CRTK038N03L4

Trench N-MOSFET 30V, 3.0mΩ, 68A

Features

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

Product Summary

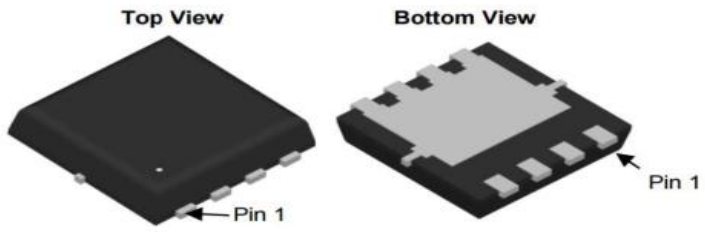
V_{DS}	30V
$R_{DS(on).typ}$	3.0mΩ
I_D	68A

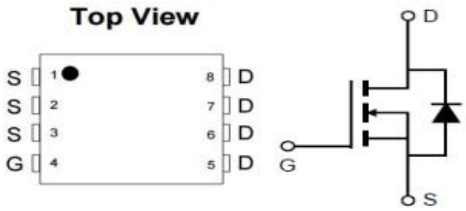
100% DVDS Tested
100% Avalanche Tested

Applications

- DC/DC Converter
- PWM Application
- high-frequency switching and synchronous rectification

PDFN3.3×3.3





CRTK038N03L4

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTK038N03L4	038N03	PDFN3.3×3.3	Tape&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	 68 50 43	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	200	A
Avalanche energy, single pulse (I_D = 25A, Rg=25Ω)[1]	E_{AS}	157	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	42	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 =25A, Vds = 30V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	3.0	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	100	

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
		30	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	0.9	1.4	2.0	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=30V,V_{GS}=0V
		-	-	100		T_j=125°C
Gate-source leakage current	I_{GSS}	0	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	3.0	3.8	mΩ	VGS=10V, ID=19A
		-	4.0	5.8		VGS=4.5V, ID=19A
Transconductance	g_{fs}	-	58.0	-	S	V_{DS}=5V, I_D=19A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2685	-	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Output Capacitance	C_{oss}	-	281	-		
Reverse Transfer Capacitance	C_{rss}	-	255	-		
Gate Total Charge	Q_G	-	57.6	-	nC	V_{GS}=10V, V_{DS}=15V, I_D=19A
Gate-Source charge	Q_{gs}	-	5.9	-		
Gate-Drain charge	Q_{gd}	-	11.2	-		
Turn-on delay time	$t_{d(on)}$	-	16.5	-	ns	V_{GS}=10V, V_{DD}=15V, R_{G_ext}=2.7Ω
Rise time	t_r	-	8.5	-		
Turn-off delay time	$t_{d(off)}$	-	68.0	-		
Fall time	t_f	-	11.2	-		
Gate resistance	R_G	-	2.0	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

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}=19A
Body Diode Reverse Recovery Time	t_{rr}	-	40.5	-	ns	I_F=19A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	34.6	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

