华润微电子(重庆)有限公司

CRSG022N10N4Z

SkyMOS4 N-MOSFET 100V, 1.8mΩ, 240A

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

Product Summary

V_{DS}	100V
$R_{DS(on)}$	1.8mΩ
I_D	240A

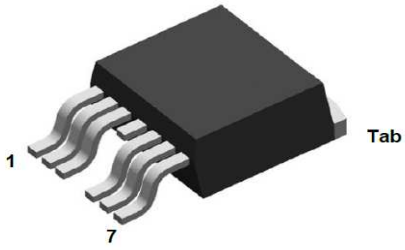
Applications

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

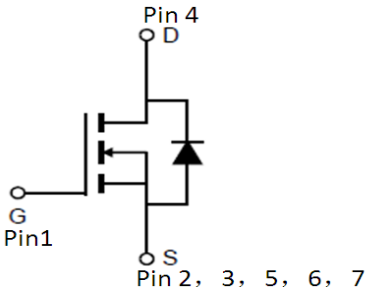
100% DVDS Tested

100% Avalanche Tested

RoHS HF



CRSG022N10N4Z



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSG022N10N4Z	SG022N10N4Z	TO-263-6L	Tape&Reel	N/A	N/A	-

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	 281 240 198	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	960	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)[1]	E_{AS}	500	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	300	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

Notes:1.EAS was tested at Tj = 25℃, ID = 45A.

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.50	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	55	

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}	100	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.2	3	3.8	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	0.05 -	1 100	μA	V_{DS}=100V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	±10	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	1.8	2.2	mΩ	V_{GS}=10V, I_D=100A
Transconductance	g_{fs}	-	275	-	S	V_{DS}=5V,I_D=100A
Dynamic Characteristic						
Input Capacitance	C_{iss}	8000	-	20000	pF	V_{GS}=0V, V_{DS}=40V, f=1MHz
Output Capacitance	C_{oss}	1000	-	3500		
Reverse Transfer Capacitance	C_{rss}	20	-	300		
Input Capacitance	C_{iss}	7565	11347	17020.5	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	1167	1751	4376		
Reverse Transfer Capacitance	C_{rss}	25	37	259		
Gate Total Charge	Q_G	100	157	200	nC	V_{GS}=10V, V_{DS}=50V, I_D=100A, f=1MHz
Gate-Source charge	Q_{gs}	30	66	100		
Gate-Drain charge	Q_{gd}	12	18	35		

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Turn-on delay time	$t_{d(on)}$	19	29	43	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3.0Ω
Rise time	t_r	76	114	170		
Turn-off delay time	$t_{d(off)}$	52	78	117		
Fall time	t_f	72	109	163		
Gate resistance	R_G	1	1.6	2.5	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}	-	0.9	1.4	V	V_{GS}=0V,I_{SD}=100A
Body Diode Continuous Forward Current	I_S	-	-	240	A	T_C = 25°C
Body Diode Pulsed Current	$I_{S\ pulse}$	-	-	960	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	49	99	197	ns	I_F=100A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	109	218	436	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

