华润微电子(重庆)有限公司

CRJD850N65GC

SJMOS N-MOSFET 650V, 0.73Ω, 5A

Features

- CRM(CQ) Super_Junction technology
- Much lower Ron*A performance for On-state efficiency
- Better efficiency due to very low FOM

Product Summary

VDS	650V
$R_{DS(on)\_typ}$	0.73Ω
I_D	5A

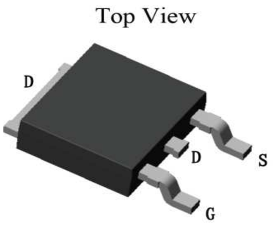
Applications

- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Charger
- Power Supply

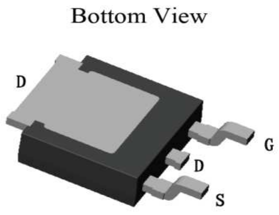
100% DVDS Tested

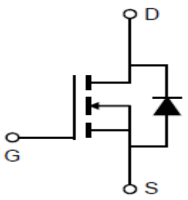
100% Avalanche Tested

Top View



Bottom View





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJD850N65GC	J850N65GC	TO-252	Tape&Reel	N/A	N/A	2500pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	650	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 5 2.5	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	20	A
Avalanche energy, single pulse (L=60mH, Rg=30Ω)	E_{AS}	70	mJ
MOSFET dv/dt ruggedness	dv/dt	50	V/ns
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_{tot}	68	W
Continuous diode forward current(T_C = 25°C)	I_S	5	A
Diode pulse current [2] (T_C = 25°C)	$I_{S\ pulse}$	20	A
Recovery diode dv/dt [3]	dv/dt	50	V/ns
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

1) Limited by Tj,max. Maximum Duty Cycle D = 0.50; TO-220 equivalent
2) Pulse width tp limited by Tj,max
3) Identical low side and high side switch with identical RG

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case	R_{thJC}	-	1.31	1.83	°C/W	
Thermal resistance, junction – ambient	R_{thJA}	-	-	132	°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}	650	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	3	3.5	4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- 5	1 -	μA	V_{DS}=650V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	0.3	80	nA	V_{GS}=±30V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	0.73 1.8	0.85 -	Ω	V_{GS}=10V, I_D=2.5A, T_j=25°C T_j=150°C
Transconductance	g_{fs}	-	6	-	S	V_{DS}=20V,I_D=2.5A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	410	-	pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}	-	20	-		
Reverse Transfer Capacitance	C_{rss}	-	1.5	-		
Gate Total Charge	Q_G	-	11	-	nC	V_{GS}=10V, V_{DS}=480V, I_D=2.5A
Gate-Source charge	Q_{gs}	-	3	-		
Gate-Drain charge	Q_{gd}	-	3.9	-		
Turn-on delay time	$t_{d(on)}$	-	17	-	ns	T_j=25°C, V_{GS}=10V, I_D=2.5A, V_{DS}=400V, R_g=25Ω
Rise time	t_r	-	8	-		
Turn-off delay time	$t_{d(off)}$	-	37	-		
Fall time	t_f	-	71	-		
Gate resistance	R_G	-	3.0	-	Ω	f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.5	0.84	1	V	V_{GS}=0V,I_{SD}=2.5A
Body Diode Reverse Recovery Time	t_{rr}	-	178	-	ns	Isd=2.5A dI/dt=100A/us, Vds=100V
Body Diode Reverse Recovery Charge	Q_{rr}	-	1.12	-	uC	

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

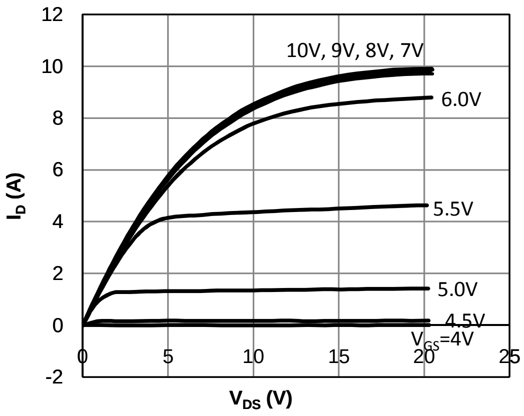


Fig 2. Output Characteristics (Tj=150℃)

