CRSZ016N10N4Z

华润微电子(重庆)有限公司

SkyMOS4 N-MOSFET 100V, 1.26mΩ, 320A

Features

- Uses CRM(CQ) advanced SkyMOS4 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
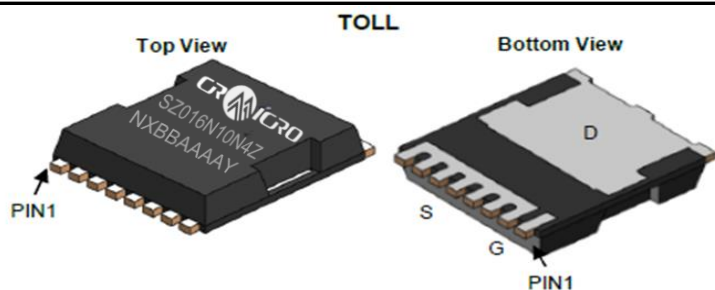- Qualified according to JEDEC criteria

Applications

- Motor control and drive
- Battery management System
- UPS (Uninterrupible Power Supplies)

Product Summary

V_{DS}	100V
$R_{DS(on).typ}$	1.26mΩ
I_D	320A

100% DVDS Tested
100% Avalanche Tested

RoHS H F

TOLL

Top View Bottom View
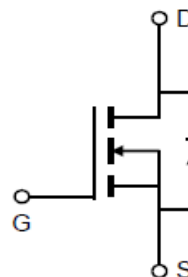
CRSZ016N10N4Z

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSZ016N10N4Z	SZ016N10N4Z	TOLL	Tape&Reel	N/A	N/A	2000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	320 370 205	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	1280	A
Avalanche energy, single pulse (I_D = 88A, Rg=25Ω)[1]	E_{AS}	1921	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	293	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

※. Notes:
1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =88A, VGS = 10V.
2.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.4	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	65	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

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

Static Characteristic

Parameter	Symbol	min.	typ.	max.	Unit	Test Condition
Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250µA
		100	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.2	3.0	3.8	V	V_{DS}=V_{GS},I_D=250µA
Zero gate voltage drain current	I_{DSS}	-	-	1	µA	V_{DS}=100V,V_{GS}=0V T_j=25°C
		-	-	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	$R_{DS(on)}$	-	1.26	1.60	mΩ	VGS=10V, ID=95A
Transconductance	g_{fs}	121.5	243.0	486	S	V_{DS}=5V, I_D=95A

