

Features

- Uses CRM(CQ) advanced SkyMOS4 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified

Applications

- DCDC Converter
- Switching applications

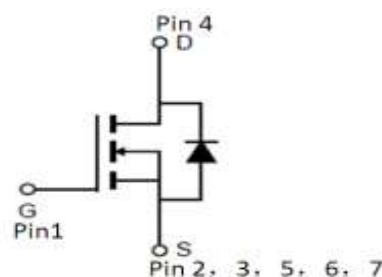
Product Summary

V_{DS}	100V
$R_{DS(on).typ}$	1.5mΩ
I_D	310A

100% DVDS Tested
100% Avalanche Tested



CRSZ019N10N4Q



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSZ019N10N4Q	019N10N4Q	TOLL	Tape&Reel	N/A	N/A	1000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	310 310 218	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	1240	A
Avalanche energy, single pulse ($I_D = 66\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	1089	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	321	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$

※. Notes:

EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_{AS} = 66\text{A}$, $V_{GS} = 10\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.47	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		100	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=100V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$
		-	-	100		$T_j=125^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	1.5	1.9	mΩ	$V_{GS}=10V, I_D=100A$
Transconductance	g_{fs}	179	358	716	S	$V_{DS}=5V, I_D=100A$

Dynamic Characteristic

Input Capacitance	C_{iss}	5259	10518	21036	pF	$V_{GS}=0V, V_{DS}=50V,$ $f=1MHz$
Output Capacitance	C_{oss}	802	1604	3208		
Reverse Transfer Capacitance	C_{rss}	4	19	95		
Gate Total Charge	Q_G	79	157	314	nC	$V_{GS}=10V, V_{DS}=50V,$ $I_D=100A, f=1MHz$
Gate-Source charge	Q_{gs}	32	64	128		
Gate-Drain charge	Q_{gd}	10	20	39		
Turn-on delay time	$t_{d(on)}$	19	39	77	ns	$V_{GS}=10V, V_{DD}=50V,$ $R_{G_ext}=3\Omega$
Rise time	t_r	39	78	156		
Turn-off delay time	$t_{d(off)}$	51	101	202		
Fall time	t_f	20	41	81		
Gate resistance	R_G	-	2	10	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}	-	0.85	1.4	V	$V_{GS}=0V, I_{SD}=100A$
Body Diode Reverse Recovery Time	t_{rr}	49	98	196	ns	$I_F=100A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	141	281	562	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

