华润微电子(重庆)有限公司

CRSS070N15NZ-Q

SkyMOS1 N-MOSFET 150V, 5.9mΩ, 155A

Features

- Uses CRM(CQ) advanced SkyMOS1 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- AEC-Q101 Criteria Qualified
- 175°C Operating Temperature

Applications

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

Product Summary

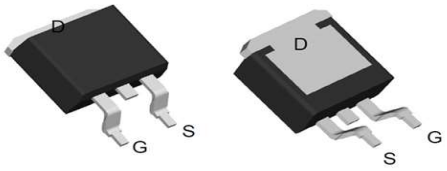
V_{DS}	150V
$R_{DS(on)}$	5.9mΩ
I_D	155A

100% Avalanche Tested

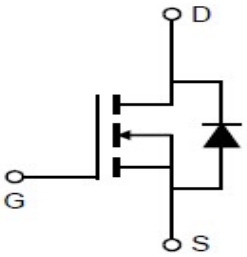
100% DVDS Tested

RoHS H F

TO-263



CRSS070N15NZ-Q



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSS070N15NZ-Q	CRSS070N15NZ	TO-263	Tape	N/A	N/A	800pcs 1000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	150	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 155 160 110	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	620	A
Avalanche energy, single pulse (I_{AS} = 36A, Rg=25Ω)	E_{AS}	324	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	333	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°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 = 36A, Vgs=10V.

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.33	0.45	°C/W	
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	-	-	62	°C/W	

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}	150	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=150V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	5.9	7.0	mΩ	V_{GS}=10V, I_D=60A TO-263
Transconductance	g_{fs}	-	106	-	S	V_{DS}=5V,I_D=60A
Dynamic Characteristic						
Input Capacitance	C_{iss}	3611	5416	8124	pF	V_{GS}=0V, V_{DS}=75V, f=1MHz
Output Capacitance	C_{oss}	381	572	858		
Reverse Transfer Capacitance	C_{rss}	20.7	31	62		
Gate Total Charge	Q_G	52.7	79	118.5	nC	V_{GS}=10V, V_{DS}=75V, I_D=60A, f=1MHz
Gate-Source charge	Q_{gs}	20.7	31	62.0		
Gate-Drain charge	Q_{gd}	11.3	17	34.0		

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Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Turn-on delay time	$t_{d(on)}$	10.0	18.0	32.4	ns	Vds=75V Id=60A Rg=2.7Ω Vgs=10V;
Rise time	t_r	55.6	100.0	180.0		
Turn-off delay time	$t_{d(off)}$	32.8	59.0	106.2		
Fall time	t_f	55.0	99.0	178.2		
Gate resistance	R_G	2.6	4.0	6.0	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}	0.6	0.9	1.4	V	V_{GS}=0V,I_{SD}=60A
Body Diode Continuous Forward Current	I_S	-	-	155	A	T_C = 25°C
Body Diode Pulsed Current	$I_{S\ pulse}$	-	-	620	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	61	122	244	ns	ISD=60A, VGS=0V, dIF/dt=100A/us;
Body Diode Reverse Recovery Charge	Q_{rr}	353	706	1412	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

