华润微电子(重庆)有限公司

CRTS105N10N

Trench N-MOSFET 100V, 8.6mΩ, 150A

Features

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

Product Summary

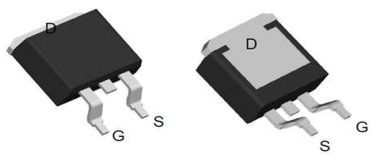
V_{DS}	100V
$R_{DS(on).typ}$	8.6mΩ
I_D	150A

Applications

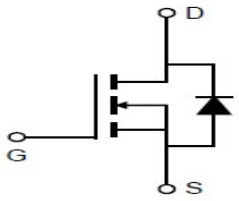
- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)
- Hot swap
- Load switch
- Soft start

100% DVDS Tested
100% Avalanche Tested

TO-263



CRTS105N10N



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTS105N10N	CRTS105N10N	TO-263	Tape	N/A	N/A	800pcs or 1000pcs

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	 150 160 103	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	600	A
Avalanche energy, single pulse (I_D = 74A, Rg=25Ω)[1]	E_{AS}	1378	mJ
Gate-Source voltage	V_{GS}	±25	V
Power dissipation (T_C = 25°C)	P_{tot}	385	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	245	°C

※. Notes:

1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =74A, VGS = 10V.

2.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=175°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.39	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	81	

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
		100	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.4	3.0	3.6	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=100V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	0	-	±100	nA	V_{GS}=±25V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	8.6	10.5	mΩ	V_{GS}=10V, I_D=50A, T_j=25℃
Transconductance	g_{fs}	20	40.0	80	S	V_{DS}=5V,I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	6015	9023	13535	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	402	602	904		
Reverse Transfer Capacitance	C_{rss}	240	480	961		
Gate Total Charge	Q_G	98	146	219	nC	V_{GS}=10V, V_{DS}=50V, I_D=50A
Gate-Source charge	Q_{gs}	30	45	67		
Gate-Drain charge	Q_{gd}	26	51	102		
Turn-on delay time	$t_{d(on)}$	13	26	53	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=2.7Ω, ID=50A
Rise time	t_r	61	92	137		
Turn-off delay time	$t_{d(off)}$	36	72	144		
Fall time	t_f	54	80	121		
Gate resistance	R_G	0.3	1.5	7	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.5	0.8	1.3	V	V_{GS}=0V,I_{SD}=50A
Body Diode Continuous Forward Current	I_S			150	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	93	-	ns	I_F=50A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	354	-	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

