华润微电子(重庆)有限公司

CRTK055N03L

Trench N-MOSFET 30V, 4.2mΩ, 64A

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
- Battery management
- UPS (Uninterrupible Power Supplies)

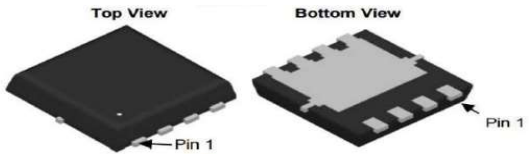
Product Summary

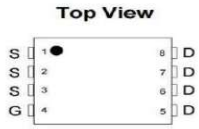
V_{DS}	30V
$R_{DS(on)@10V\ typ}$	4.2mΩ
I_D	64A

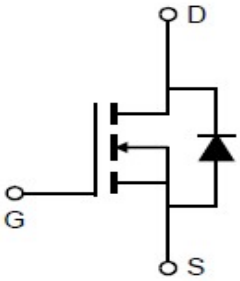
100% Avalanche Tested
100% DVDS Tested

RoHS HF

DFN3.3*3.3







Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTK055N03L	05503	DFN3.3*3.3	Reel	N/A	N/A	5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	30	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 64 67 41	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	256	A
Avalanche energy, single pulse (I_D=0.3mH, Rg=25Ω)	E_{AS}	55	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	37	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	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	3.4	°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}	30	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	0.8	1.2	1.8	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 50	μA	V_{DS}=30V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}		-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- - 	4.2 6.8 	5.5 8.8 	mΩ	V_{GS}=10V, I_D=25A, T_j=25°C T_j=150°C
Transconductance	g_{fs}	-	94	-	S	V_{DS}=5V,I_D=25A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2273	-	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Output Capacitance	C_{oss}	-	306	-		
Reverse Transfer Capacitance	C_{rss}	-	211	-		
Gate Total Charge	Q_G	-	25	-	nC	V_{GS}=4.5V, V_{DS}=25V, I_D=14A, f=1MHz
Gate-Source charge	Q_{gs}	-	6	-		
Gate-Drain charge	Q_{gd}	-	10	-		
Turn-on delay time	$t_{d(on)}$	-	10	-	ns	V_{DS}=15V, V_{GS}=10V I_D=14A, R_{G_ext}=25Ω
Rise time	t_r	-	58	-		
Turn-off delay time	$t_{d(off)}$	-	201	-		
Fall time	t_f	-	123	-		
Gate resistance	R_G	-	1.6	-	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}	-	0.84	1.3	V	V_{GS}=0V,I_{SD}=25A
Body Diode Continuous Forward Current	Is	-	-	64	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	13	-	ns	I_F=25A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	3	-	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

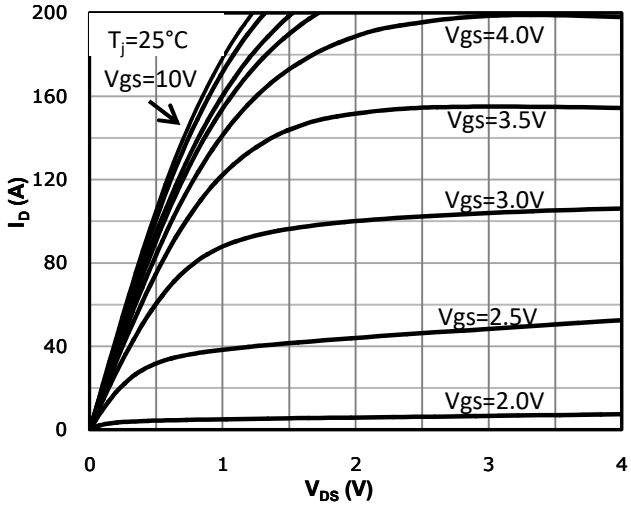
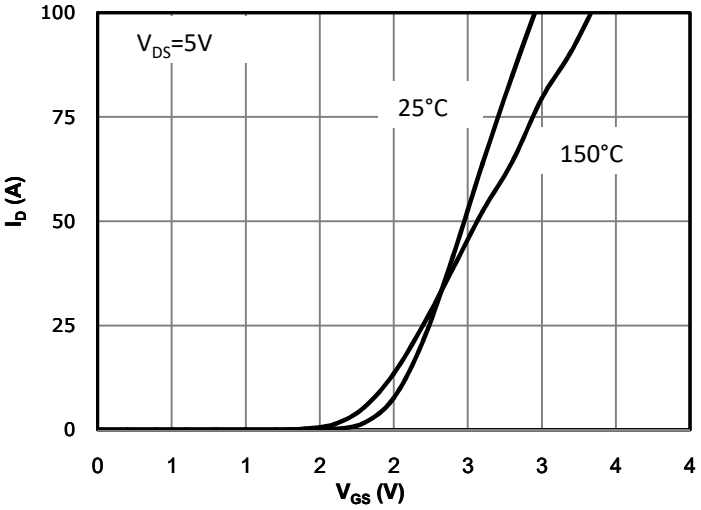


