华润微电子(重庆)有限公司

CRJL190N65GC

SJMOS N-MOSFET 650V, 0.18Ω, 20A

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
$R_{DS(on)\_typ}$	0.18Ω
I_D	20A

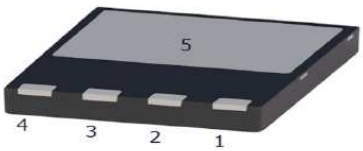
Applications

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

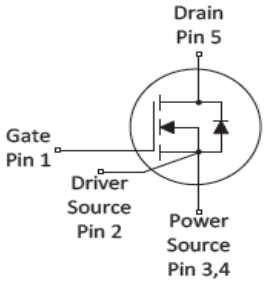
100% DVDS Tested

100% Avalanche Tested

RoHS HF



CRJL190N65GC



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJL190N65GC	CRJL190N65GC	DFN8*8	Tape&Reel	N/A	N/A	3000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current[1)] T_C = 25°C T_C = 100°C	I_D	 20 14.0	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	80	A
Avalanche energy, single pulse (L=60mH, Rg=30Ω)	E_{AS}	320	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}	144	W
Continuous diode forward current(T_C = 25°C)	I_S	20	A
Diode pulse current [2)] (T_C = 25°C)	$I_{S\ pulse}$	80	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

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case. Max	RthJC	-	0.62	0.87	°C/W	
Thermal resistance, junction – ambient. Max	RthJA	-	-	49	°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	$V_{GS(th)}$	3.2	3.7	4.2	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- 20	1 -	μA	V_{DS}=650V,V_{GS}=0V T_C=25°C T_C=150°C
Gate-source leakage current	I_{GSS}	-		±100	nA	V_{GS}=±30V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	0.18 0.43	0.21 -	Ω	V_{GS}=10V, I_D=10A, T_C=25°C T_C=150°C
Transconductance	g_{fs}	-	24	-	S	V_{DS}=20V,I_D=10A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	1787	-	pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}	-	65	-		
Reverse Transfer Capacitance	C_{rss}	-	2.4	-		
Gate Total Charge	Q_G	-	49	-	nC	V_{GS}=10V, V_{DS}=480V, I_D=10A
Gate-Source charge	Q_{gs}	-	11.5	-		
Gate-Drain charge	Q_{gd}	-	20	-		
Gate-Drain charge	$V_{plateau}$	-	5.7	-	V	
Turn-on delay time	$t_{d(on)}$	-	39	-	ns	T_j=25°C, V_{GS}=10V, I_D=10A, V_{DS}=400V,
Rise time	t_r	-	26	-		
Turn-off delay time	$t_{d(off)}$	-	156	-		
Fall time	t_f	-	48	-		
Gate resistance	Rgint	-	0.9	-	Ω	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	0.84	1	V	V_{GS}=0V,I_{SD}=10A
Body Diode Reverse Recovery Time	t_{rr}	-	303	-	ns	Isd=10A dI/dt=100A/us Vds=100V
Body Diode Reverse Recovery Charge	Q_{rr}	-	3.76	-	uC	

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Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

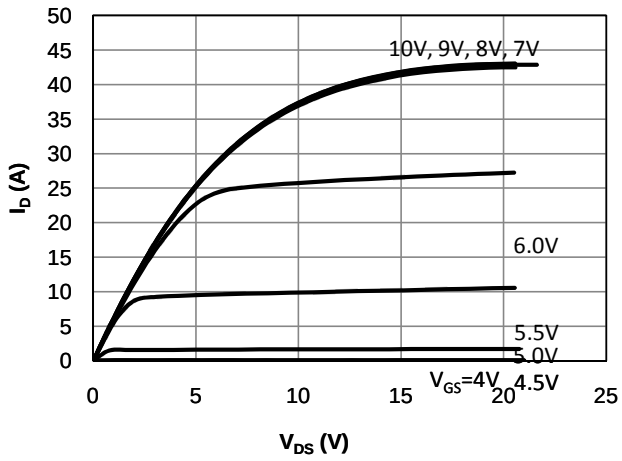

Fig 2. Output Characteristics (Tj=150℃)