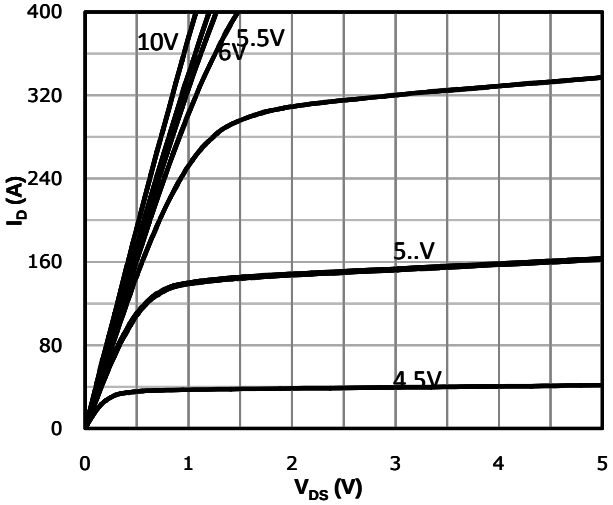
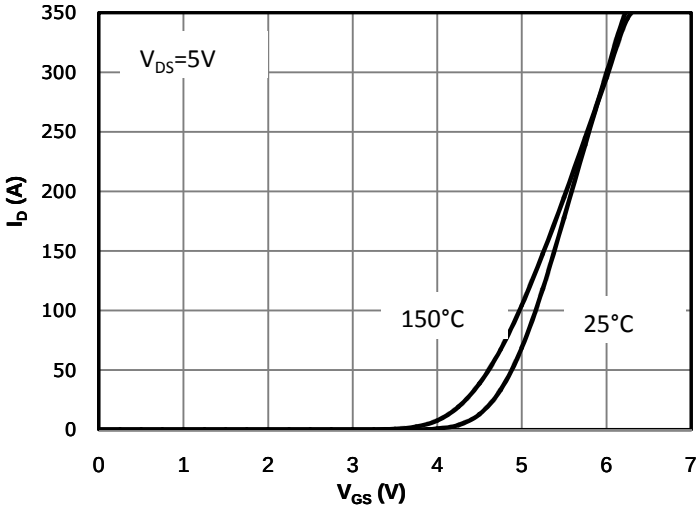