Fig 2: Transfer Characteristics



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

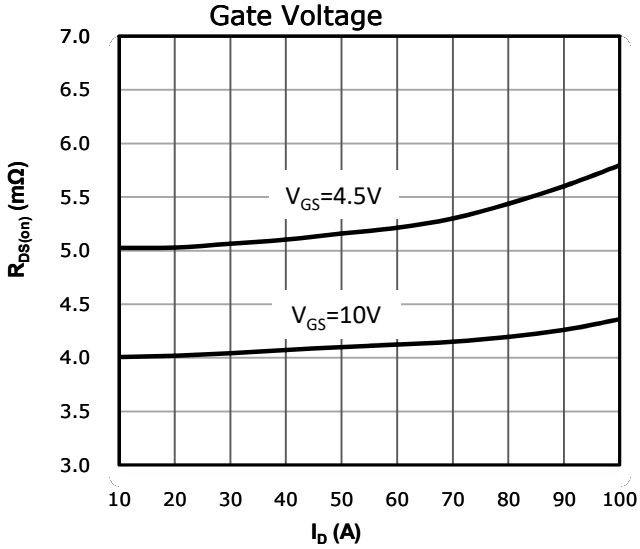


Fig 4: Rds(on) vs Gate Voltage

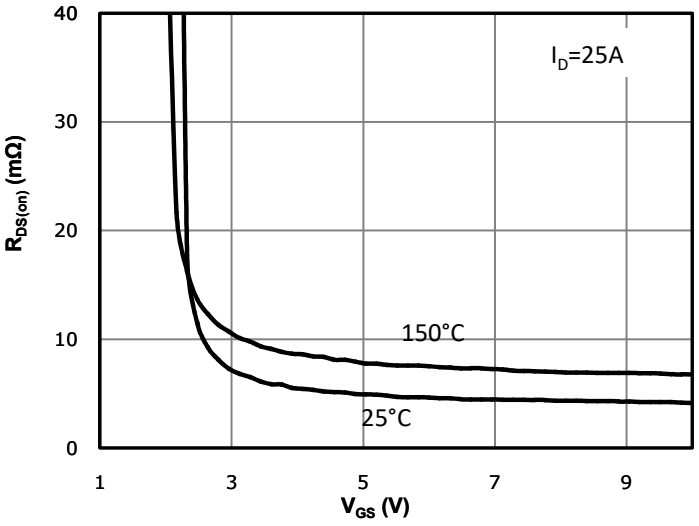


Fig 5: Rds(on) vs. Temperature

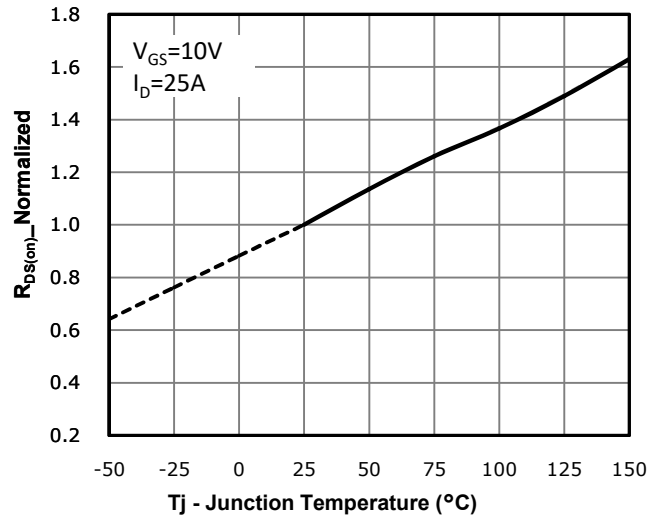
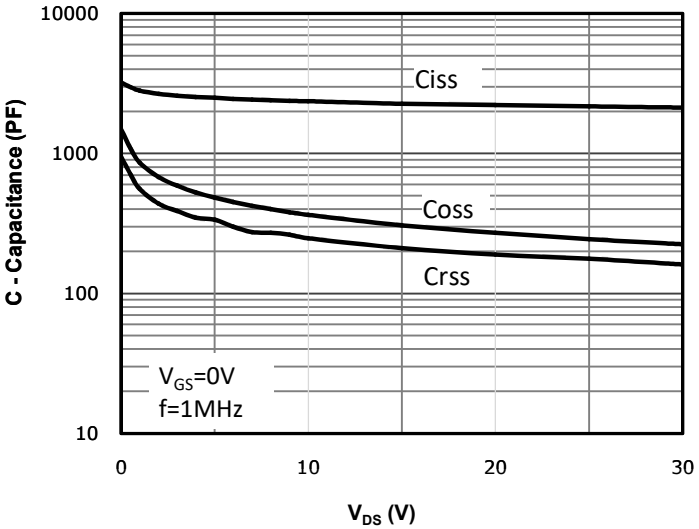