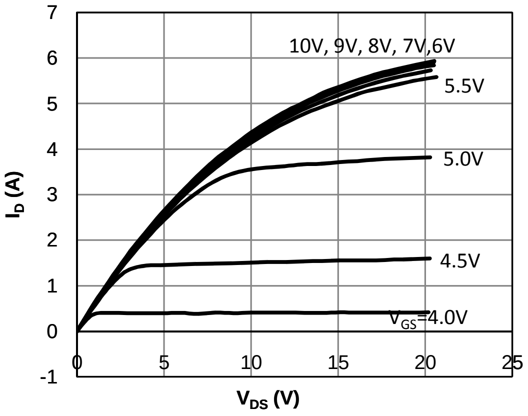


Fig 3: Transfer Characteristics

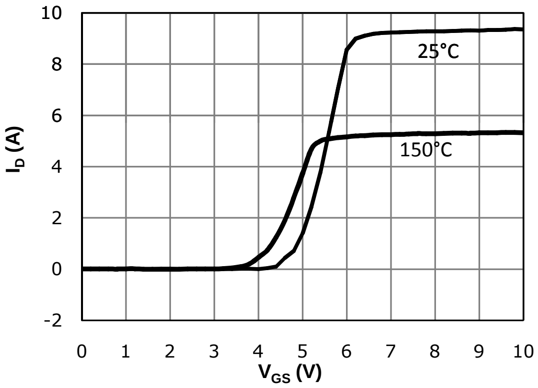


Fig 4: V_{TH} Vs Tj Temperature Characteristics

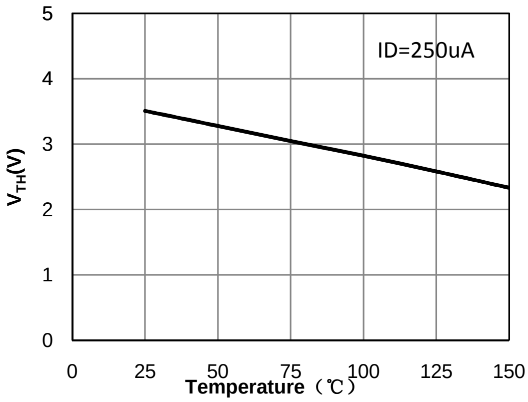


Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

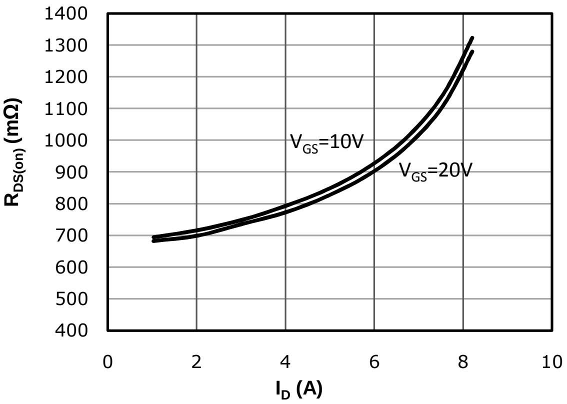


