

Features

- Uses CRM(CQ) advanced SkyMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified

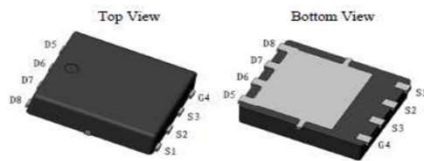
Product Summary

V_{DS}	40V
$R_{DS(on).typ}$	2.1mΩ
I_D	120A

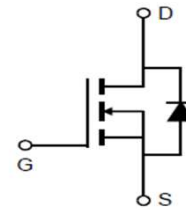
Applications

- DCDC Converter
- Switching applications
- UPS (Uninterruptible Power Supplies)

100% DVDS Tested
100% Avalanche Tested



CRSM023N04N2Z


Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM023N04N2Z	023N04N2Z	DFN5*6	Tape&reel	N/A	N/A	4000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Continuous drain current	I_D	120	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		88	
$T_C = 100^\circ\text{C}$ (Silicon limit)			
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	480	A
Avalanche energy, single pulse ($I_{AS} = 35\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	180	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	65	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)	T_{sold}	260	°C

※. Notes:

EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.3\text{mH}$, $I_{AS} = 35\text{A}$, $V_{GS} = 10\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case (junction-heat spreader)	R_{thJC}	2.3	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		40	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=40V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=125^\circ C$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.1	2.6	mΩ	$V_{GS}=10V, I_D=70A$
Transconductance	g_{fs}	120	240	480	S	$V_{DS}=5V, I_D=70A$

Dynamic Characteristic

Input Capacitance	C_{iss}	1450	2950	5900	pF	$V_{GS}=0V, V_{DS}=20V, f=1MHz$
Output Capacitance	C_{oss}	475	950	1900		
Reverse Transfer Capacitance	C_{rss}	-	35	175		
Gate Total Charge	Q_G	30	43	65	nC	$V_{GS}=10V, V_{DS}=20V, I_D=70A, f=1MHz$
Gate-Source charge	Q_{gs}	-	19	38		
Gate-Drain charge	Q_{gd}	-	5.0	10		
Turn-on delay time	$t_{d(on)}$	-	13	26	ns	$V_{GS}=10V, V_{DD}=20V, R_{G_ext}=3\Omega$
Rise time	t_r	15	25	40		
Turn-off delay time	$t_{d(off)}$	-	30	60		
Fall time	t_f	5	11	25		
Gate resistance	R_G	-	2.5	12.0	Ω	$V_{GS}=0V, V_{DS}=0V, f=1MHz$

死区时间：Toffmax-Tonmin

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.9	1.4	V	$V_{GS}=0V, I_{SD}=70A$
Body Diode Reverse Recovery Time	t_{rr}	20	40	80	ns	$I_F=50A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	17	35	70	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

