

Features

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

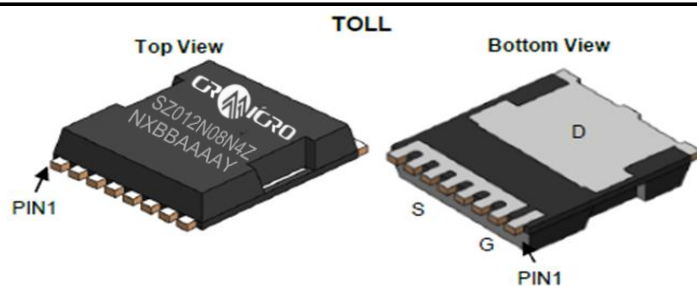
Product Summary

V_{DS}	80V
$R_{DS(on).typ}$	0.95mΩ
I_D	350A

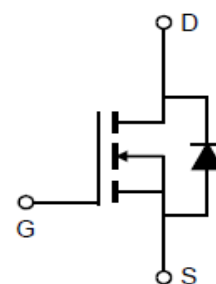
Applications

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

100% DVDS Tested
100% Avalanche Tested



CRSZ012N08N4Z


Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSZ012N08N4Z	SZ012N08N4Z	TOLL	Tape&Reel	N/A	N/A	2000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	80	V
Continuous drain current	I_D	350	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		370	
$T_C = 25^\circ\text{C}$ (Package limit)		219	
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	1400	A
Avalanche energy, single pulse ($I_D = 95\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	2239	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	260	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	°C

※. Notes:

1.EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_{AS} = 95\text{A}$, $V_{GS} = 10\text{V}$.

2.Repetitive rating, pulse width limited by junction temperature $T_j(\text{MAX}) = 150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_j = 25^\circ\text{C}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.48	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	66	

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}	85	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		85	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	2.2	3.0	3.8	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=80V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=125^\circ C$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.95	1.25	mΩ	$V_{GS}=10V, I_D=95A$
Transconductance	g_{fs}	131	261	523	S	$V_{DS}=5V, I_D=95A$

Dynamic Characteristic

Input Capacitance	C_{iss}	9592	14387	21581	pF	$V_{GS}=0V, V_{DS}=40V,$ $f=1MHz$
Output Capacitance	C_{oss}	1910	2865	4297		
Reverse Transfer Capacitance	C_{rss}	15	31	62		
Gate Total Charge	Q_G	135	203	305	nC	$V_{GS}=10V, V_{DS}=50V,$ $I_D=95A$
Gate-Source charge	Q_{gs}	51	76	114		
Gate-Drain charge	Q_{gd}	12	25	49		
Turn-on delay time	$t_{d(on)}$	19	38	76	ns	$V_{GS}=10V, V_{DD}=40V,$ $R_{G_ext}=2.7\Omega$
Rise time	t_r	46	69	103		
Turn-off delay time	$t_{d(off)}$	76	113	170		
Fall time	t_f	30	45	68		
Gate resistance	R_G	0	1.9	9.45	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}	-	0.83	1.4	V	$V_{GS}=0V, I_{SD}=95A$
Body Diode Reverse Recovery Time	t_{rr}	62	124	248	ns	$I_F=95A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	184	367	734	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

