华润微电子(重庆)有限公司

CRSK024N04L2

SkyMOS2 N-MOSFET 40V, 2.4mΩ, 118A

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

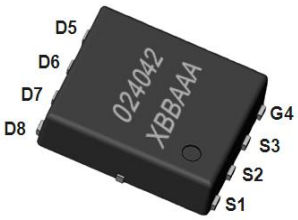
- Motor control and drive
- UPS (Uninterrupible Power Supplies)

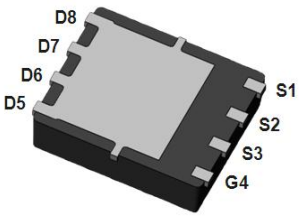
Product Summary

V_{DS}	40V
$R_{DS(on)}$	2.4mΩ
I_D	118A

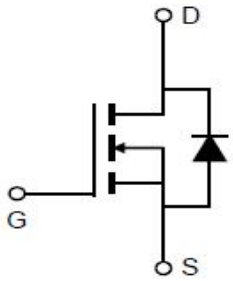
100% DVDS Tested

100% Avalanche Tested





CRSK024N04L2



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSK024N04L2	024042	PDFN3.3X3.3	Tape	N/A	N/A	5000pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	40	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 100°C (Silicon limit)	I_D	 119 75	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	472	A
Avalanche energy, single pulse (ID = 35A, Rg=25Ω)	E_{AS}	78	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	69	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.	R_{thJC}	-	1.10	1.81	°C/W	
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	-	68.30	95.62	°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}	40	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	1.2	1.7	2.2	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	0 0	0.05 -	1 100	μA	V_{DS}=40V, 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	$R_{DS(on)}$	2.0 3.0	2.4 3.5	3.0 4.6	mΩ	V_{GS}=10V, I_D=40A V_{GS}=4.5V, I_D=40A
Transconductance	g_{fs}	50	133	300	S	V_{DS}=5V, I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	1433	2150	3225	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	529	794	1191		
Reverse Transfer Capacitance	C_{rss}	32	48	72		
Gate Total Charge	Q_G	24	36	54	nC	V_{GS}=10V, V_{DS}=20V, I_D=40A, f=1MHz
Gate-Source charge	Q_{gs}	6	9	14		
Gate-Drain charge	Q_{gd}	4	5	11		
Turn-on delay time	$t_{d(on)}$	7	11	16	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=3.0Ω
Rise time	t_r	56	84	168		
Turn-off delay time	$t_{d(off)}$	16	24	36		
Fall time	t_f	3	4	8		
Gate resistance	R_G	0.2	0.35	0.5	Ω	V_{GS}=15mV, 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}	0.5	0.84	1.4	V	V_{GS}=0V, I_{SD}=40A
Body Diode Continuous Forward Current	I_S	-	-	118	A	T_C = 25°C
Body Diode Pulsed Current	$I_{S\ pulse}$	-	-	472	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	17	33	66	ns	I_F=40A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	13	26	52	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

