

Features

- Qualified according to AEC Q101
- Much lower Ron*A performance for On-state efficiency
- Better efficiency due to very low FOM
- Ultra-fast body diode
- Easy to use/drive

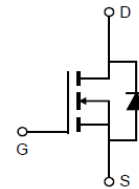
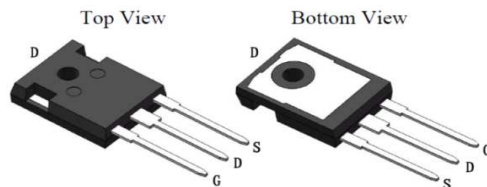
Applications

Suitable for PFC and DC-DC stages for:

- Unidirectional and bidirectional DC-DC converters,
- On-Board battery Chargers

Product Summary

V _{DS}	650V
R _{DS(on)_typ}	42mΩ
I _D	70A

100% DVDS Tested
100% Avalanche Tested

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJQ41N65GCFQ	CRJQ41N65GCFQ	TO-247-3L	Tube	N/A	N/A	25pcs

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	70 44	A
Pulsed drain current ²⁾ (T _C = 25°C, t _p limited by T _{jmax})	I _{D pulse}	209	A
Avalanche energy, single pulse (L=30mH, R _g =30Ω)	E _{AS}	1500	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}	687	W
Continuous diode forward current (T _C = 25°C)	I _S	70	A
Diode pulse current ²⁾ (T _C = 25°C)	I _{S pulse}	209	A
Recovery diode dv/dt ³⁾	dv/dt	50	V/ns
Maximum diode commutation speed	di _F /dt	900	A/μs
Operating junction and storage temperature	T _j , T _{stg}	-55...+150	°C

 1) Limited by T_{j,max}. Maximum Duty Cycle D = 0.50;

 2) Pulse width t_p limited by T_{j,max}

 3) Identical low side and high side switch with identical R_G

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case	R_{thJC}	-	0.13	0.18	°C/W	
Thermal resistance, junction – ambient	R_{thJA}	-	-	45	°C/W	

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

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.9	-	4.9	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	$V_{DS}=650V, V_{GS}=0V$ $T_j=25\text{ °C}$
		-	1000	-		$T_j=150\text{ °C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 30V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	42	51	mΩ	$V_{GS}=10V, I_D=35A,$ $T_j=25\text{ °C}$
		-	110	-		$T_j=150\text{ °C}$
Transconductance	g_{fs}	-	44	-	S	$V_{DS}=20V, I_D=35A$

Dynamic Characteristic

Input Capacitance	C_{iss}		6470		pF	$V_{GS}=0V, V_{DS}=100V,$ $f=1MHz$
Output Capacitance	C_{oss}		240			
Reverse Transfer Capacitance	C_{rss}		2.4			
Gate Total Charge	Q_G		176		nC	$V_{GS}=10V, V_{DS}=480V,$ $I_D=35A$
Gate-Source charge	Q_{gs}		57			
Gate plateau voltage	Q_{gd}		91			
Gate-Drain charge	$V_{plateau}$	-	8	-	V	
Turn-on delay time	$t_{d(on)}$	-	31	-	ns	$V_{GS}=10V, I_D=35A,$ $V_{DS}=400V, R_g=1.8\Omega$
Rise time	t_r	-	14	-		
Turn-off delay time	$t_{d(off)}$	-	63	-		
Fall time	t_f	-	9	-		
Gate resistance	R_G		1		Ω	$V_{GS}=0V, V_{DS}=0V, f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.7	0.9	1.2	V	$V_{GS}=0V, I_{SD}=35A$
Body Diode Reverse Recovery Time	t_{rr}		176		ns	$I_{sd}=35A$ $dI/dt=100A/us,$ $V_{ds}=400V$
Body Diode Reverse Recovery Charge	Q_{rr}		1.2		uC	
Body Diode Reverse Recovery Peak Current	I_{rrm}		12		A	

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25°C)

