华润微电子(重庆)有限公司

CRJQF41N65GC

SJMOS N-MOSFET 650V, 40mΩ, 83A

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
$R_{DS(on)\_typ}$	40mΩ
I_D	83A

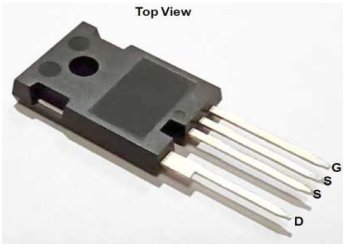
Applications

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

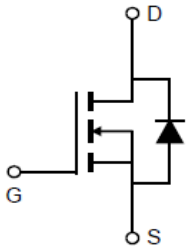
100% DVDS Tested

100% Avalanche Tested

RoHS HF



CRJQF41N65GC



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJQF41N65GC	-	TO-247-4L	Tube	N/A	N/A	30pcs

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	 83 52	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	331	A
Avalanche energy, single pulse (L=30mH, Rg=30Ω)	E_{AS}	1500	mJ
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_{tot}	658	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case. Max	RthJC	-	0.1357	0.19	°C/W	
Thermal resistance, junction – ambient. Max	RthJA	-	-	43	°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	-	4.2	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- 10	2 -	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	$R_{DS(on)}$	- -	40 100	46 -	mΩ	V_{GS}=10V, I_D=35A, T_C=25°C T_C=150°C
Transconductance	g_{fs}	-	63	-	S	V_{DS}=20V,I_D=35A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	7580	11370	pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}	-	250	375		
Reverse Transfer Capacitance	C_{rss}	-	35	70		
Gate Total Charge	Q_G	-	213	320	nC	V_{GS}=10V, V_{DS}=480V, I_D=35A, f=1MHz
Gate-Source charge	Q_{gs}	-	37	74		
Gate-Drain charge	Q_{gd}	-	82	164		
Turn-on delay time	$t_{d(on)}$	-	146	-	ns	T_j=25°C, V_{GS}=10V, I_D=35A, V_{DS}=400V, R_g=27 Ω
Rise time	t_r	-	96	-		
Turn-off delay time	$t_{d(off)}$	-	625	-		
Fall time	t_f	-	102	-		
Gate resistance	R_G	-	1.0	2	Ω	f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.5	0.88	1	V	V_{GS}=0V,I_{SD}=35A
Body Diode Reverse Recovery Time	t_{rr}	-	670	1340	ns	Isd=35A dI/dt=100A/us,Vds=400V
Body Diode Reverse Recovery Charge	Q_{rr}	-	17.41	35	uC	

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

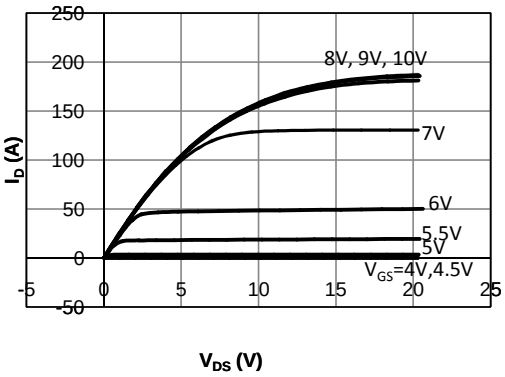


Fig 2. Output Characteristics (Tj=150℃)