Fig 2: Transfer Characteristics



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

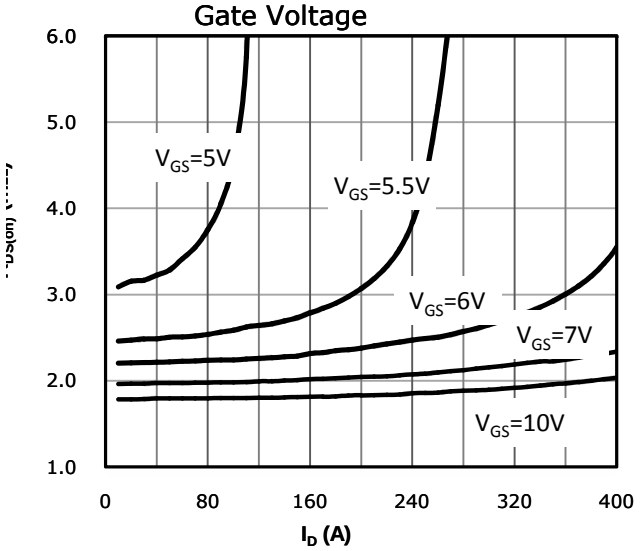


Fig 4: Rds(on) vs Gate Voltage

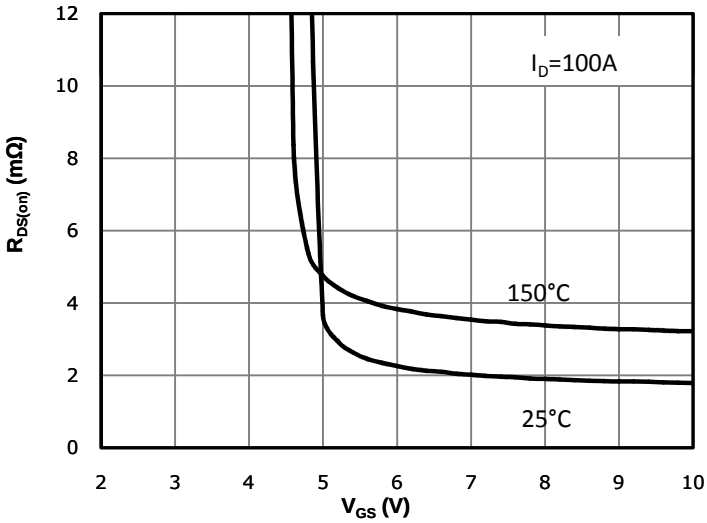


Fig 5: Rds(on) vs. Temperature

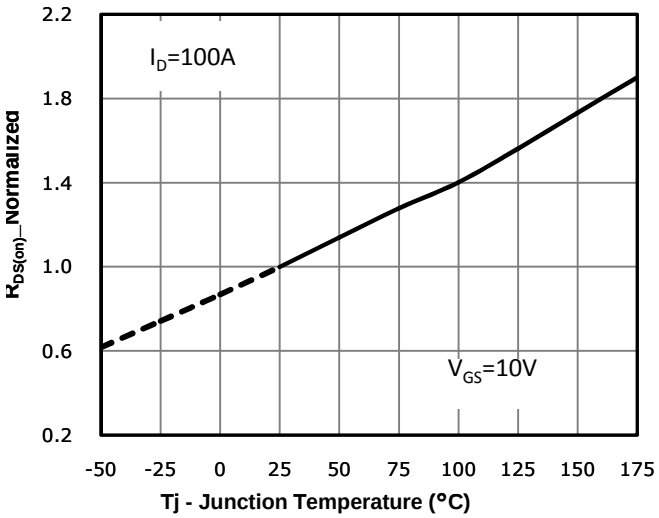
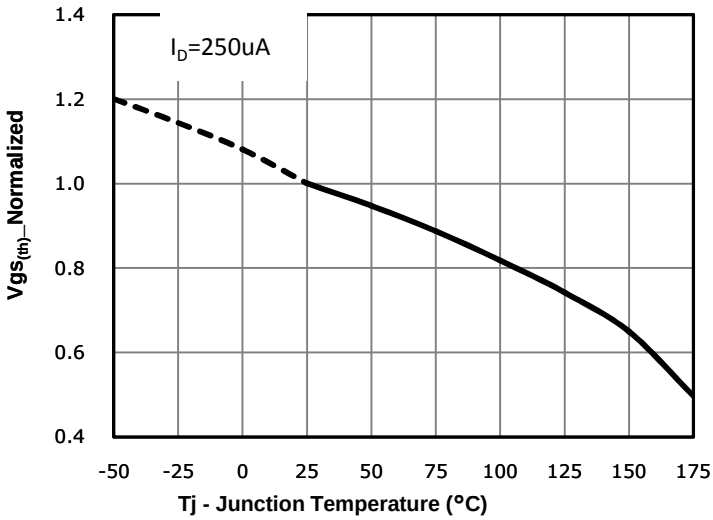


