华润微电子(重庆)有限公司

CRSM024N06L2

SkyMOS2 N-MOSFET 60V, 2.4mΩ, 80A

Features

- Uses CRM(CQ) advanced SkyMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

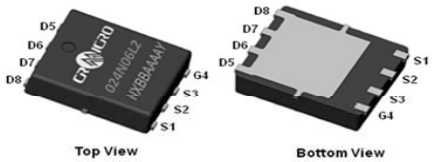
- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterrupible Power Supplies)

Product Summary

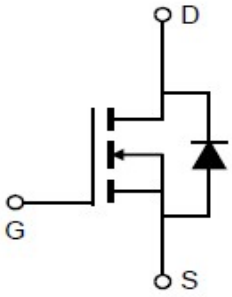
V_{DS}	60V
$R_{DS(on)@10V\ typ}$	2.4mΩ
I_D	80A

100% Avalanche Tested
100% DVDS Tested

RoHS HF



CRSM024N06L2



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM024N06L2	024N06L2	PDFN5x6	Tape&Reel	N/A	N/A	4000pcs

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	 134 80 85	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	536	A
Avalanche energy, single pulse (L=0.5mH, Vds=60V)	E_{AS}	315	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	89	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	-	1.1	1.4	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	39.4	°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}	60	-	-	V	V_{GS}=0V, I_D=250μA
Gate threshold voltage	$V_{GS(th)}$	1.2	-	2.2	V	V_{DS}=V_{GS},I_D=250μA
Zero gate voltage drain current	I_{DSS}	0 0	0.02 -	1 100	μA	V_{DS}=60V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	0	±10	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	1	2.4	2.9	mΩ	Vgs=10V,Id=40A
		1	3.0	3.6		Vgs=4.5V,Id=32A
Transconductance	g_{fs}	50	176	300	S	V_{DS}=5V,I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	2305	4610	6915	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Output Capacitance	C_{oss}	1094	2188	3282		
Reverse Transfer Capacitance	C_{rss}	33	66	132		
Gate Total Charge	Q_G	37	74	112	nC	Vds=30V,Id=40A ,Vgs=10V
Gate-Source charge	Q_{gs}	9	17	34		
Gate-Drain charge	Q_{gd}	5	9	19		
Turn-on delay time	$t_{d(on)}$	7	14	28	ns	V_{GS}=10V, V_{DD}=30V, R_{G_ext}=2.7Ω,ID=40A
Rise time	t_r	32	64	128		
Turn-off delay time	$t_{d(off)}$	23	47	94		
Fall time	t_f	53	105	210		
Gate resistance	R_G	0	2	4	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}	-	0.8	1.4	V	V_{GS}=0V,I_{SD}=40A
Body Diode Continuous Forward Current	Is	-	-	80	A	TC = 25°C
Body Diode Pulsed Current	Is pulse	-	-	320	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	26	53	106	ns	I_F=40A, dI/dt=300A/μs,Vds=60V
Body Diode Reverse Recovery Charge	Q_{rr}	28	56	113	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