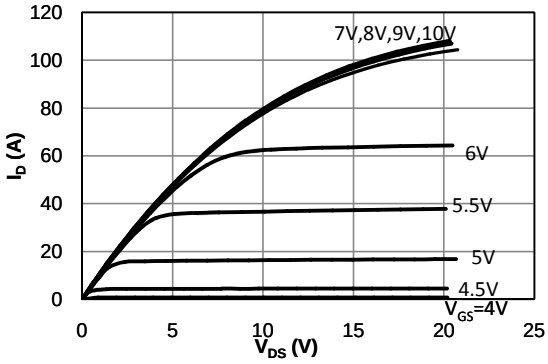


Fig 3: Transfer Characteristics

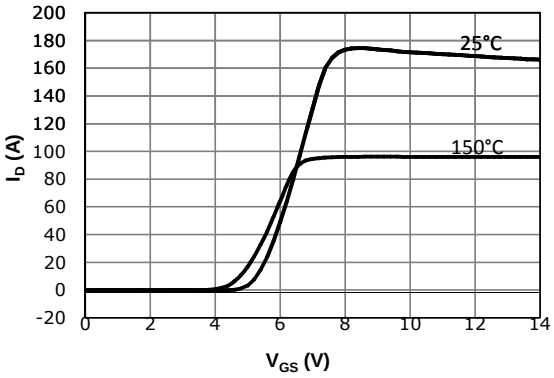


Fig 4: V_{TH} Vs Tj Temperature Characteristics

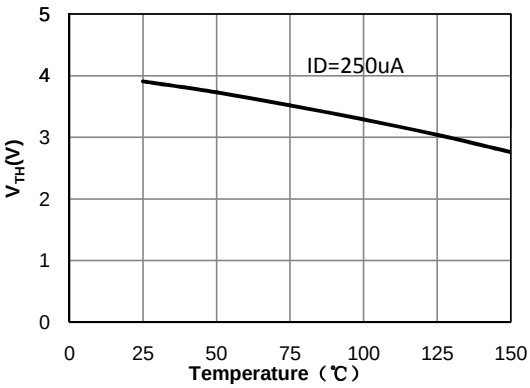


Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

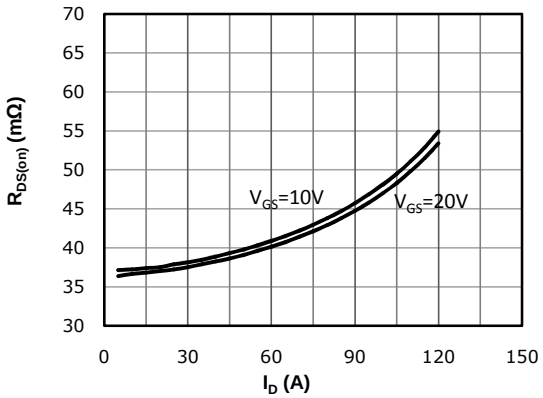