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVds vs. Temperature

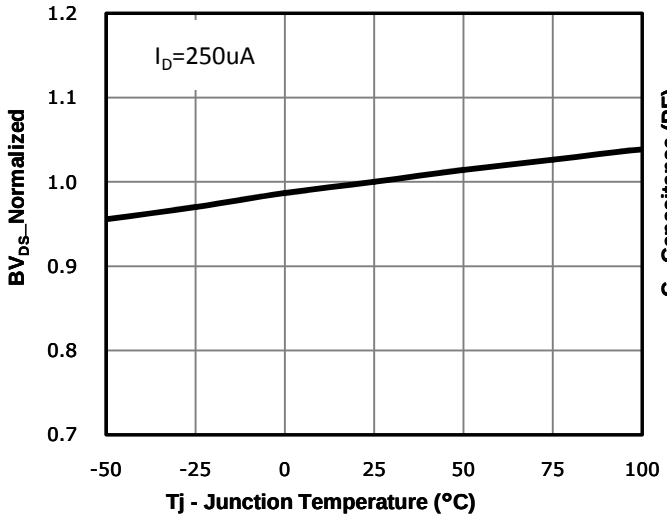


Fig 8: Capacitance Characteristics

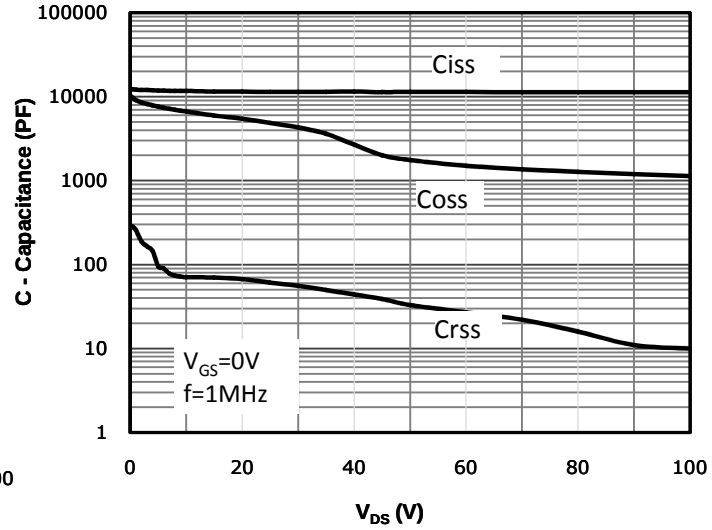


Fig 9: Gate Charge Characteristics