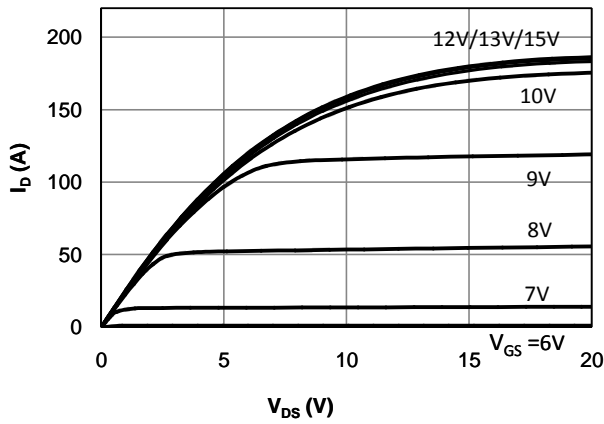


Fig 2. Output Characteristics (Tj=150°C)

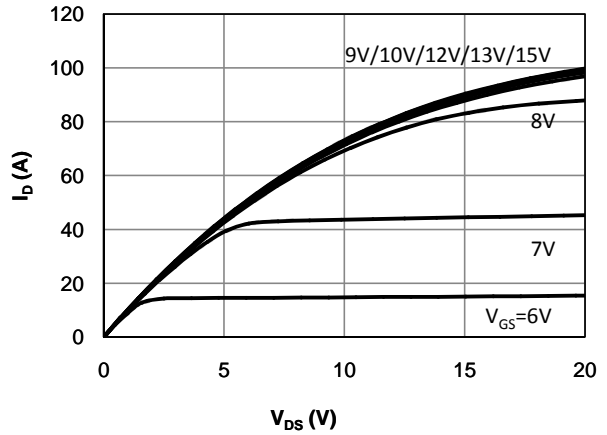


Fig 3: Transfer Characteristics

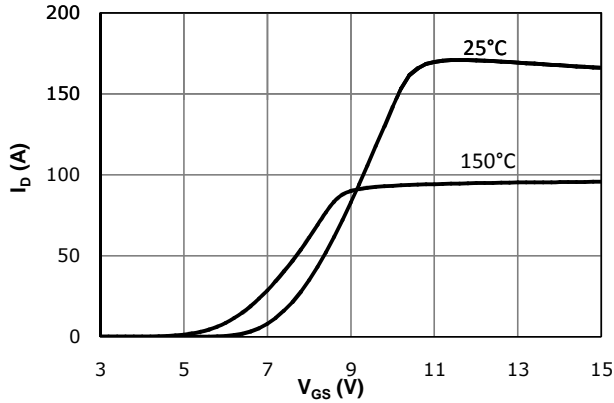


Fig 4: V_{TH} Vs Tj Temperature Characteristics

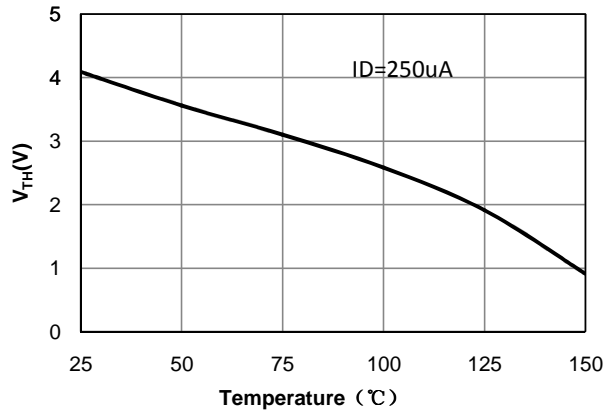


Fig 5: R_{DS(on)} Vs I_{DS} Characteristics (Tj=25°C)