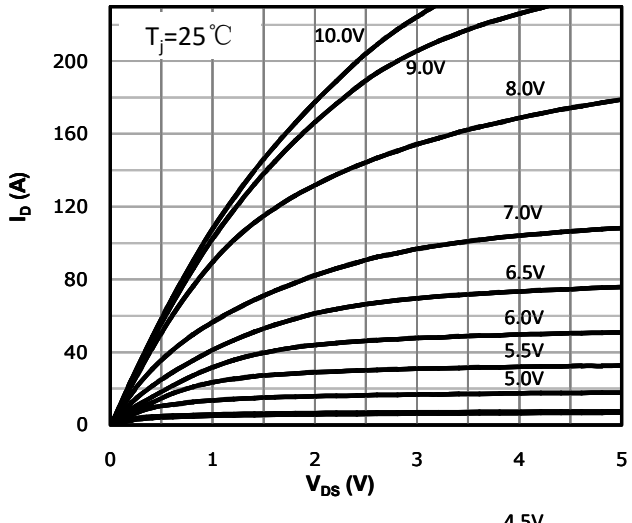


Fig 2: Transfer Characteristics

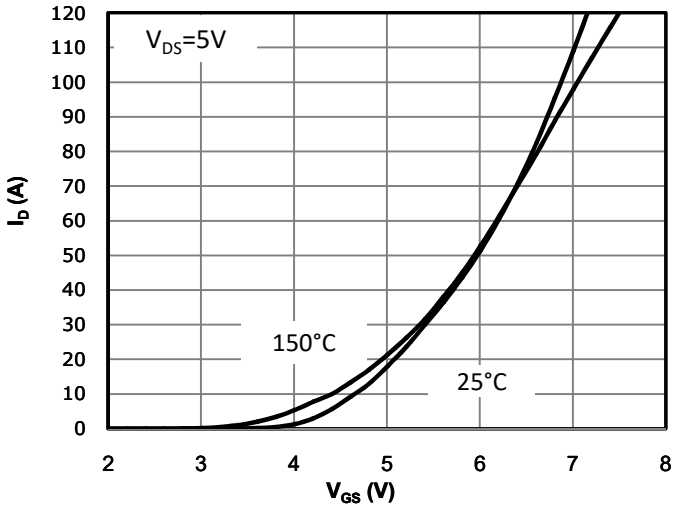


Fig 3: Rds(on) vs Drain Current and Gate Voltage

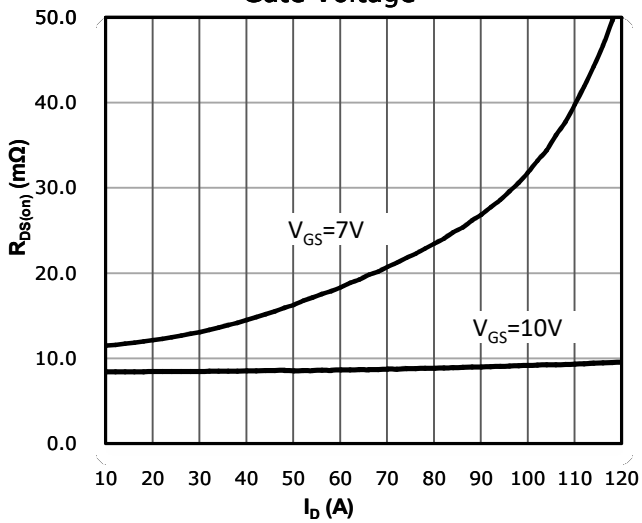