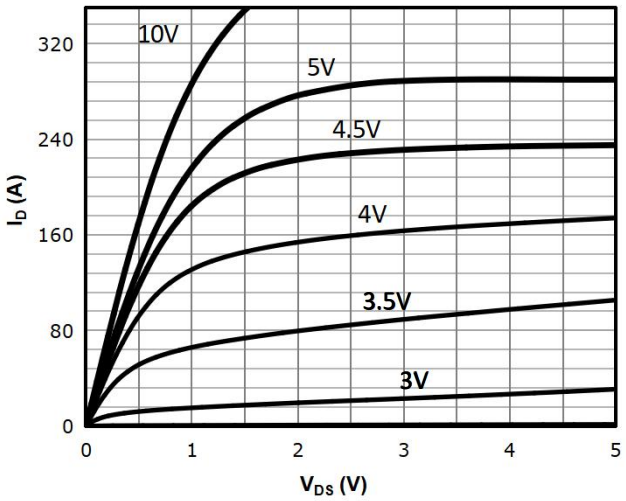
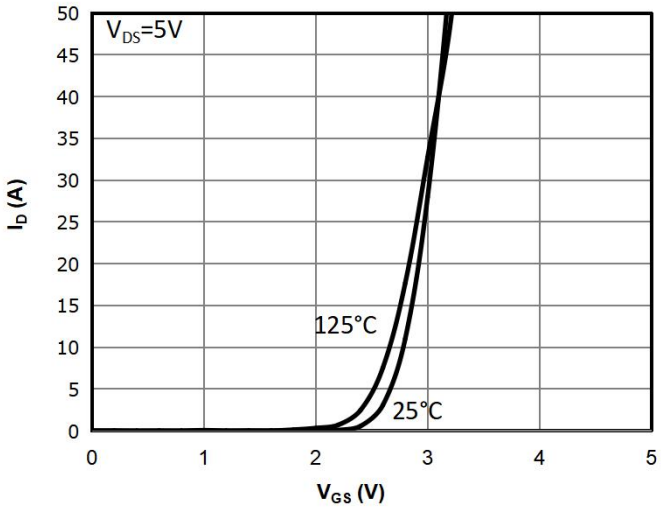