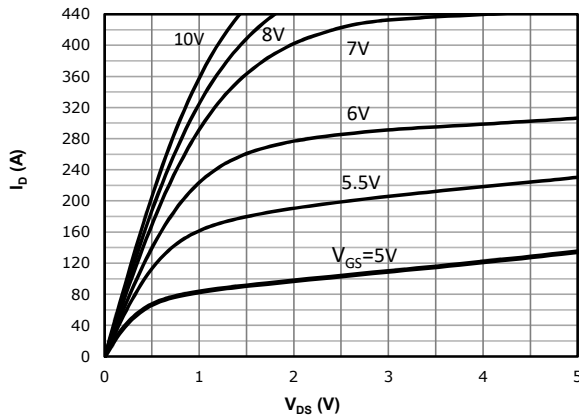


Fig 2: Transfer Characteristics

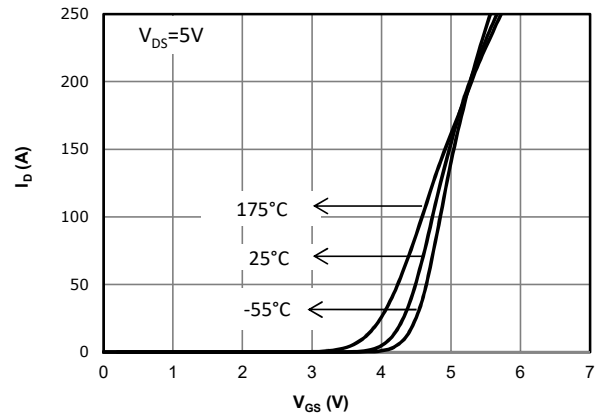


Fig 3: Rds(on) vs Drain Current and Gate Voltage

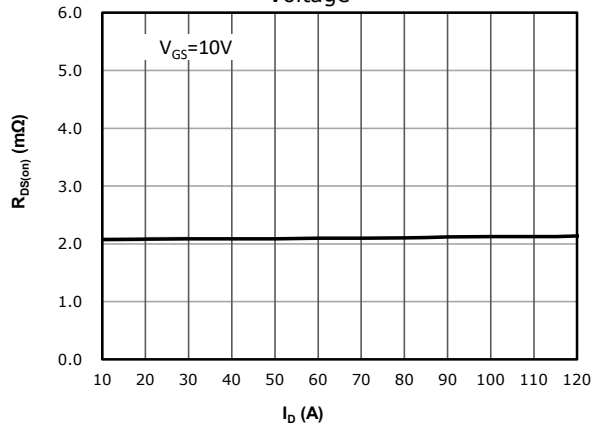


Fig 4: Rds(on) vs Gate Voltage

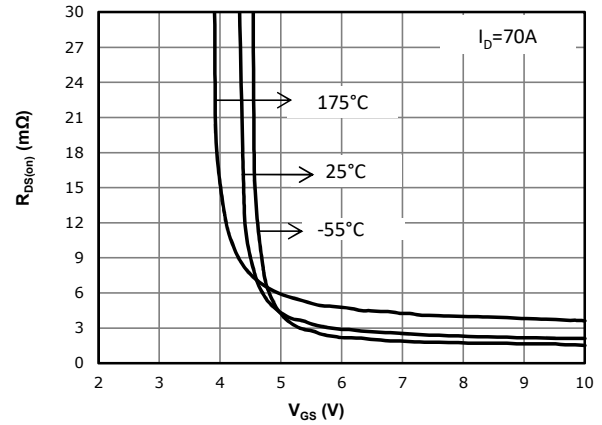


Fig 5: Rds(on) vs. Temperature

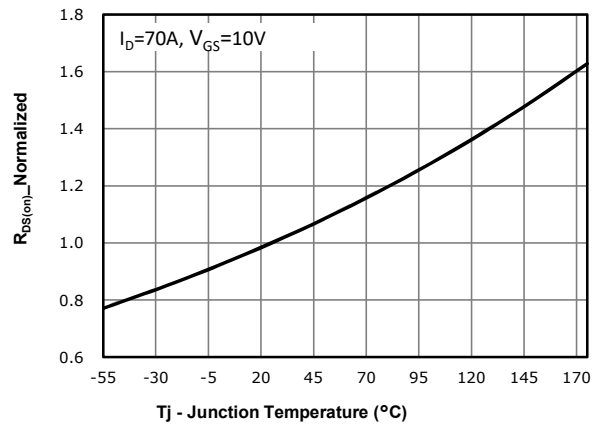