Fig 6: Capacitance Characteristics



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Fig 7: BVDS vs. Temperature

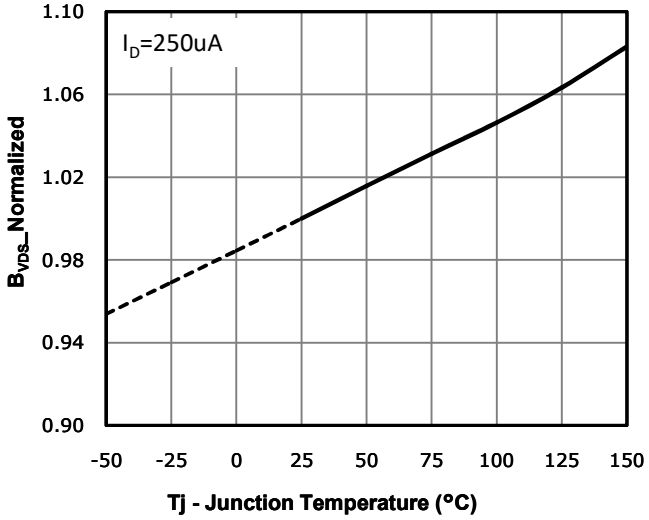


Fig 8: VTH vs. Temperature

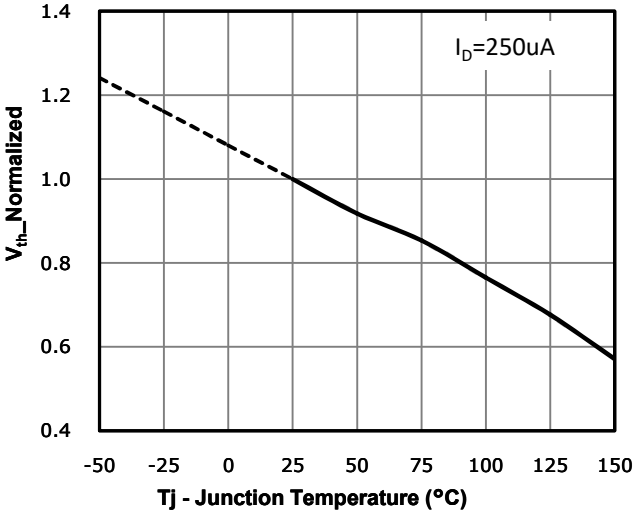