Fig 6: Rds(on) vs. Temperature

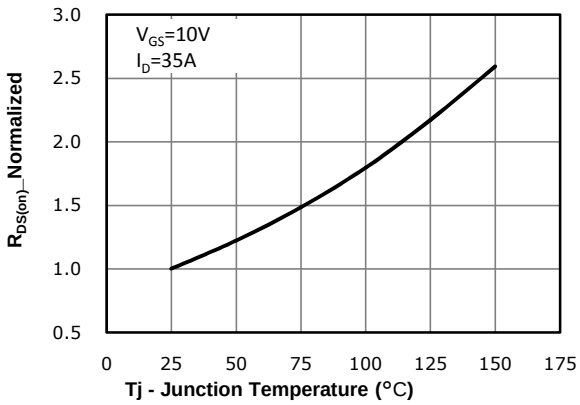


Fig 7: BVDSS vs. Temperature

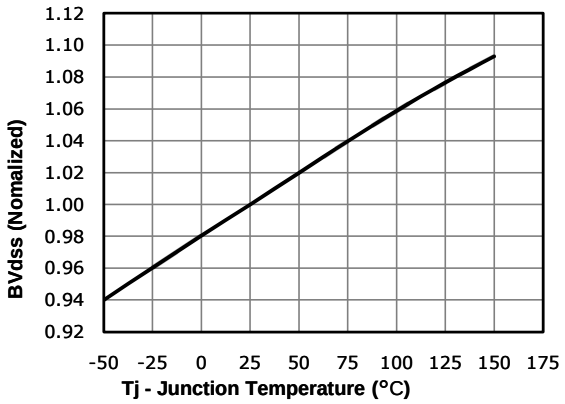


Fig 8: Rds(on) vs Gate Voltage

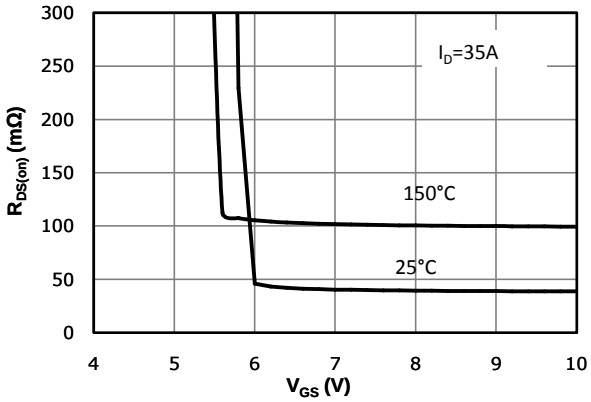


Fig 9: Body-diode Forward Characteristics

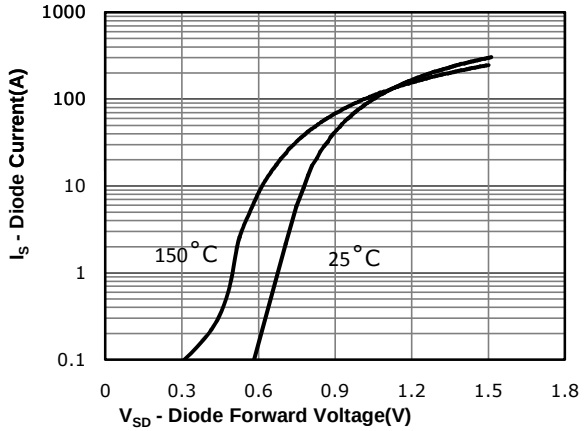