Fig 6: Vgs(th) vs. Temperature

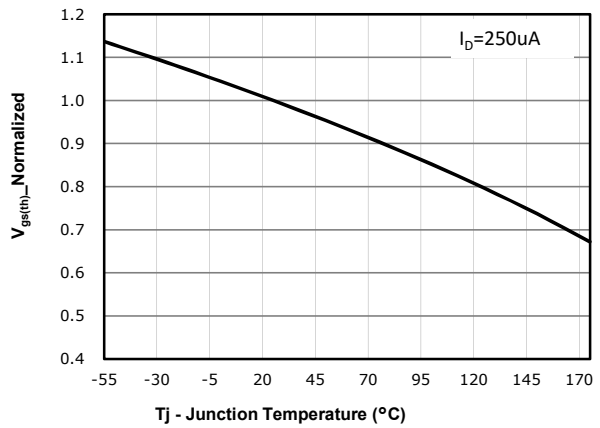


Fig 7: BVdss vs. Temperature

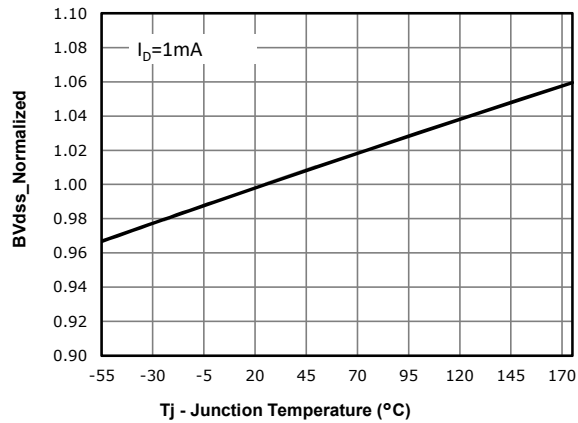


Fig 8: Capacitance Characteristics

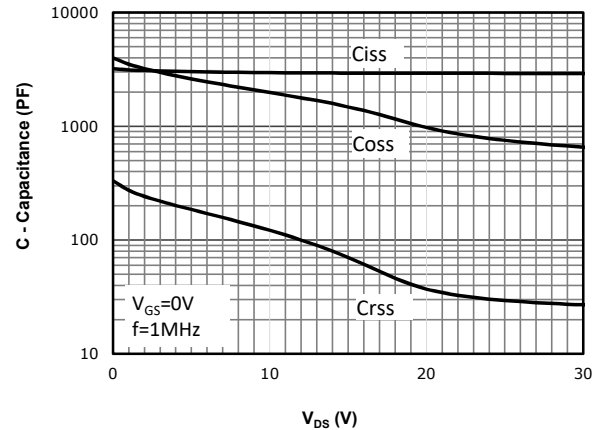


Fig 9: Gate Charge Characteristics

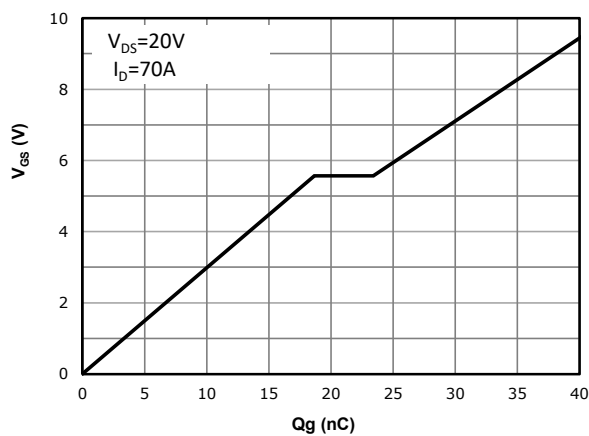


Fig 10: Body-diode Forward Characteristics