Fig 2: Transfer Characteristics



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

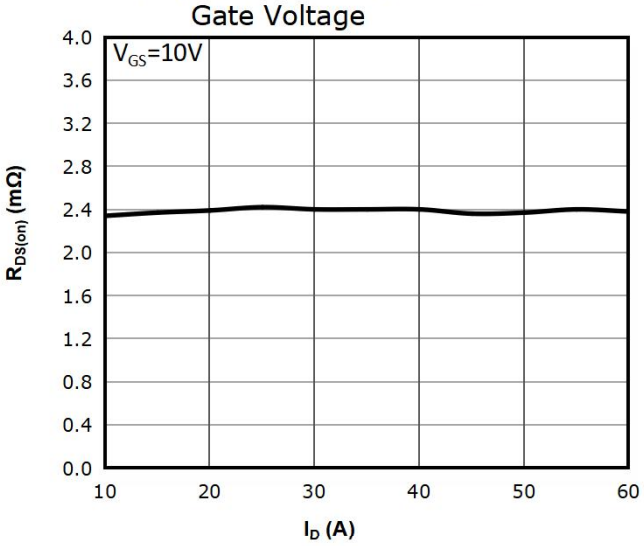


Fig 4: Rds(on) vs Gate Voltage

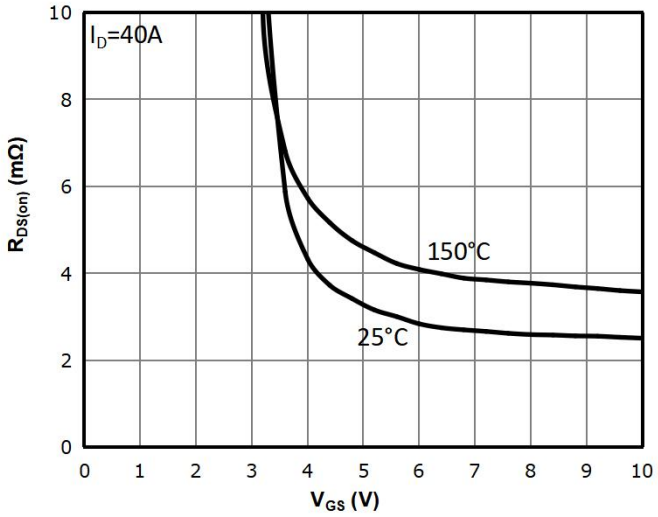


Fig 5: Rds(on) vs. Temperature

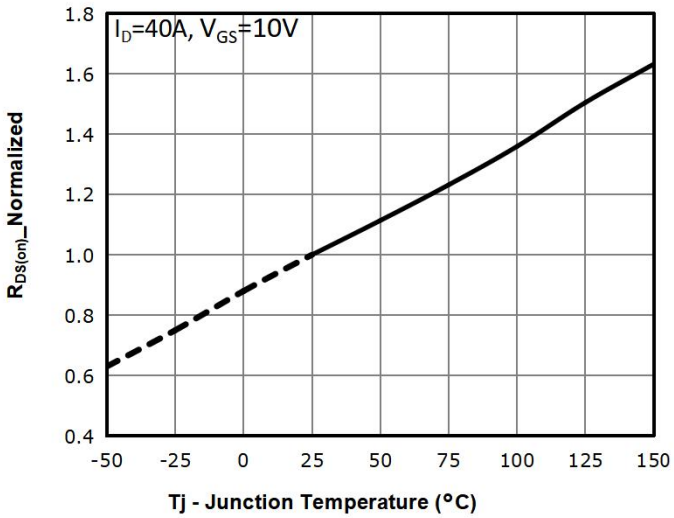
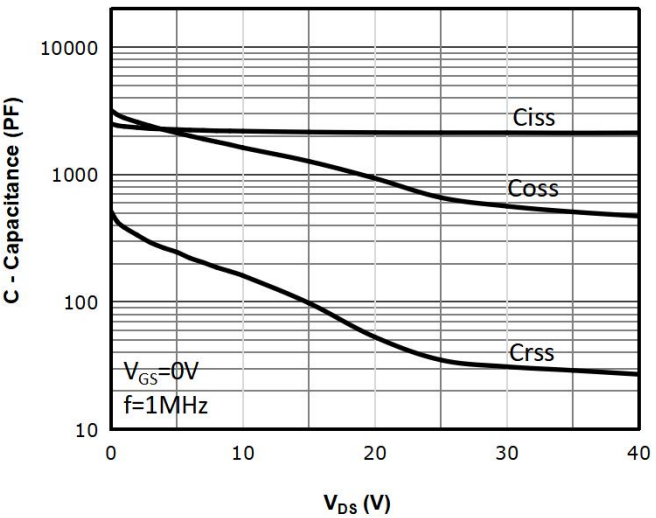


Fig 6: Capacitance Characteristics



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Fig 7: Vgs(th) vs. Temperature