Fig 4: Rds(on) vs Gate Voltage

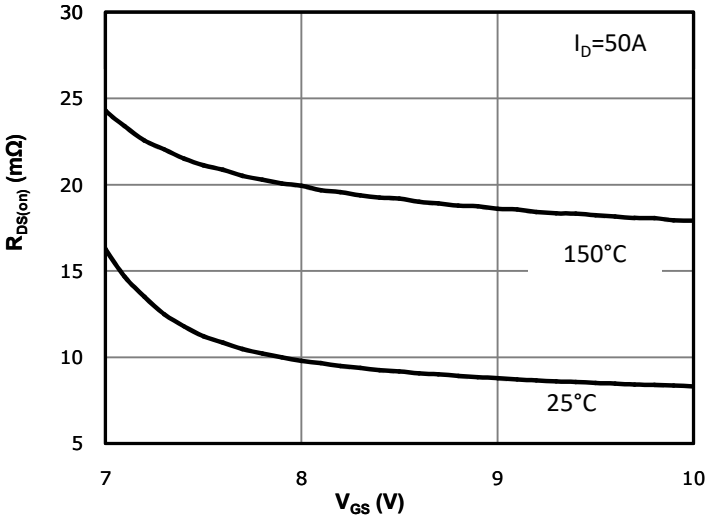


Fig 5: Rds(on) vs. Temperature

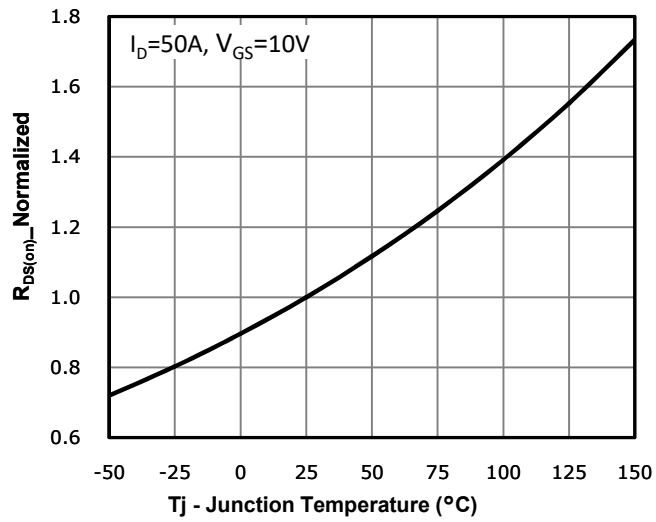
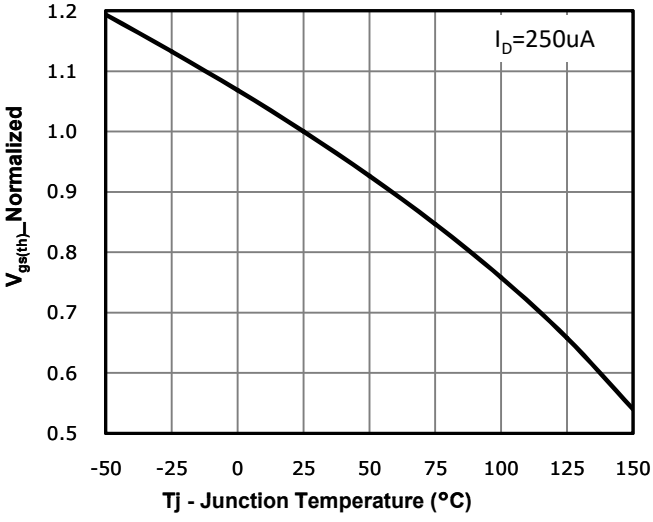