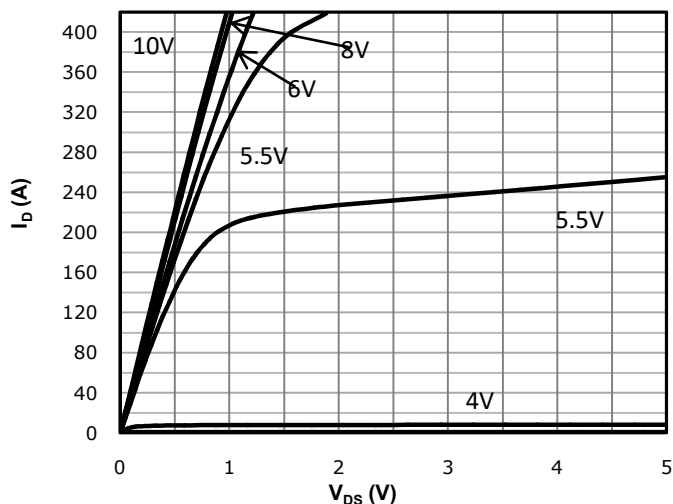


Fig 2: Transfer Characteristics

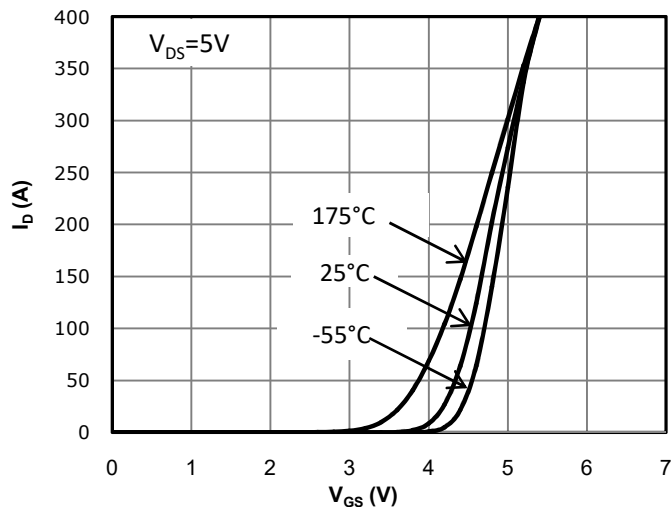


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

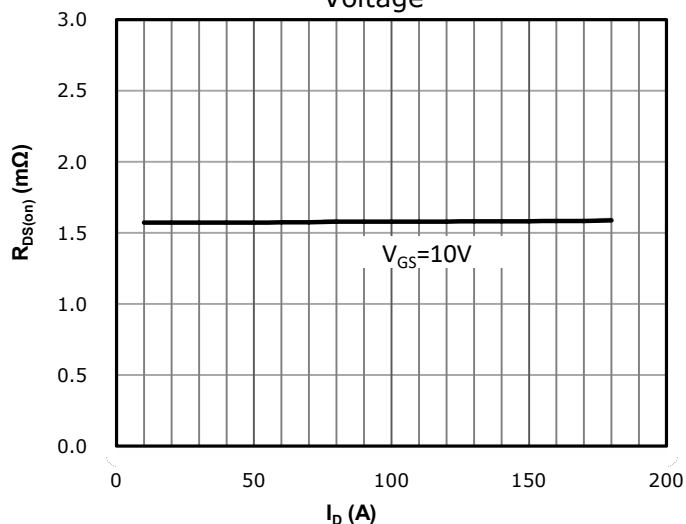


Fig 4: $R_{DS(on)}$ vs Gate Voltage

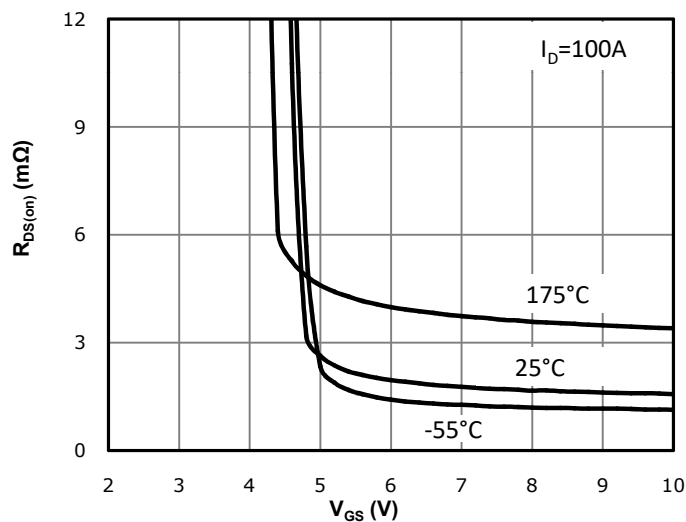