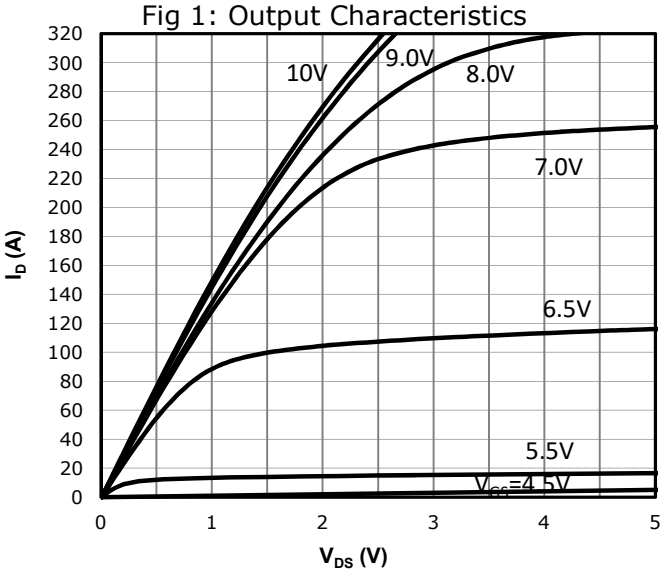


Fig 2: Transfer Characteristics

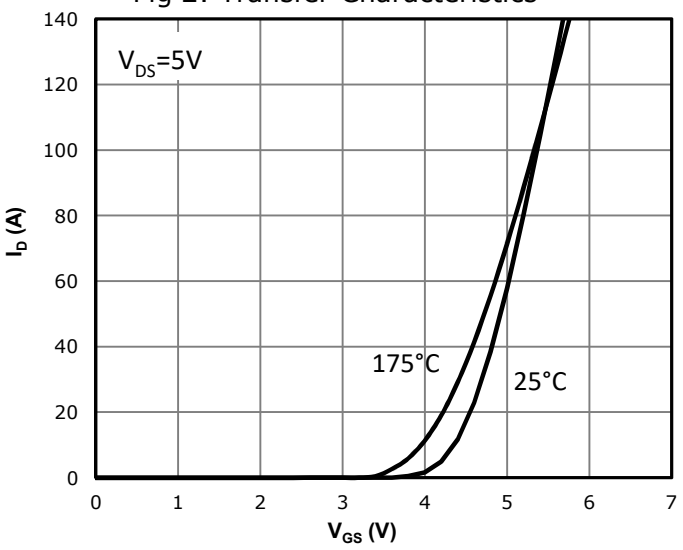


Fig 3: Rds(on) vs Drain Current and Gate Voltage

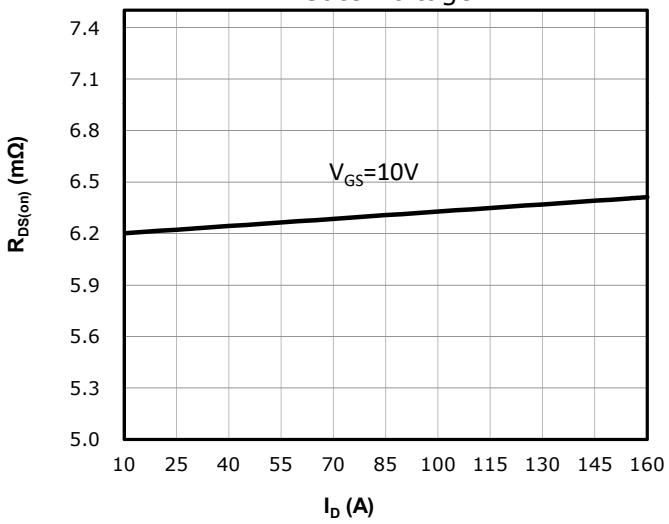


Fig 4: Rds(on) vs Gate Voltage