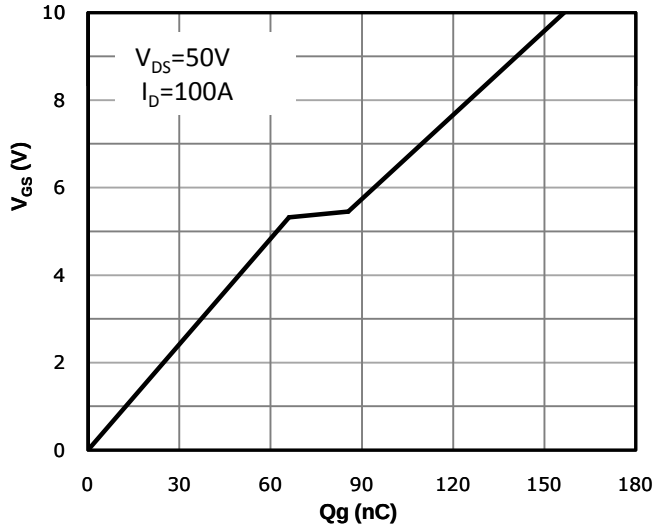


Fig 10: Body-diode Forward Characteristics

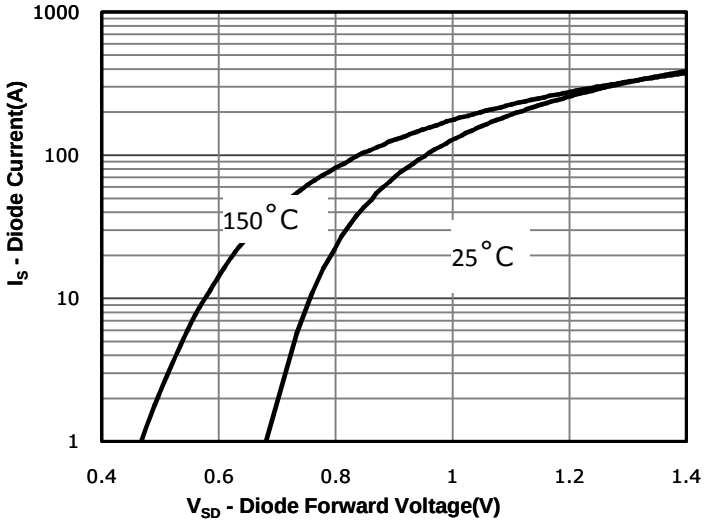


Fig 11: Power Dissipation

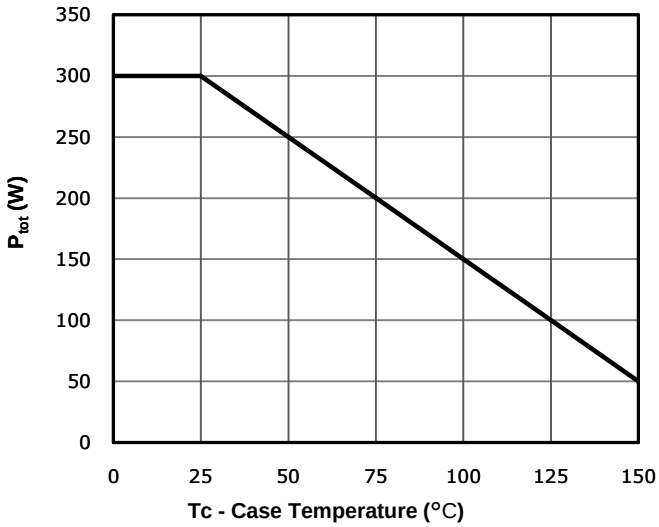
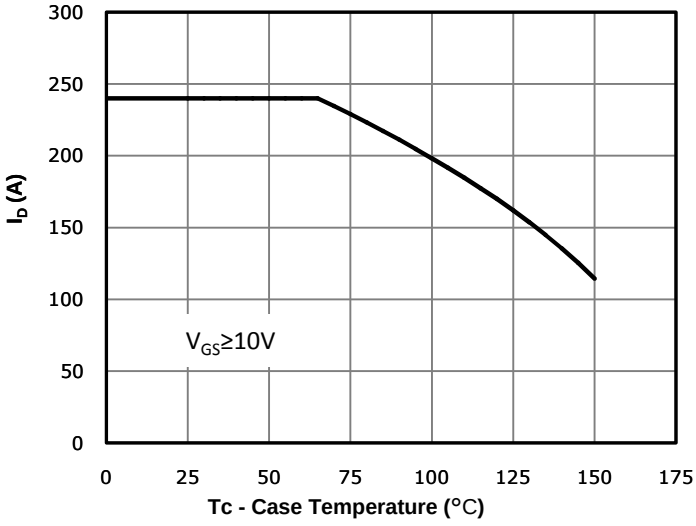