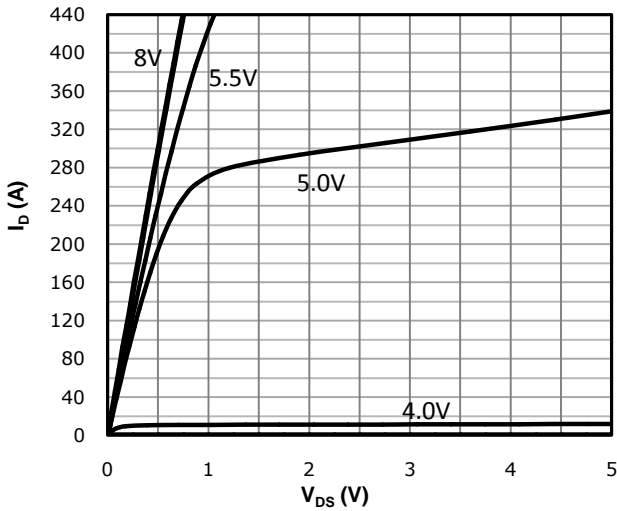


Fig 2: Transfer Characteristics

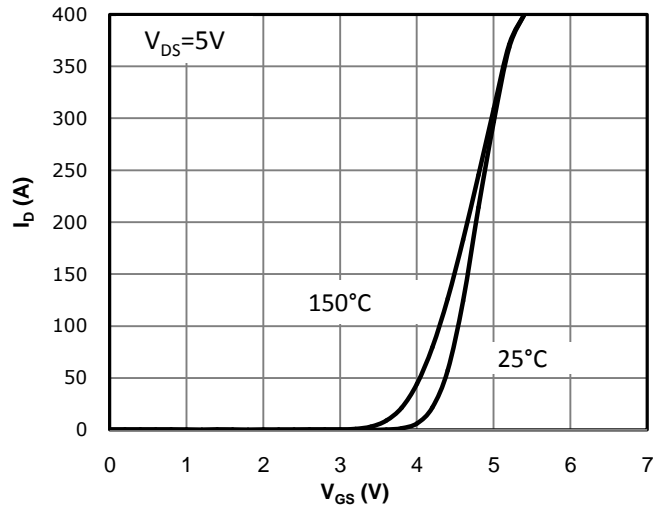


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

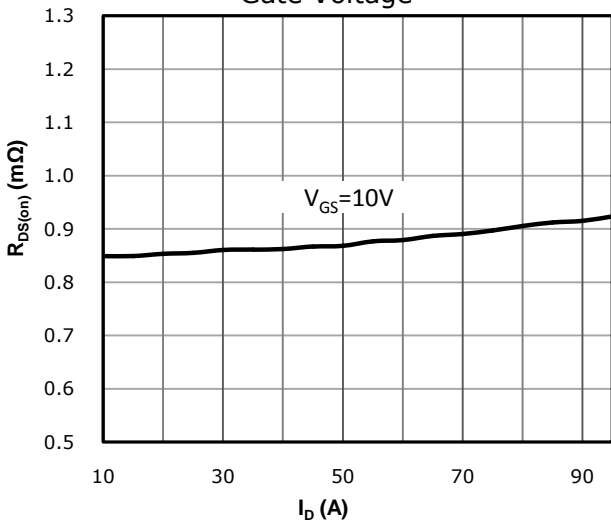


Fig 4: $R_{DS(on)}$ vs Gate Voltage

