Circuit & Waveform



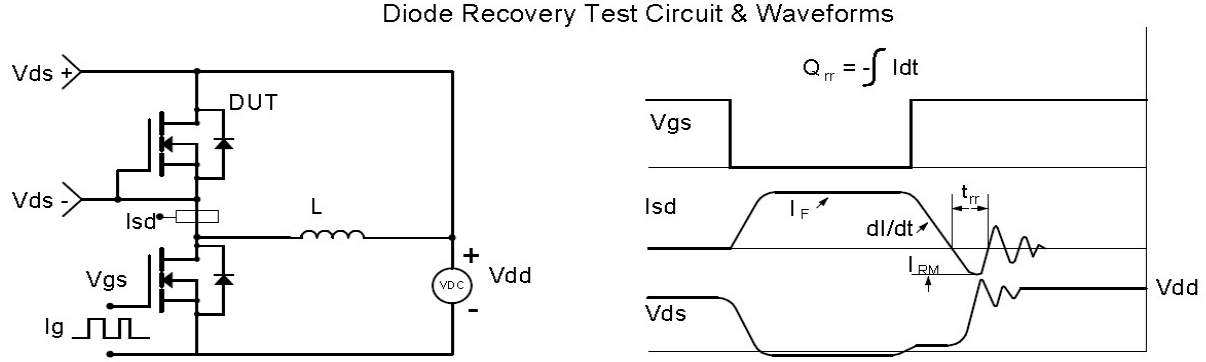
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

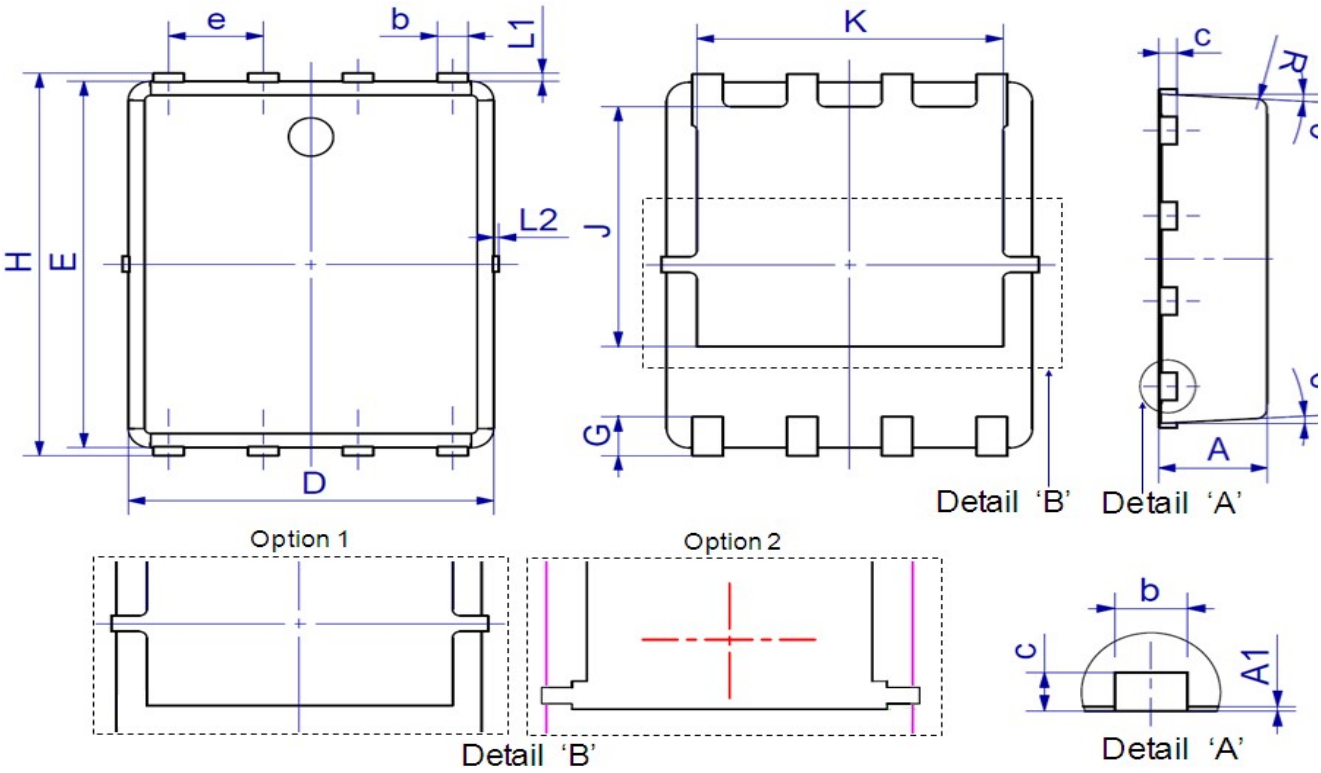


Diode Recovery Test Circuit & Waveforms



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Package Outline: DFN5X6



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

Revison	Date	Major changes
3.2	2022/11/1	Change DC data

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified 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.

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