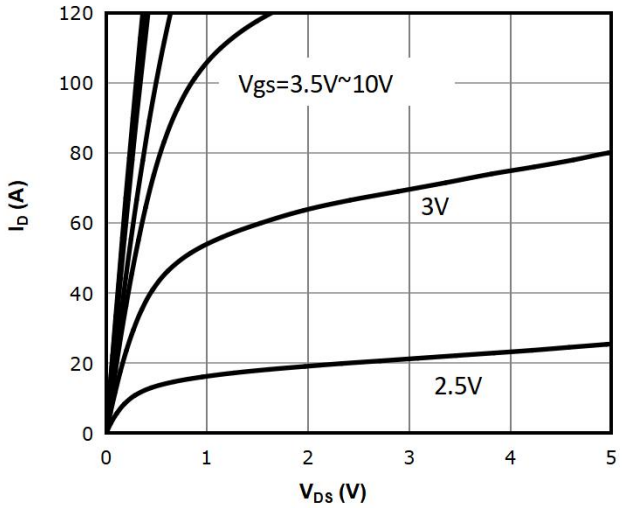


Fig 2: Transfer Characteristics

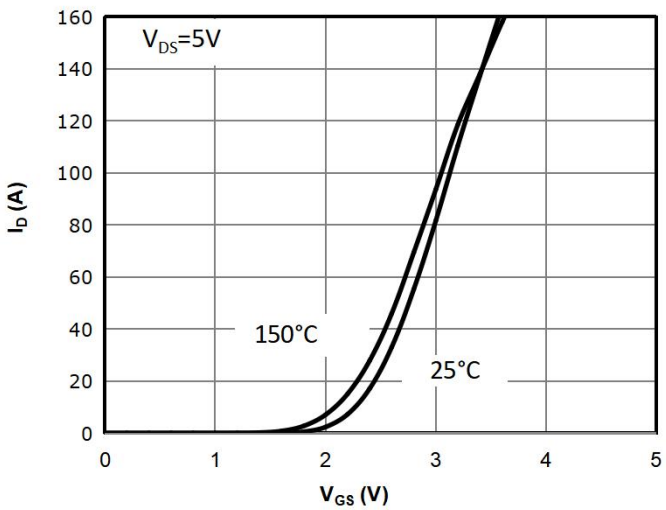


Fig 3: Rds(on) vs Drain Current and Gate Voltage

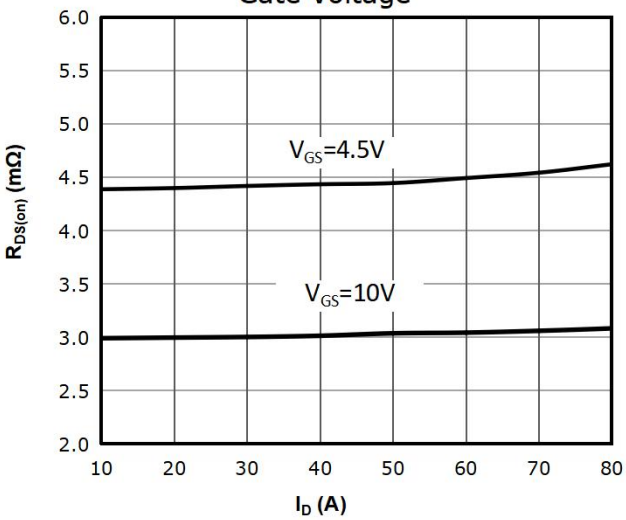


Fig 4: Rds(on) vs Gate Voltage