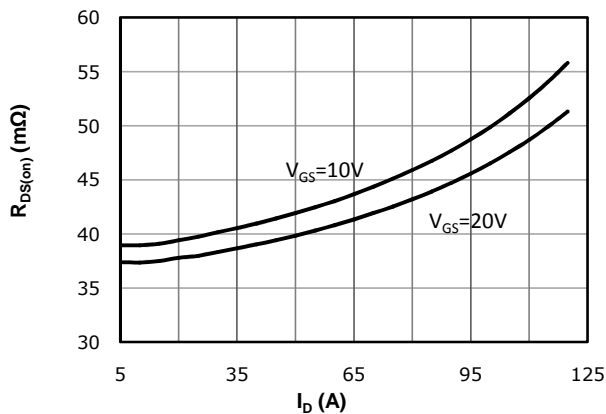


Fig 6: R_{DS(on)} vs. Temperature

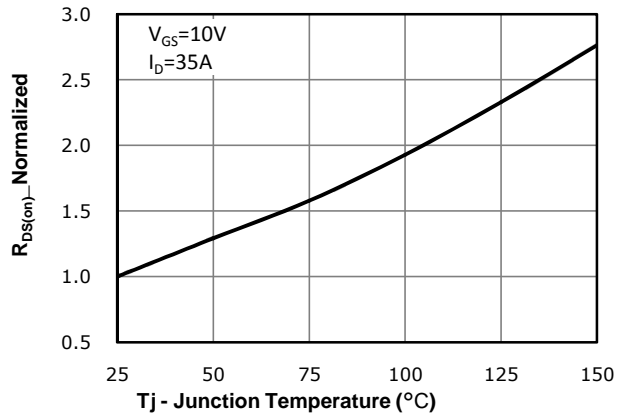


Fig 7: BVdss vs. Temperature

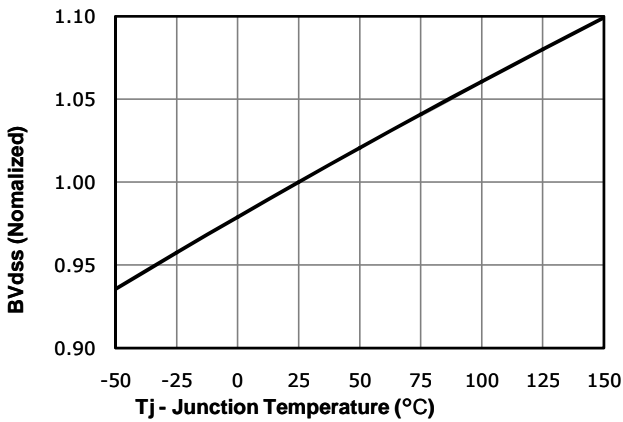


Fig 8: Rds(on) vs Gate Voltage

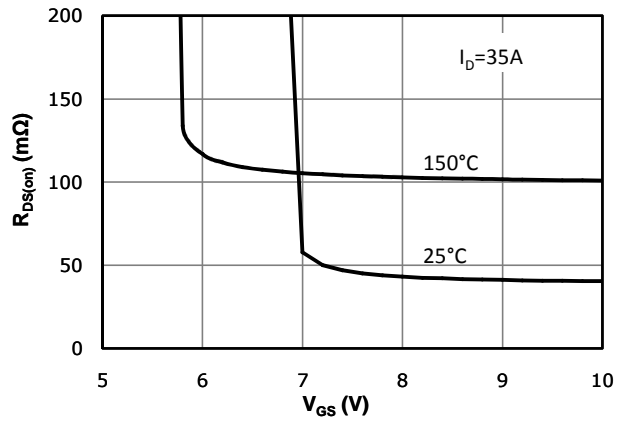


Fig 9: Body-diode Forward Characteristics

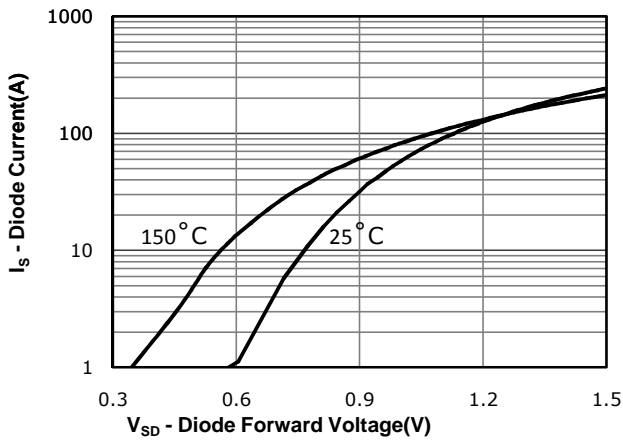