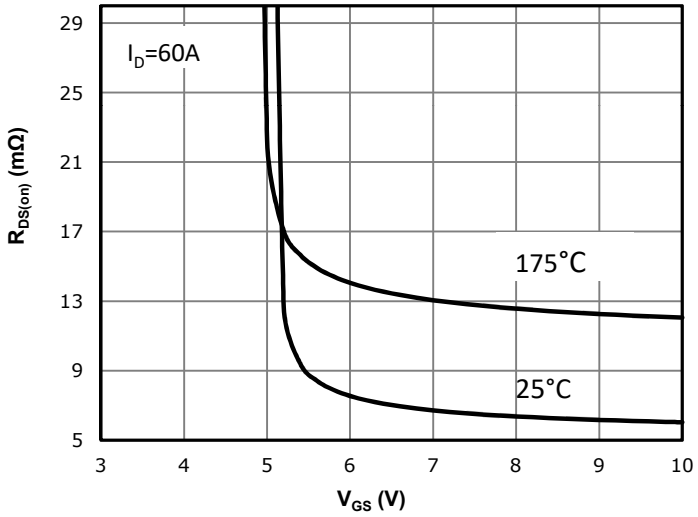


Fig 5: Rds(on) vs. Temperature

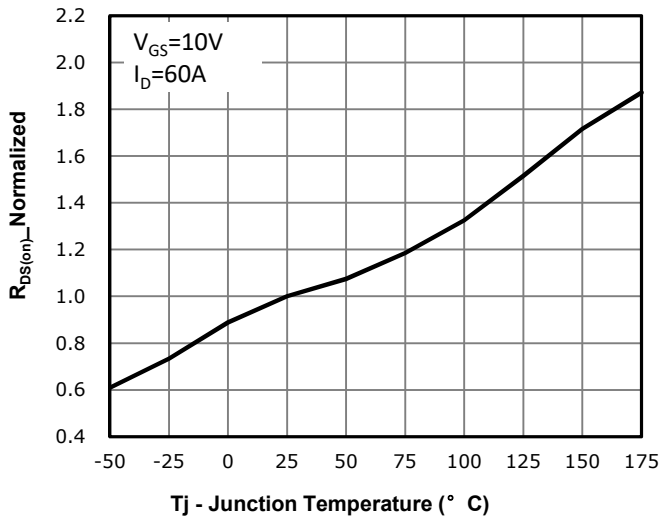
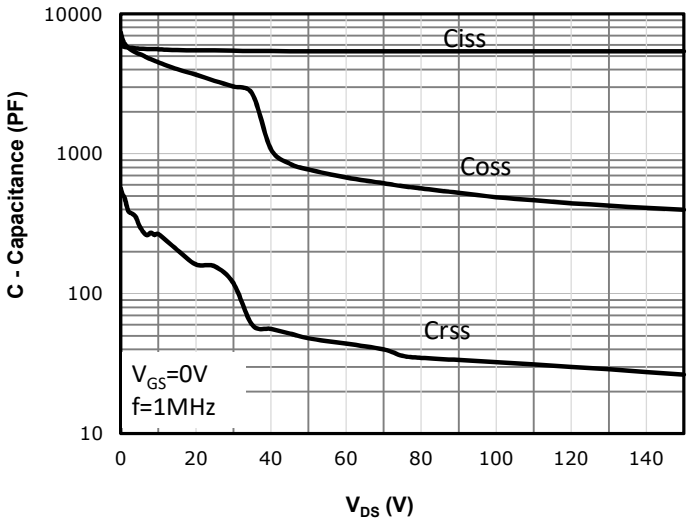


Fig 6: Capacitance Characteristics



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Fig 7: Vgs(th) vs. Temperature