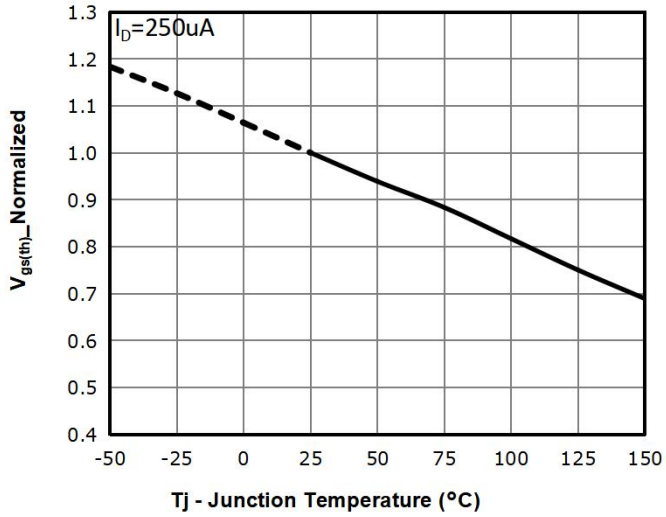


Fig 8: BVdss vs. Temperature

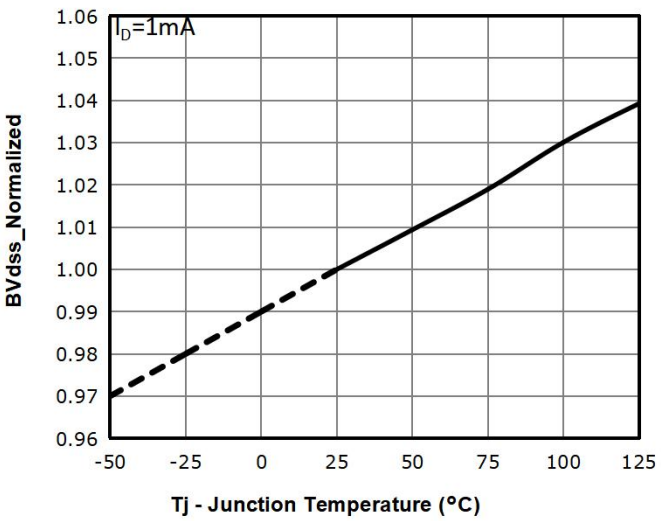


Fig 9: Gate Charge Characteristics

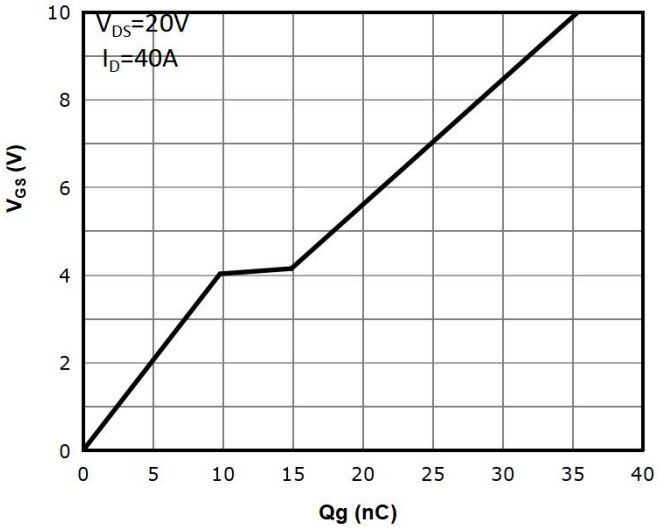


Fig 10: Body-diode Forward Characteristics

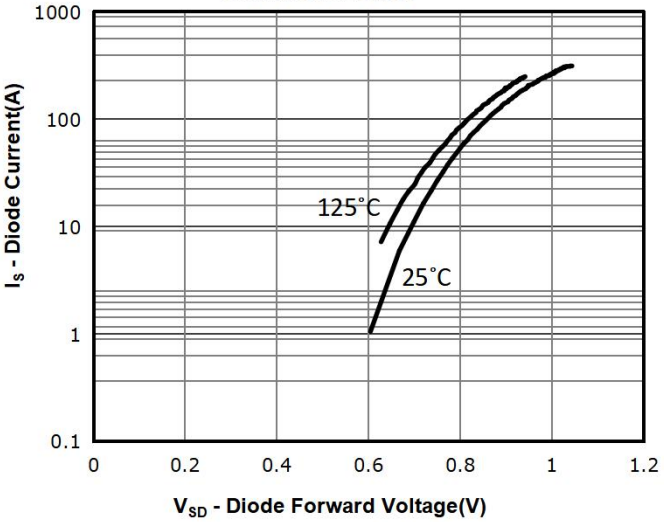