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

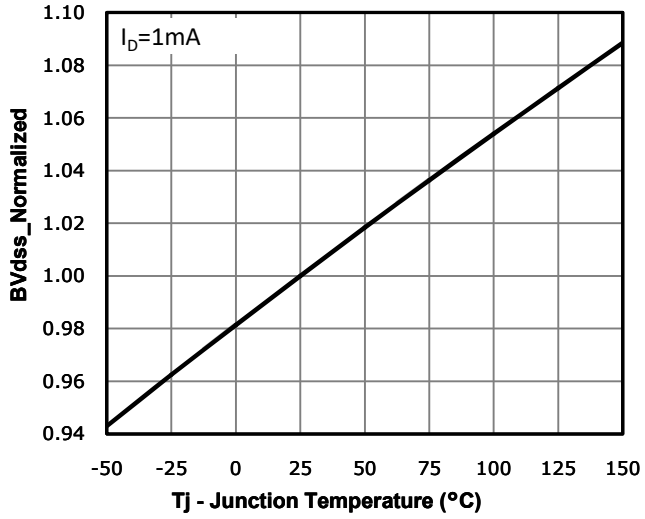


Fig 8: Capacitance Characteristics

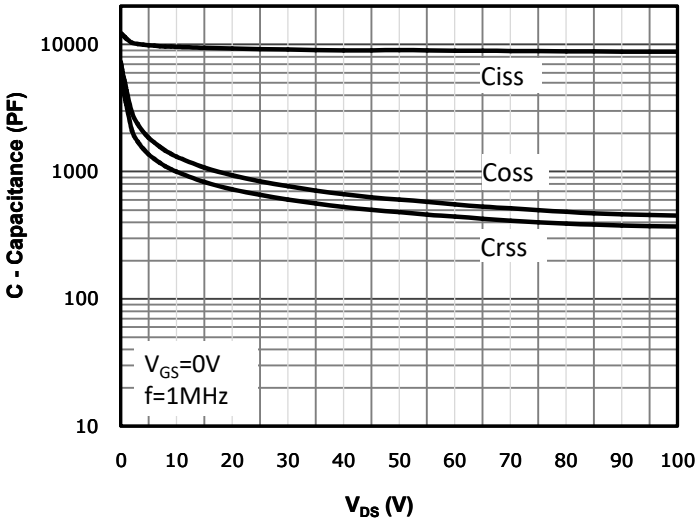


Fig 9: Gate Charge Characteristics