Dynamic Characteristic

Parameter	Symbol	min.	typ.	max.	Unit	Test Condition
Input Capacitance	C_{iss}	8409	12614	18920	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	1226	1838	2758		
Reverse Transfer Capacitance	C_{rss}	15	30	60		
Gate Total Charge	Q_G	118	177	266	nC	V_{GS}=10V, V_{DS}=50V, I_D=95A
Gate-Source charge	Q_{gs}	45	67	101		
Gate-Drain charge	Q_{gd}	11	22	45		
Turn-on delay time	$t_{d(on)}$	18	35	71	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=2.7Ω
Rise time	t_r	47	71	107		
Turn-off delay time	$t_{d(off)}$	67	101	151		
Fall time	t_f	25	38	57		
Gate resistance	R_G	0	1.8	9.05	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}	-	0.84	1.4	V	V_{GS}=0V,I_{SD}=95A
Body Diode Reverse Recovery Time	t_{rr}	53	106.2	212	ns	I_F=95A dI/dt=100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	145	290.0	580	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics
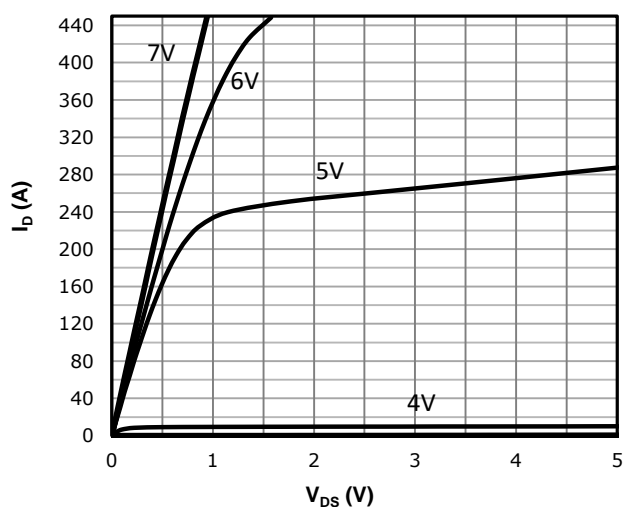
Fig 2: Transfer Characteristics
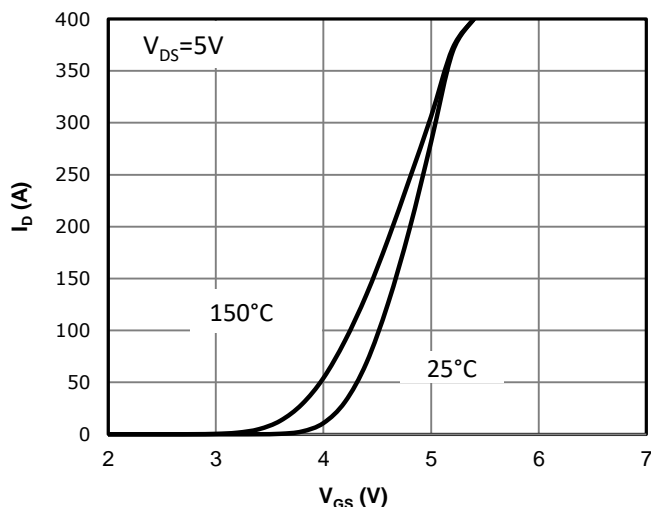
Fig 3: Rds(on) vs Drain Current and Gate Voltage
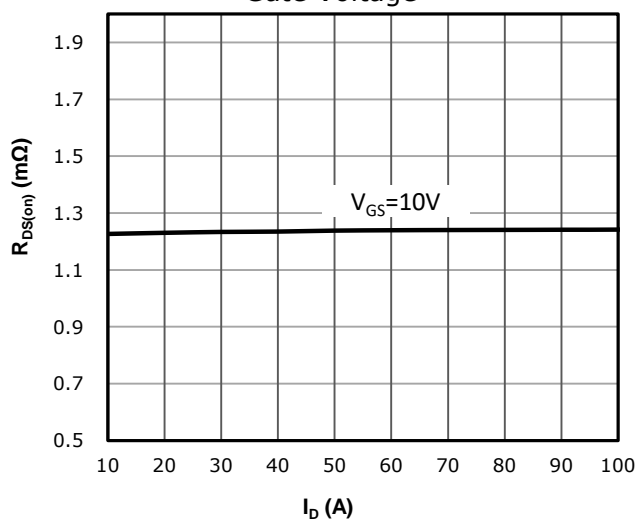
Fig 4: Rds(on) vs Gate Voltage
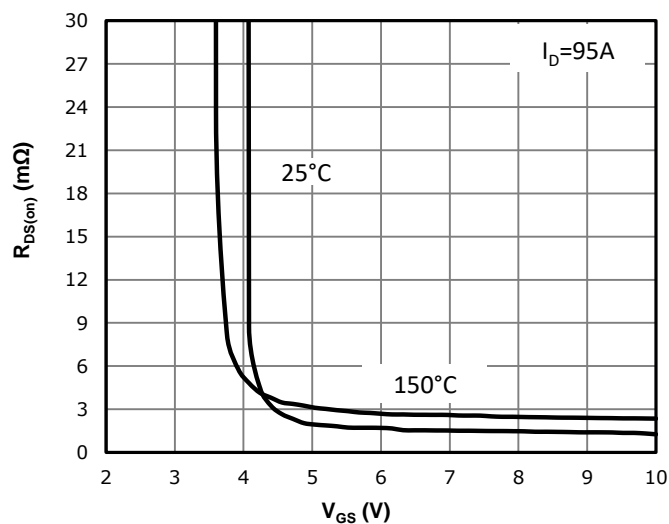
Fig 5: Rds(on) vs. Temperature
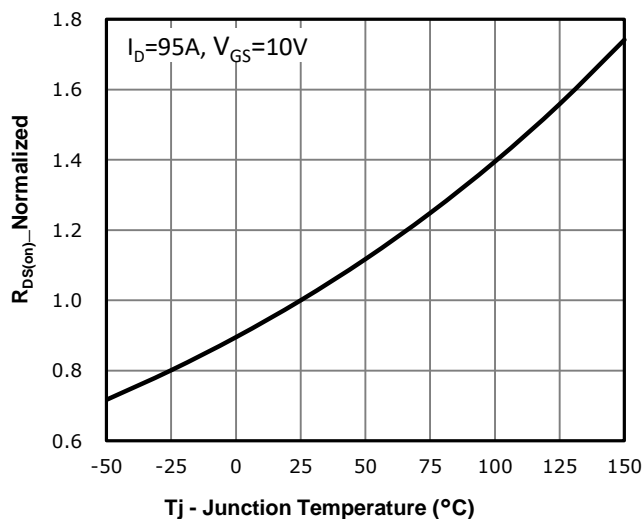
Fig 6: Vgs(th) vs. Temperature
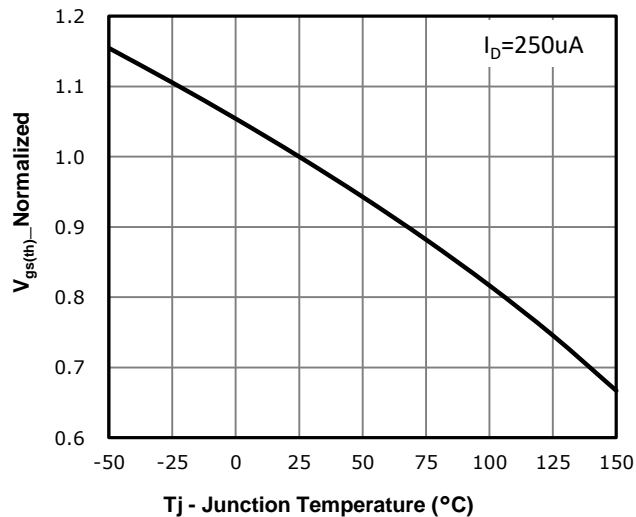
Fig 7: BVdss vs. Temperature