Fig 9: Gate Charge Characteristics

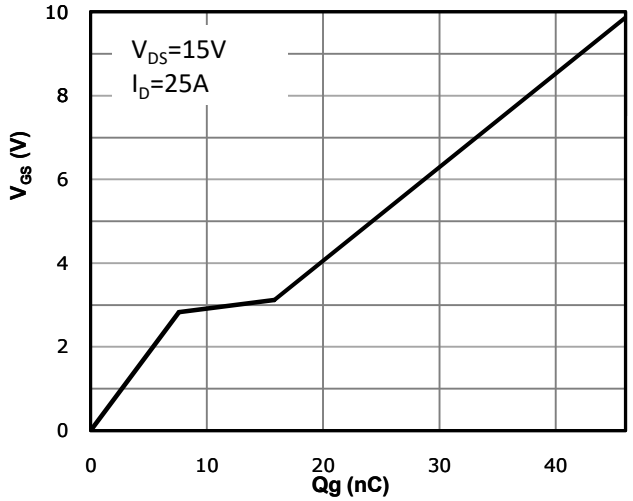


Fig 10: Body-diode Forward Characteristics

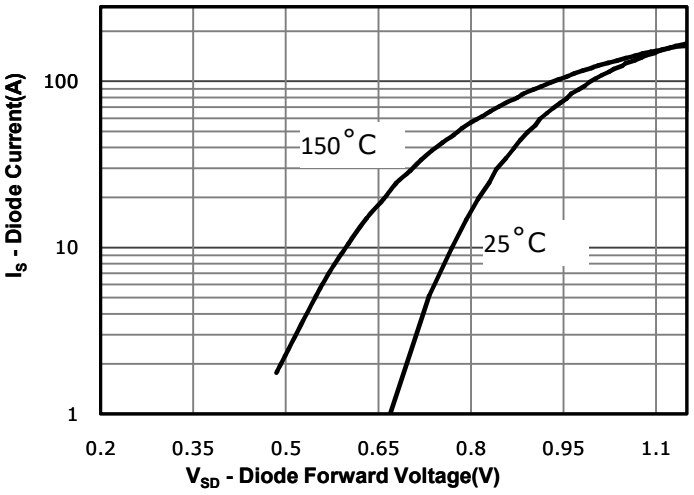


Fig 11: Power Dissipation