Fig 10: Gate Charge Characteristics

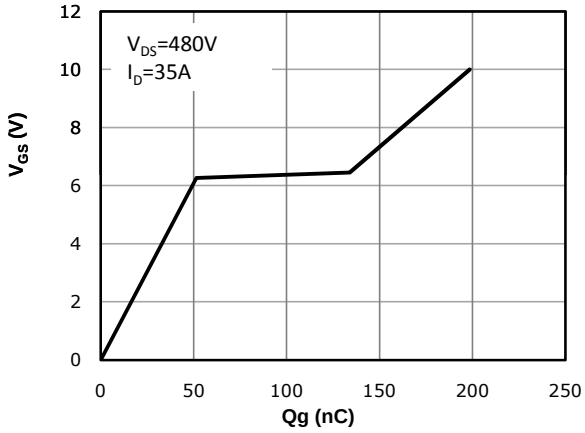


Fig 11: Capacitance Characteristics

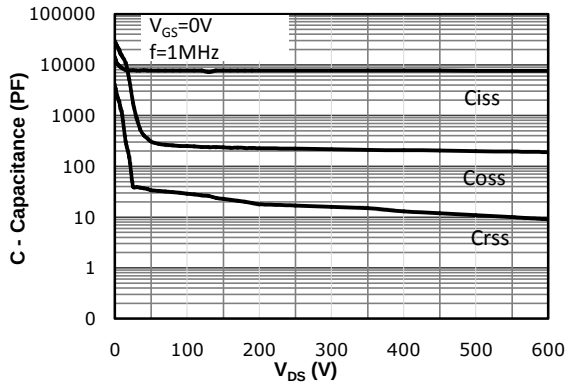


Fig 12: Safe Operating Area

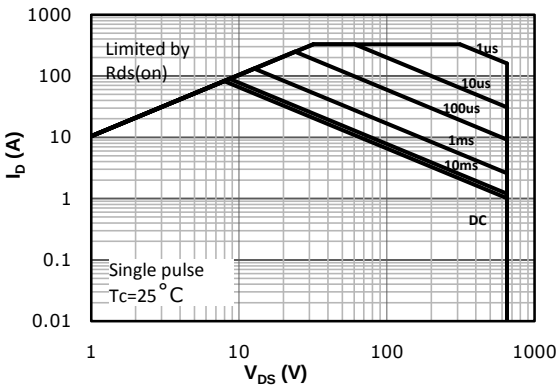
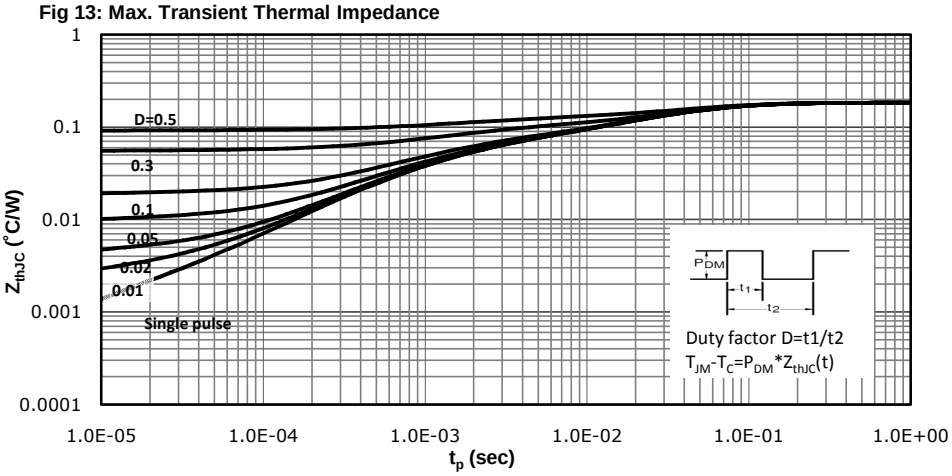
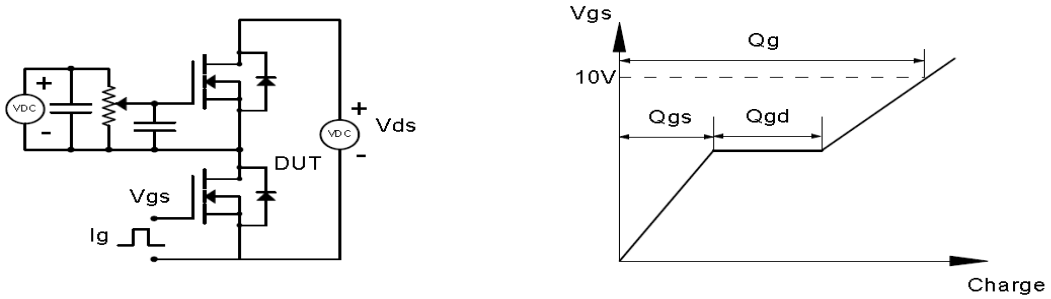