I_D=1mA

BVdss_Normalized

Tj - Junction Temperature (°C)
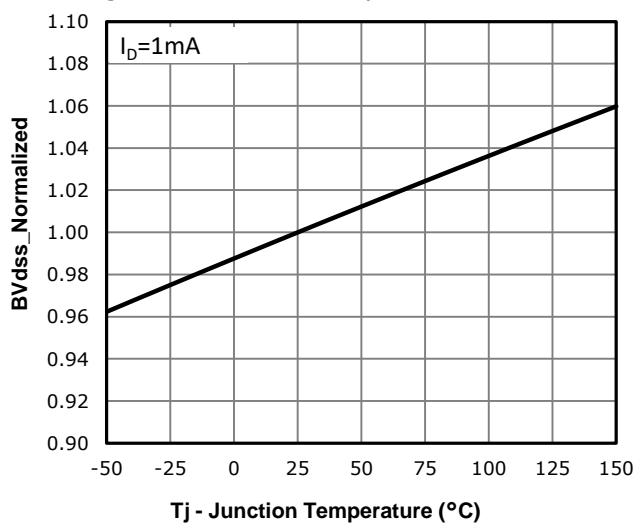
Fig 8: Capacitance Characteristics

C - Capacitance (PF)

Ciss

Coss

Crss

V_{GS}=0V
f=1MHz

V_{DS} (V)
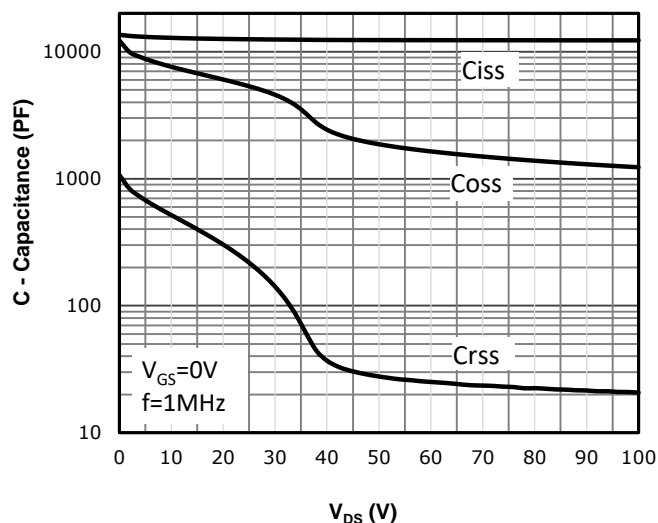
Fig 9: Gate Charge Characteristics

