CRSG022N10N4Q

SkyMOS4 N-MOSFET 100V, 1.6mΩ, 250A

Features

- Uses CRM(CQ) advanced SkyMOS4 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified
- MSL1 up to 260°C peak reflow

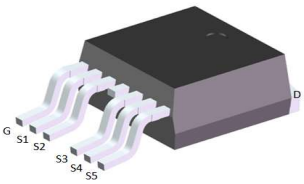
Applications

- DCDC Converter
- Switching applications

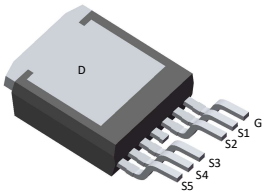
Product Summary

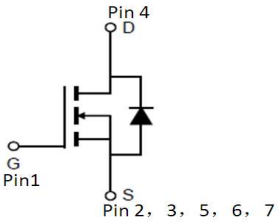
V_{DS}	100V
$R_{DS(on).typ}$	1.6mΩ
I_D	250A

100% DVDS Tested
100% Avalanche Tested



CRSG022N10N4Q





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSG022N10N4Q	CRSG022N10N4Q	TO-263-6L	Tape	N/A	N/A	800pcs

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	 270 250 194	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	1000	A
Avalanche energy, single pulse (I_D = 66A, Rg=25Ω)[1]	E_{AS}	1089	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	321	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:
EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =66A, VGS = 10V.

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case (junction-heat spreader)	R_{thJC}	0.47	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	
Thermal resistance, junction – plastic case	$R_{thJ\text{-}pc}$	26	

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	$V_{GS(th)}$	2.0	3.0	4.0	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}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	1.6	2.2	mΩ	VGS=10V, ID=100A
Transconductance	g_{fs}	148	295	590	S	VDS=5V,ID=100A
Dynamic Characteristic						
Input Capacitance	C_{iss}	5538	11075	22150	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	785	1569	3138		
Reverse Transfer Capacitance	C_{rss}	-	20	100		
Gate Total Charge	Q_G	100	150	225	nC	V_{GS}=10V, V_{DS}=50V, I_D=100A,,f=1MHz
Gate-Source charge	Q_{gs}	23	45	90		
Gate-Drain charge	Q_{gd}	13	25	51		
Turn-on delay time	$t_{d(on)}$	13	26	51	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3Ω
Rise time	t_r	75	112	169		
Turn-off delay time	$t_{d(off)}$	54	81	122		
Fall time	t_f	75	112	169		
Gate resistance	R_G	-	1.8	3	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}	-	0.95	1.4	V	V_{GS}=0V,I_{SD}=100A
Body Diode Reverse Recovery Time	t_{rr}	49	98	196	ns	I_F=100A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	125	249	498	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