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

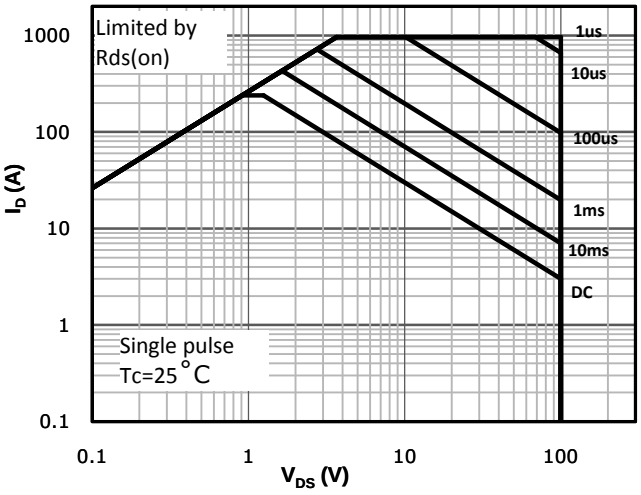
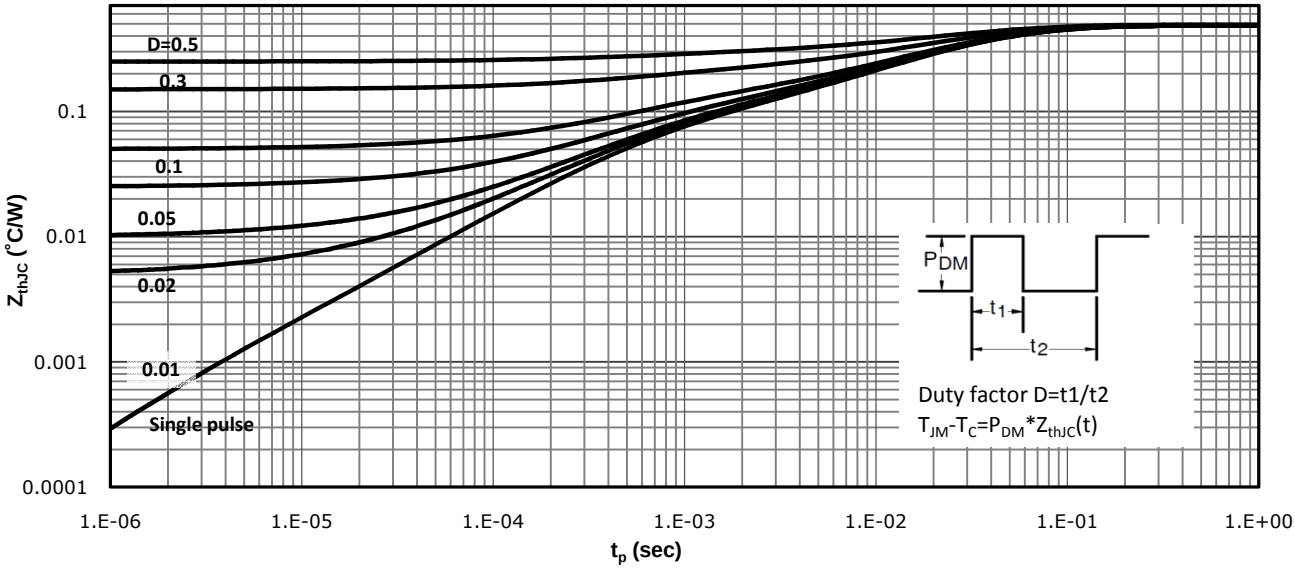


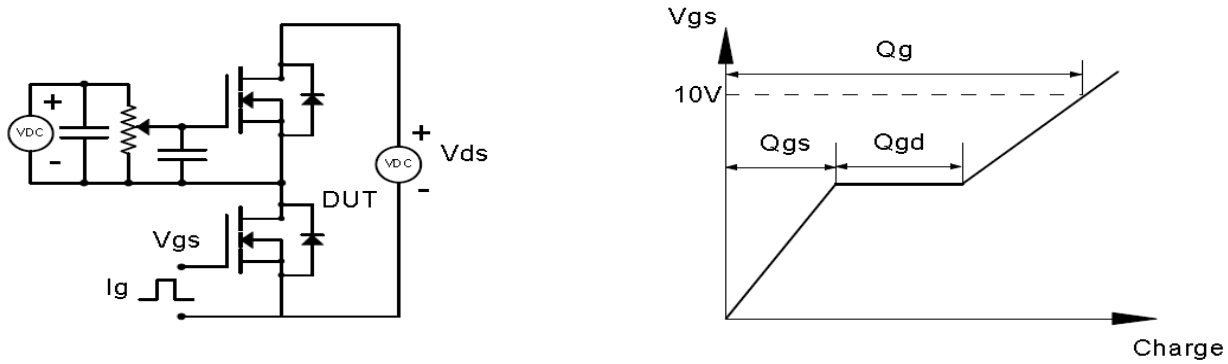
Fig 13: Max. Transient Thermal Impedance