V_{DS}=50V
I_D=95A

V_{GS} (V)

Qg (nC)
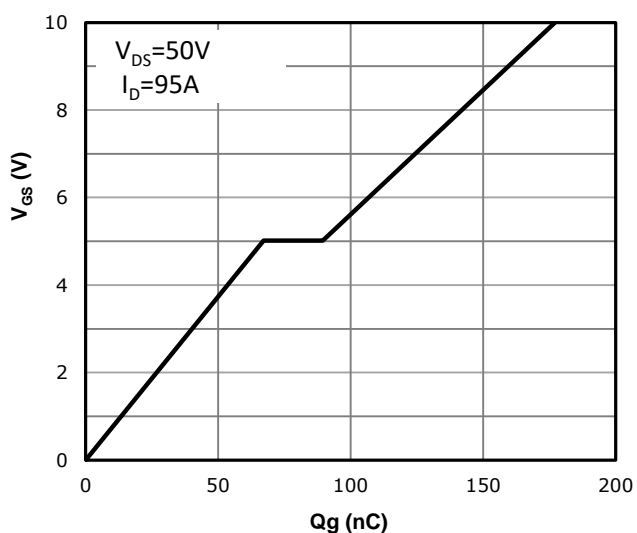
Fig 10: Body-diode Forward Characteristics

I_S - Diode Current(A)

150℃

25℃

V_{SD} - Diode Forward Voltage(V)

Fig 11: Power Dissipation

P_{tot} (W)