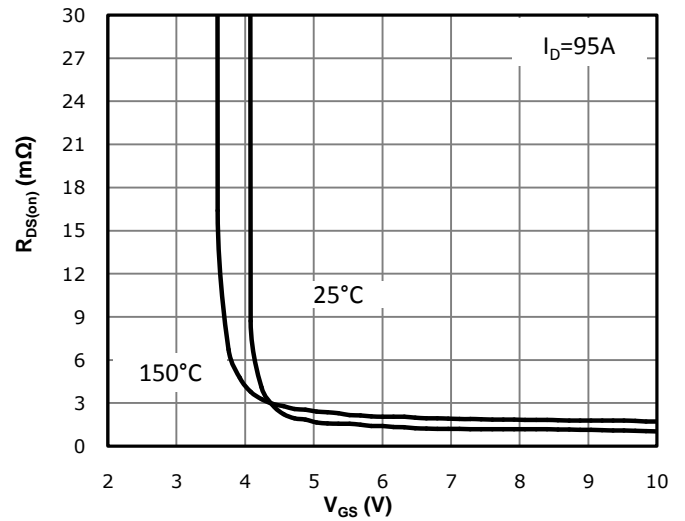


Fig 5: $R_{DS(on)}$ vs. Temperature

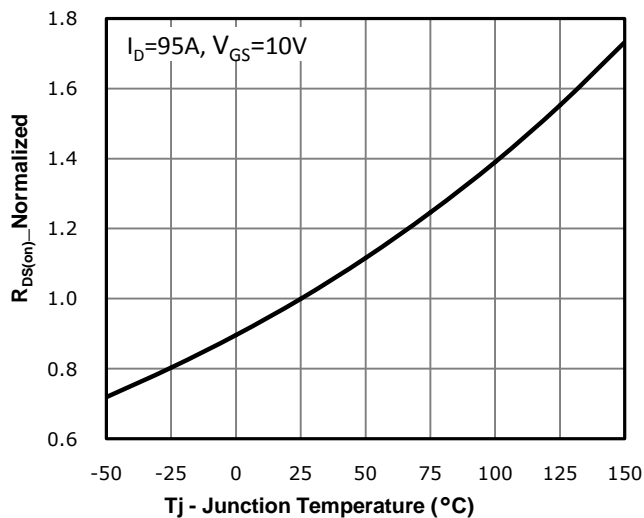


Fig 6: $V_{gs(th)}$ vs. Temperature

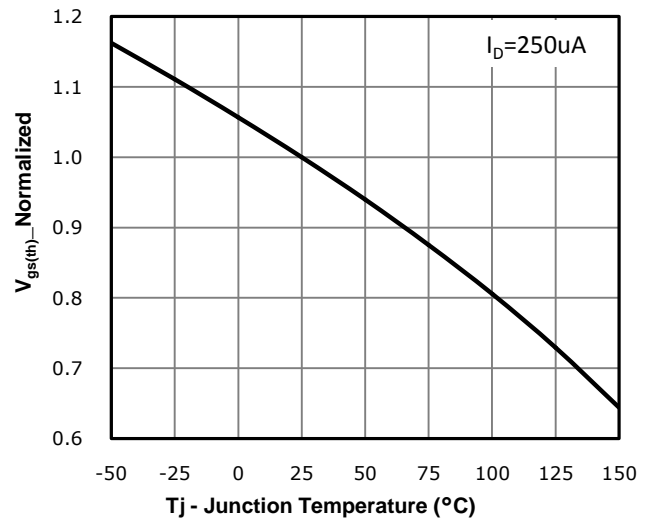


Fig 7: BVdss vs. Temperature

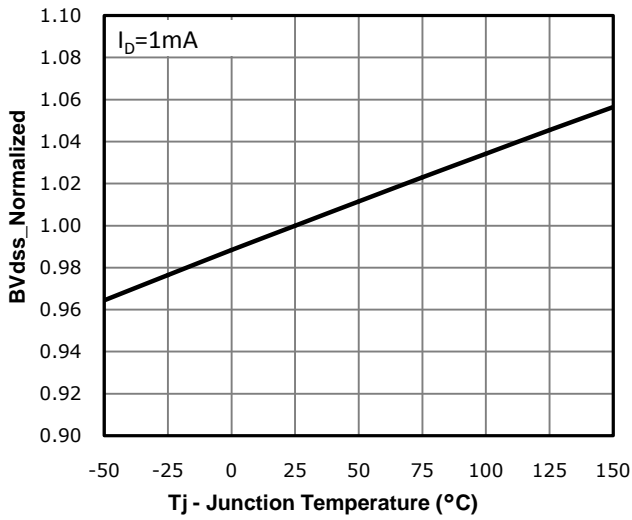