Fig 6: Rds(on) vs. Temperature

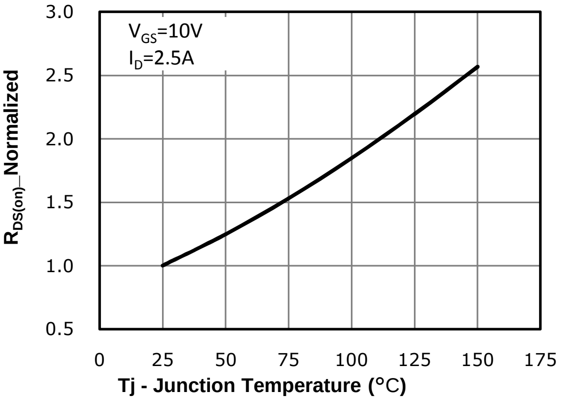


Fig 7: BVDSS vs. Temperature

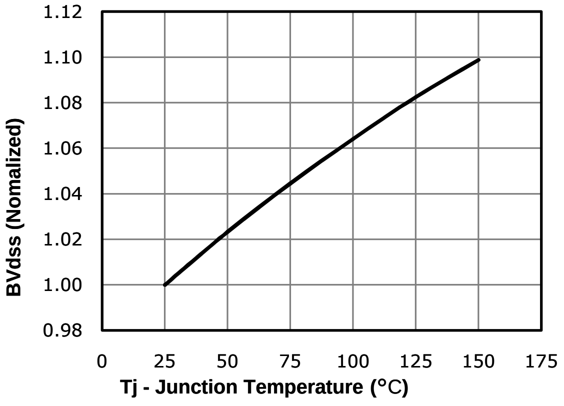


Fig 8: Rds(on) vs Gate Voltage

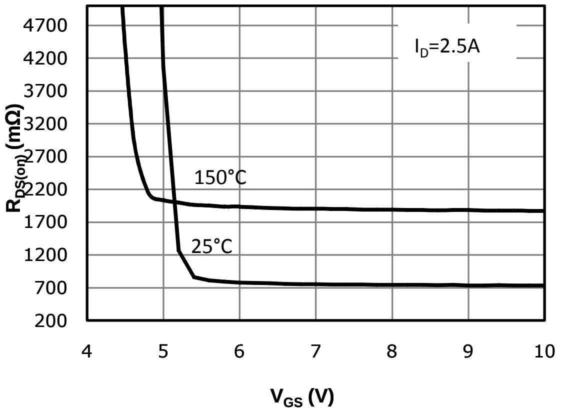


Fig 9: Body-diode Forward Characteristics

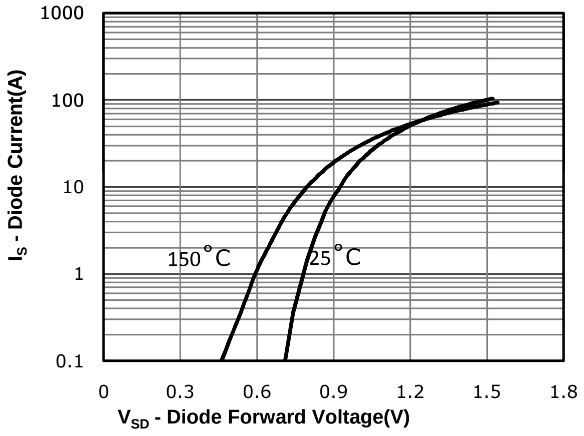