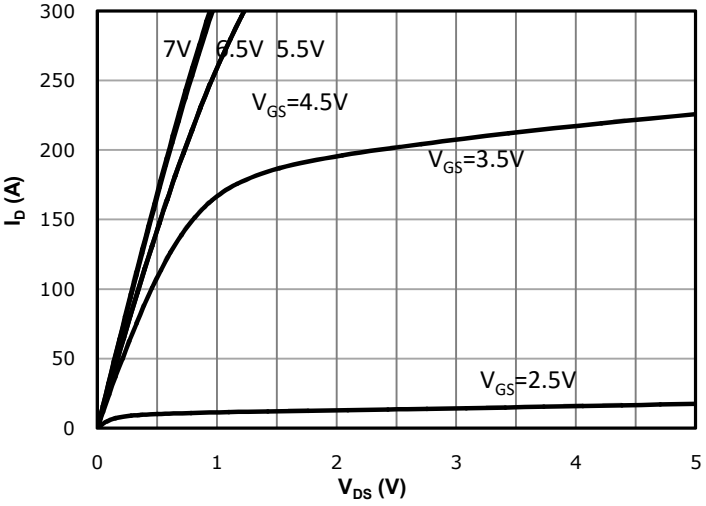


Fig 2: Transfer Characteristics

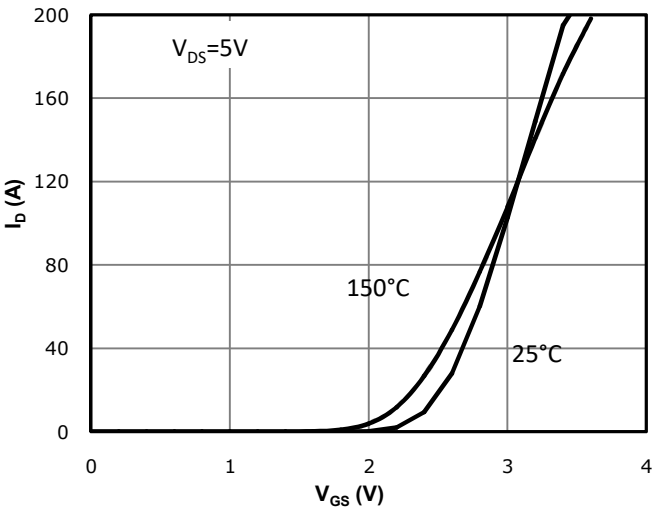


Fig 3: Rds(on) vs Drain Current and Gate Voltage

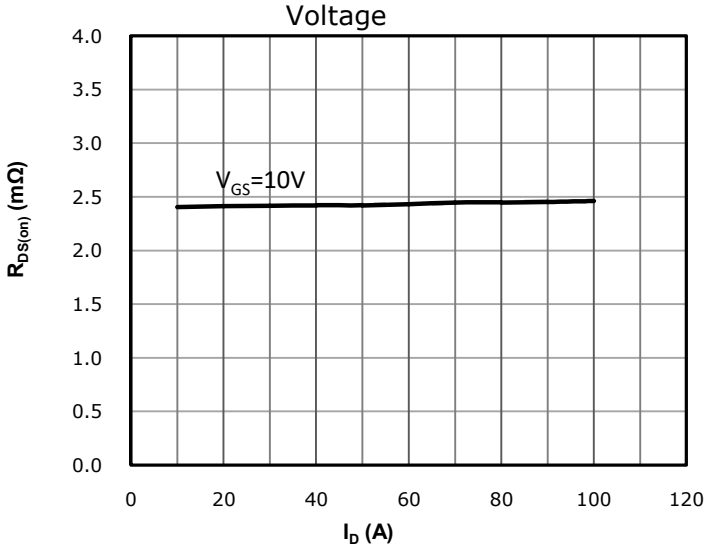