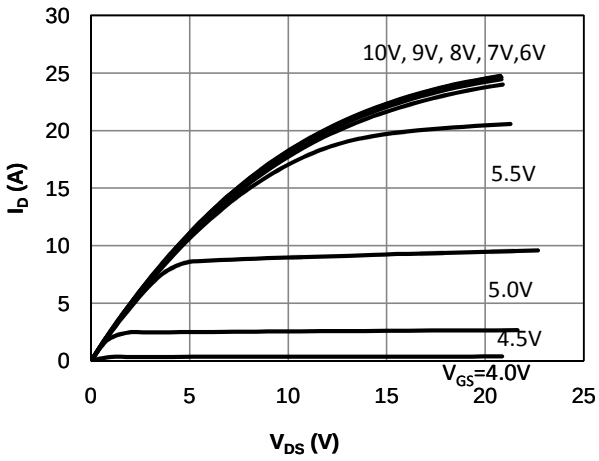

Fig 3: Transfer Characteristics

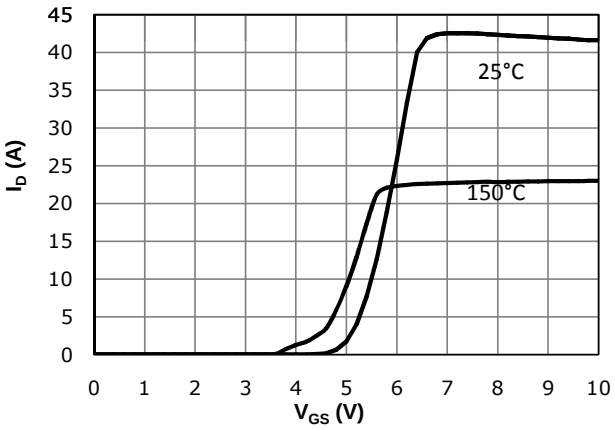

Fig 4: V_{TH} Vs Tj Temperature Characteristics

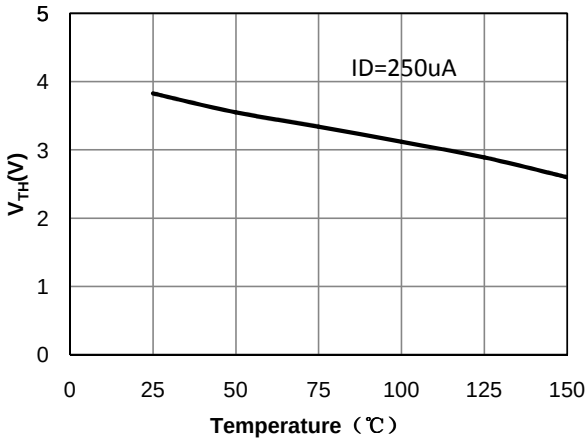

Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

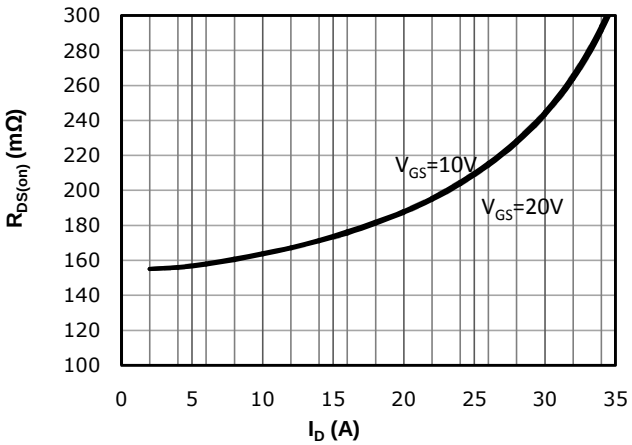

Fig 6: Rds(on) vs. Temperature

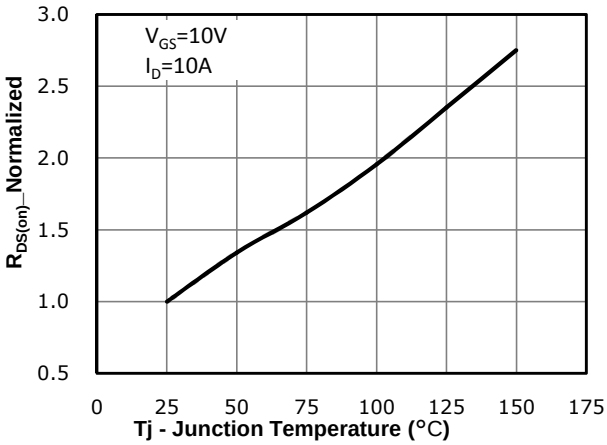

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Fig 7: BVDSS vs. Temperature