Tc - Case Temperature (°C)
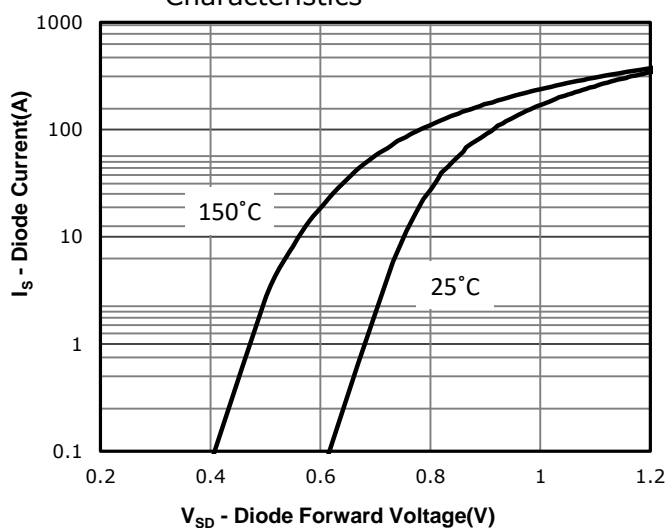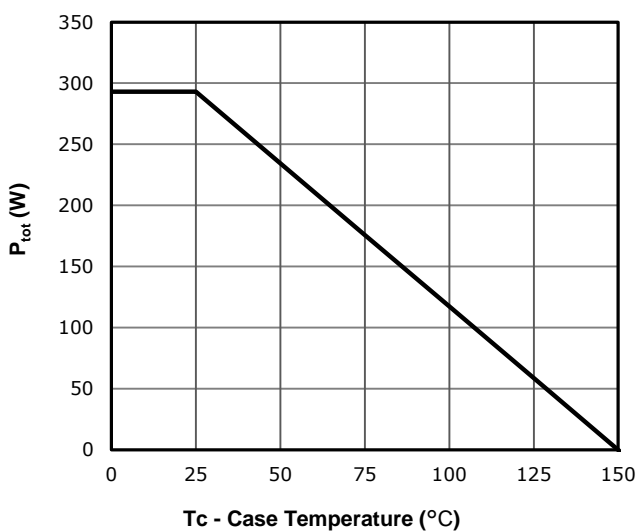
Fig 12: Drain Current Derating
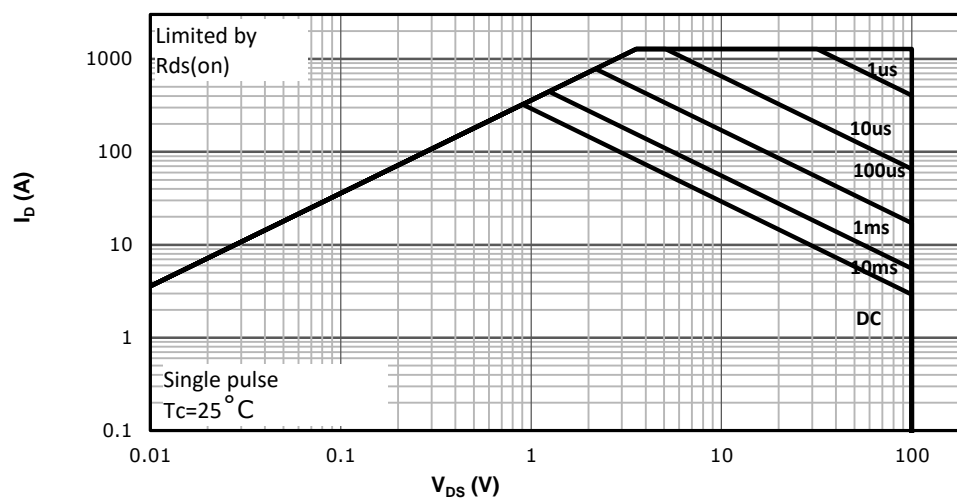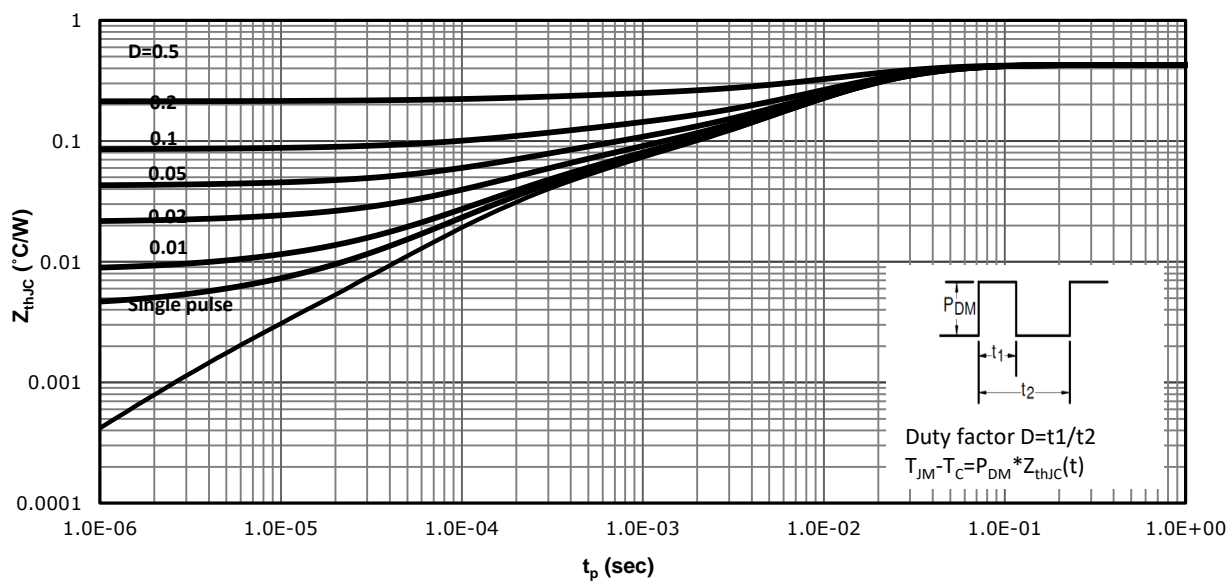
V_{GS}≥10V

I_D (A)

Tc - Case Temperature (°C)
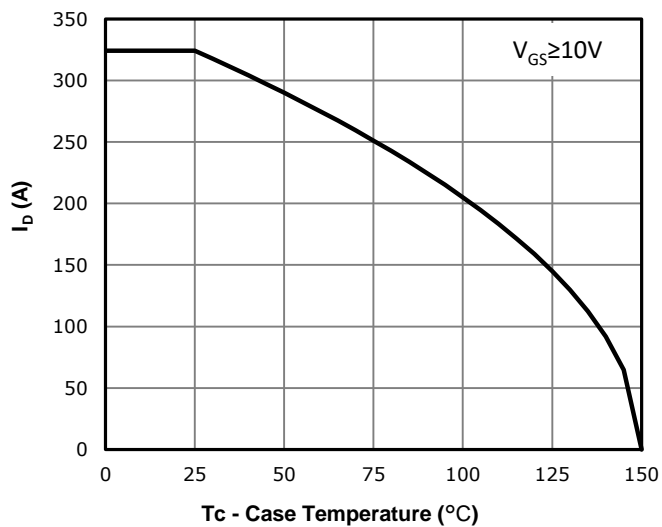
Fig 13: Safe Operating Area