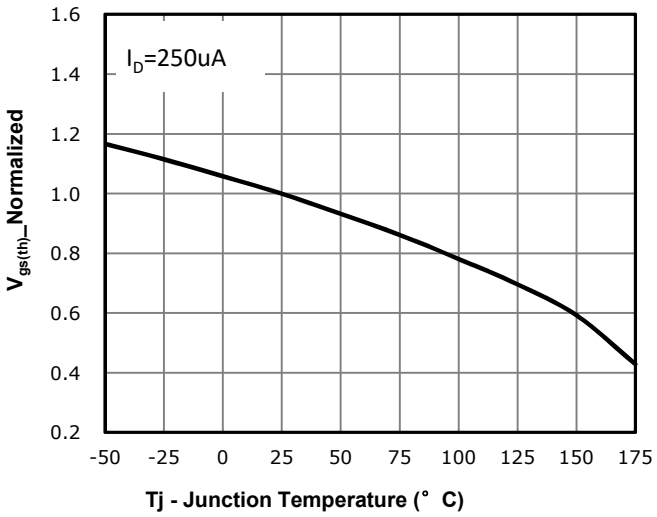


Fig 8: BVdss vs. Temperature

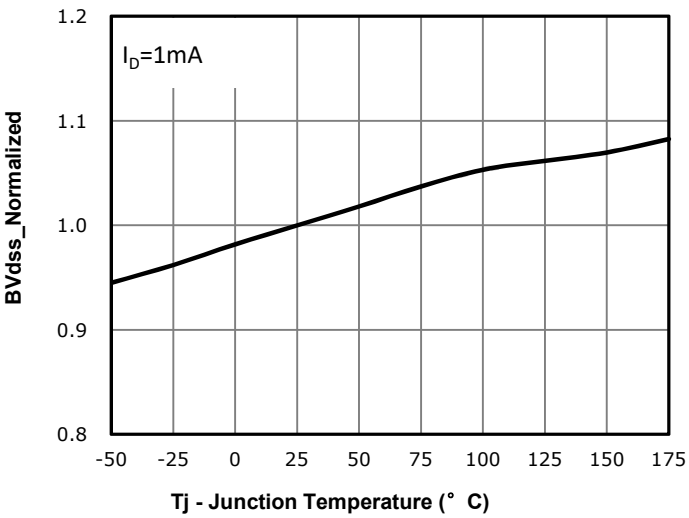


Fig 9: Gate Charge Characteristics

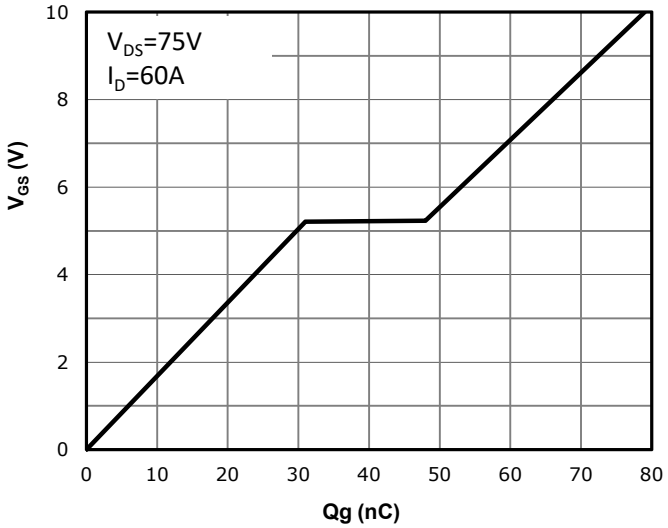


Fig 10: Body-diode Forward Characteristics

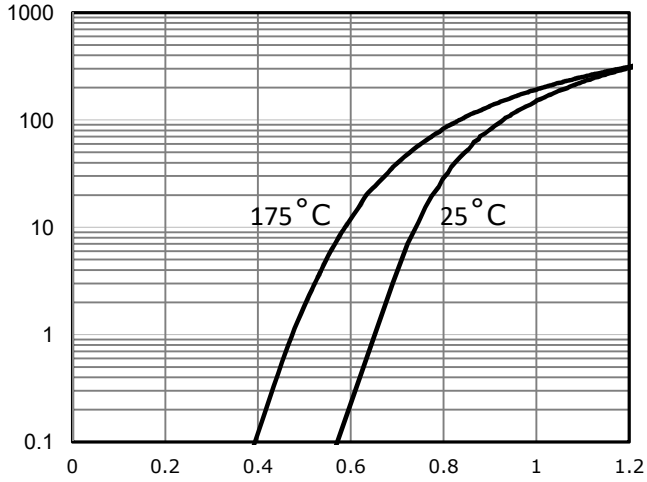