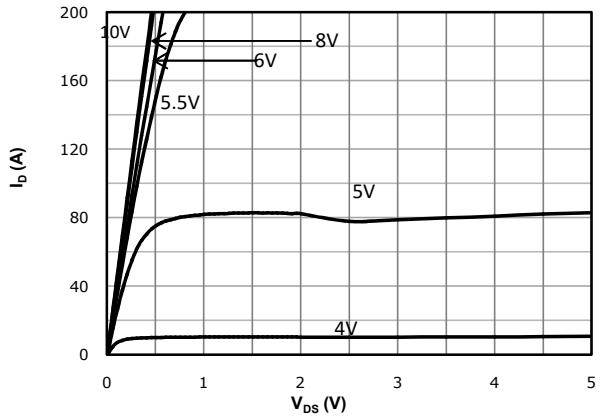


Fig 2: Transfer Characteristics

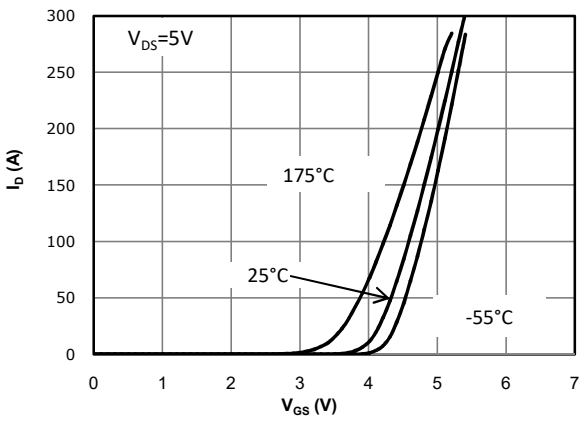


Fig 3: Rds(on) vs Drain Current and Gate Voltage

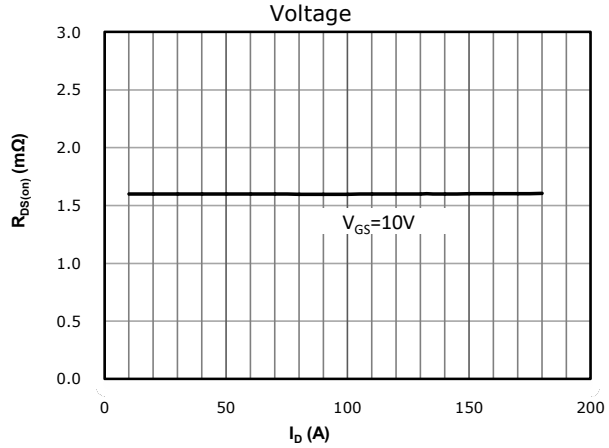


Fig 4: Rds(on) vs Gate Voltage

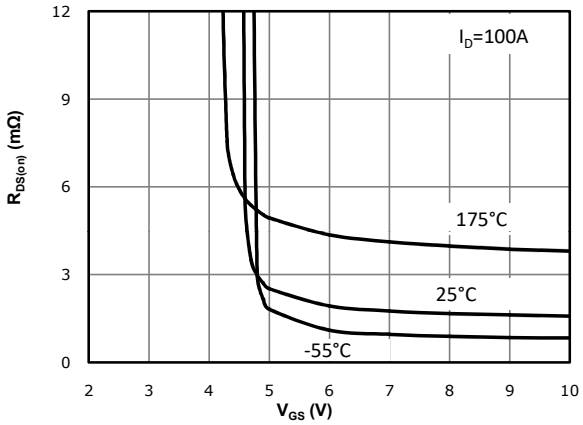


Fig 5: Rds(on) vs. Temperature

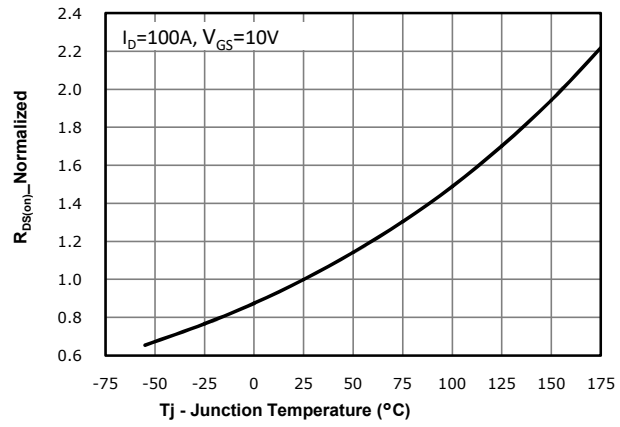
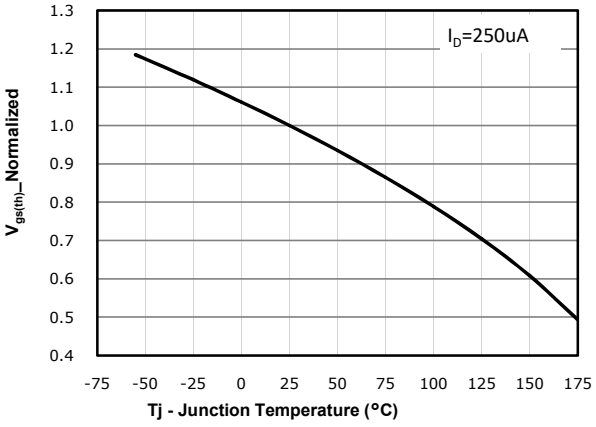