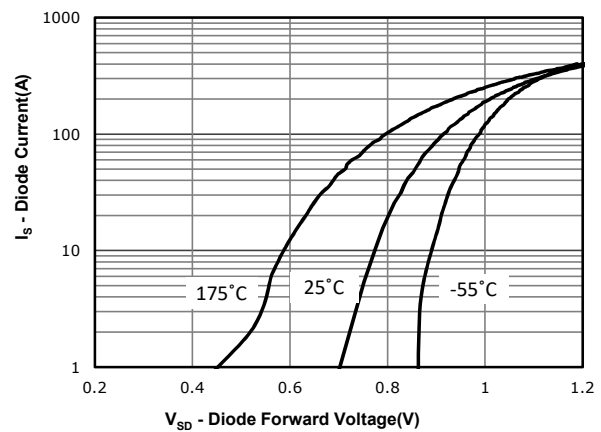


Fig 11: Power Dissipation

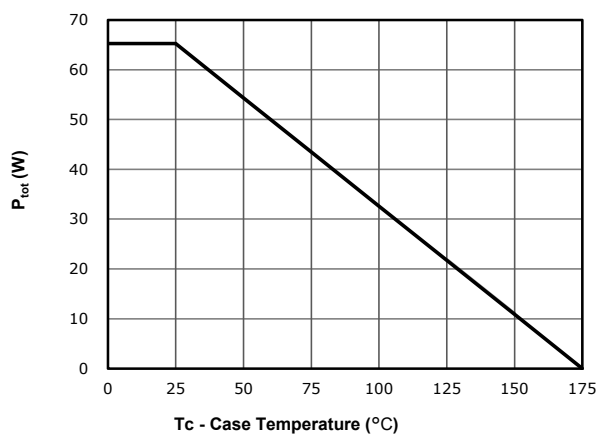


Fig 12: Drain Current Derating

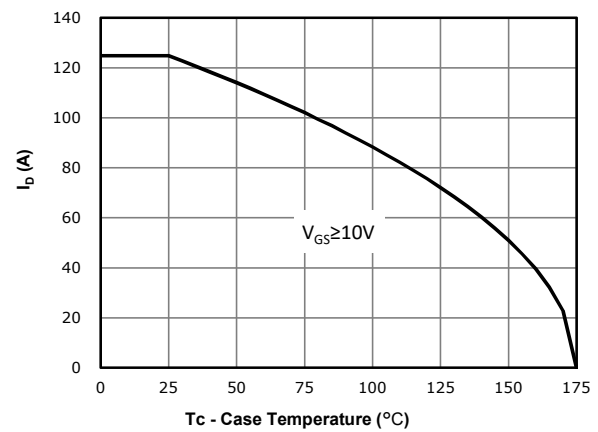


Fig 13: Safe Operating Area

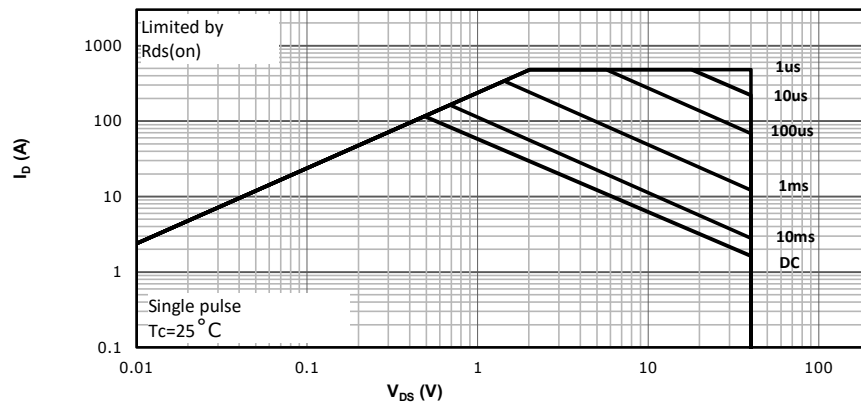
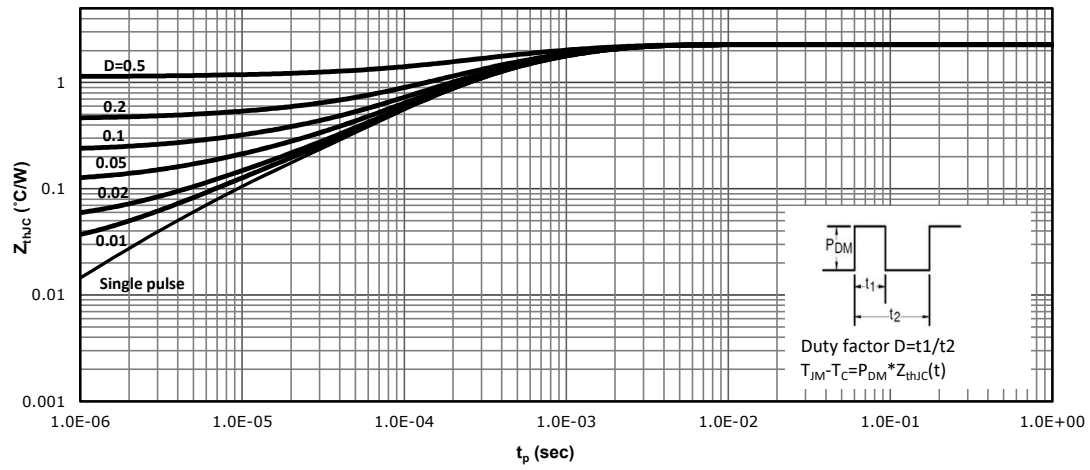
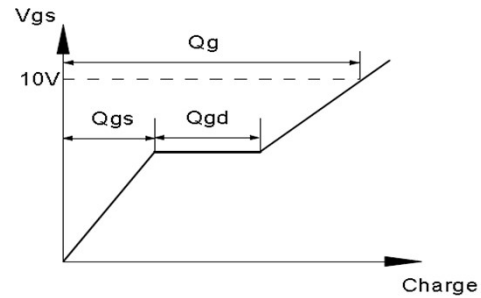
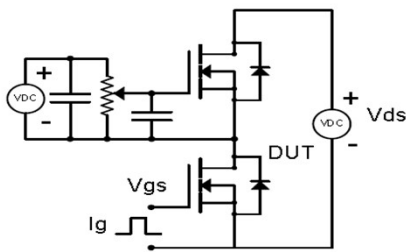