Fig 10: Gate Charge Characteristics

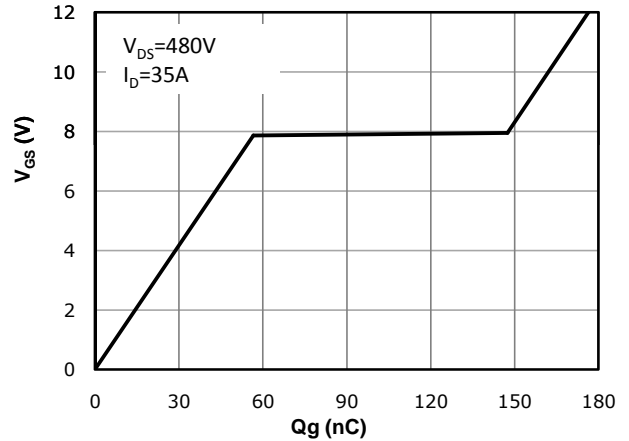


Fig 11: Capacitance Characteristics

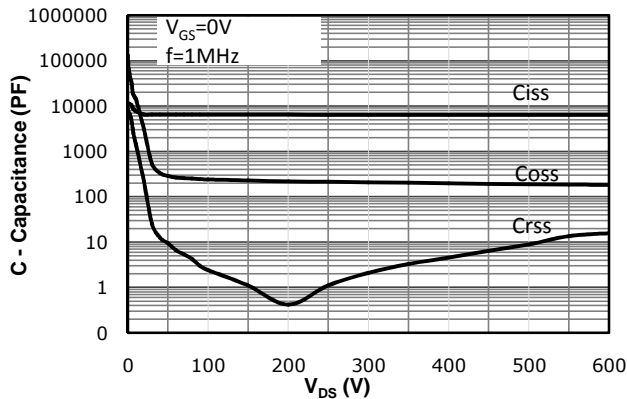


Fig 12: Safe Operating Area

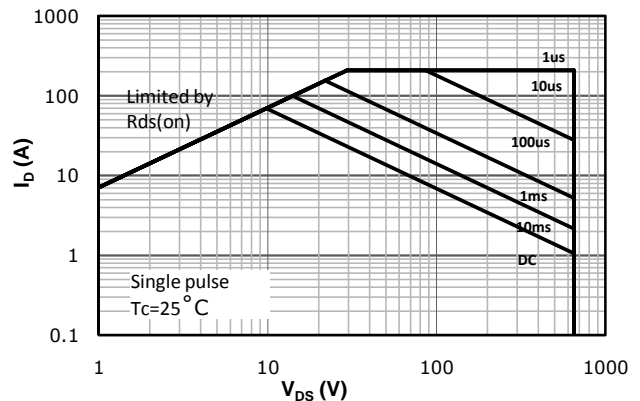
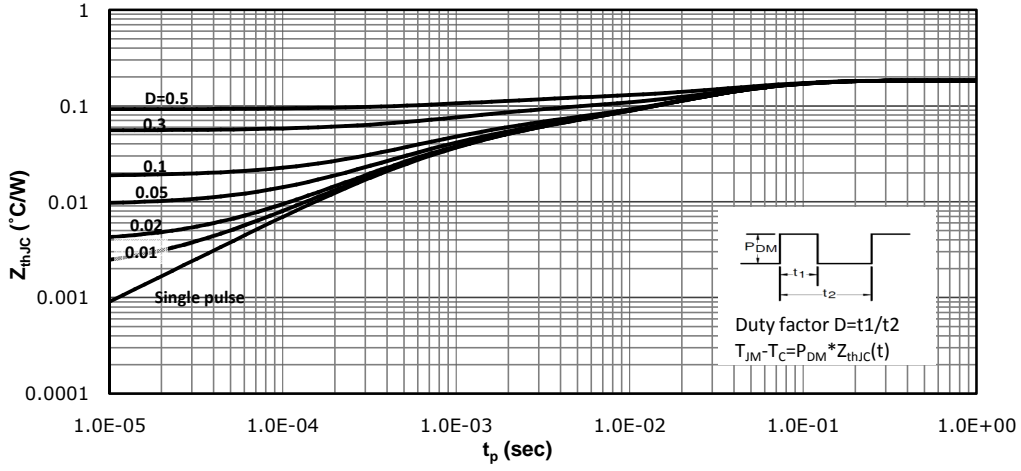
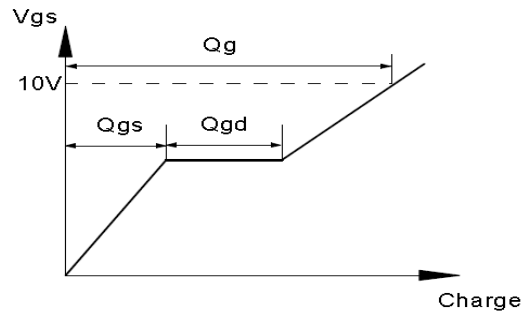
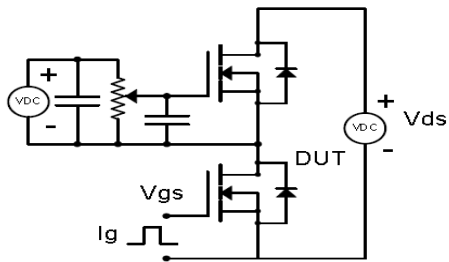