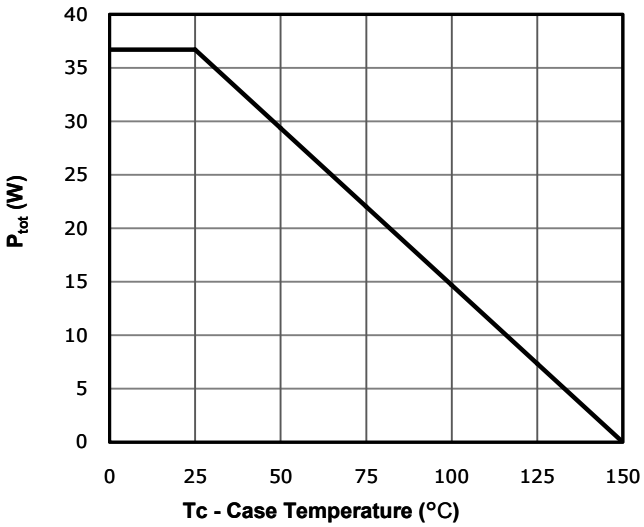
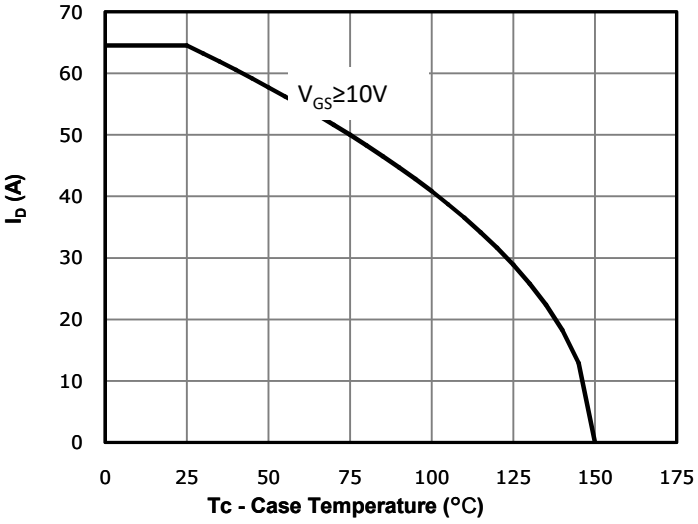


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

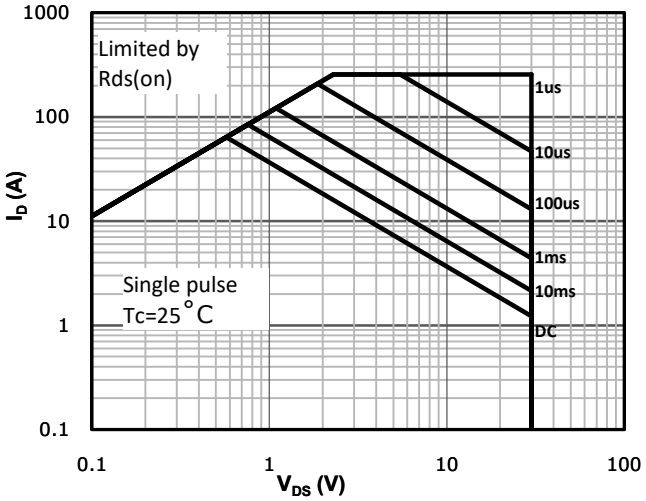
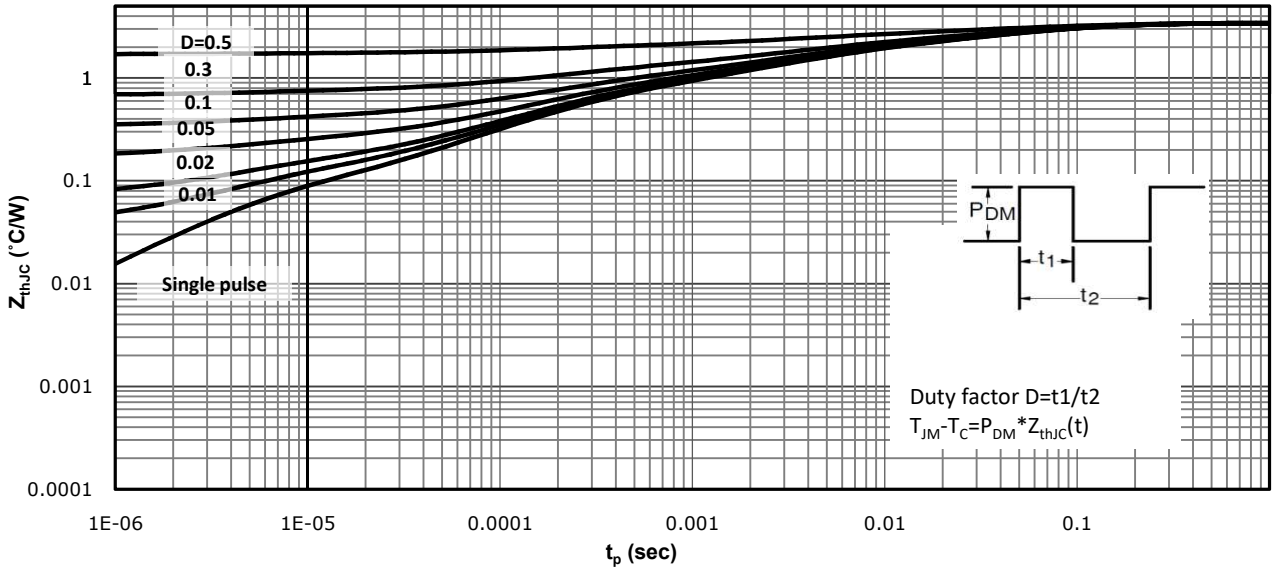