Fig 5: $R_{DS(on)}$ vs. Temperature

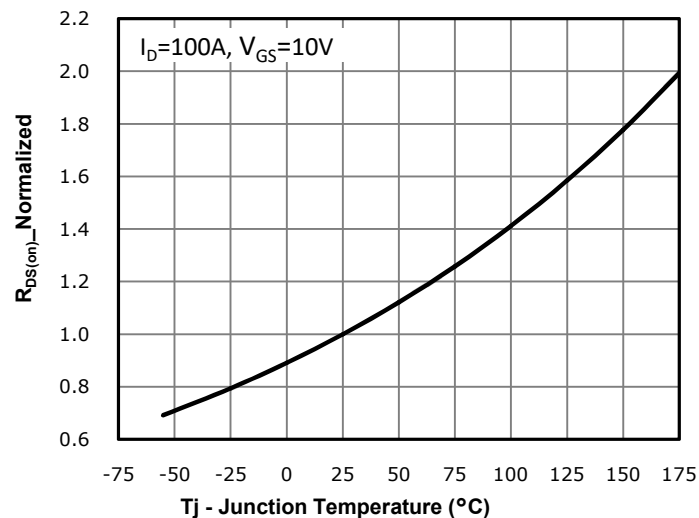


Fig 6: $V_{GS(th)}$ vs. Temperature

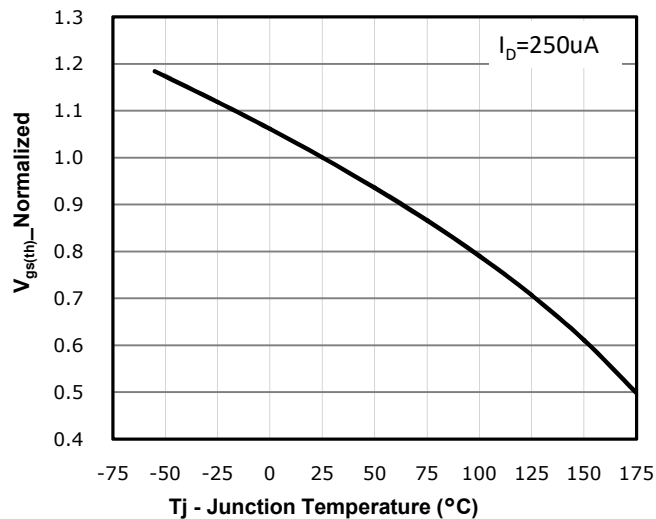


Fig 7: BVdss vs. Temperature

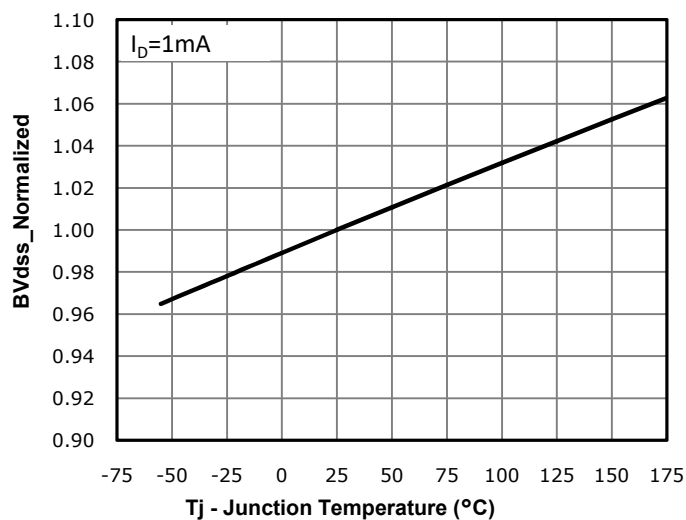


Fig 8: Capacitance Characteristics