Fig 4: Rds(on) vs Gate Voltage

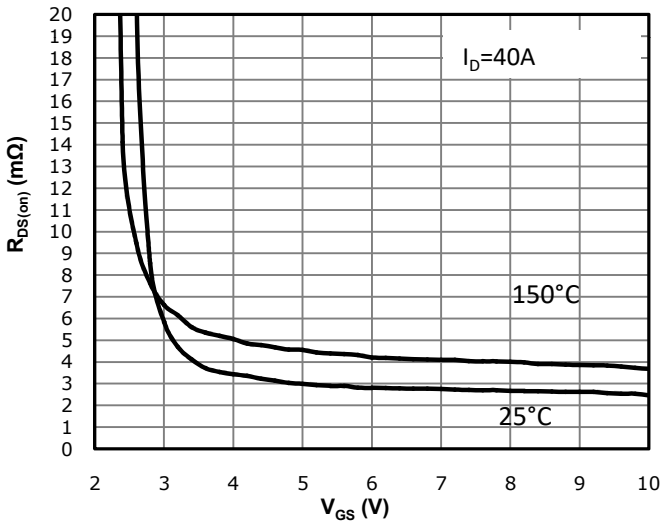


Fig 5: Rds(on) vs. Temperature

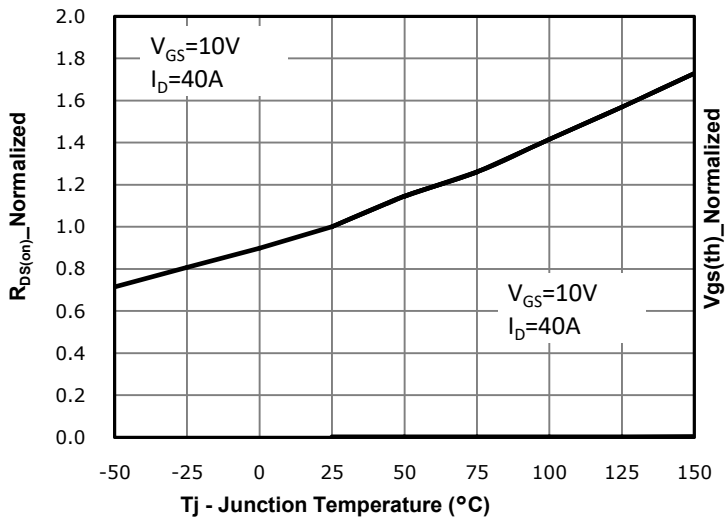
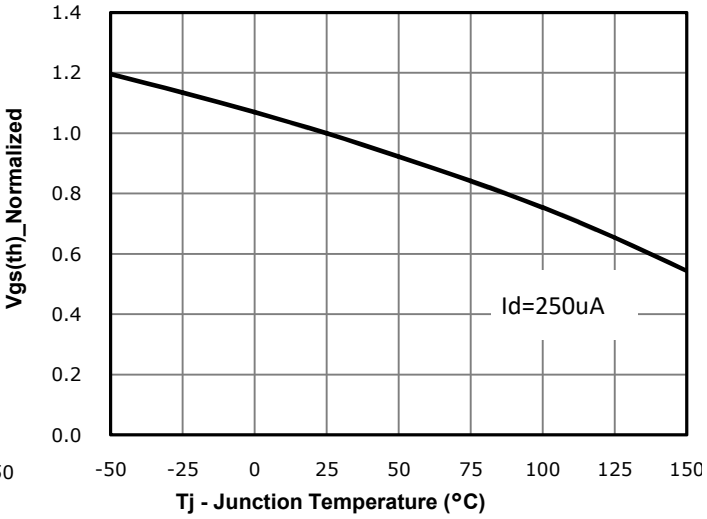