Fig 8: Capacitance Characteristics

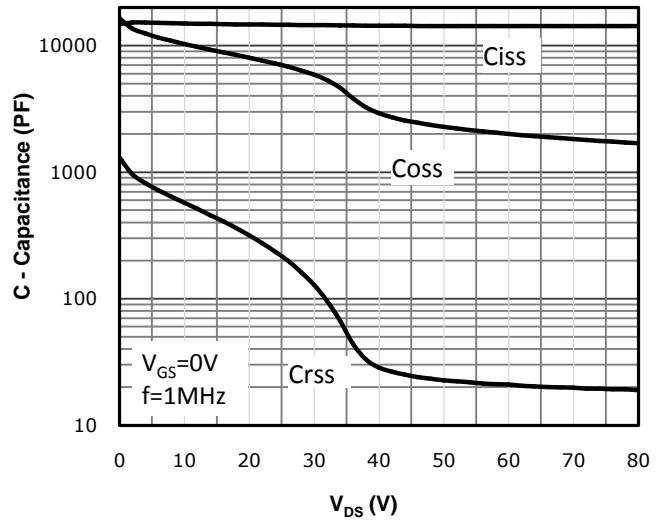


Fig 9: Gate Charge Characteristics

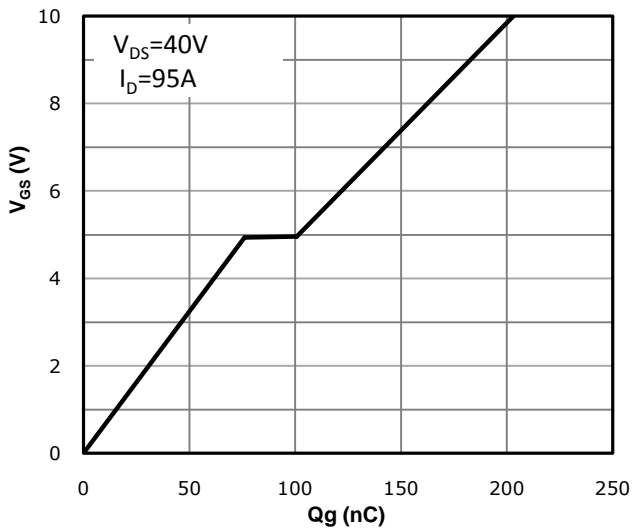


Fig 10: Body-diode Forward Characteristics

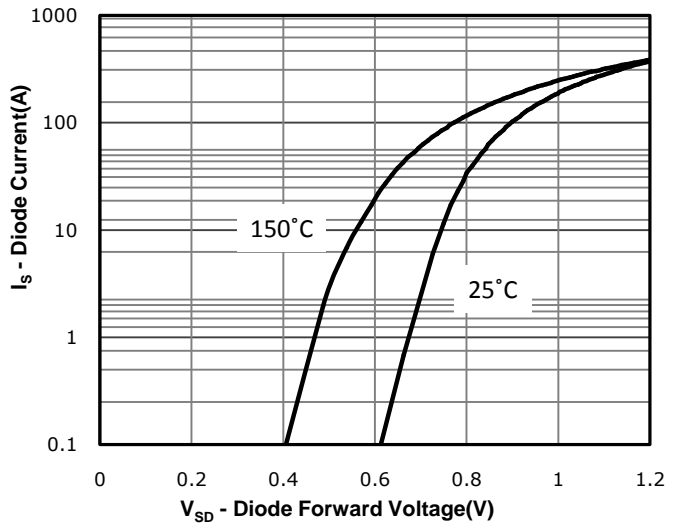


Fig 11: Power Dissipation