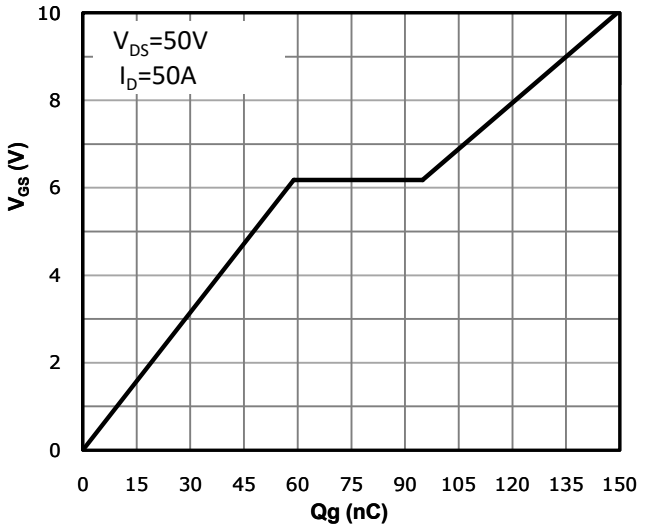


Fig 10: Body-diode Forward Characteristics

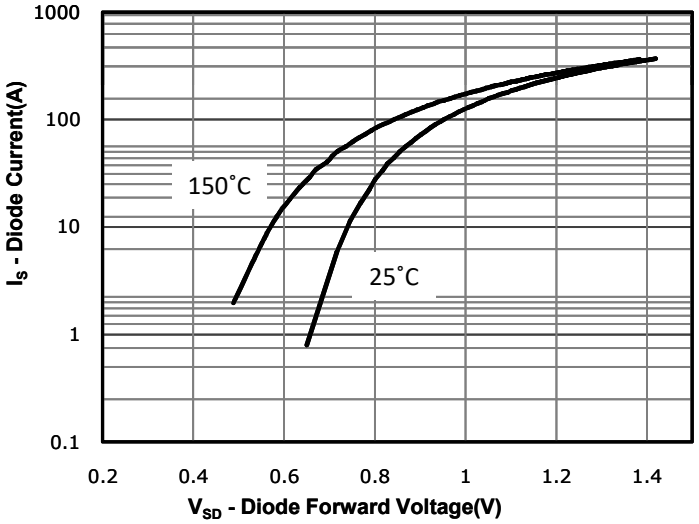


Fig 11: Power Dissipation

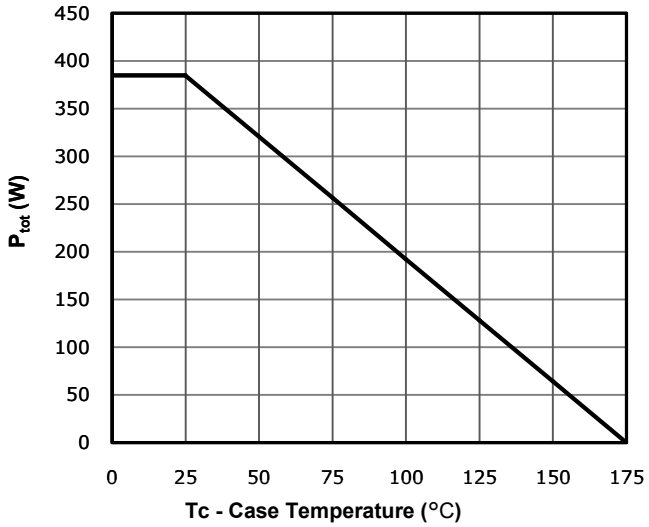
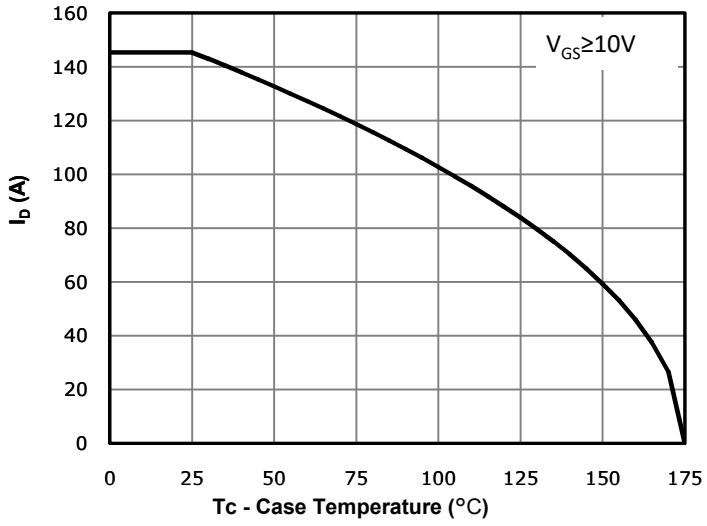