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

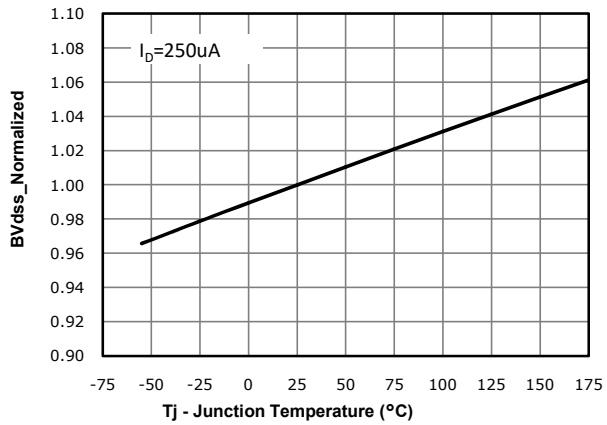


Fig 8: Capacitance Characteristics

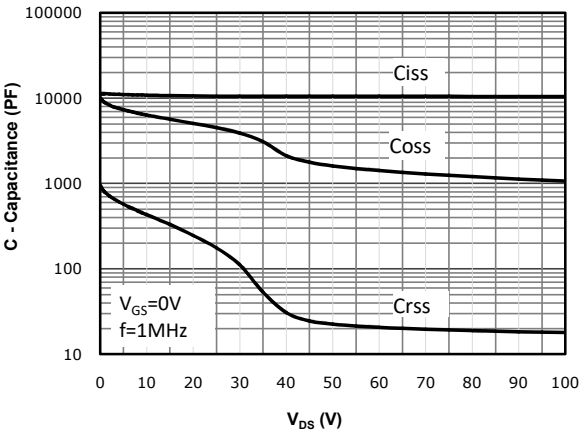


Fig 9: Gate Charge Characteristics

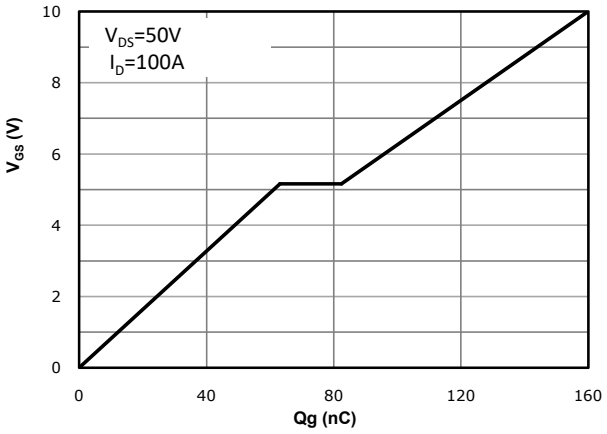


Fig 10: Body-diode Forward Characteristics