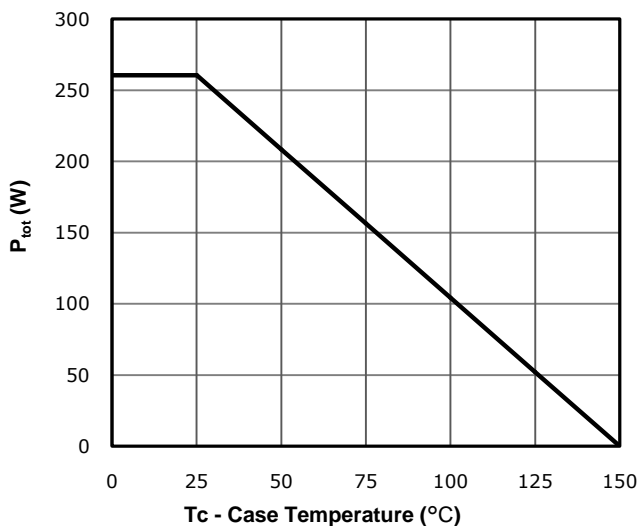


Fig 12: Drain Current Derating

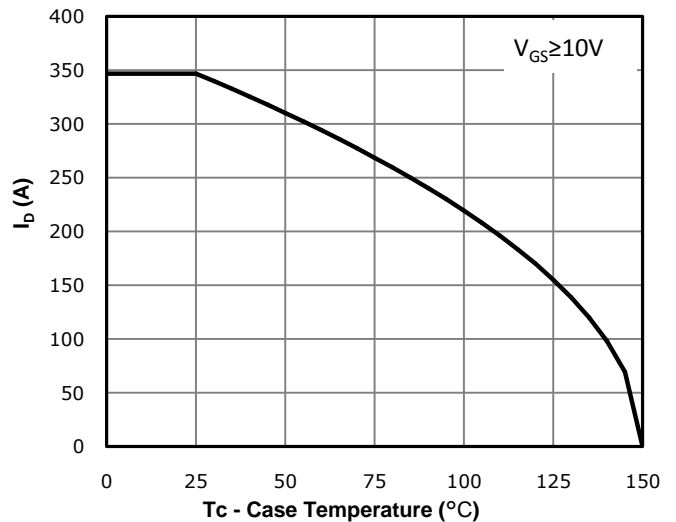


Fig 13: Safe Operating Area

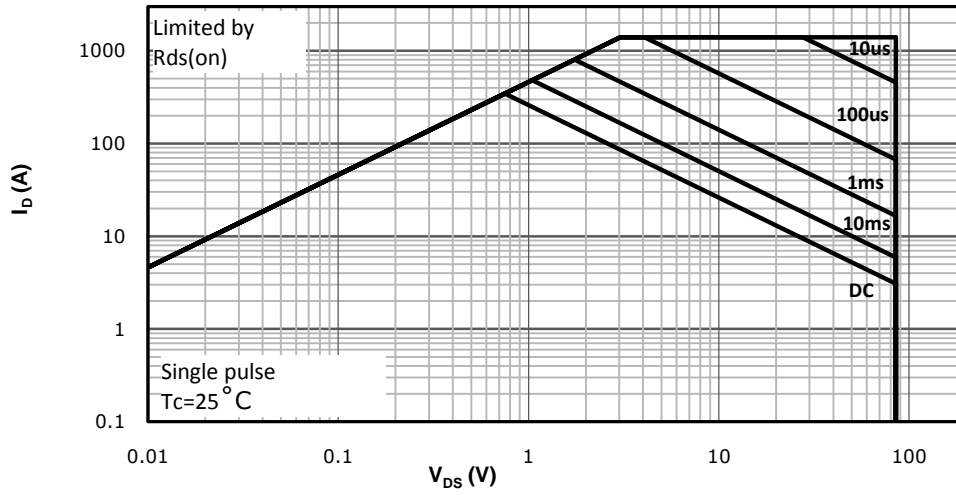
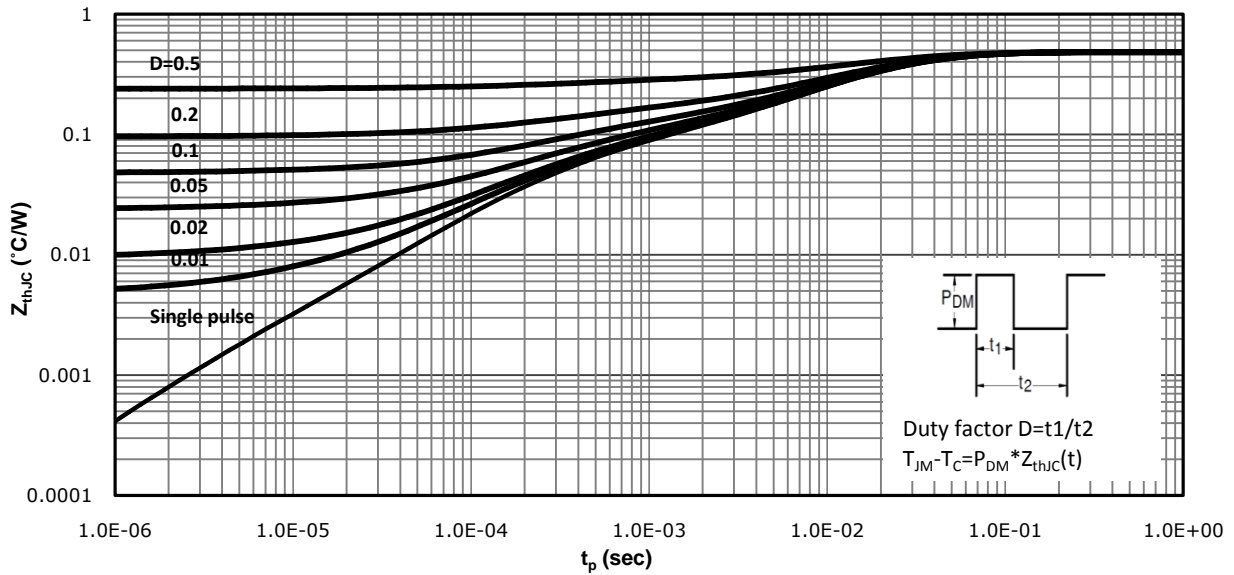
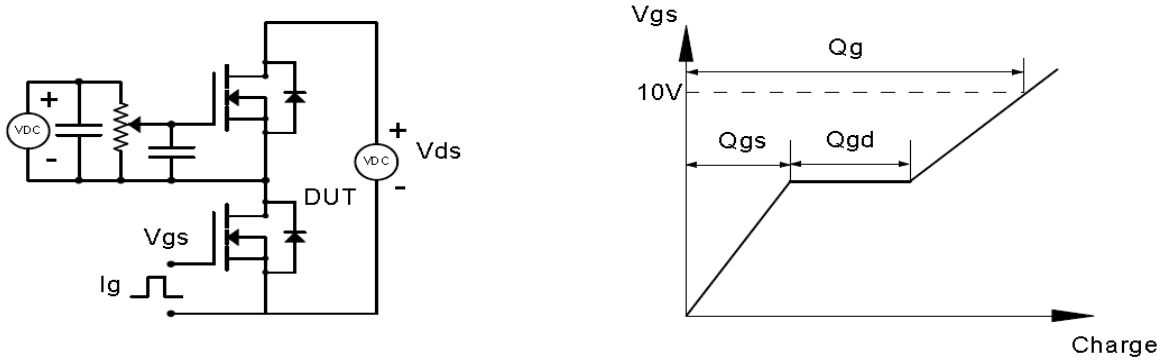