Fig 14: Max. Transient Thermal Impedance

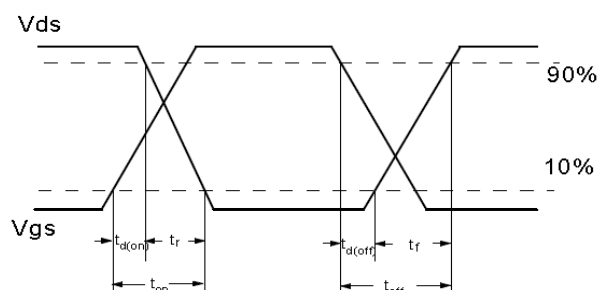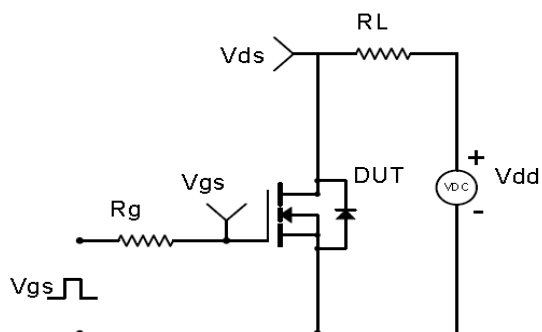Duty factor D=t1/t2

$T_{JM} - T_C = P_{DM} * Z_{thJC}(t)$
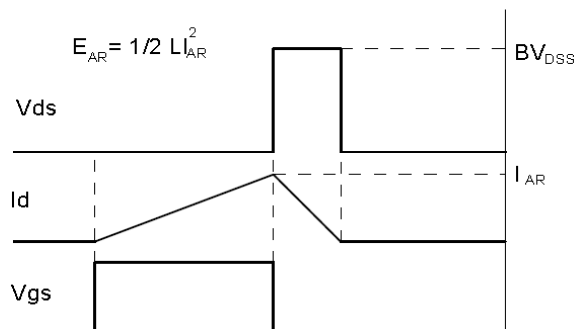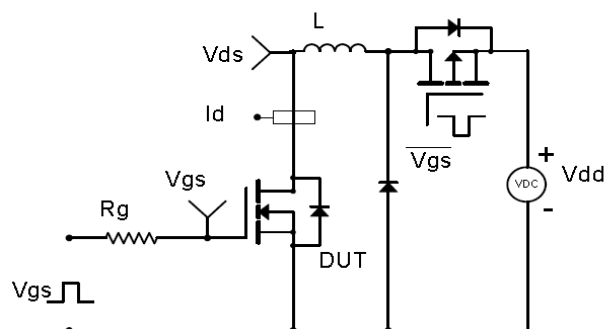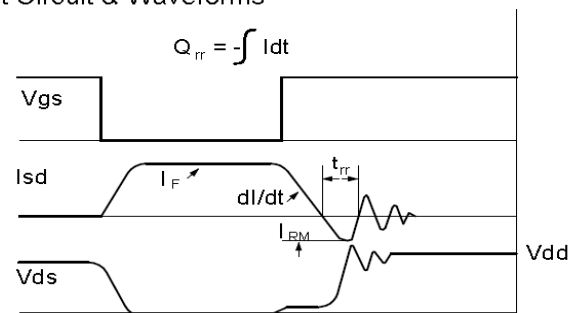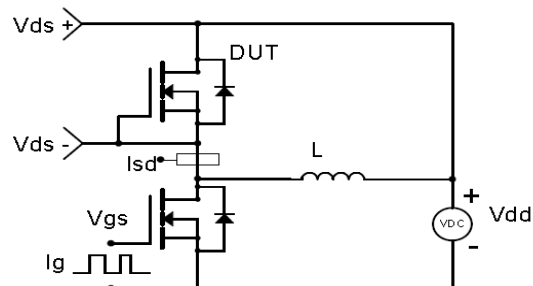
Test Circuit & Waveform