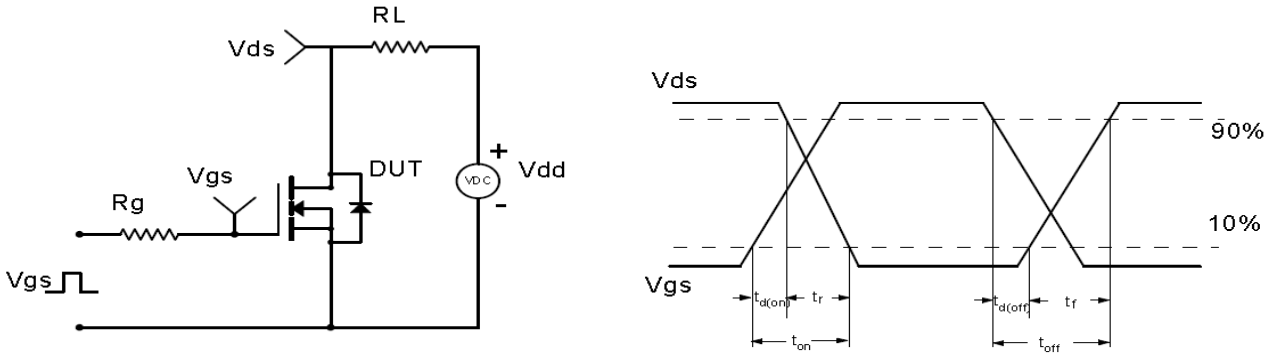
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Test Circuit & Waveform

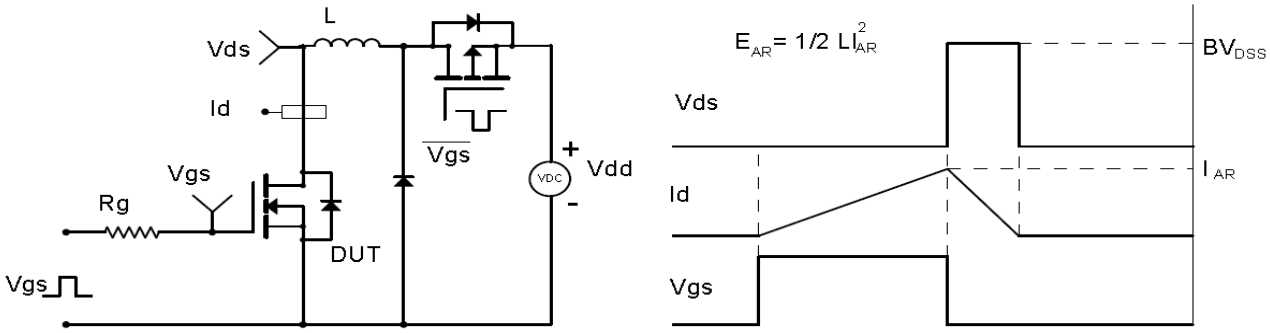
Gate Charge Test Circuit & Waveform



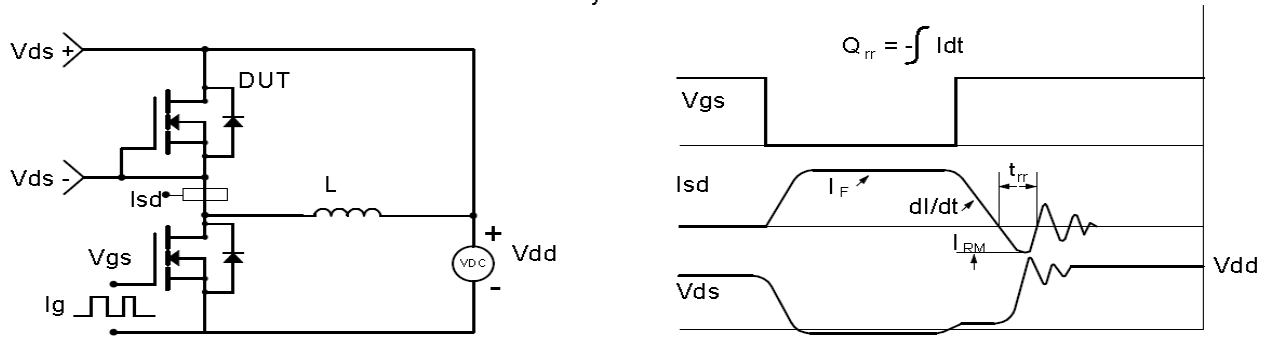
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