Fig 14: Max. Transient Thermal Impedance

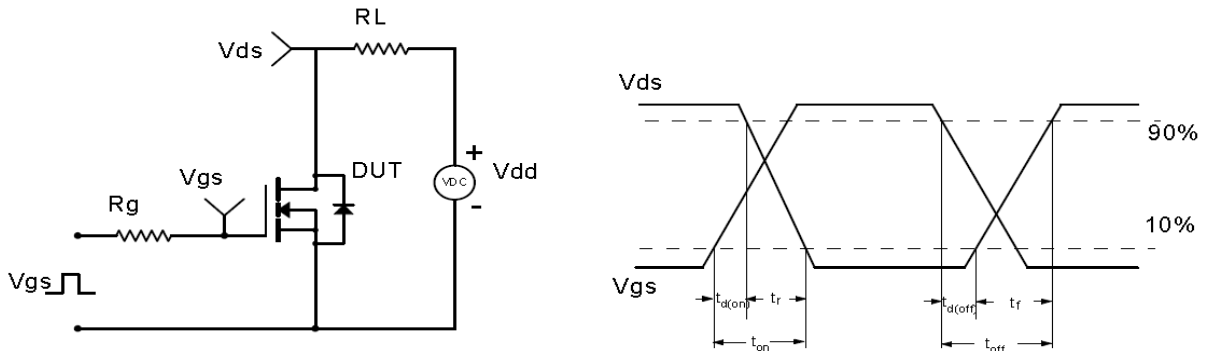


Test Circuit & Waveform

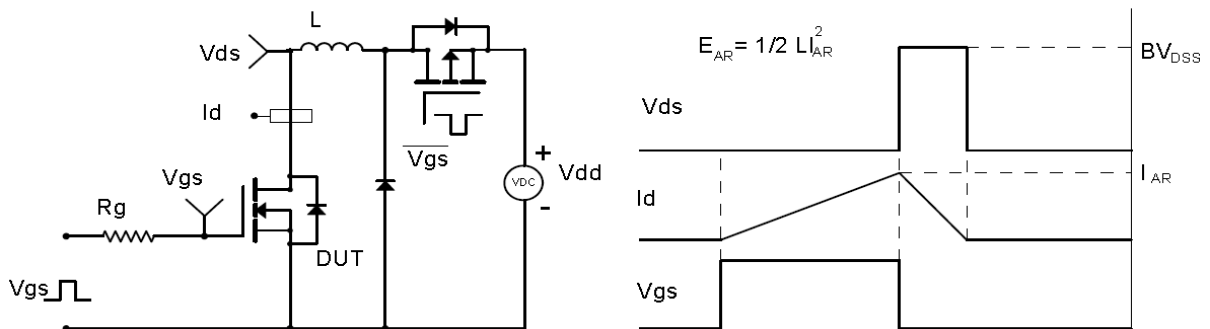
Gate Charge Test Circuit & Waveform



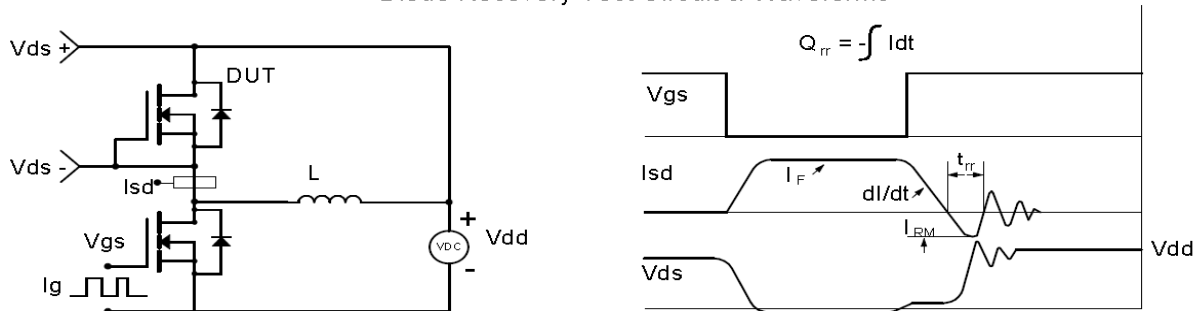
Resistive Switching Test Circuit & Waveforms

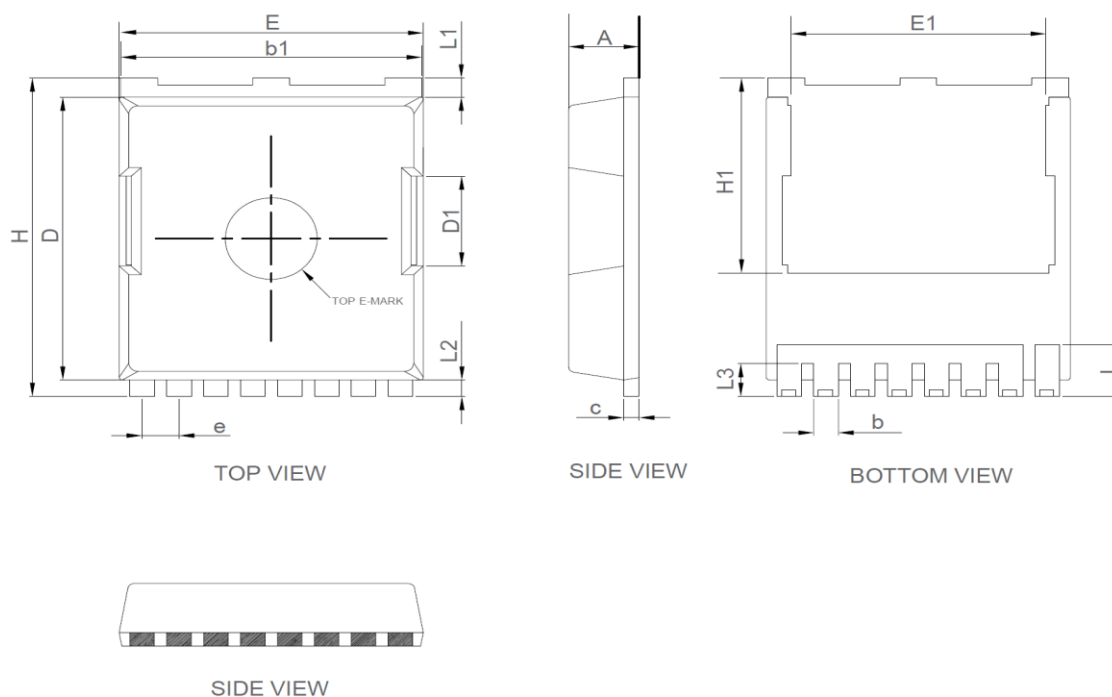


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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:

NXBBAAAAAY

N —Wire Bond code
X —Assembly location code
BB —Fab code
AAAA —Lot code
Y —Bin code

Revision History

Revision	Date	Major changes
1.0	2023-8-5	Release of Preliminary version.
1.1	2023-11-23	Update $BV_{DSS}/t_{rr}/Q_{rr}$.

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 semiconductor 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.