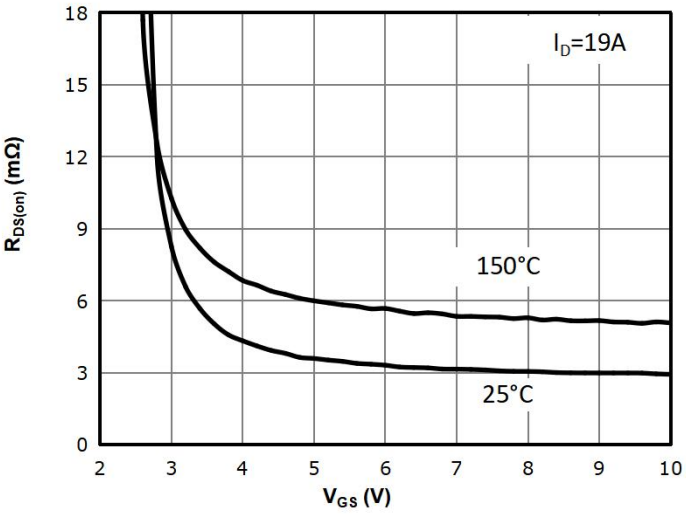


Fig 5: Rds(on) vs. Temperature

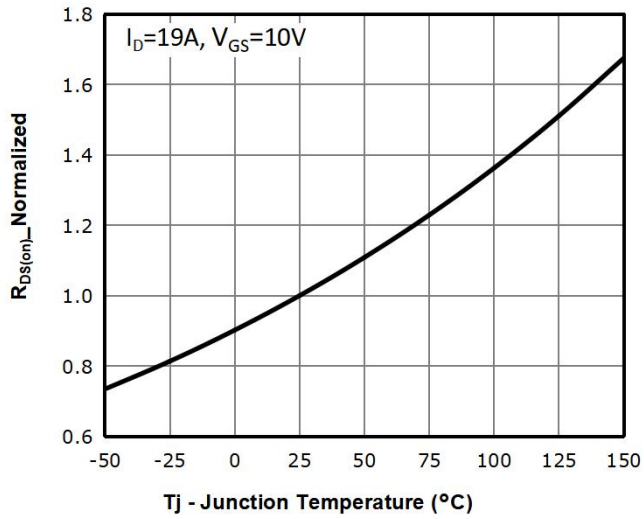


Fig 6: Vgs(th) vs. Temperature

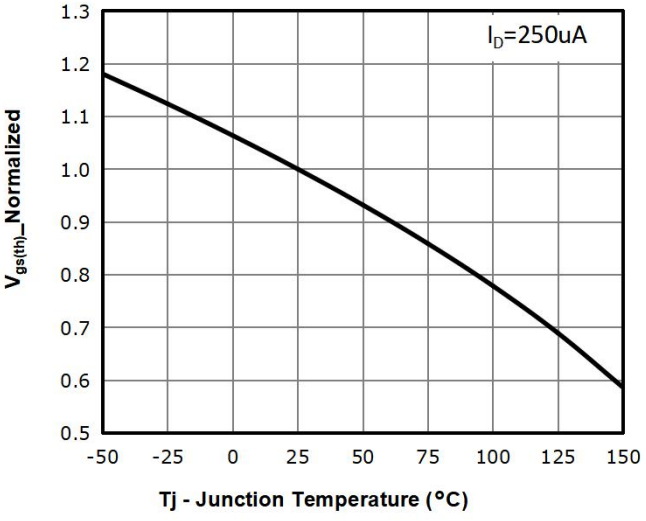


Fig 7: BVdss vs. Temperature

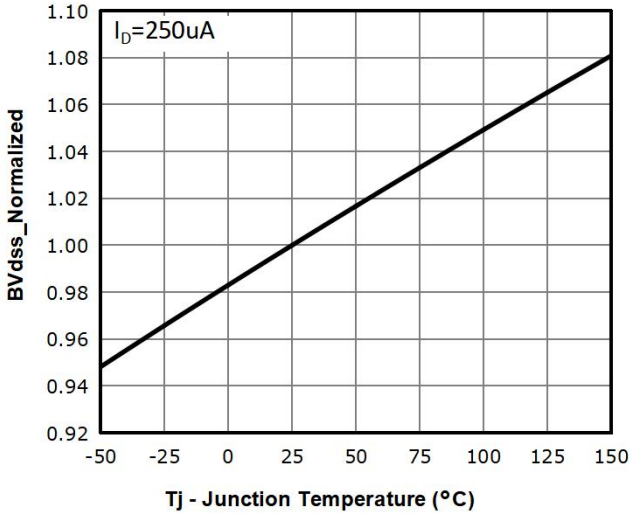