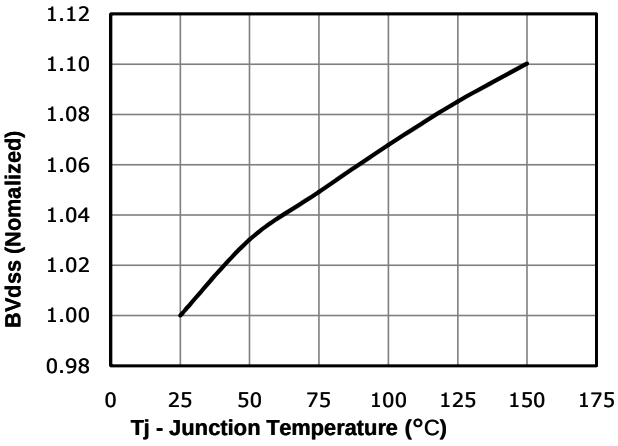

Fig 8: Rds(on) vs Gate Voltage

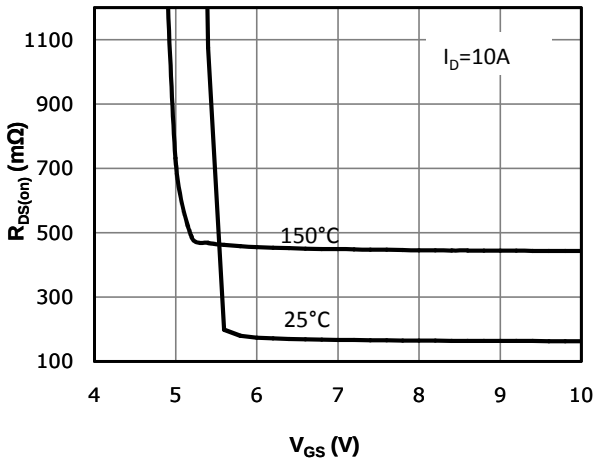

Fig 9: Body-diode Forward Characteristics

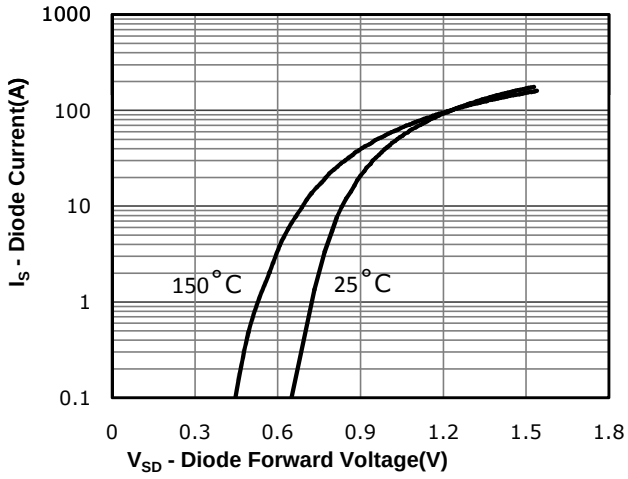

Fig 10: Gate Charge Characteristics

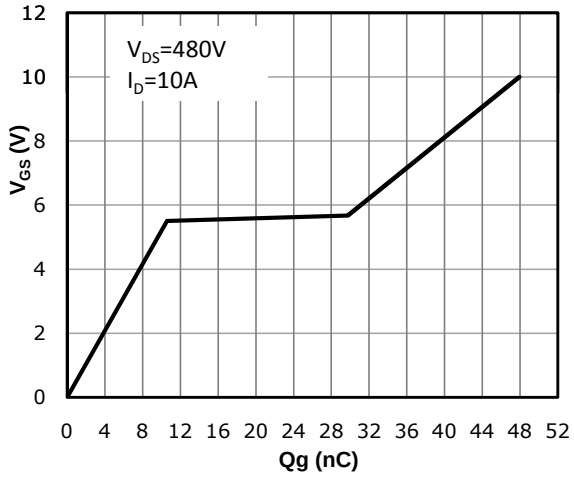