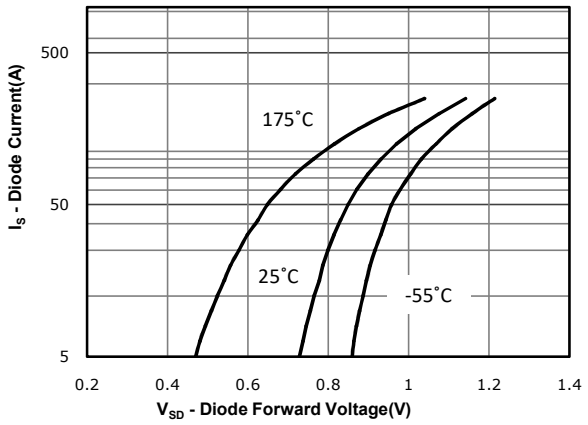


Fig 11: Power Dissipation

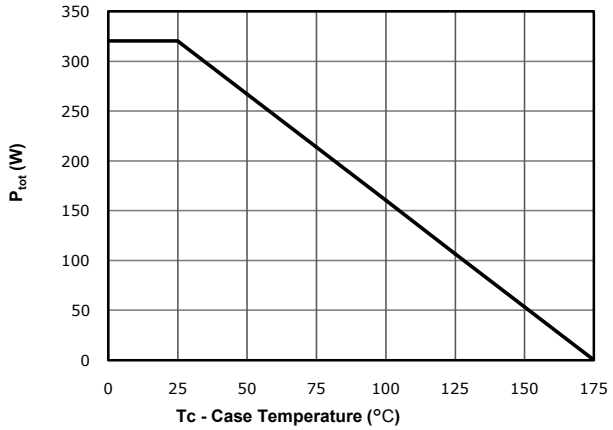
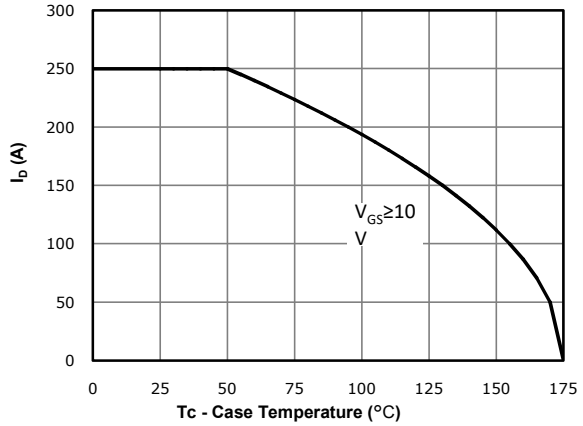


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

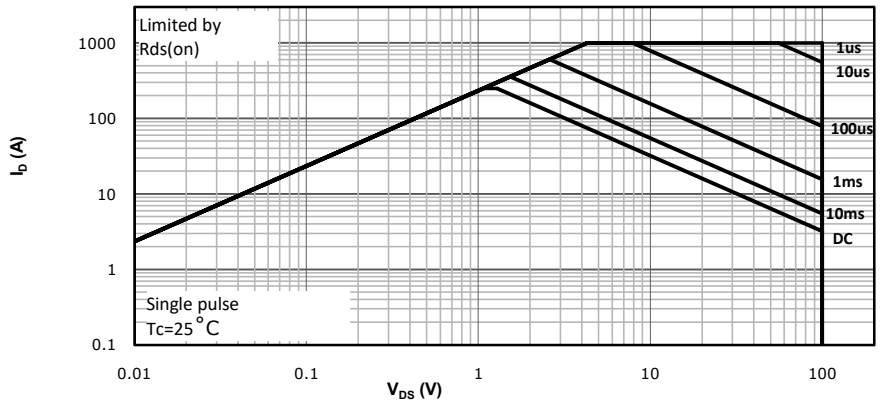
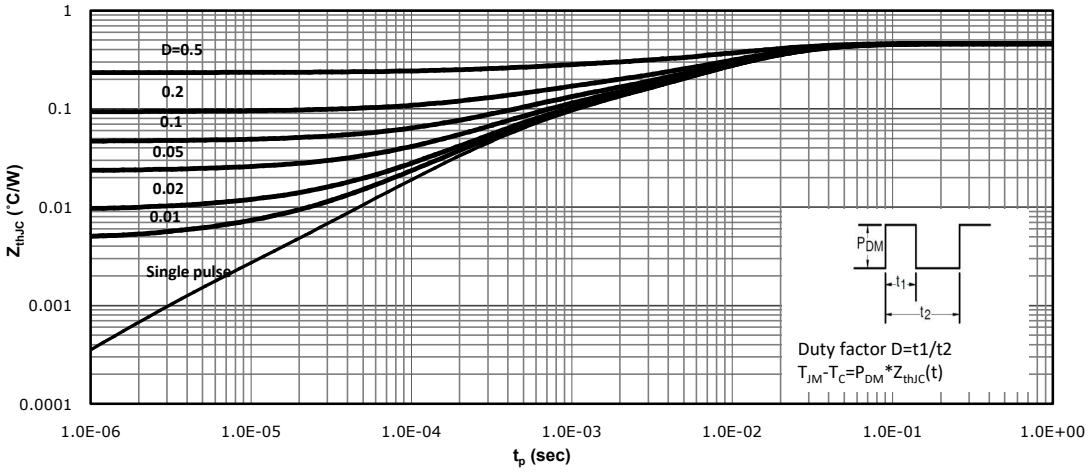