Fig 8: Capacitance Characteristics

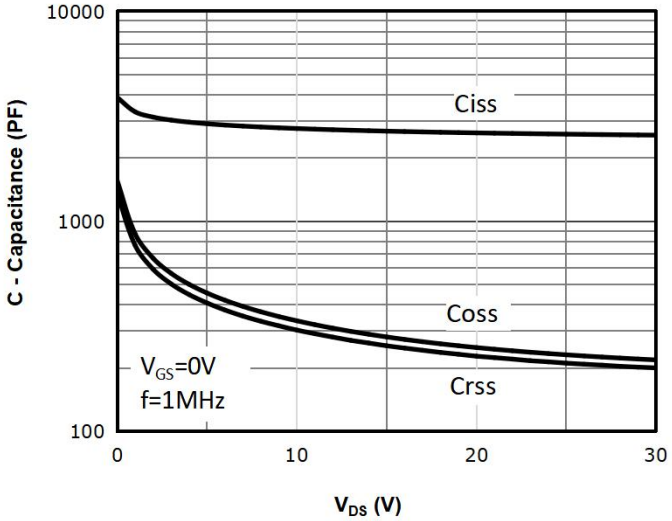


Fig 9: Gate Charge Characteristics

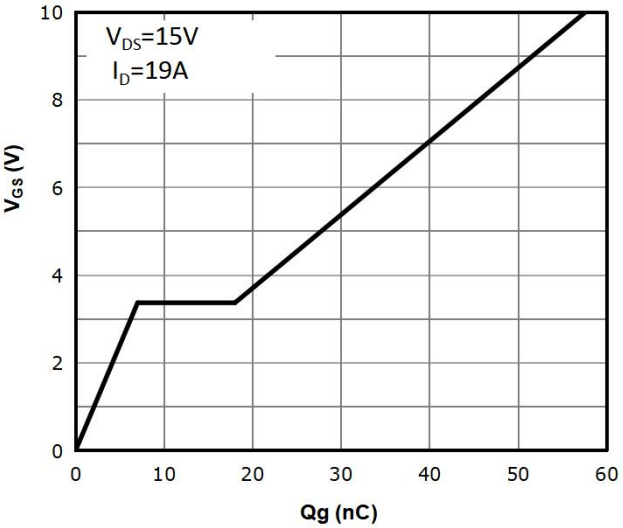


Fig 10: Body-diode Forward Characteristics

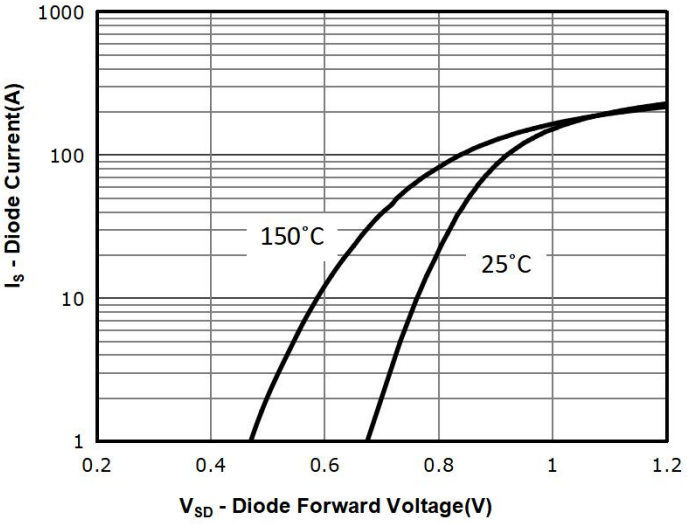


Fig 11: Power Dissipation