Fig 11: Capacitance Characteristics

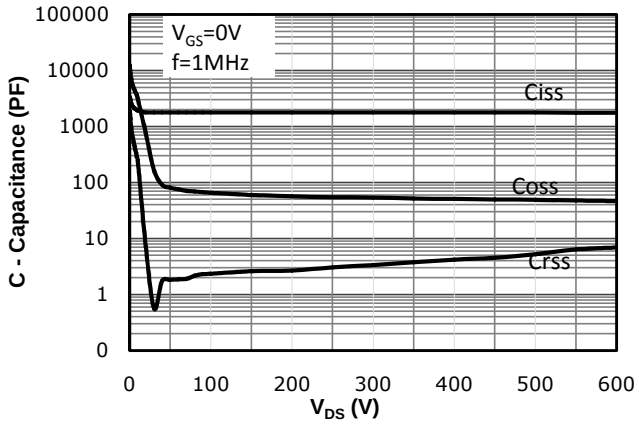

Fig 12: Safe Operating Area

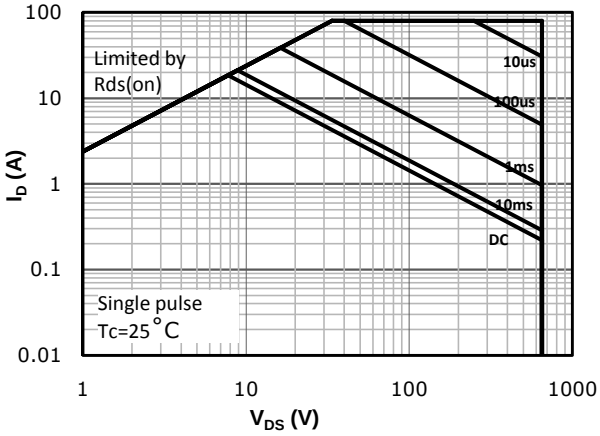

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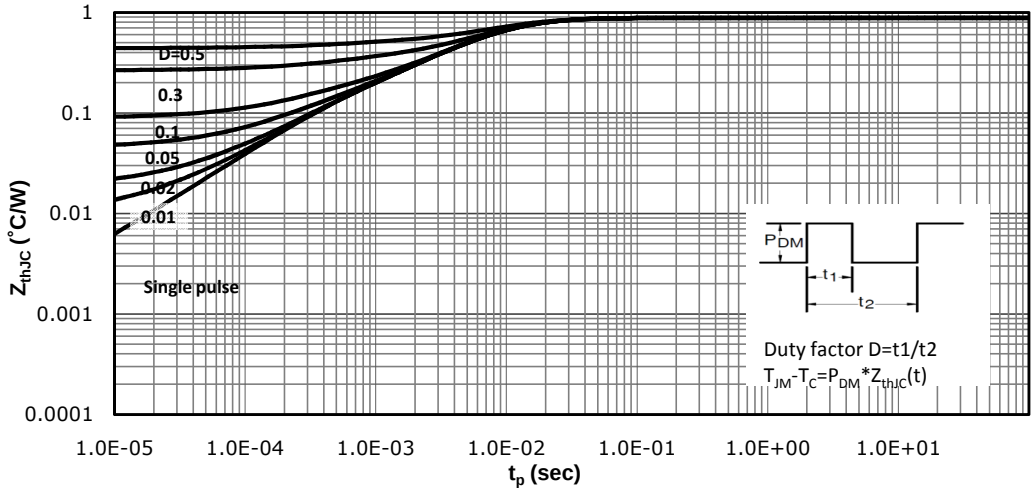
Fig 13: Max. Transient Thermal Impedance