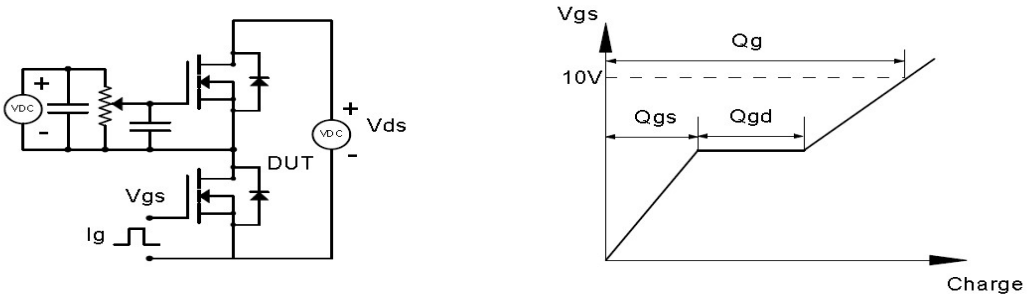
Fig 14: Max. Transient Thermal Impedance



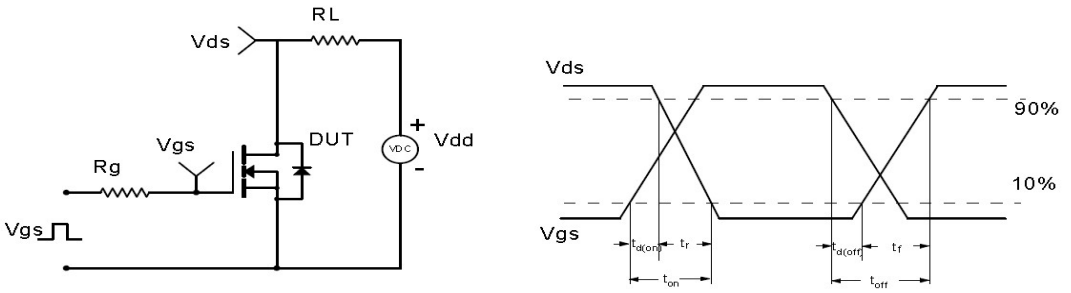
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Test Circuit & Waveform

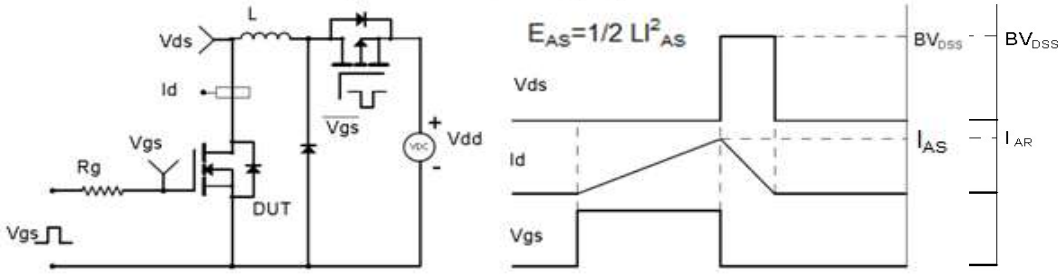
Gate Charge Test Circuit & Waveform



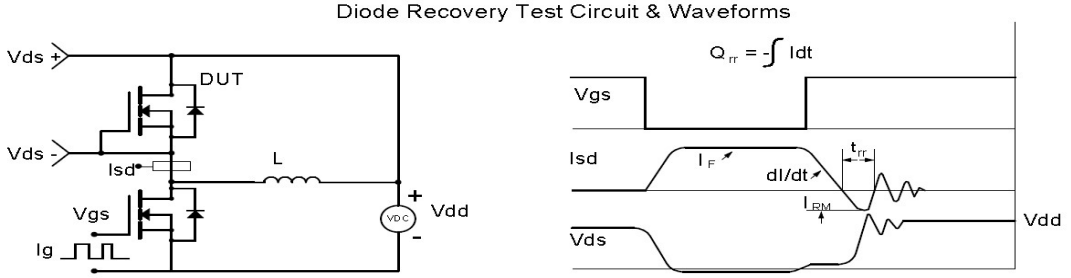
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