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

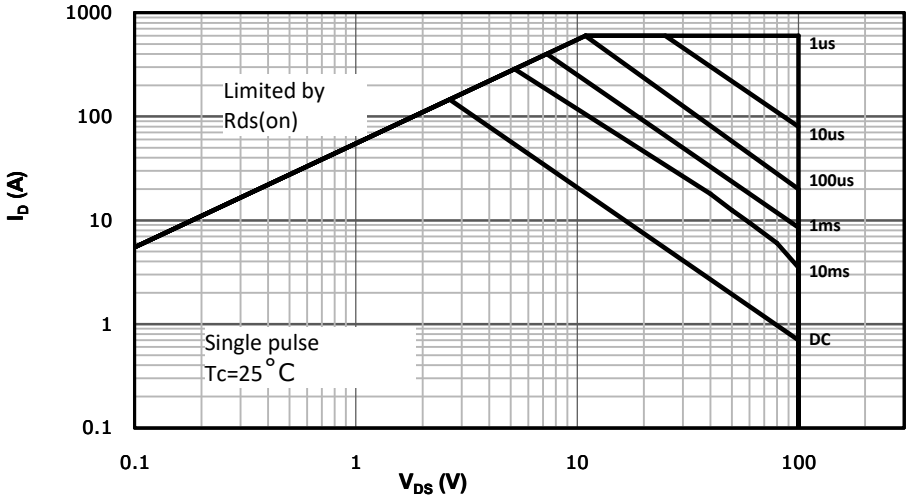


Fig 14: Safe Operating Area

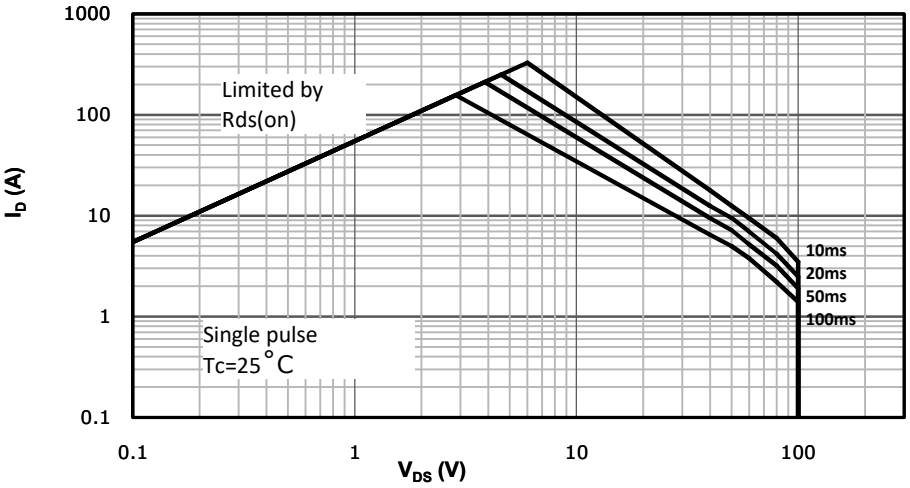
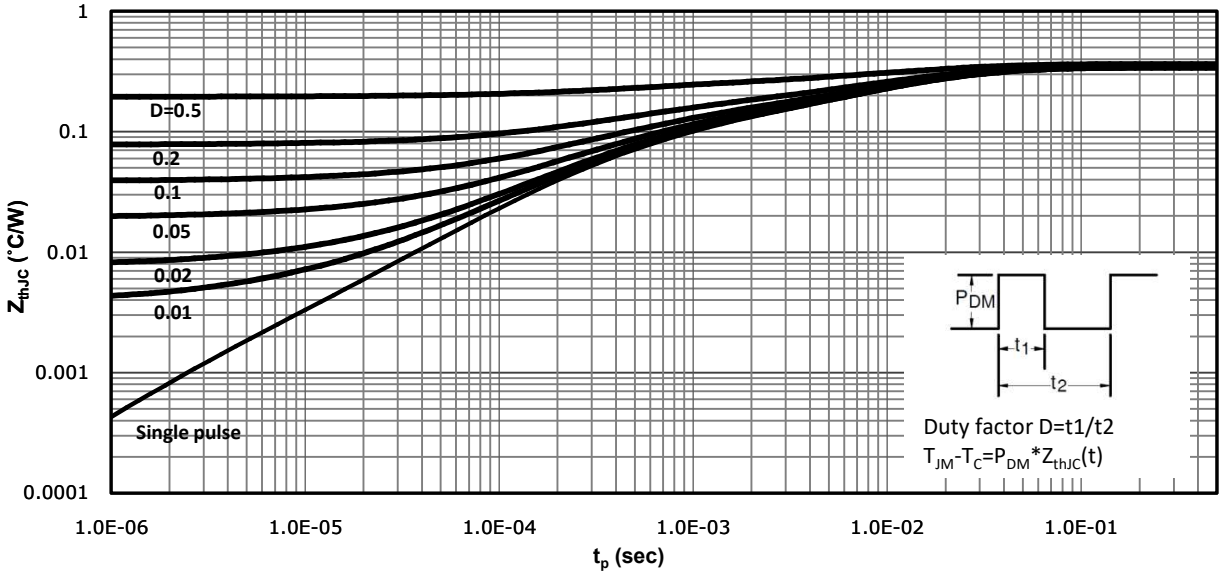


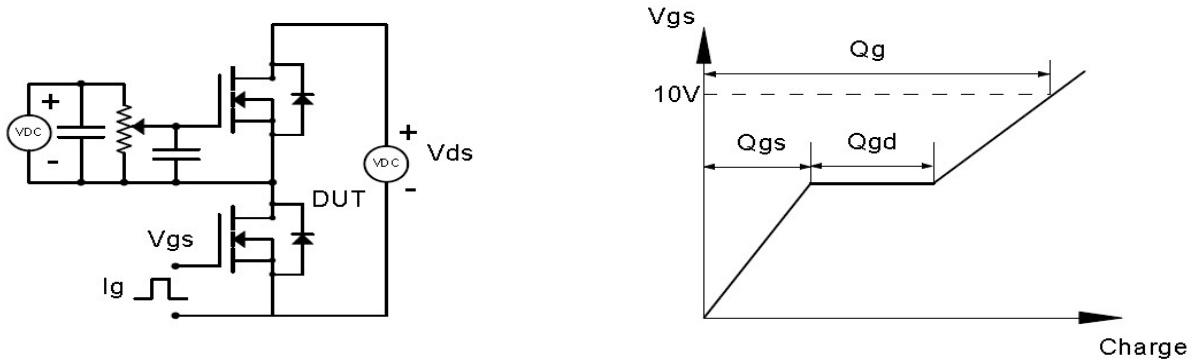
Fig 15: Max. Transient Thermal Impedance