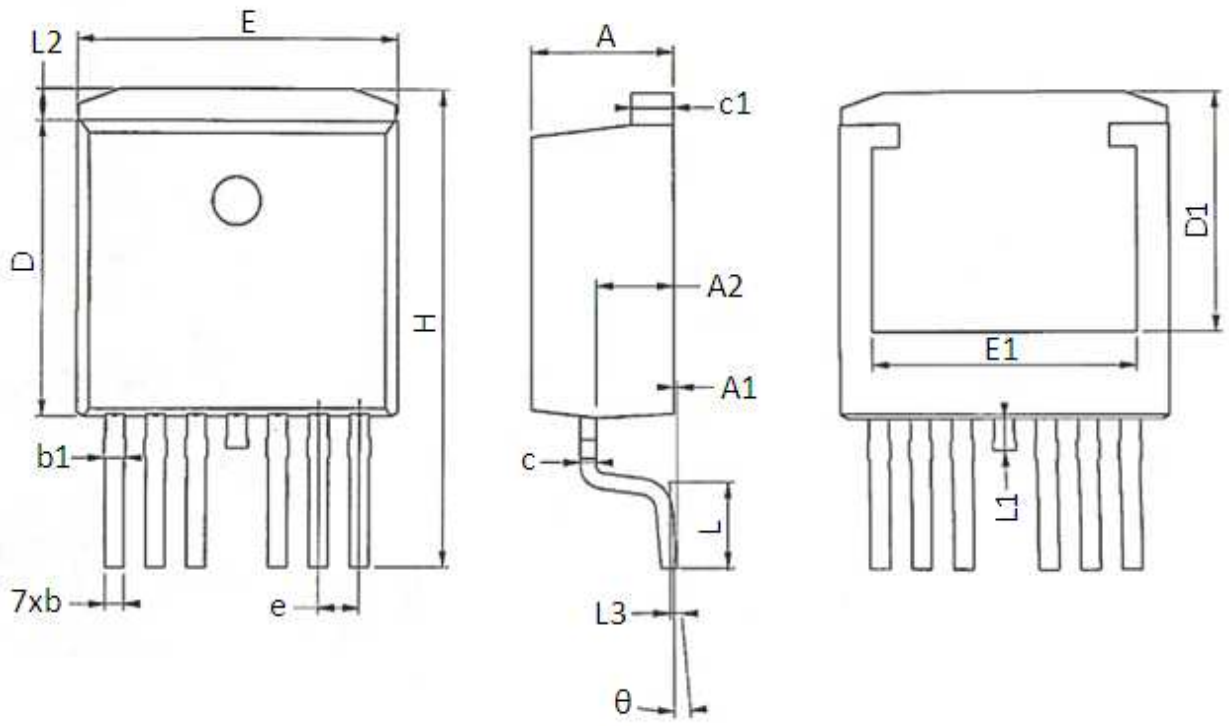


Diode Recovery Test Circuit & Waveforms



Package Outline: TO263-6L

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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.60	0.167	0.181
A1	0.00	0.25	0.000	0.010
A2	2.25	2.55	0.089	0.100
b	0.50	0.70	0.020	0.028
b1	0.58	0.88	0.023	0.035
c	0.40	0.60	0.016	0.024
c1	1.20	1.40	0.047	0.055
D	9.05	9.45	0.356	0.372
D1	6.90	--	0.272	--
e	1.27 BSC		0.050 BSC	
E	9.80	10.20	0.386	0.402
E1	7.25	--	0.285	--
H	14.65	15.35	0.577	0.604
L	2.40	3.00	0.094	0.118
L1	0.85	1.30	0.033	0.051
L2	0.70	1.30	0.028	0.051
L3	0.25 BSC		0.010 BSC	
θ	0°	8°	0°	8°

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Revision History

Revison	Date	Major changes
1.0	10/04/2023	Release of draft 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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