Fig 11: Power Dissipation

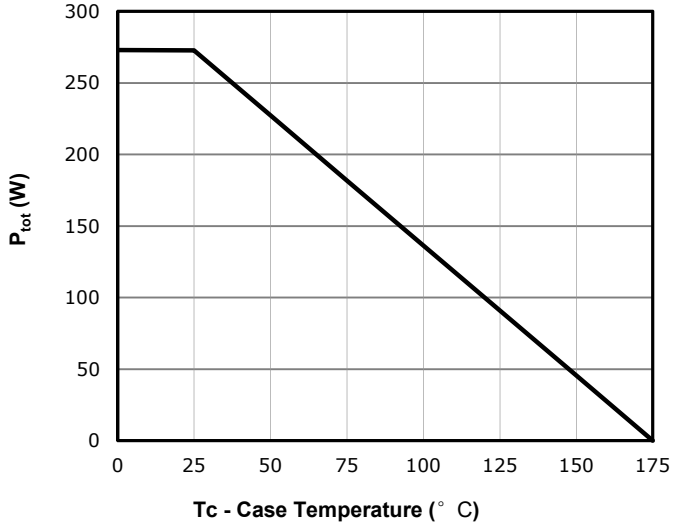
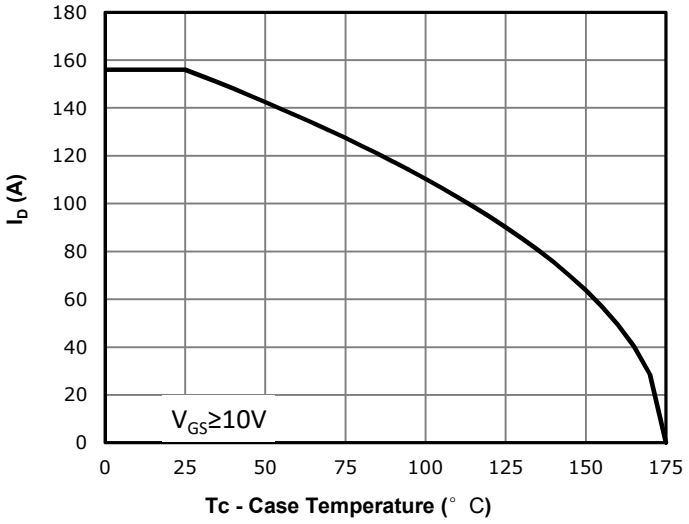


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

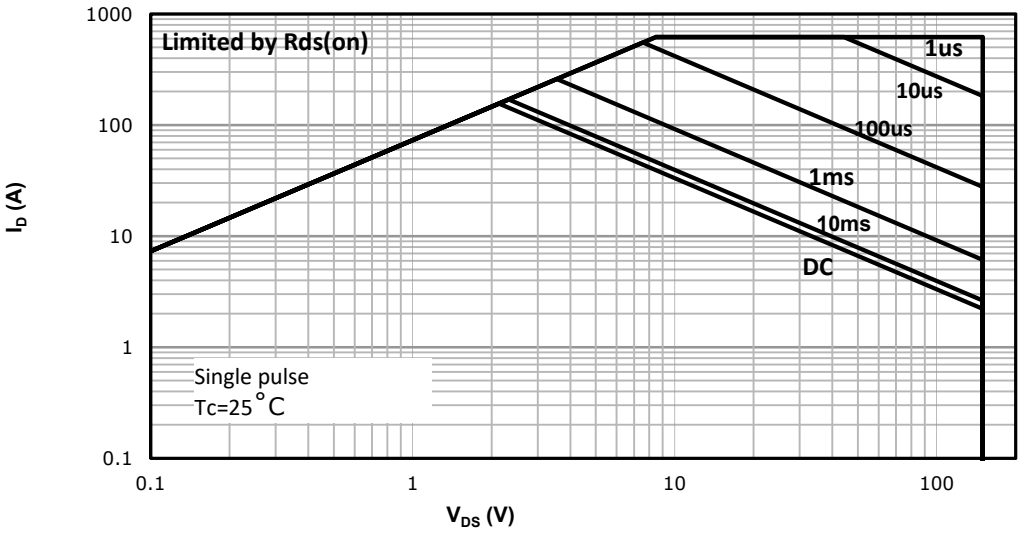
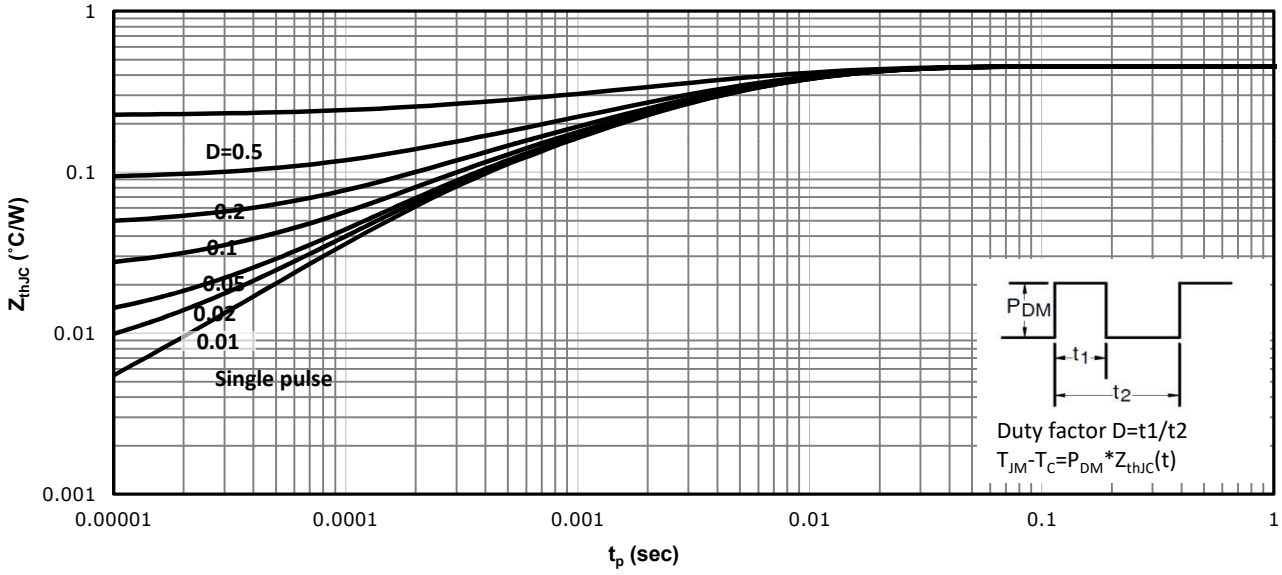