Fig 10: Gate Charge Characteristics

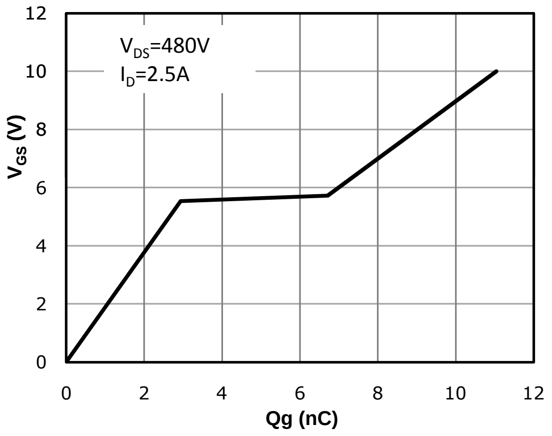


Fig 11: Capacitance Characteristics

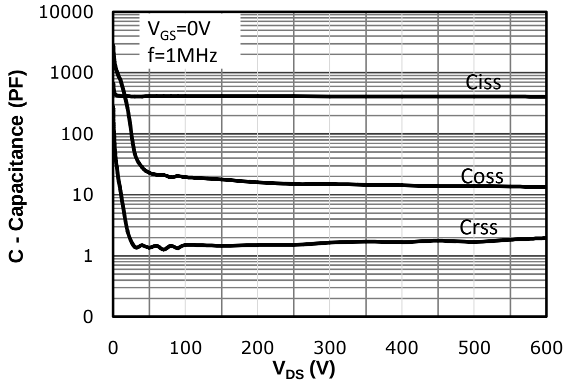


Fig 12: Safe Operating Area

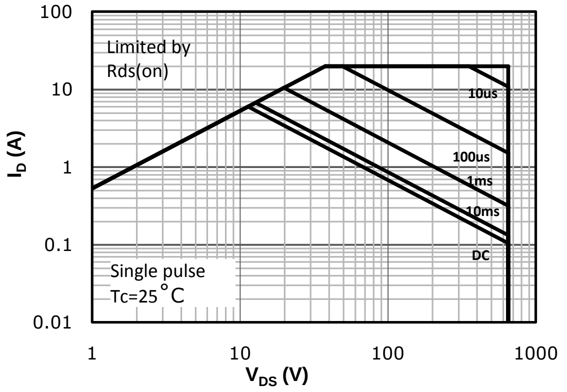
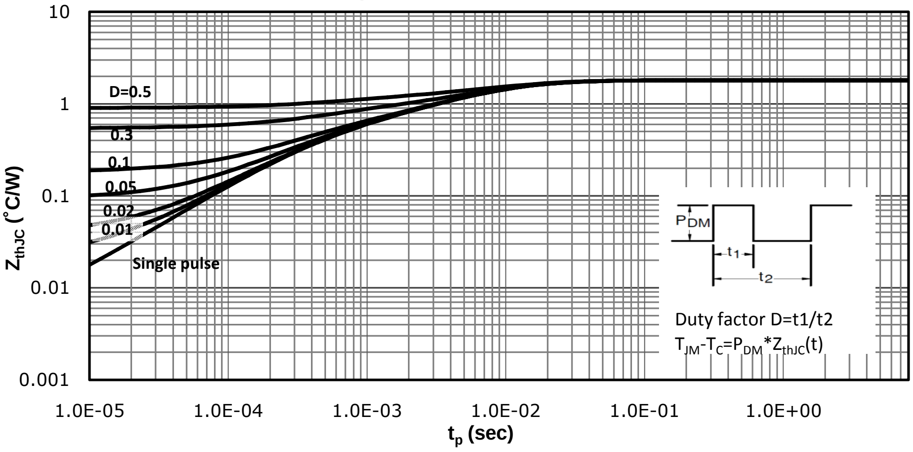
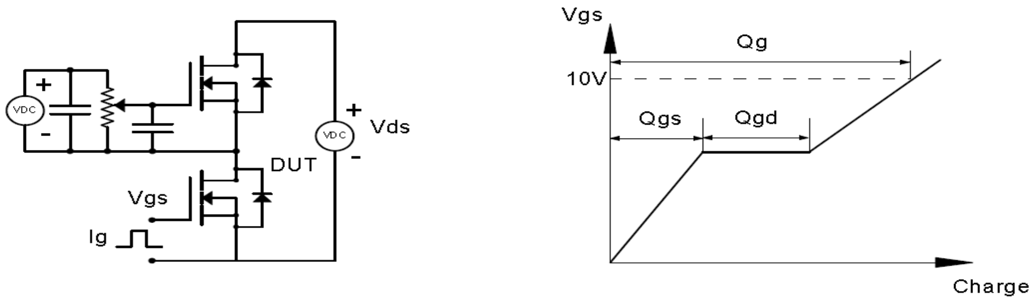