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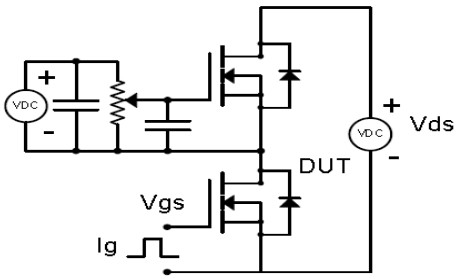
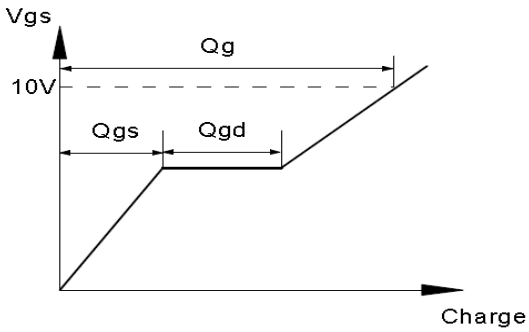
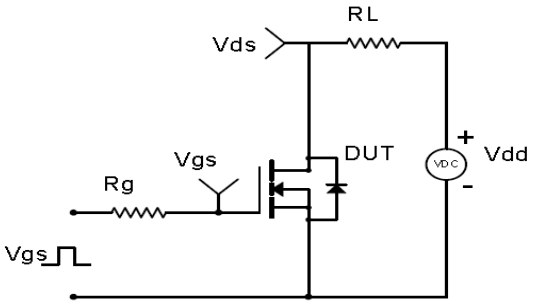
Test Circuit & Waveform

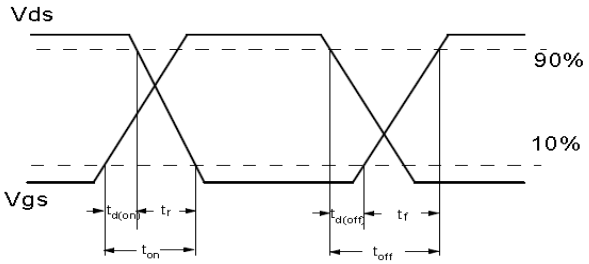
Gate Charge Test Circuit & Waveform



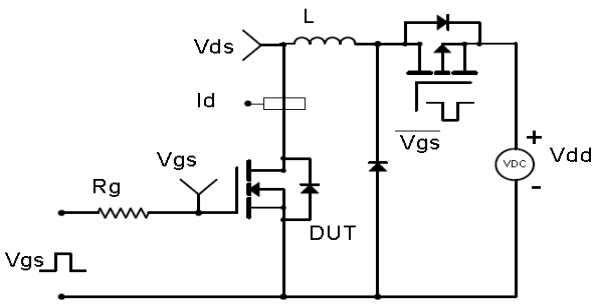


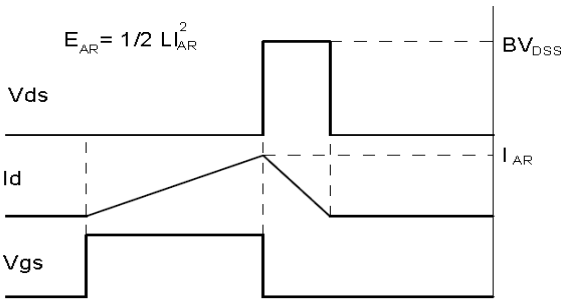
Resistive Switching Test Circuit & Waveforms