Fig 14: Max. Transient Thermal Impedance

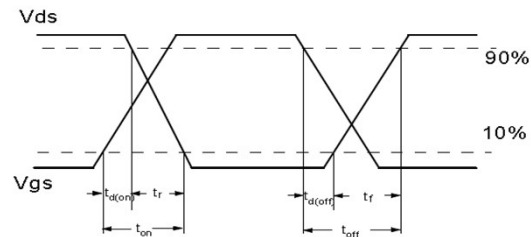
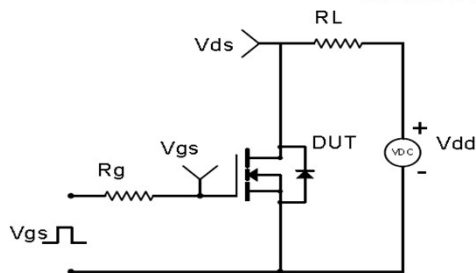


Test Circuit & Waveform

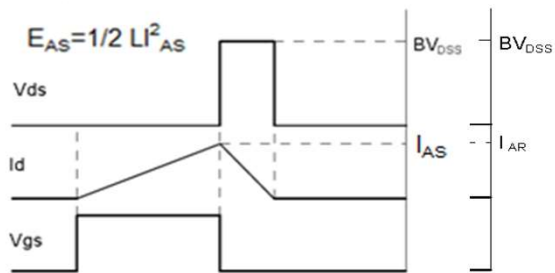
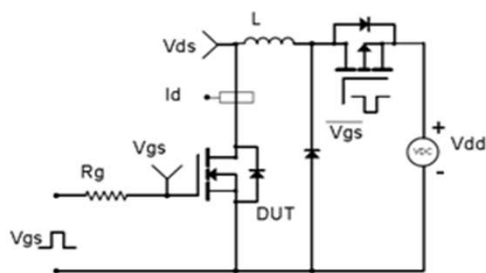
Gate Charge Test Circuit & Waveform