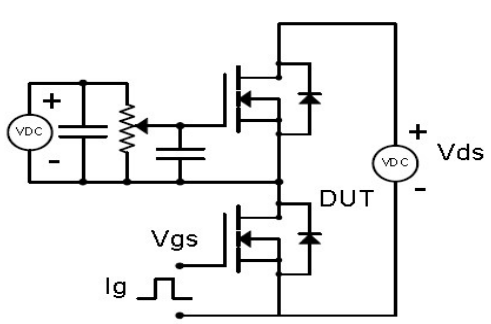
Fig 12: Max. Transient Thermal Impedance

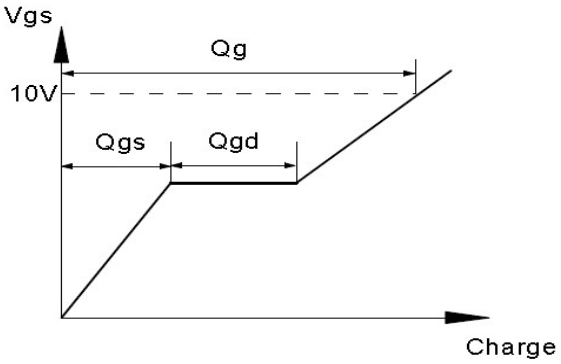


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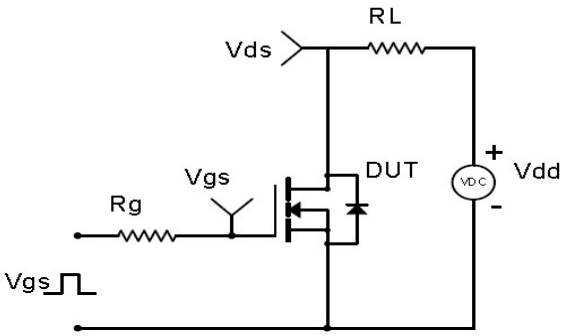
Test Circuit & Waveform