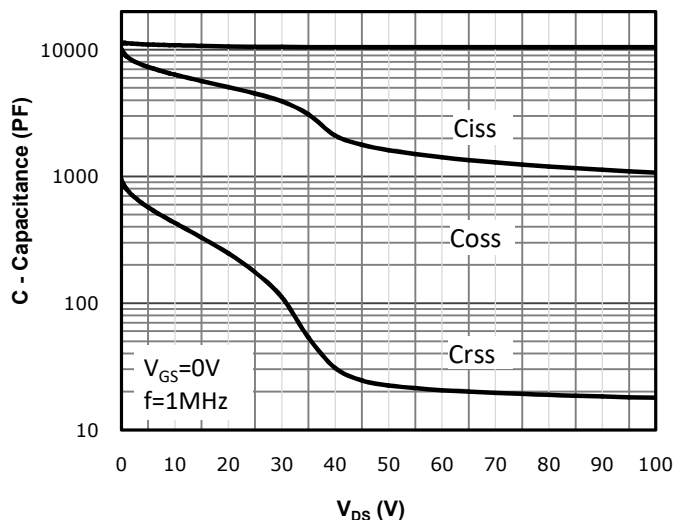


Fig 9: Gate Charge Characteristics

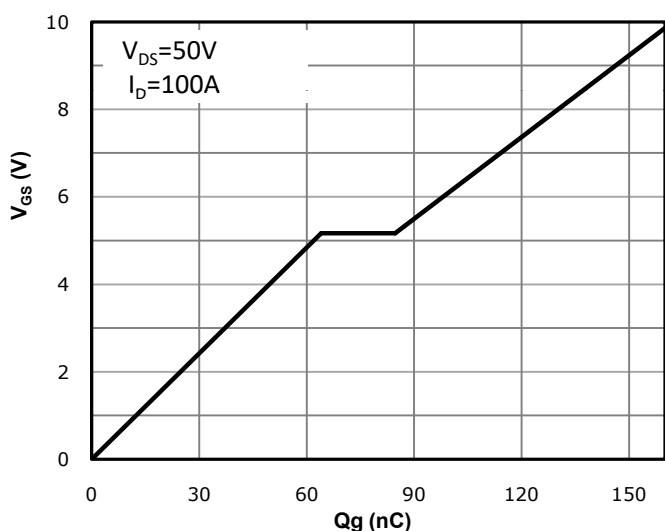


Fig 10: Body-diode Forward Characteristics

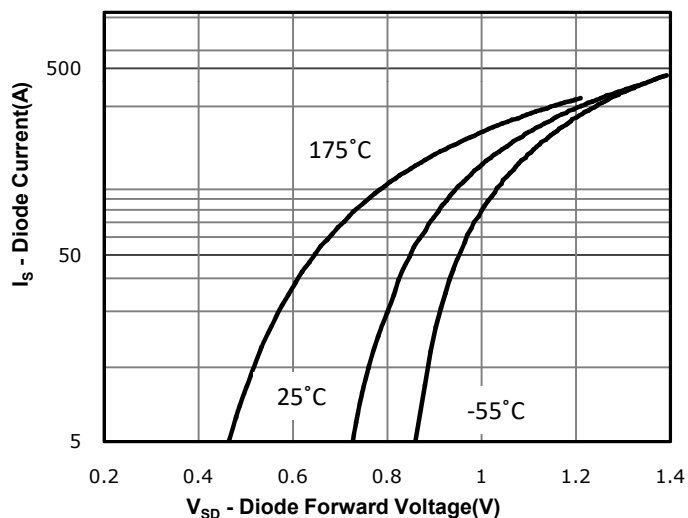


Fig 11: Power Dissipation

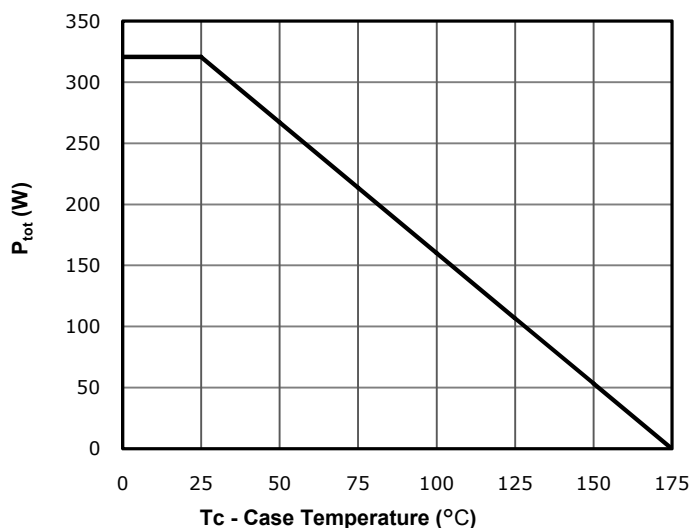