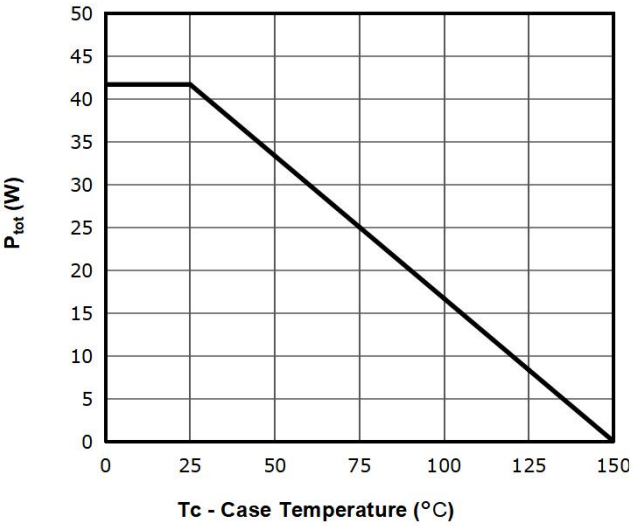


Fig 12: Drain Current Derating

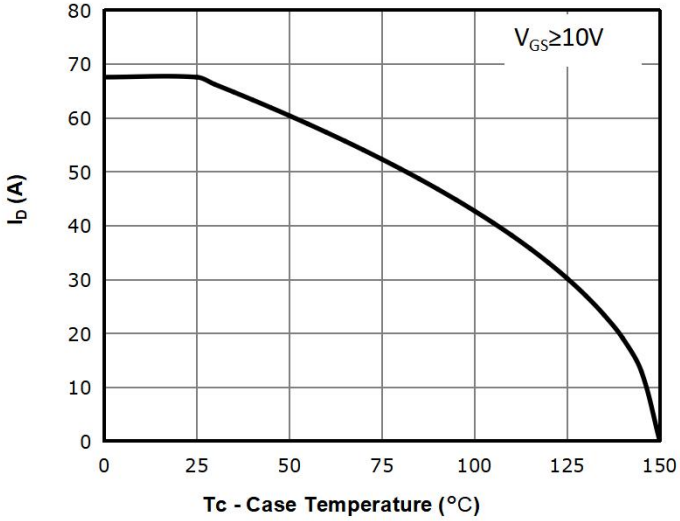


Fig 13: Safe Operating Area

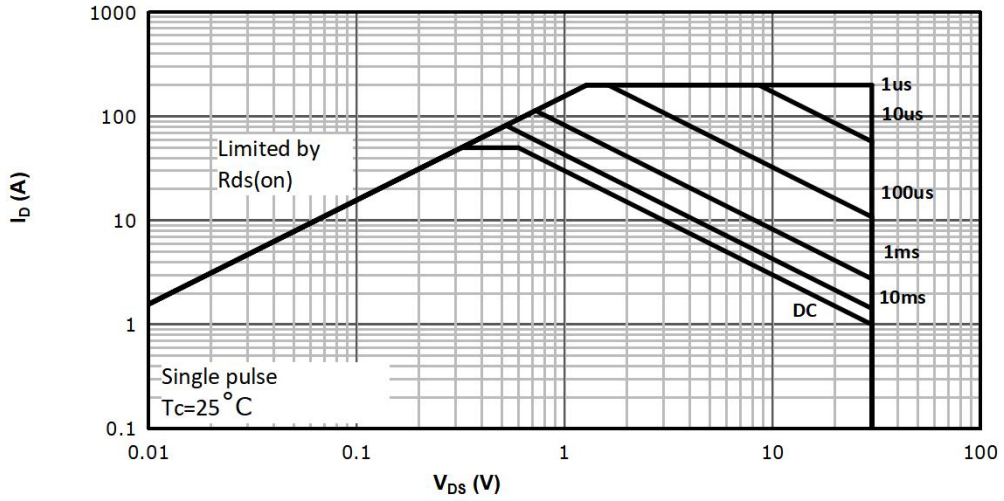
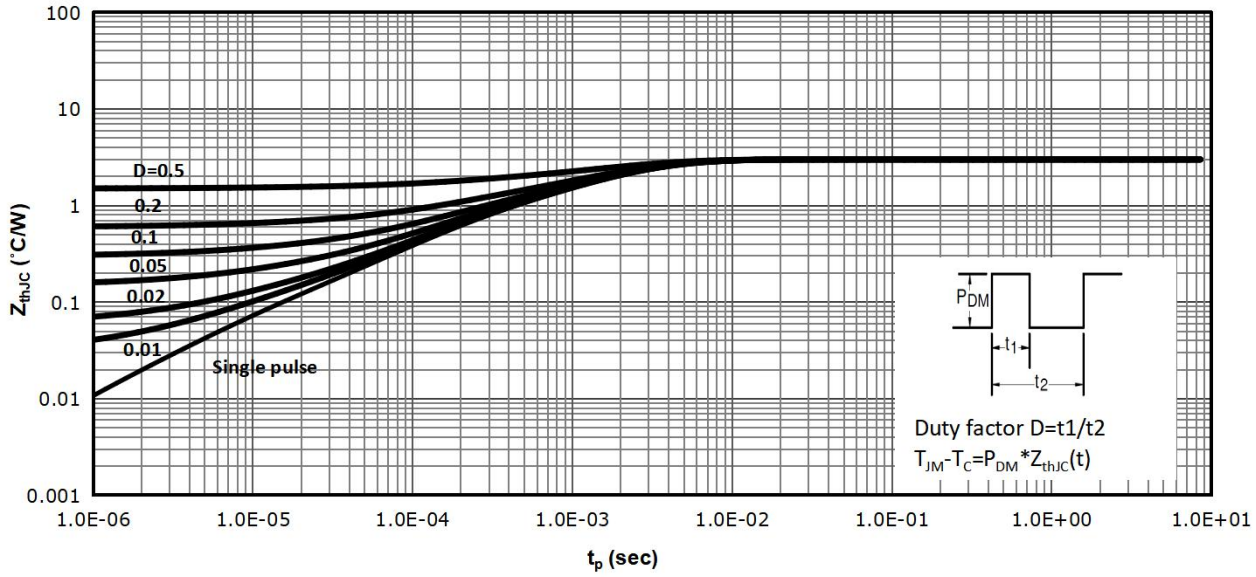
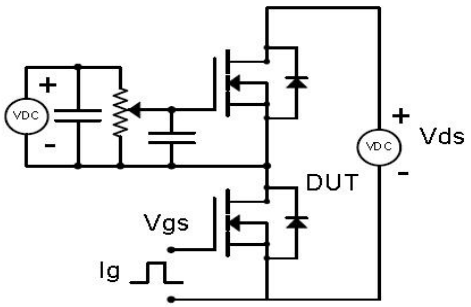