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

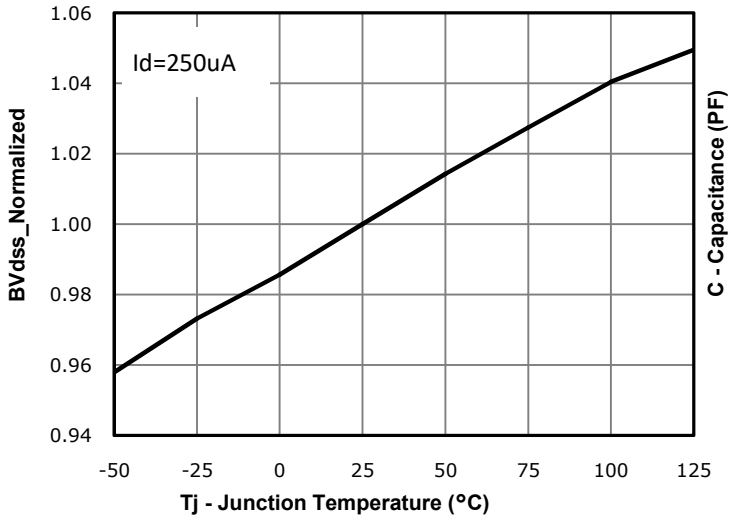


Fig 8: Capacitance Characteristics

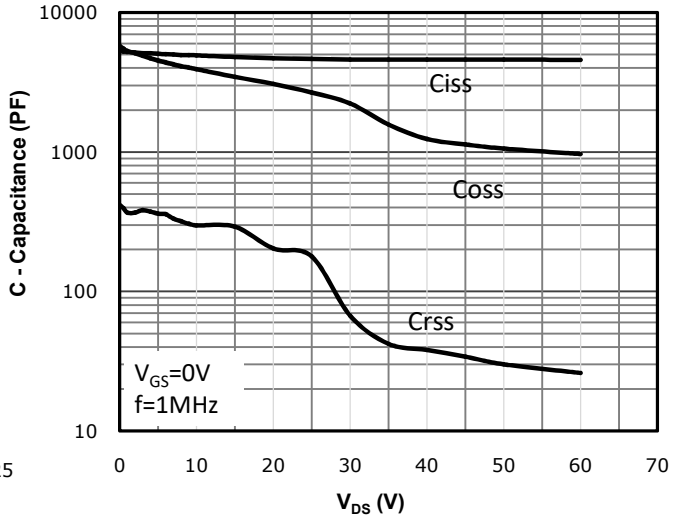


Fig 9: Gate ChargeCharacteristics