Fig 12: Drain Current Derating

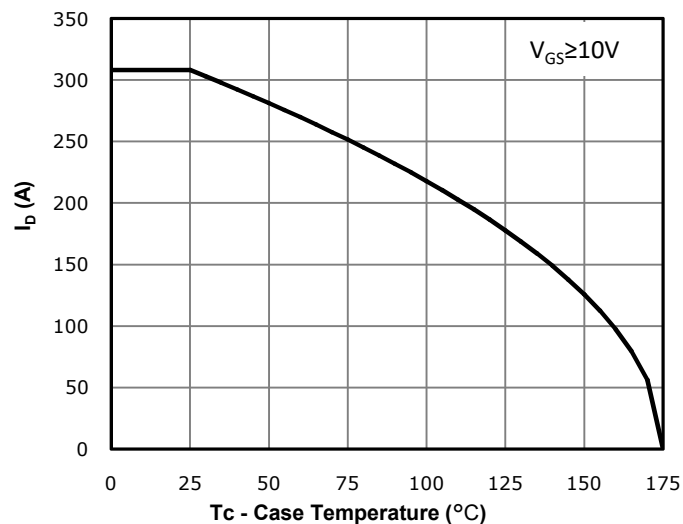


Fig 13: Safe Operating Area

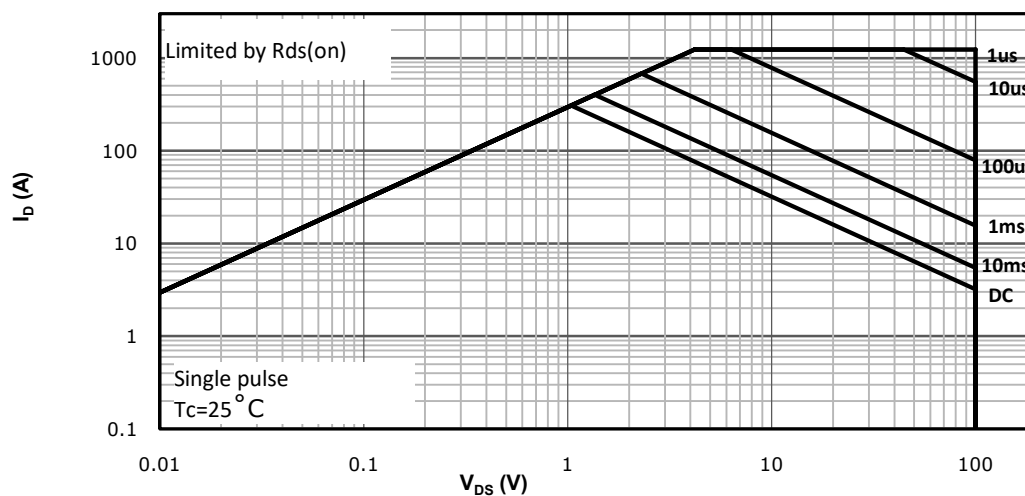
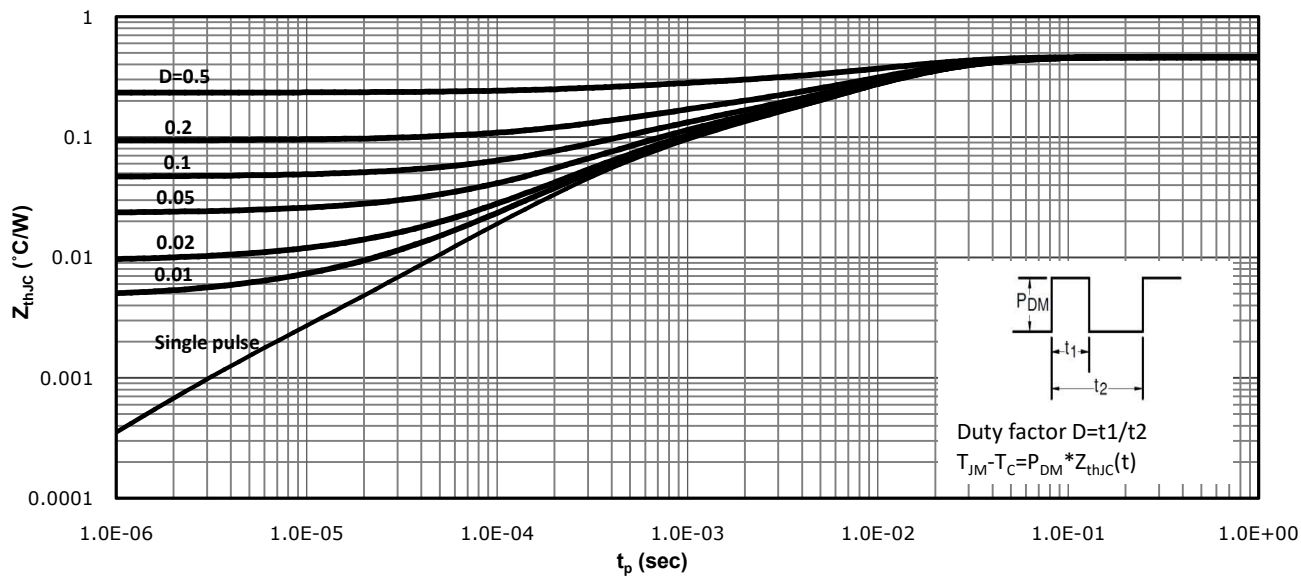
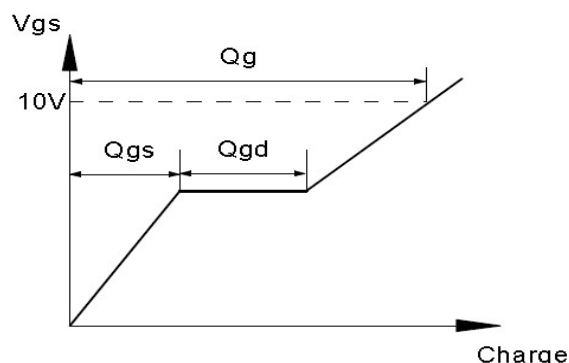
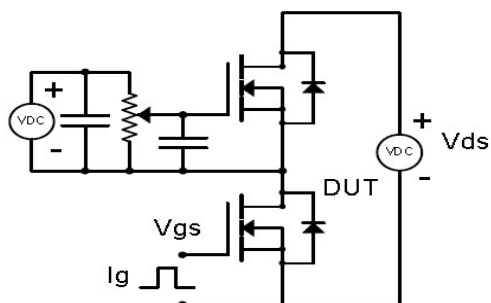