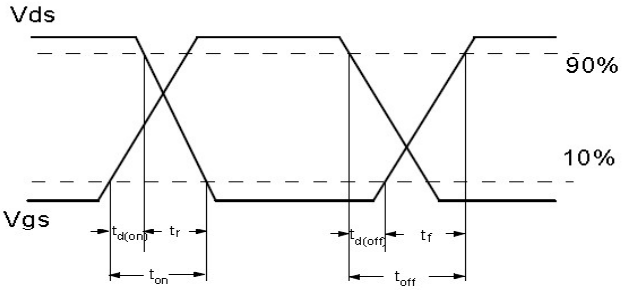
Gate Charge Test Circuit & Waveform



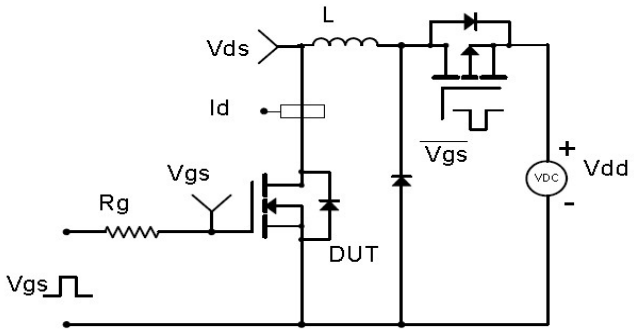


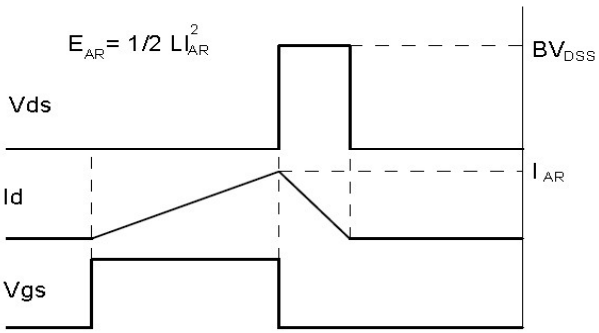
Resistive Switching Test Circuit & Waveforms



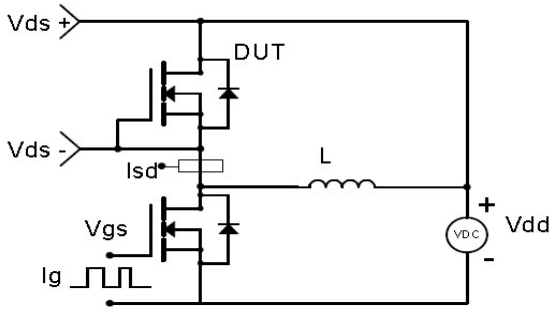


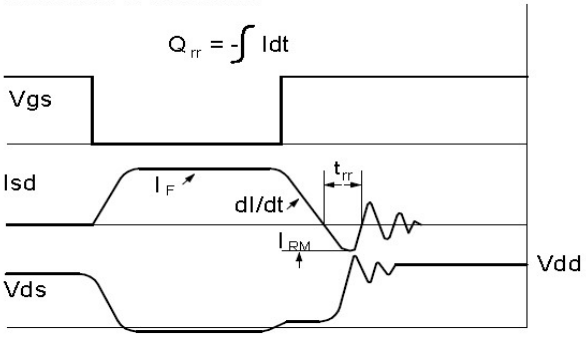
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