Fig 11: Power Dissipation

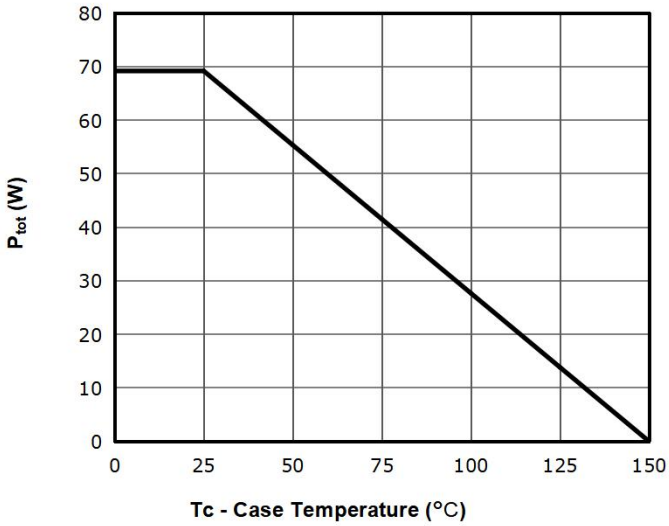
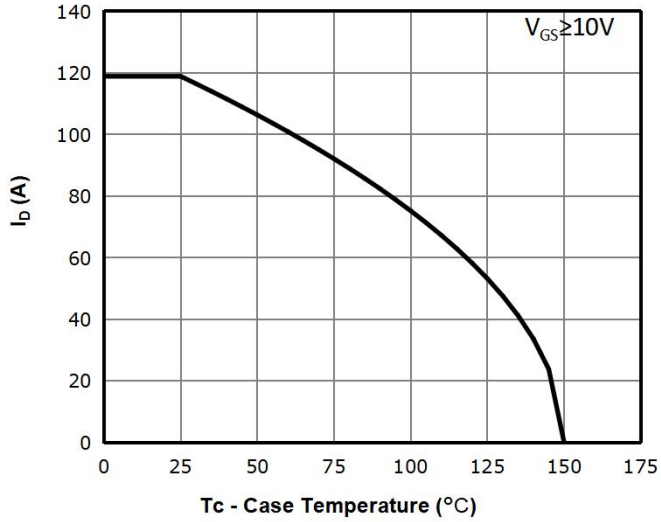


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

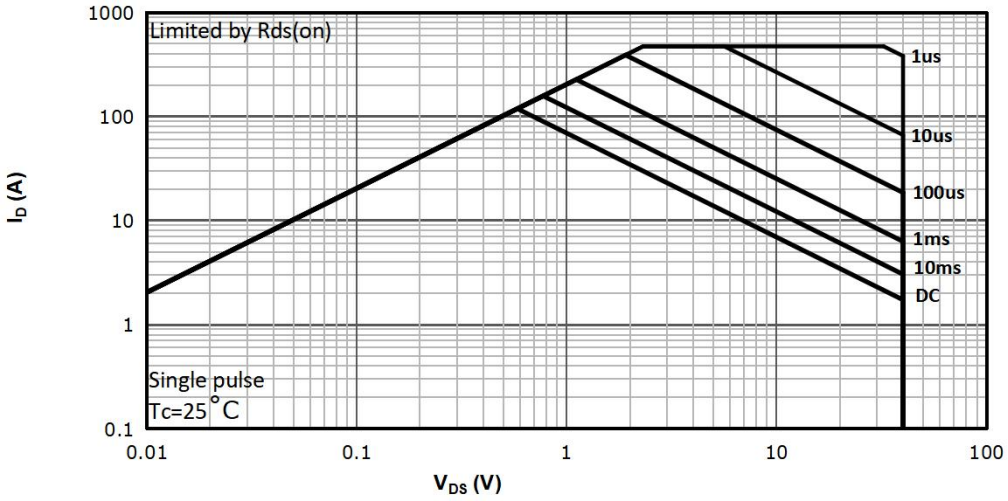
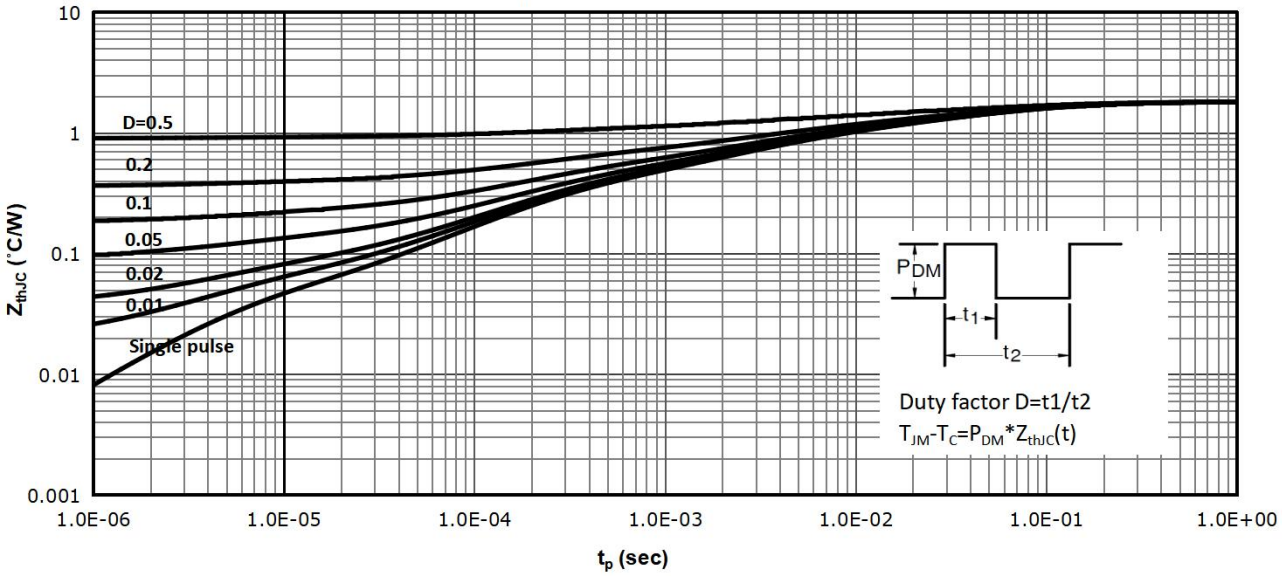