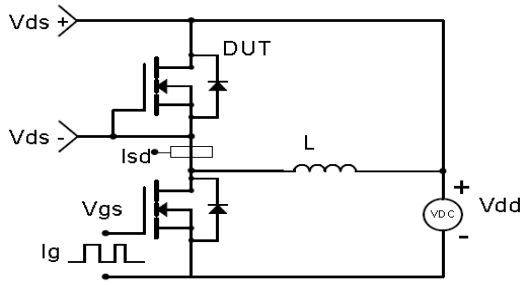


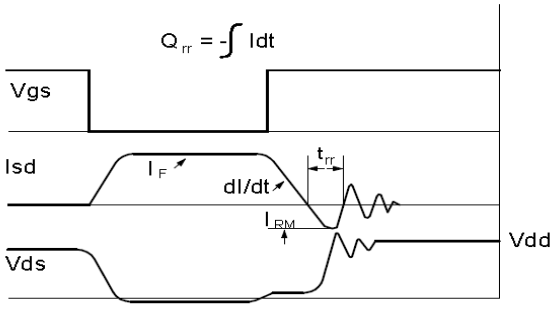
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





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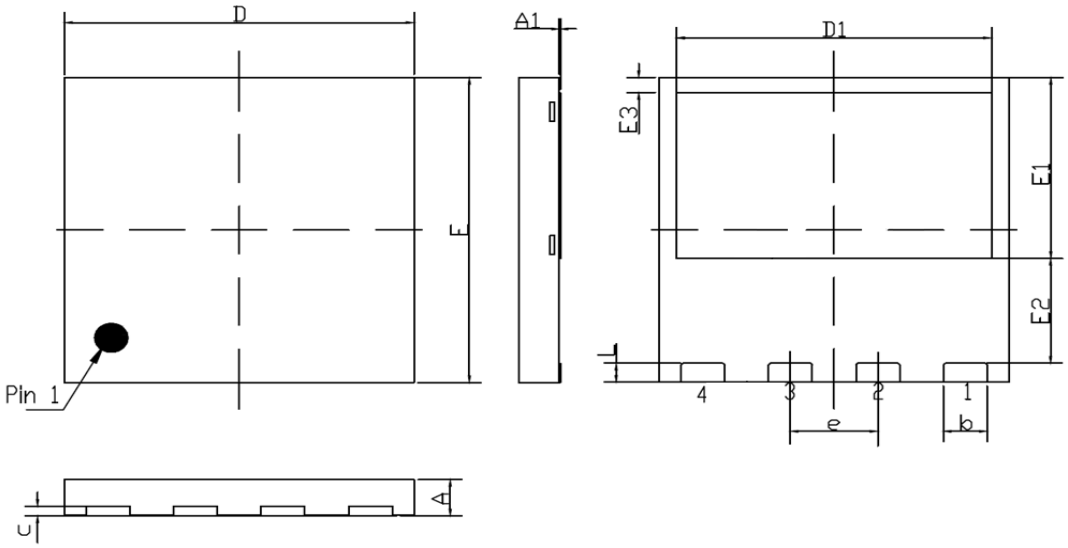
Package Outline: DFN8*8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.75	1.10	0.030	0.043
A1	0.00	0.05	0.000	0.002
b	0.90	1.10	0.035	0.043
c	0.10	0.30	0.004	0.012
D	7.90	8.10	0.311	0.319
D1	7.10	7.30	0.280	0.287
E	7.90	8.10	0.311	0.319
E1	4.65	4.85	0.183	0.191
E2	2.65	2.85	0.104	0.112
E3	0.30	0.50	0.012	0.020
e	2.00 BSC		0.079 BSC	
L	0.40	0.60	0.016	0.024

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Marking

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

Revision History

Revison	Date	Major changes
1.1	2021-1-12	Update Ron spec
2.0	2022-3-8	Update Cxss and POD
3.0	2023-5-26	Update format

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.

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