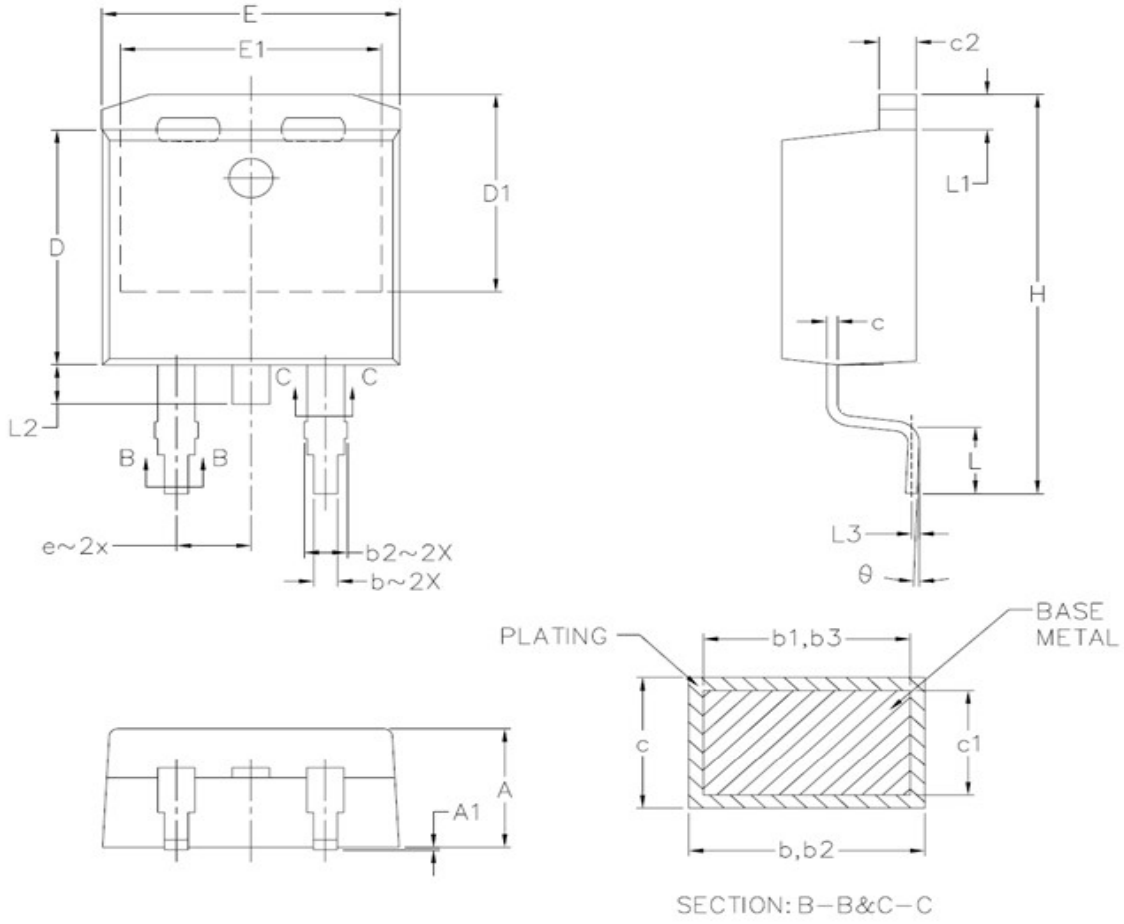
Diode Recovery Test Circuit & Waveforms





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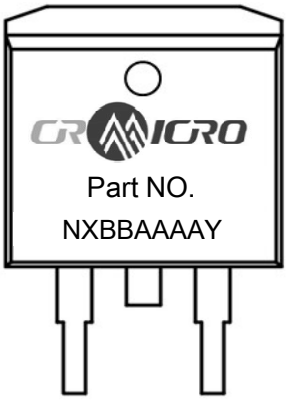
Package Outline: TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.50	0.99	0.020	0.039
b2	1.14	1.78	0.045	0.070
c	0.33	0.74	0.013	0.029
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380
D1	6.86	--	0.270	--
e	2.54 BSC.		0.100 BSC.	
E	9.65	10.67	0.380	0.420
E1	6.22	--	0.245	--
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	--	1.68	--	0.066
L2	--	1.78	--	0.070
L3	0.254 BSC.		0.010 BSC.	
θ	0°	8°	0°	8°

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Marking



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

Revison	Date	Major changes
1.0	2021/12/25	Priliminary Release;
2.0	2022/6/15	Follow CRMICRO Industrial Product Naming Rule HCRSS070N15N change to CRSS070N15NZ
3.0	2022/9/27	Update Package POD
4.0	2022/10/27	Update Product Feature_AEC-Q101 Qualified

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