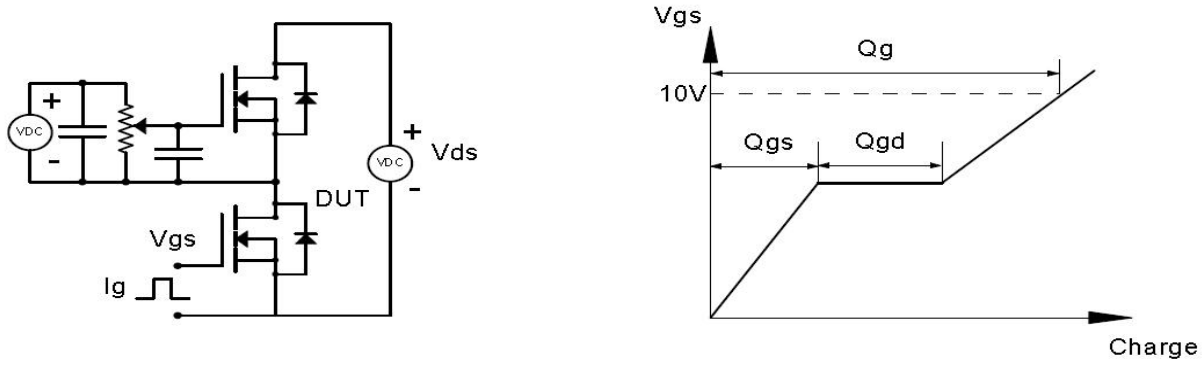
Fig 12: Max. Transient Thermal Impedance