Fig 13: Max. Transient Thermal Impedance

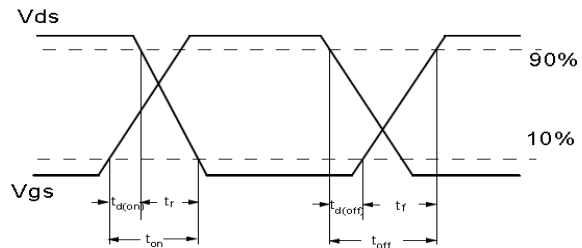
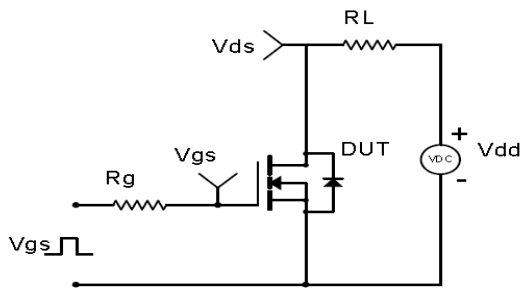


Test Circuit & Waveform

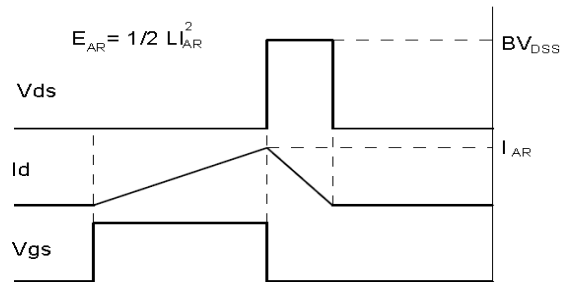
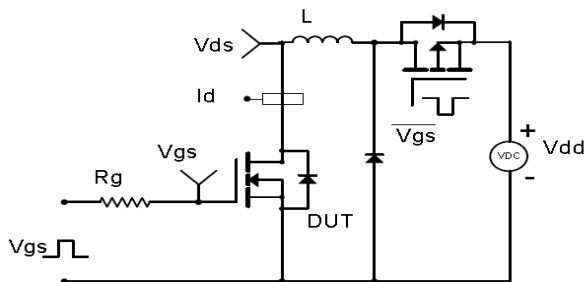
Gate Charge Test Circuit & Waveform



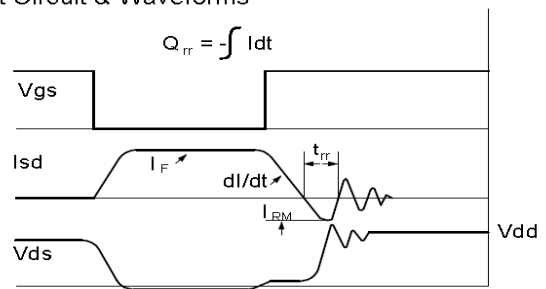
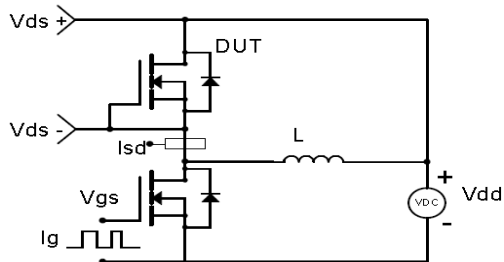
Resistive Switching Test Circuit & Waveforms