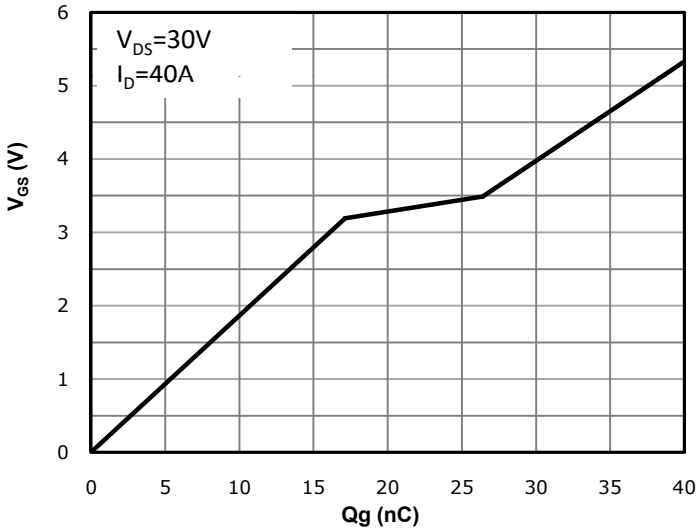


Fig 10: Body-diode Forward Characteristics

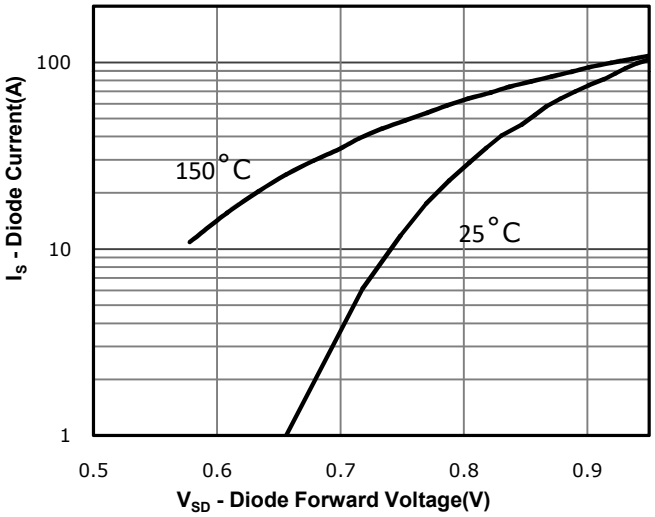


Fig 11: Power Dissipation

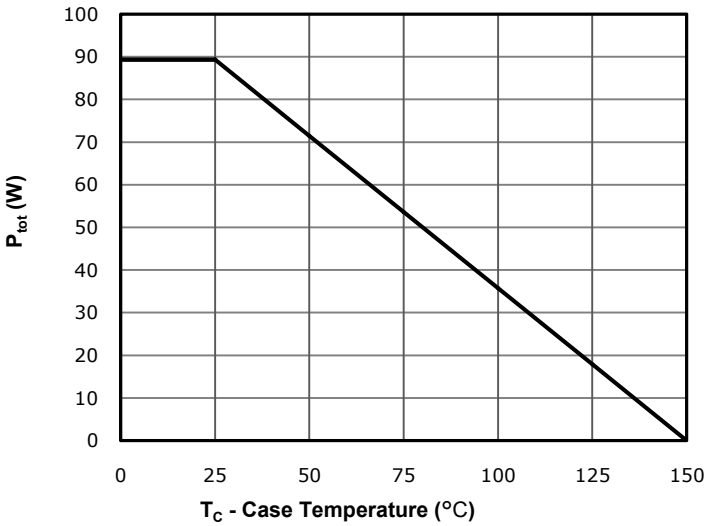
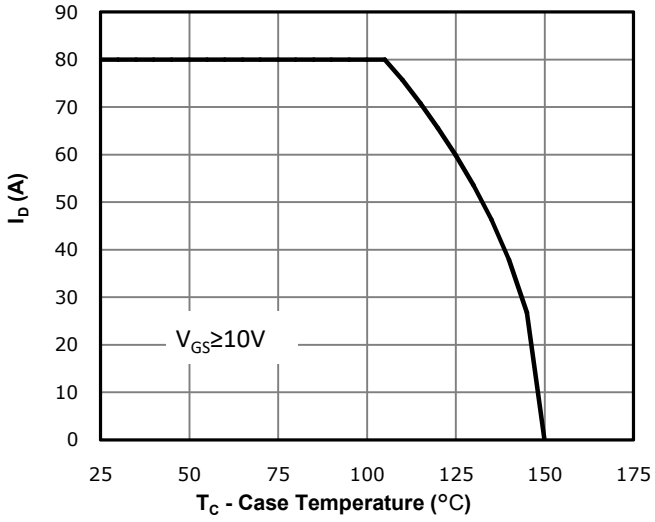