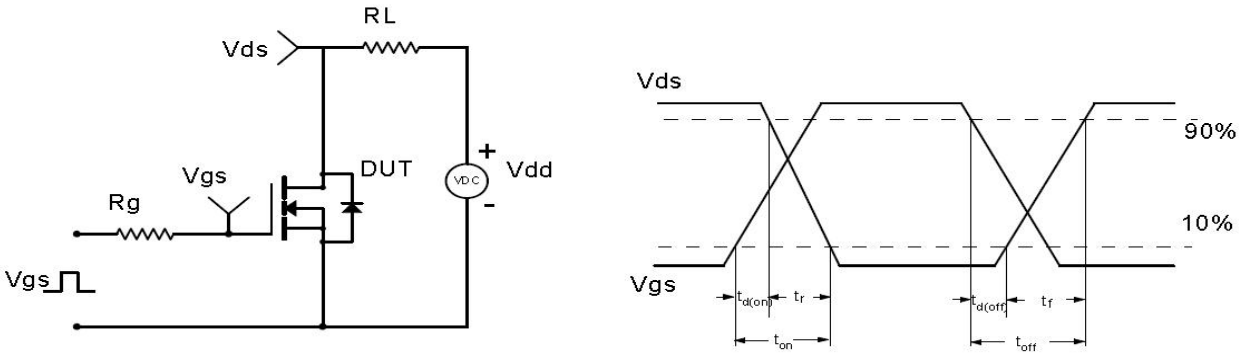
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Test Circuit & Waveform

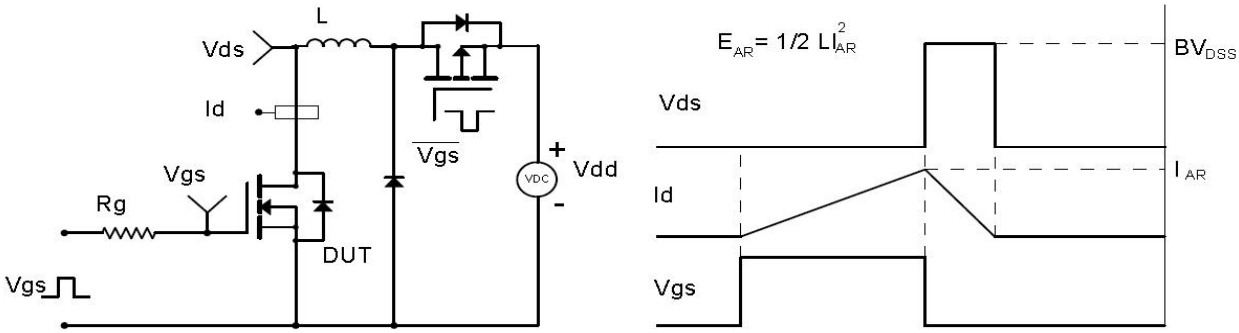
Gate Charge Test Circuit & Waveform



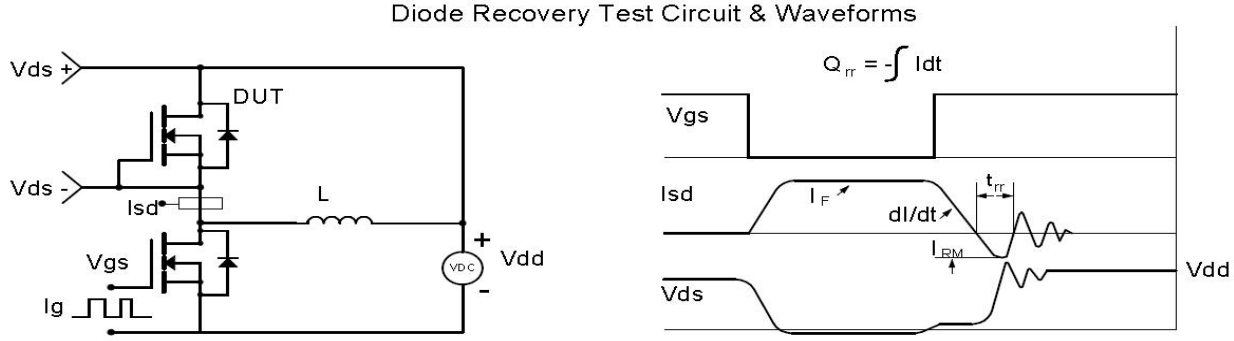
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