Fig 13: Max. Transient Thermal Impedance

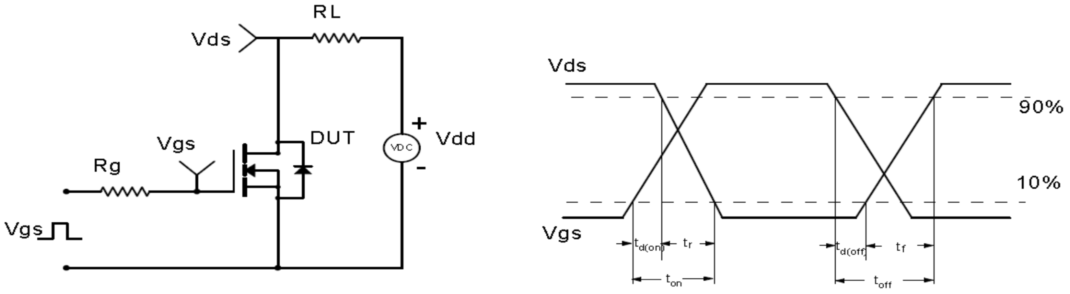


Test Circuit & Waveform

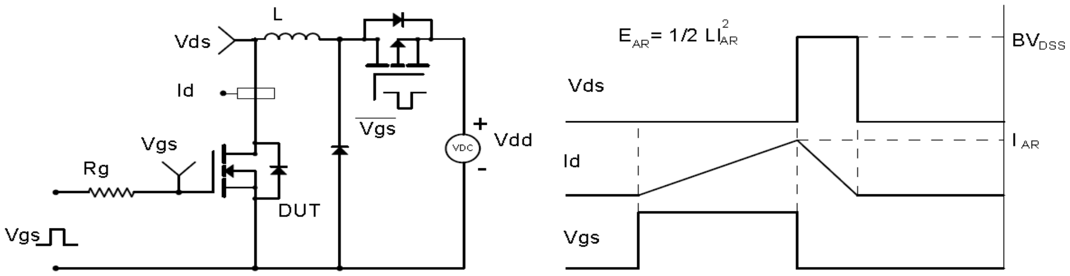
Gate Charge Test Circuit & Waveform



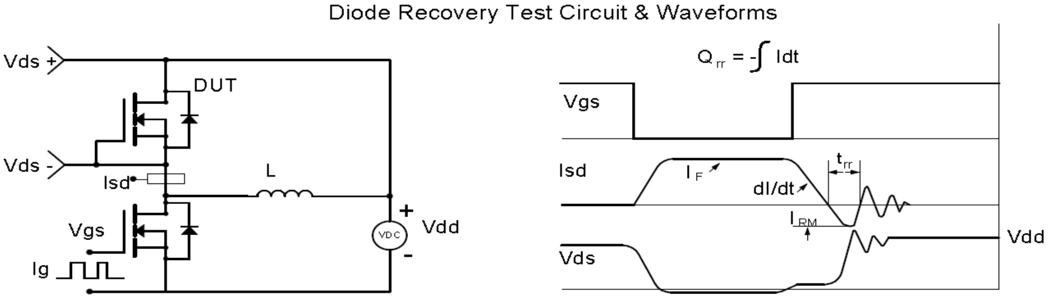
Resistive Switching Test Circuit & Waveforms



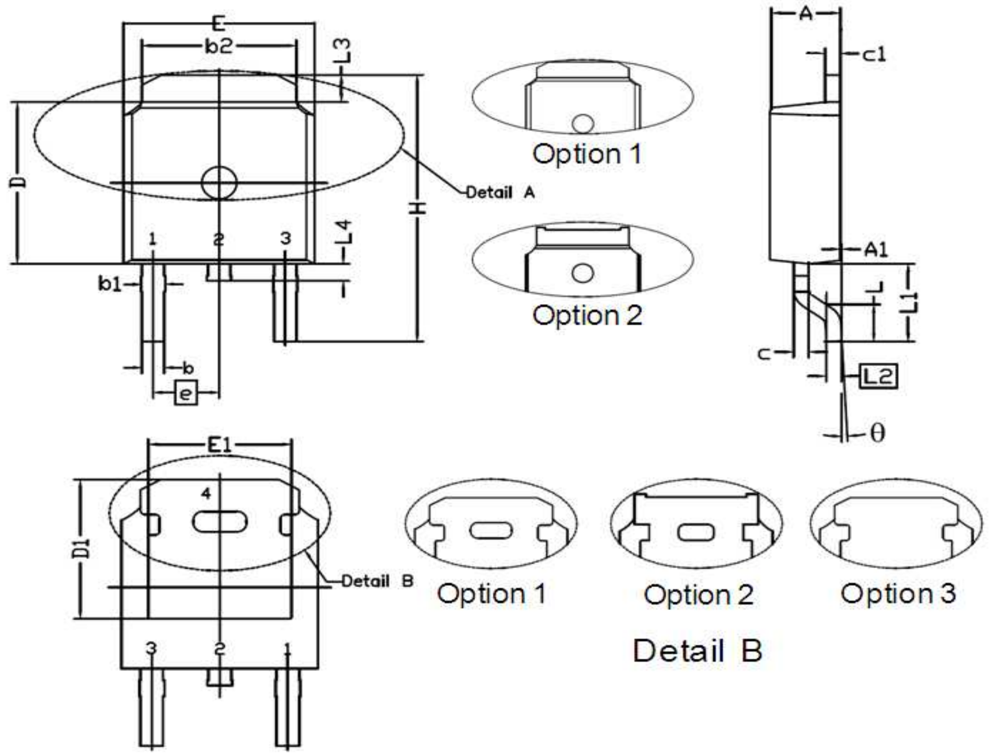
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252