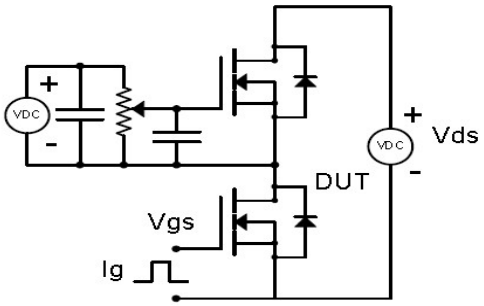
Fig 14: Max. Transient Thermal Impedance

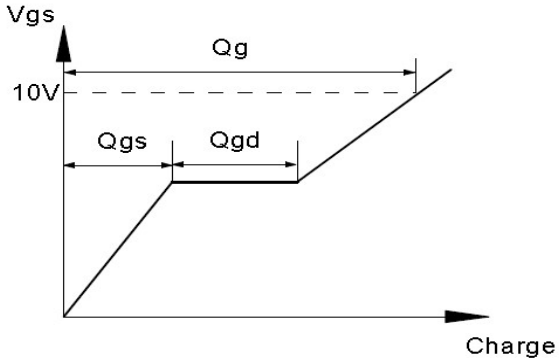


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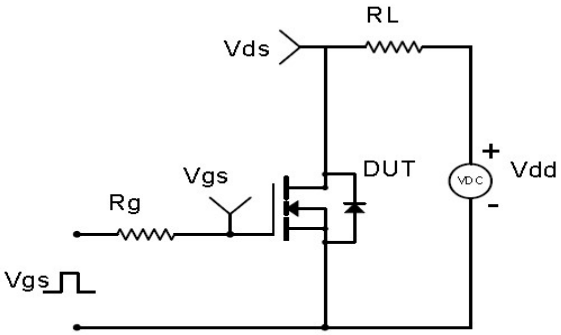
Test Circuit & Waveform