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

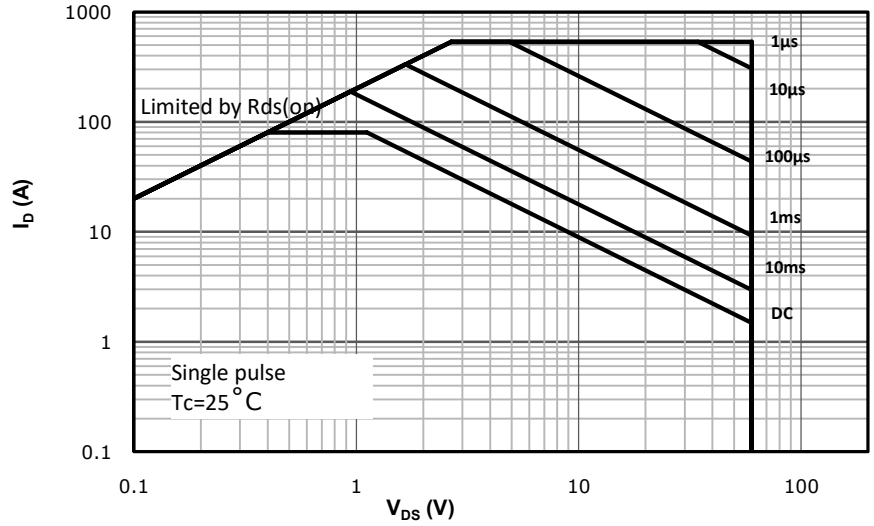
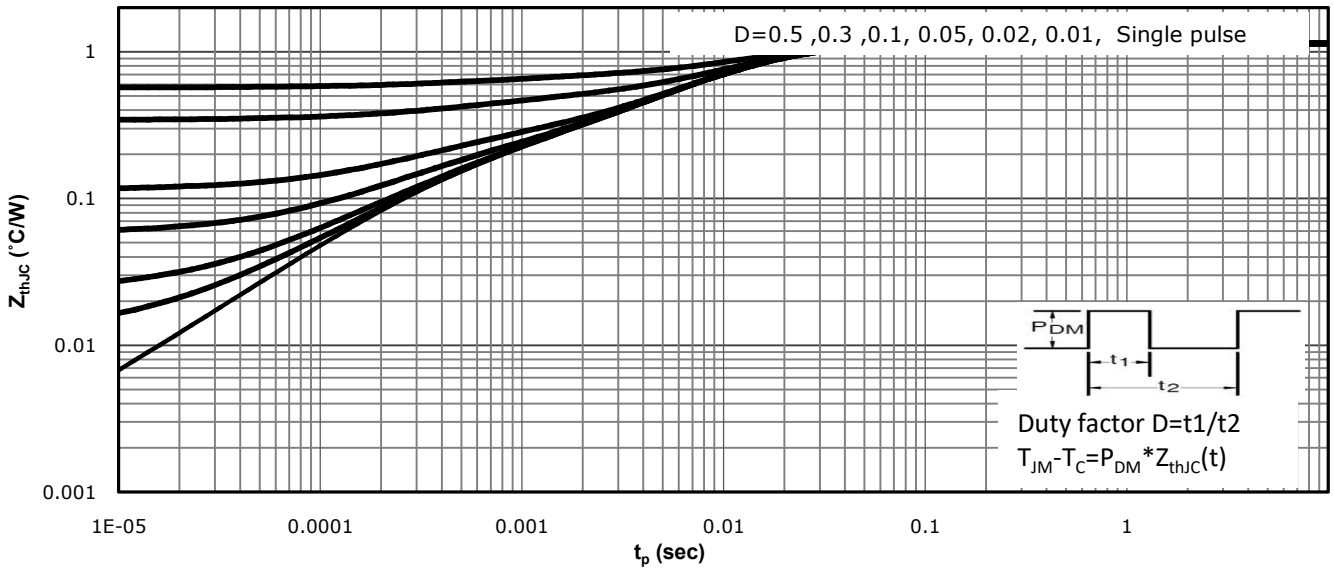


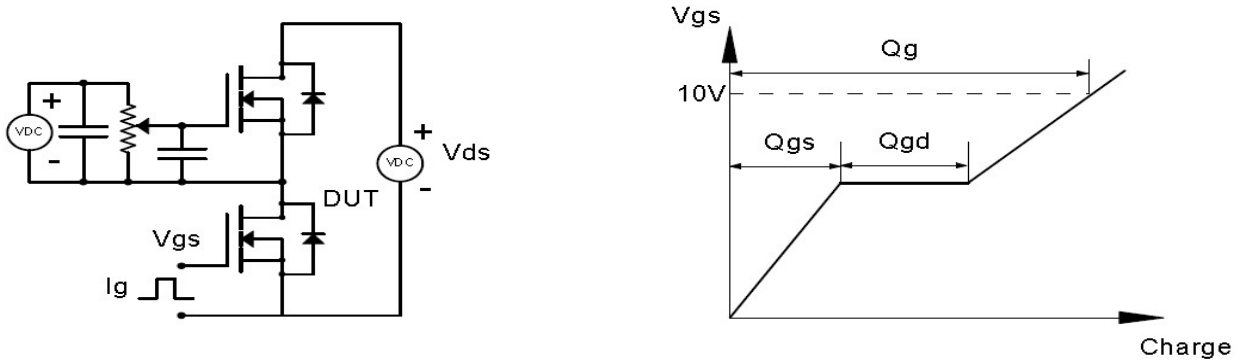
Fig 14: Max. Transient Thermal Impedance