<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Dimensions In Millimeters</th><th colspan="2">Dimensions In Inches</th></tr>
<tr><th>Min.</th><th>Max.</th><th>Min.</th><th>Max.</th></tr>
<tr><td>A</td><td>2.15</td><td>2.45</td><td>0.085</td><td>0.096</td></tr>
<tr><td>A1</td><td>0.00</td><td>0.15</td><td>0.000</td><td>0.006</td></tr>
<tr><td>b</td><td>0.60</td><td>0.91</td><td>0.024</td><td>0.036</td></tr>
<tr><td>b1</td><td>0.65</td><td>1.15</td><td>0.026</td><td>0.045</td></tr>
<tr><td>b2</td><td>5.00</td><td>5.64</td><td>0.197</td><td>0.222</td></tr>
<tr><td>c</td><td>0.45</td><td>0.61</td><td>0.018</td><td>0.024</td></tr>
<tr><td>c1</td><td>0.36</td><td>0.66</td><td>0.014</td><td>0.026</td></tr>
<tr><td>D</td><td>5.80</td><td>6.30</td><td>0.228</td><td>0.248</td></tr>
<tr><td>D1</td><td>5.21</td><td>--</td><td>0.205</td><td>--</td></tr>
<tr><td>e</td><td colspan="2">2.29 BSC.</td><td colspan="2">0.090 BSC.</td></tr>
<tr><td>E</td><td>6.30</td><td>6.90</td><td>0.248</td><td>0.272</td></tr>
<tr><td>E1</td><td>4.40</td><td>--</td><td>0.173</td><td>--</td></tr>
<tr><td>H</td><td>9.40</td><td>10.48</td><td>0.370</td><td>0.413</td></tr>
<tr><td>L</td><td>1.38</td><td>1.78</td><td>0.054</td><td>0.070</td></tr>
<tr><td>L1</td><td colspan="2">2.92 REF</td><td colspan="2">0.115 REF</td></tr>
<tr><td>L2</td><td colspan="2">0.508 BSC.</td><td colspan="2">0.020 BSC.</td></tr>
<tr><td>L3</td><td>0.72</td><td>1.35</td><td>0.028</td><td>0.053</td></tr>
<tr><td>L4</td><td>0.60</td><td>1.20</td><td>0.024</td><td>0.047</td></tr>
<tr><td>θ</td><td>0°</td><td>10°</td><td>0°</td><td>10°</td></tr>
</table>

Marking

NOTE:
NXBBAAAAY
X —Assembly location code
BB —Fab code
AAAA —Lot code
Y —Bin code

Revision History

Revison	Date	Major changes
1.0	2019-8-13	Release of formal version
2.0	2022-4-26	Update Cxss and package outline; Add MOSFET dv/dt ruggedness,Recovery diode dv/dt,Continuous diode forward current,Diode pulse current; Add marking

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.