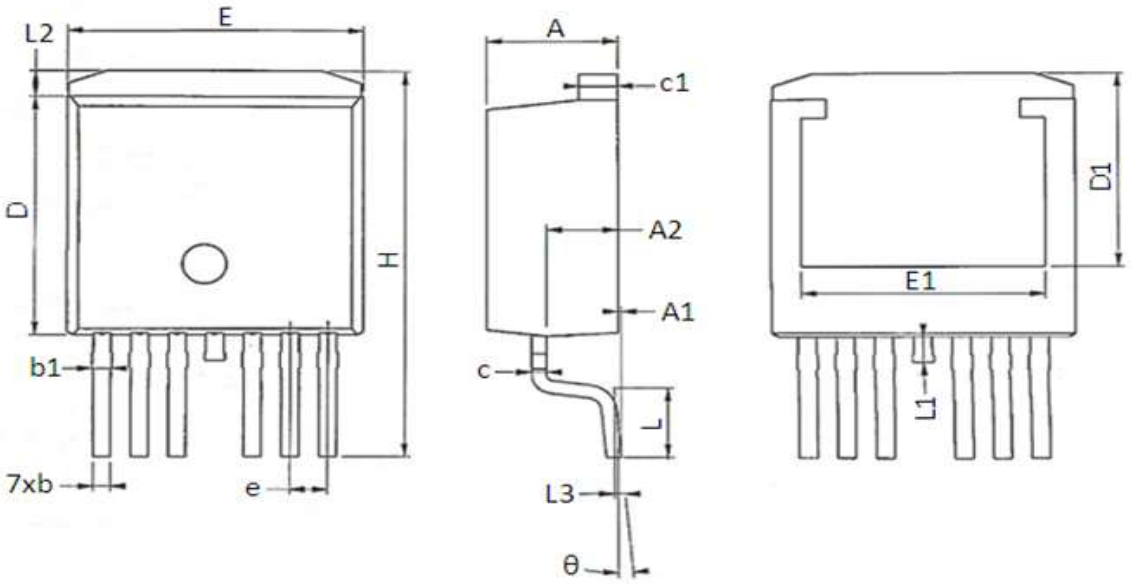


Diode Recovery Test Circuit & Waveforms



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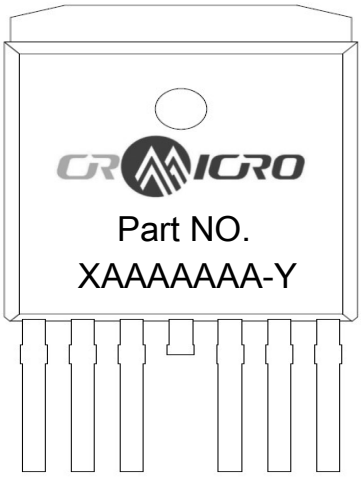
Package Outline: TO263-6L



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	4.24	4.44	4.64
A1	0.00	0.10	0.25
A2	2.25	--	2.70
b	0.50	0.60	0.70
b1	0.50	--	0.90
c	0.40	0.50	0.60
c1	1.15	1.27	1.40
D	8.82	8.92	9.45
D1	7.10	7.65	7.95
e		1.27 BSC	
E	9.80	10.18	10.36
E1	7.95	8.35	8.65
H	14.61	15.00	15.25
L	1.78	2.32	3.00
L1	0.85	1.20	1.60
L2	0.80	1.36	1.60
L3		0.254 BSC	
θ	0°	--	-8°

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Marking



NOTE:
XAAAAAAA-Y
X —Assembly location code
AAAAAAA —Assembly lot NO. last 7digits
Y —Bin code

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Revision History

Revision	Date	Major changes
1.0	2023/4/18	draft version.
1.1	2023/5/22	Release of preliminary version.
1.2	2023/6/25	Update Ciss/Coss /Crss/RthJA spec.
2.0	2023/8/25	Update MARKING
2.1	2023/8/31	Update MARKING

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