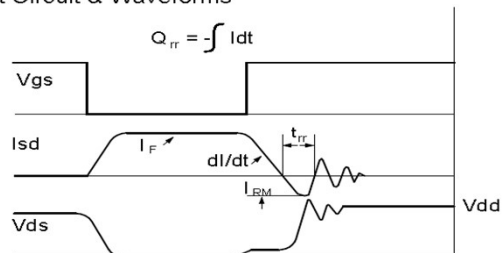
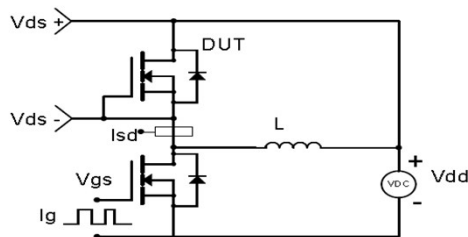
Resistive Switching Test Circuit & Waveforms



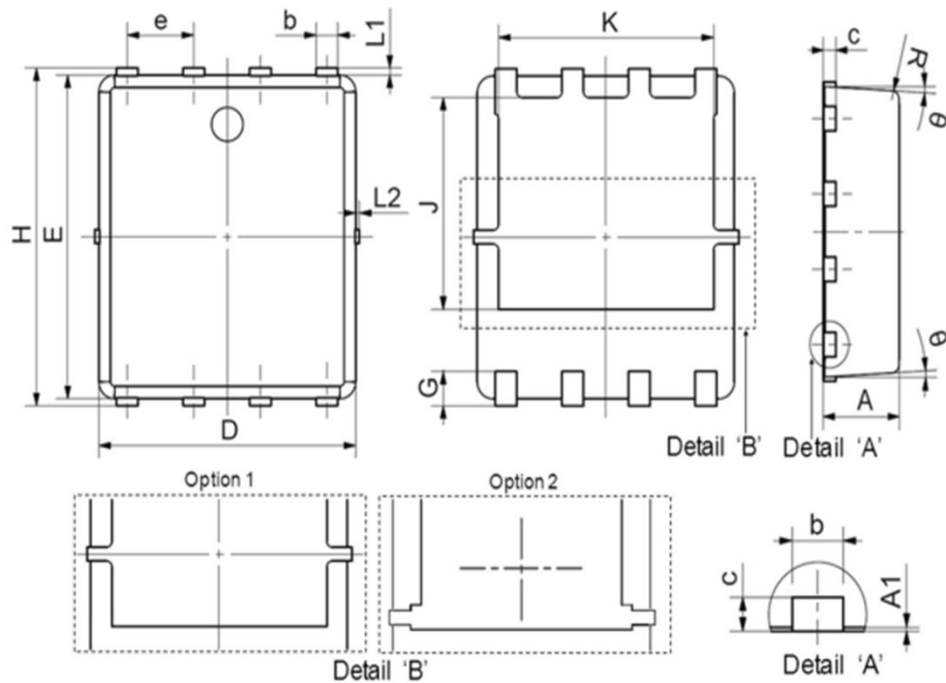
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: DFN5*6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.80	1.20	0.031	0.047
A1	0.00	0.05	0.000	0.002
b	0.30	0.51	0.012	0.020
c	0.15	0.35	0.006	0.014
D	4.80	5.40	0.189	0.213
e	1.27 BSC		0.050 BSC	
E	5.65	6.06	0.222	0.239
G	0.30	0.86	0.012	0.034
H	5.90	6.35	0.232	0.250
J	3.25	3.92	0.128	0.154
K	3.61	4.40	0.142	0.173
L1	0.05	0.25	0.002	0.010
L2	0.00	0.22	0.000	0.009
R	0.25 REF		0.010 REF	
θ	0°	14°	0°	12°

Marking**NOTE:**

XAAAAAAAA-Y

X	—Assembly location code
AAAAAAA	—Assembly lot NO. last 7digits
Y	—Bin code

Revision History

Revision	Date	Major changes
1.0	2023/9/13	Release of preliminary version.

Disclaimer

CRM reserves the right to change any product or information in this Specification at any time without prior notice.

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