Gate Charge Test Circuit & Waveform
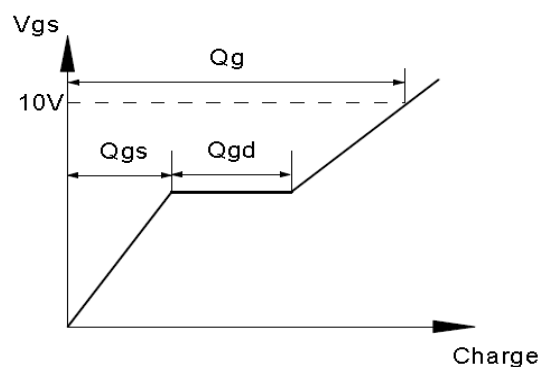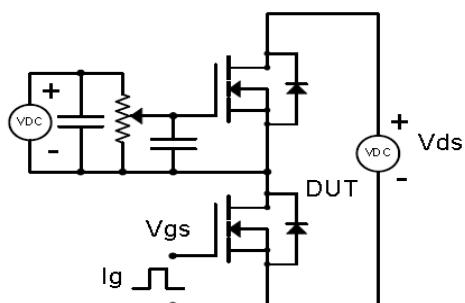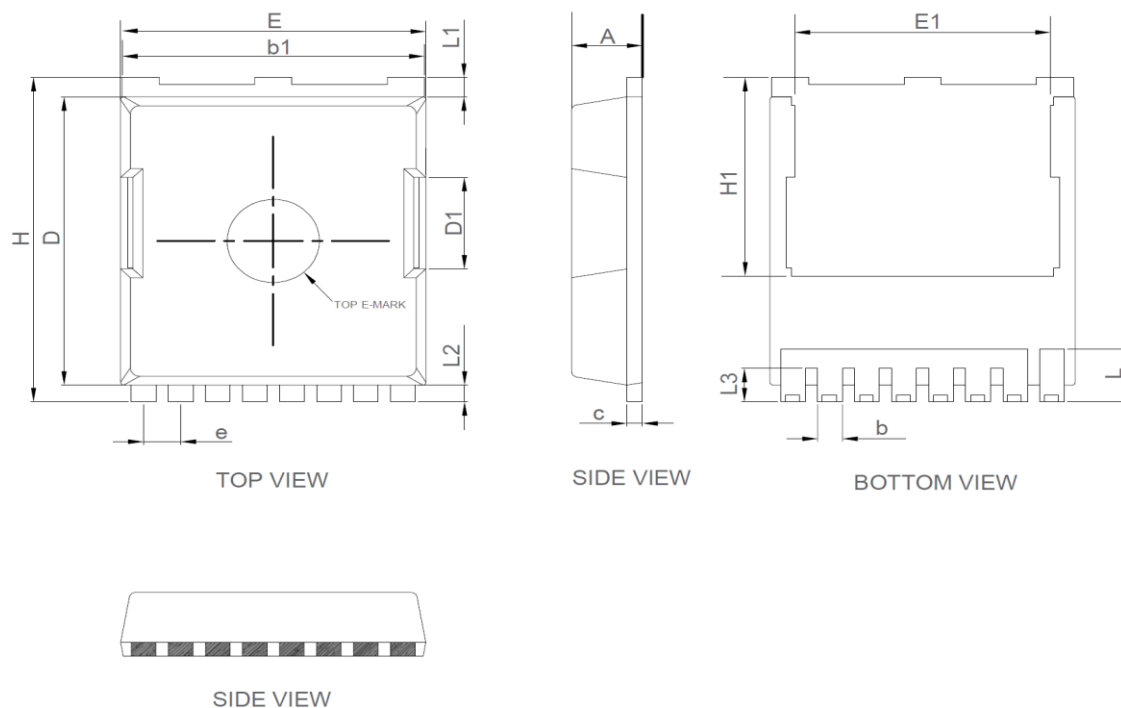
Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$E_{AR} = 1/2\, LI_{AR}^2$

Diode Recovery Test Circuit & Waveforms

$Q_{rr} = \int Idt$

Package Outline: TOLL

TOP VIEW

TOP E-MARK

SIDE VIEW

BOTTOM VIEW

SIDE VIEW

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


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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	2023/8/5	Release of Preliminary version.

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 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.