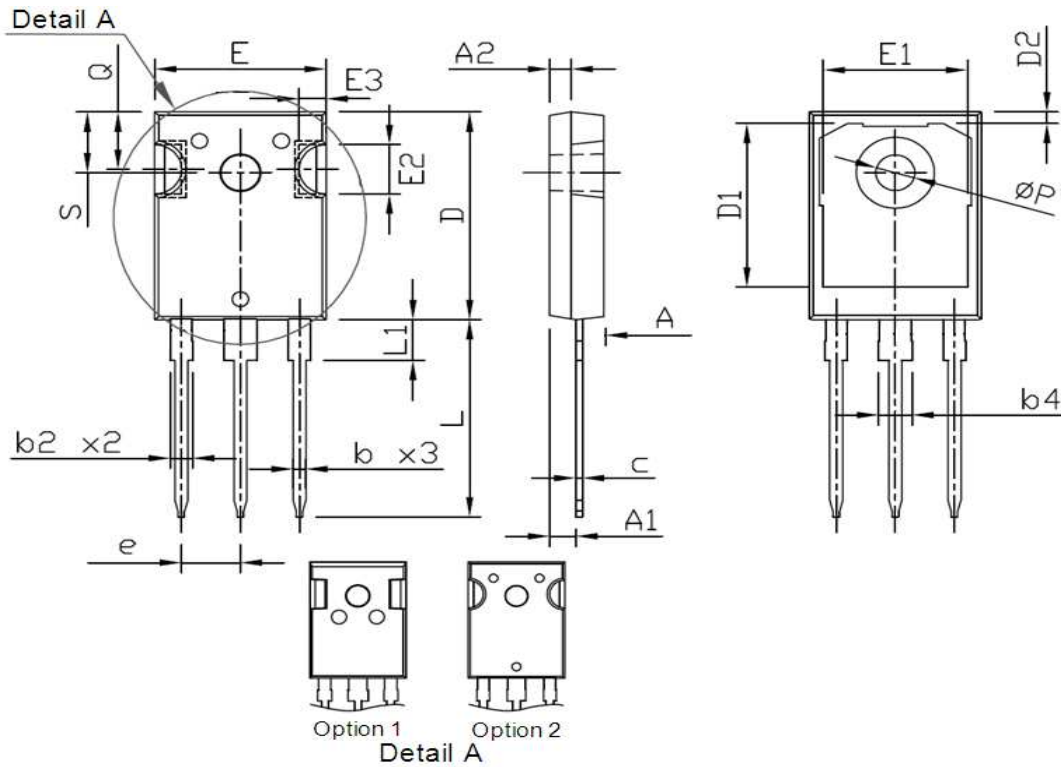
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-247-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.70	5.30	0.185	0.209
A1	2.20	2.60	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	1.04	1.33	0.041	0.052
b2	1.90	2.41	0.075	0.095
b4	2.87	3.43	0.113	0.135
c	0.55	0.70	0.022	0.028
D	20.70	21.30	0.815	0.839
D1	16.25	17.65	0.640	0.695
D2	0.51	1.40	0.020	0.055
e	5.44 BSC.		0.214 BSC.	
E	15.50	16.30	0.610	0.642
E1	13.08	14.16	0.515	0.557
E2	3.80	5.49	0.150	0.216
E3	1.00	2.75	0.039	0.108
L	19.72	20.32	0.776	0.800
L1	3.85	4.50	0.152	0.177
Q	5.25	6.25	0.207	0.246
P	3.50	3.70	0.138	0.146
S	6.04	6.30	0.238	0.248

Marking



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

Revision History

Revision	Date	Major changes
1.0	2023-3-3	First version

Disclaimer

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