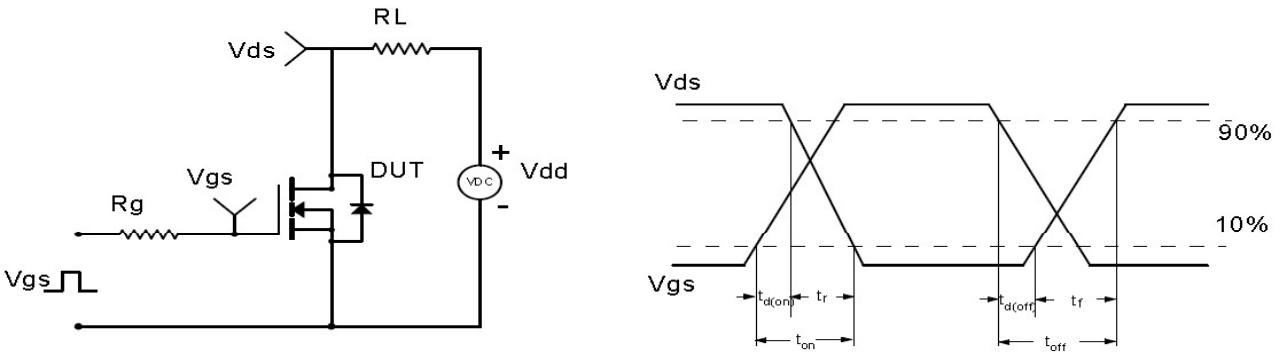
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Test Circuit & Waveform

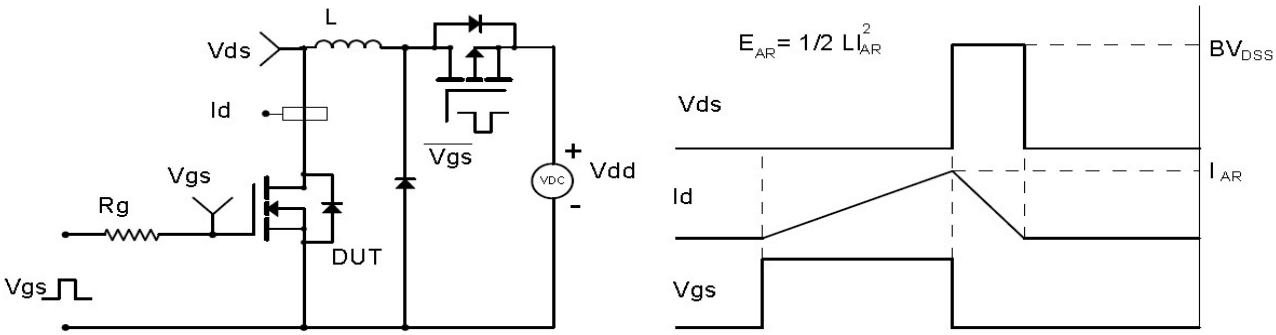
Gate Charge Test Circuit & Waveform



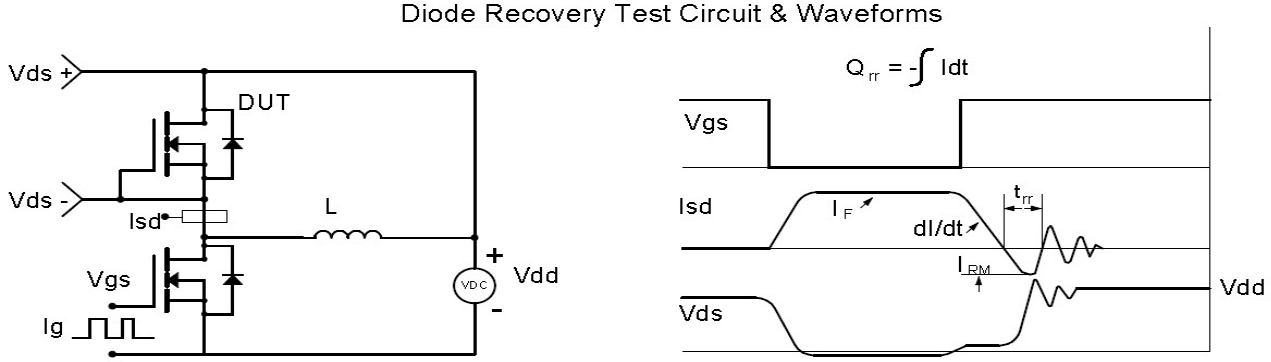
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