Fig 14: Max. Transient Thermal Impedance

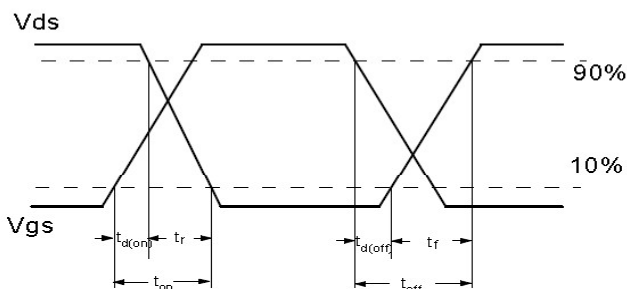
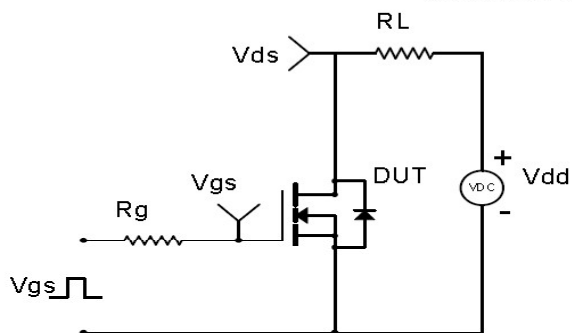


Test Circuit & Waveform

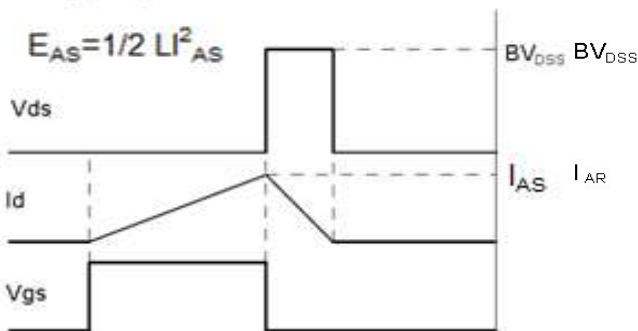
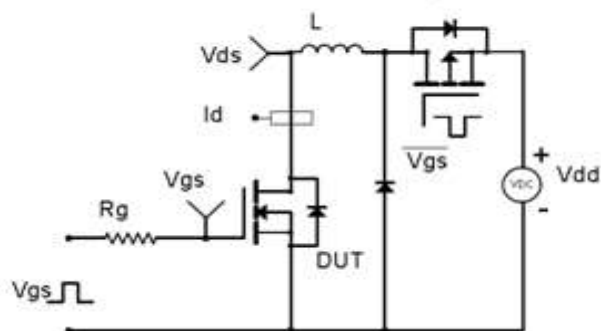
Gate Charge Test Circuit & Waveform



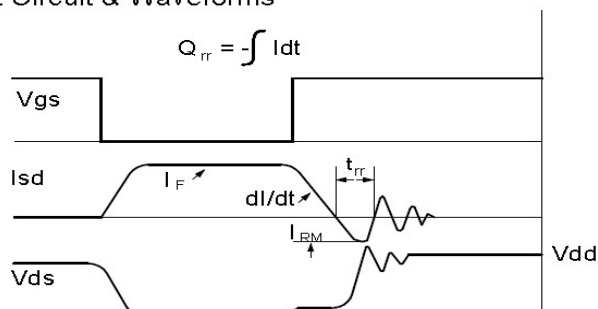
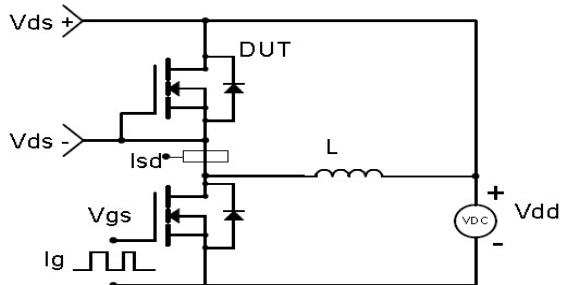
Resistive Switching Test Circuit & Waveforms