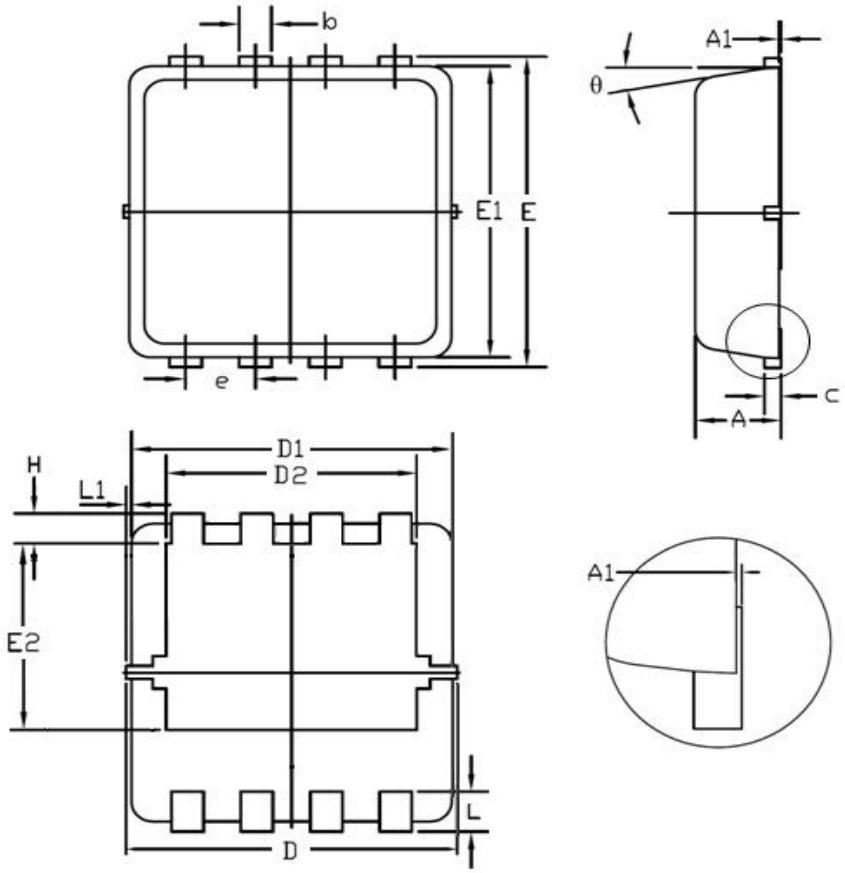


Diode Recovery Test Circuit & Waveforms



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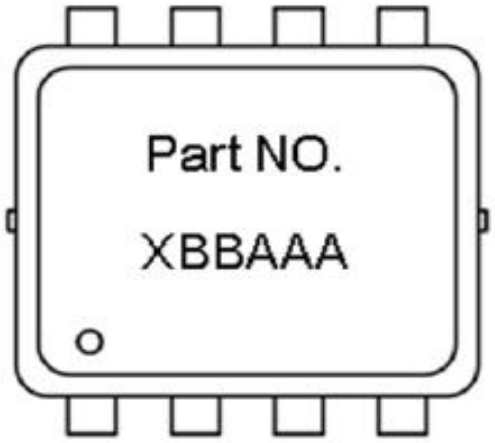
Package Outline: PDFN3.3*3.3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.70	0.90	0.028	0.035
A1	0.00	0.05	0.000	0.002
b	0.20	0.43	0.008	0.017
c	0.10	0.25	0.004	0.010
D	3.00	3.45	0.118	0.136
D1	2.90	3.30	0.114	0.130
D2	1.98	2.65	0.078	0.104
E	3.10	3.45	0.122	0.136
E1	2.80	3.20	0.110	0.126
E2	1.32	1.98	0.052	0.078
e	0.65 BSC		0.026 BSC	
H	0.28	0.65	0.011	0.026
L	0.30	0.65	0.012	0.026
L1	0.13		0.005	
θ	0°	14°	0°	14°

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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
0.1	2021/12/3	Release of Preliminary version.
0.2	2022/6/27	Update SOA
0.3	2022/7/22	Update Marking
0.4	2022/10/12	Update RDS(on)

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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