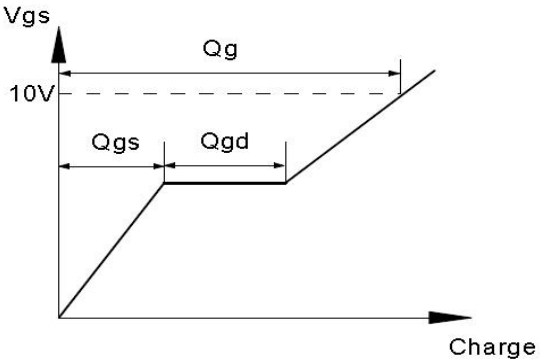
Fig 14: Max. Transient Thermal Impedance



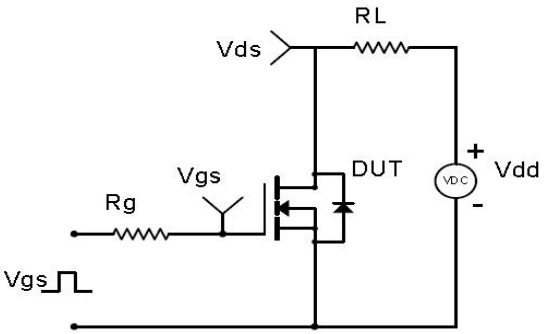
Test Circuit & Waveform

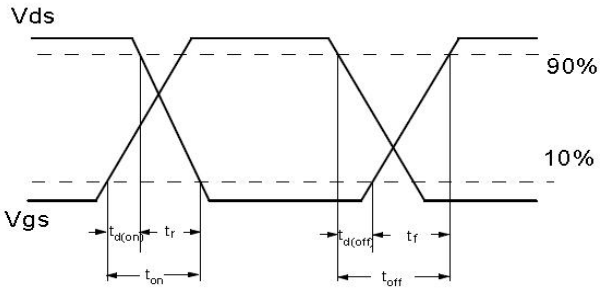
Gate Charge Test Circuit & Waveform



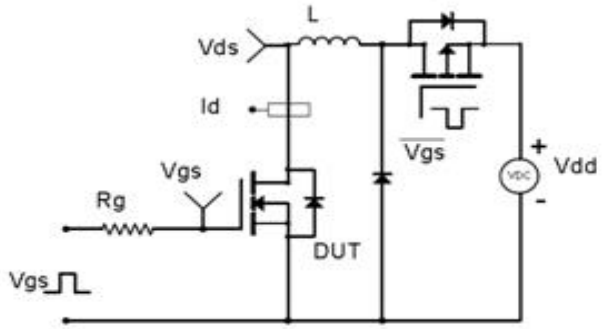


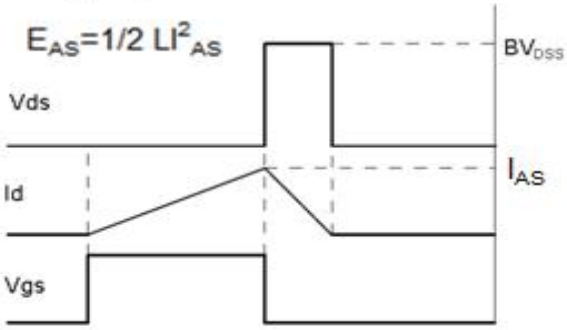
Resistive Switching Test Circuit & Waveforms