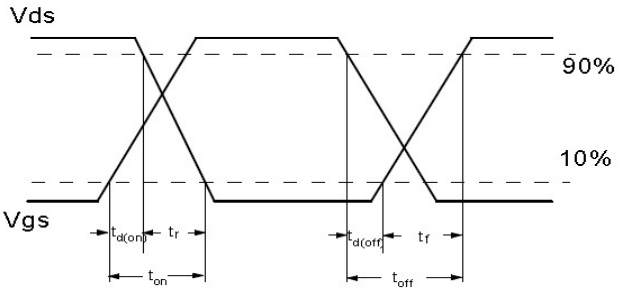
Gate Charge Test Circuit & Waveform



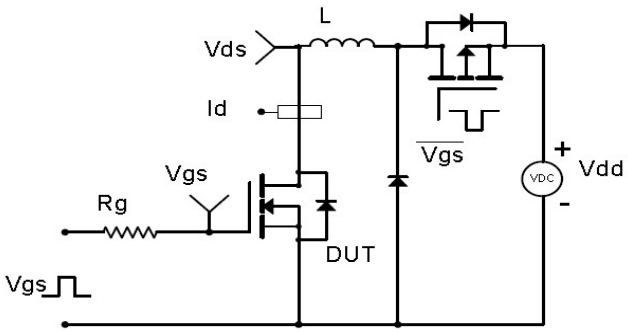


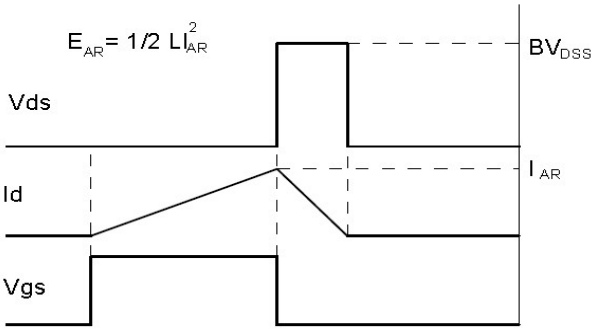
Resistive Switching Test Circuit & Waveforms



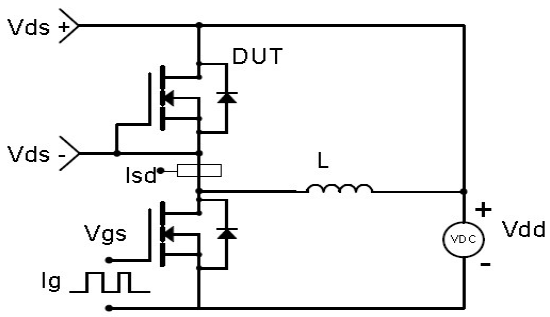


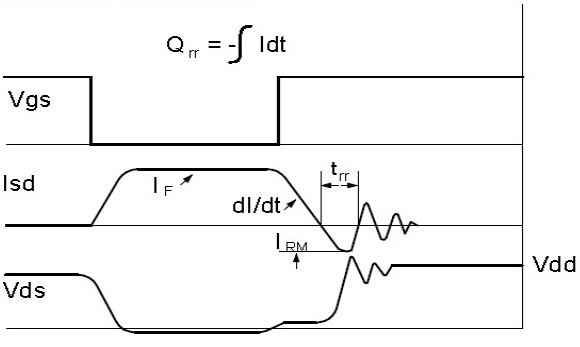
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