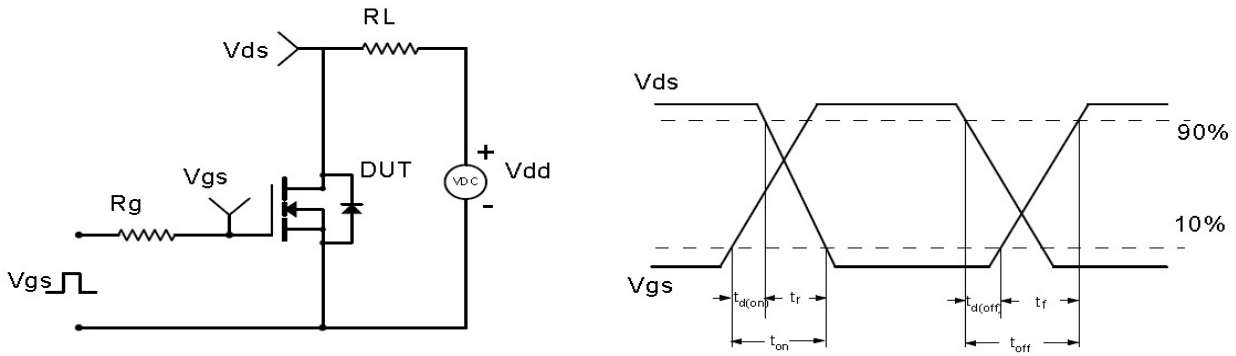
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Test Circuit & Waveform

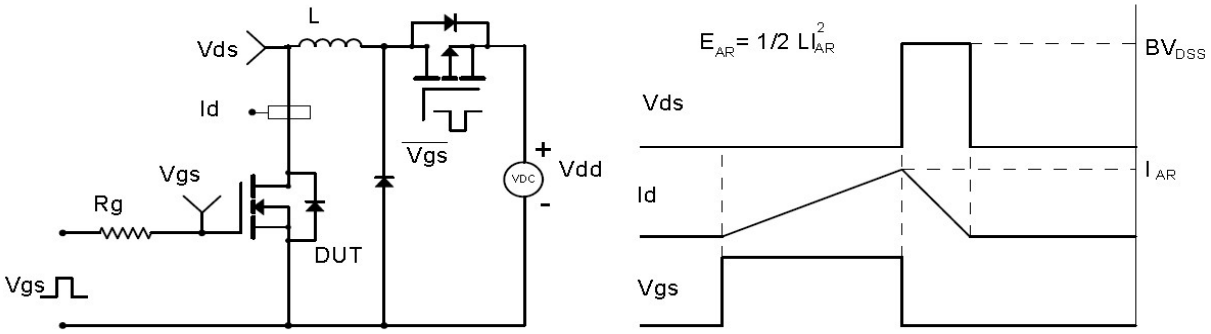
Gate Charge Test Circuit & Waveform



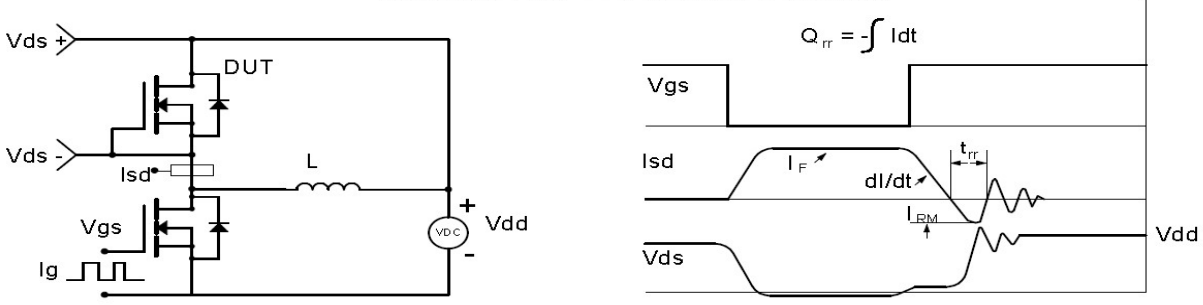
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