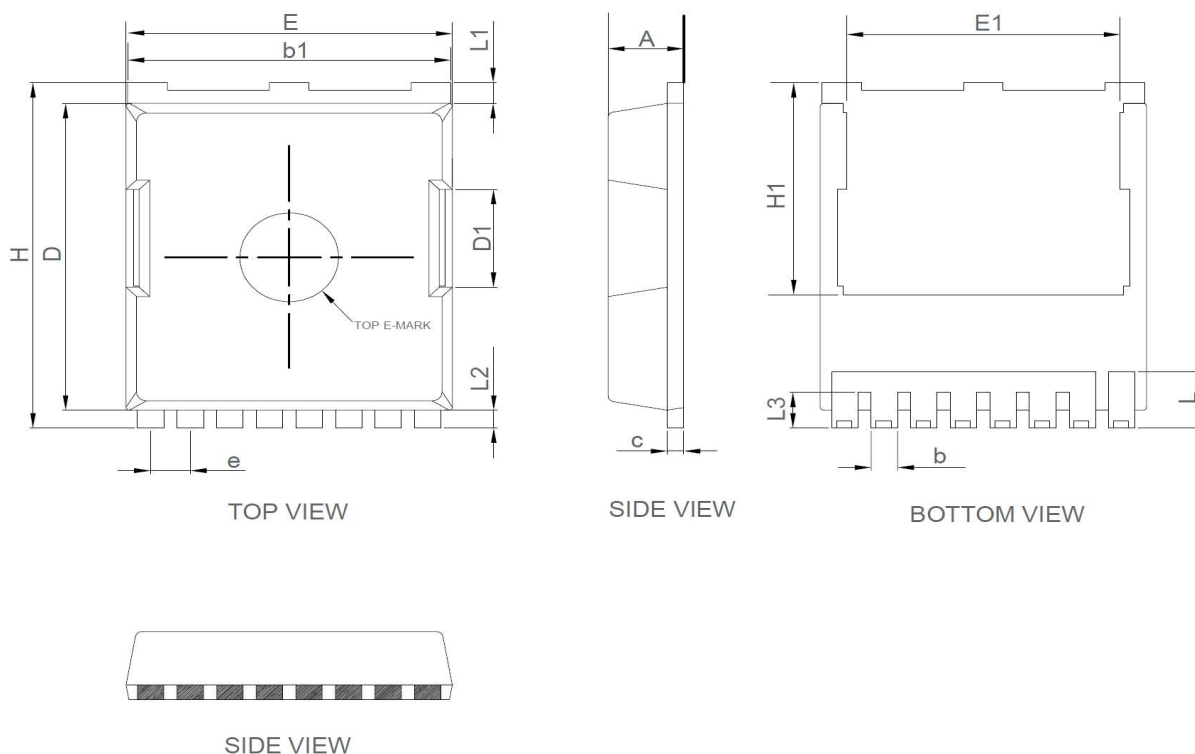
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TOLL



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
b	0.60	0.90	0.024	0.035
b1	9.65	9.95	0.380	0.392
c	0.35	0.65	0.014	0.026
D	10.18	10.70	0.401	0.421
D1	3.15	3.45	0.124	0.136
E	9.70	10.10	0.382	0.398
E1	7.35	8.45	0.289	0.333
e	1.10	1.30	0.043	0.051
H	11.45	11.95	0.451	0.470
H1	6.55	7.50	0.258	0.295
L	1.35	2.10	0.053	0.083
L1	0.50	0.90	0.020	0.035
L2	0.40	0.80	0.016	0.031
L3	0.95	1.35	0.037	0.053

Marking



NOTE:

XAAAAAAAA-Y

X —Assembly location code

AAAAAAA —Assembly lot NO. last 7digits

Y —Bin code

Revision History

Revision	Date	Major changes
1.0	2023/8/4	Release of preliminary 1.0 version.
1.1	2023/8/31	Update marking.

Disclaimer

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

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