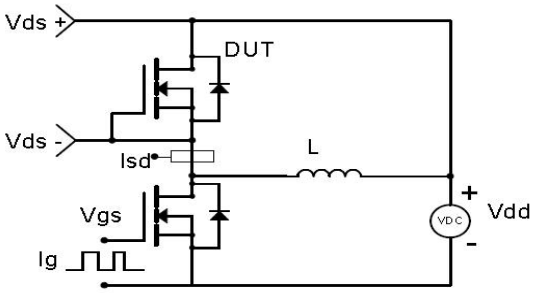


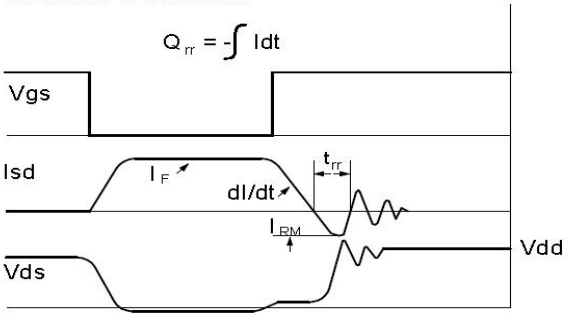
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



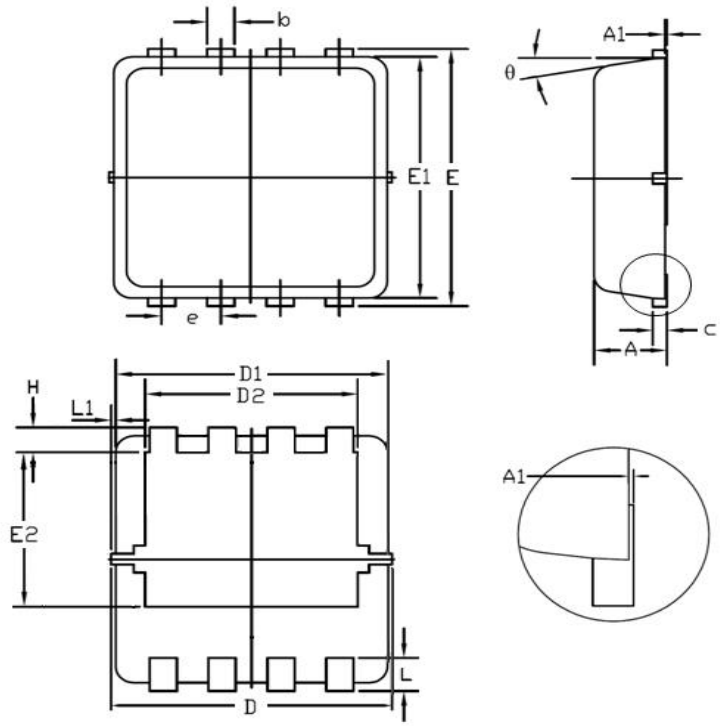


Diode Recovery Test Circuit & Waveforms



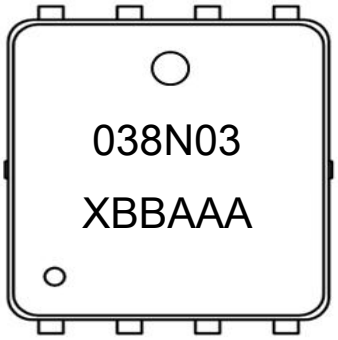


Package Outline: PDFN3.3×3.3



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°

Marking



NOTE:
XBBAAA

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

Revision History

Revision	Date	Major changes
1.0	2025/7/8	Release of Preliminary version.

Disclaimer

CRM reserves the right to change any product or information in this Specification at any time without prior notice.

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics .The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

The product is not intended for use in applications that require extraordinary levels of quality and reliability, such as 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.