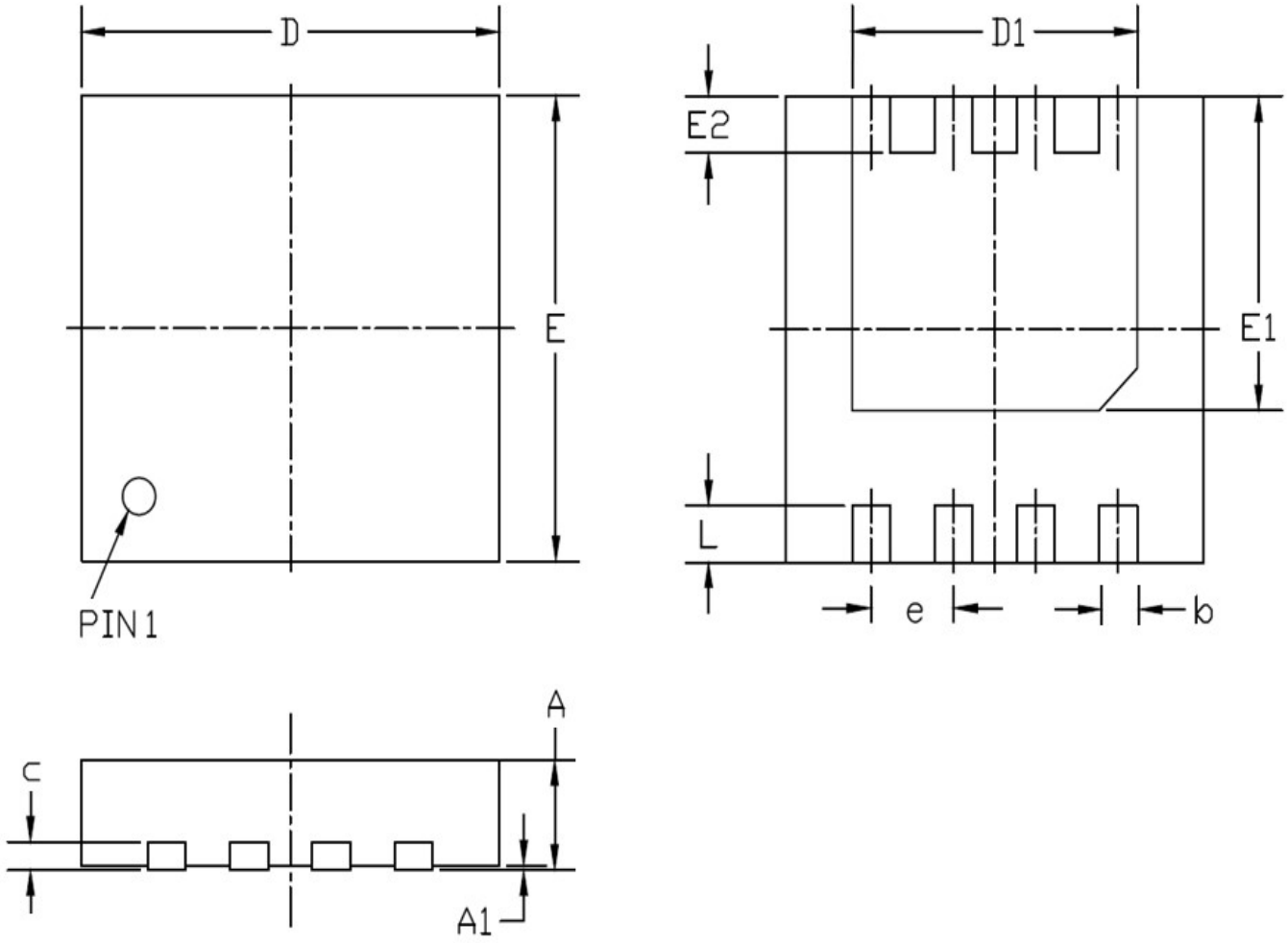
Diode Recovery Test Circuit & Waveforms





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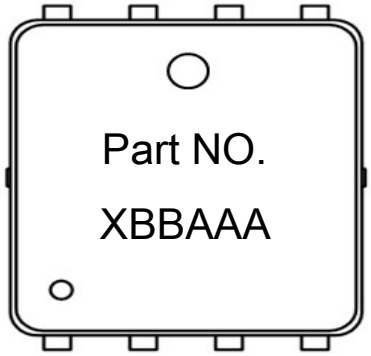
Package Outline: DFN3.3X3.3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.70	0.85	0.028	0.033
A1	0.00	0.05	0.000	0.002
b	0.24	0.39	0.009	0.015
c	0.10	0.25	0.004	0.010
D	3.20	3.40	0.126	0.134
D1	2.15	2.39	0.085	0.094
E	3.20	3.40	0.126	0.134
E1	1.85	2.33	0.073	0.092
E2	0.25	0.50	0.010	0.020
e	0.65 BSC		0.026 BSC	
L	0.30	0.55	0.012	0.022

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Marking



NOTE:
XBBAAA

X	—Assembly location code
BB	—Fab code
AAA	—Lot code

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Revision History

Revision	Date	Major changes
1.0	2022/11/7	Release of Preliminary version.

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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