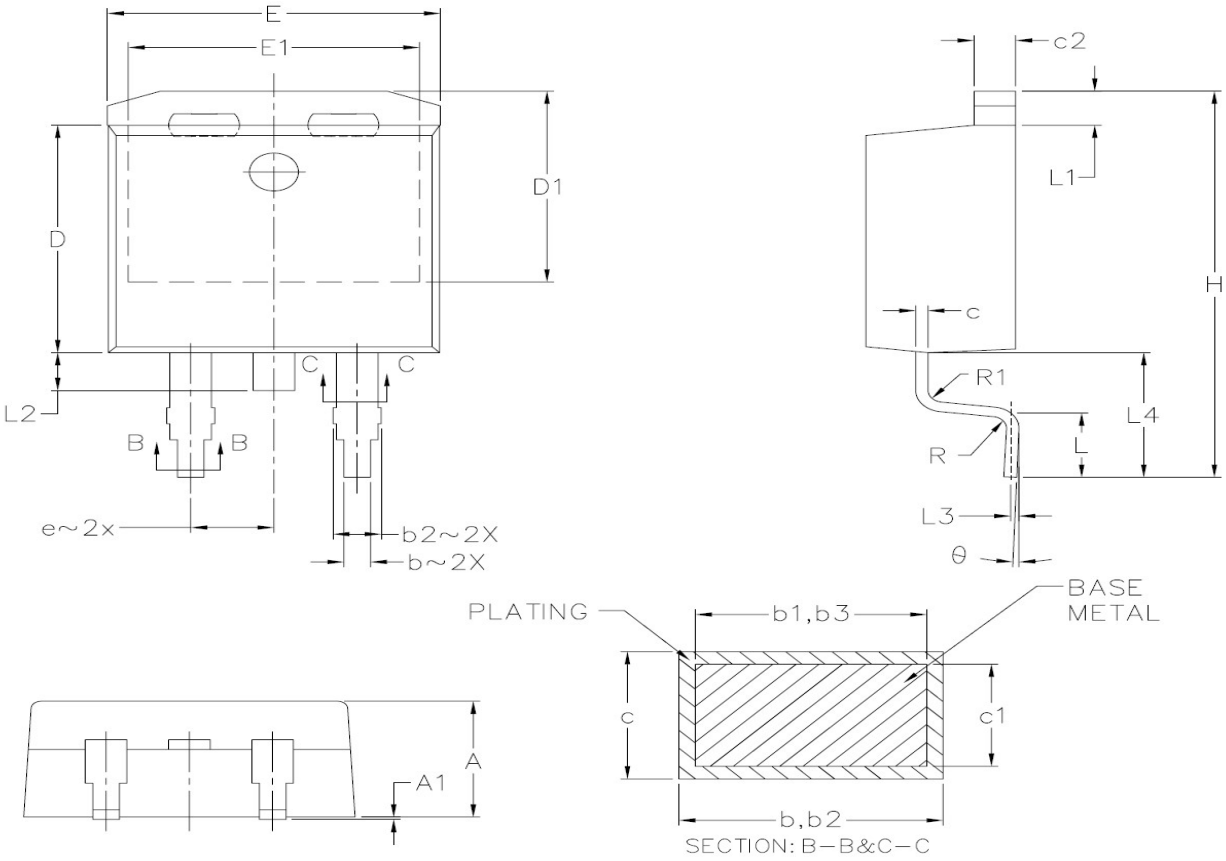


Diode Recovery Test Circuit & Waveforms



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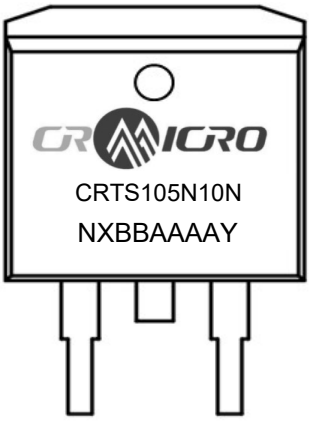
Package Outline: TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.060	4.830	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.500	0.991	0.020	0.039
b1	0.500	0.890	0.020	0.035
b2	1.140	1.780	0.045	0.070
b3	1.140	1.730	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	--	0.270	--
e	2.54 BSC.		0.100 BSC.	
E	9.652	10.668	0.380	0.420
E1	6.223	--	0.245	--
H	14.605	15.880	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	--	1.676	--	0.066
L2	--	1.778	--	0.070
L3	0.254 BSC.		0.010 BSC.	
L4	4.780	5.280	0.188	0.208
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

Revision	Date	Major changes
1.0	2023/9/7	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.

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