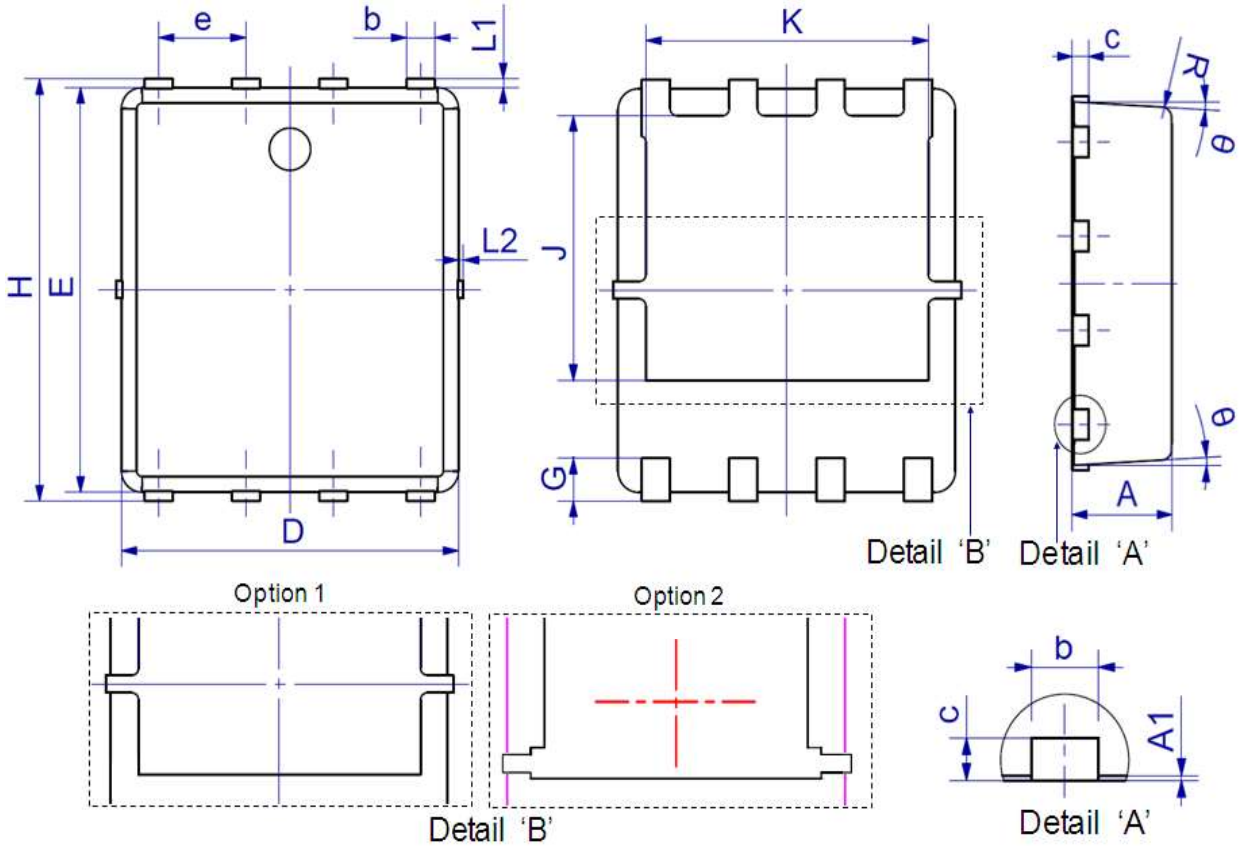


Diode Recovery Test Circuit & Waveforms



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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

Revision	Date	Major changes
1.0	2020/9/27	Release of Formal Version.
2.0	2021/7/14	Add BV/Vth vs Temperature
3.0	2023/11/16	Add Dynamic Characteristic Spec&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.

Any and all semiconductor 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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