Fig 13: Max. Transient Thermal Impedance

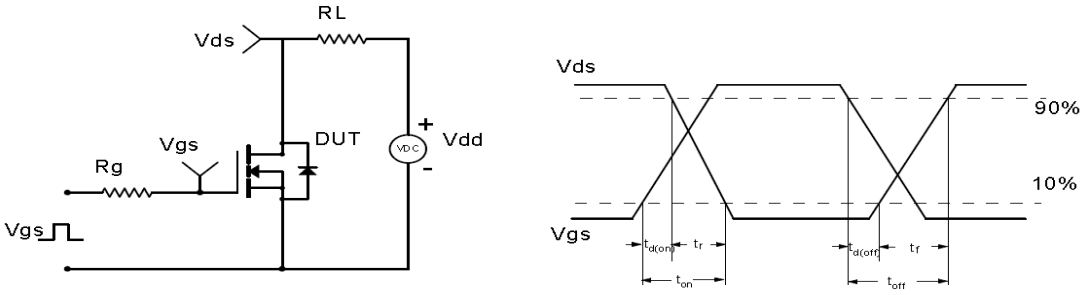


Test Circuit & Waveform

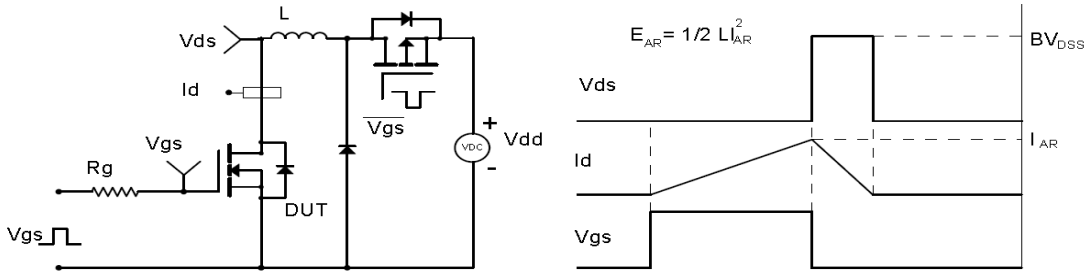
Gate Charge Test Circuit & Waveform



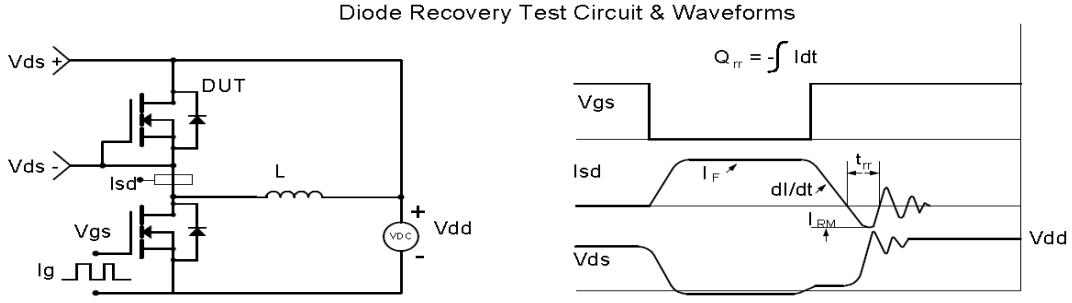
Resistive Switching Test Circuit & Waveforms



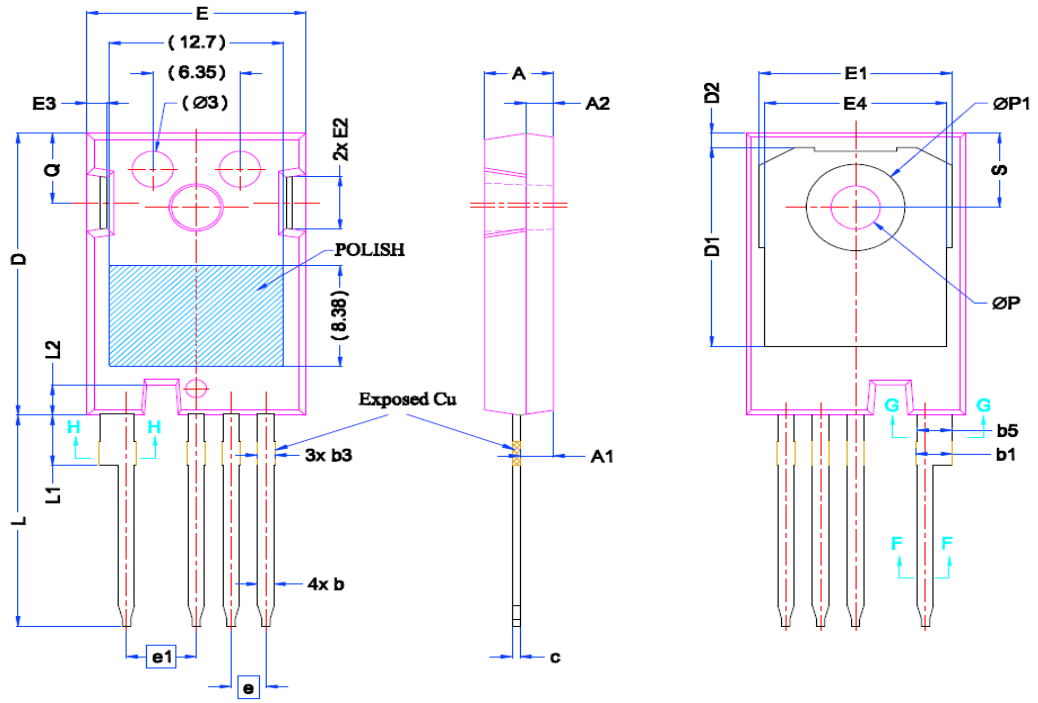
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-247-4L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.07	1.33	0.042	0.052
b1	2.39	2.94	0.094	0.116
b2	2.39	2.84	0.094	0.112
b3	1.07	1.60	0.042	0.063
b4	1.07	1.50	0.042	0.059
b5	2.39	2.69	0.094	0.106
c	0.55	0.68	0.022	0.027
D	23.30	23.60	0.917	0.929
D1	16.25	17.65	0.640	0.695
D2	0.95	1.25	0.037	0.049
E	15.75	16.13	0.620	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	1.90	0.039	0.075
E4	12.38	13.43	0.487	0.529
e	2.54 BSC		0.100 BSC	
e1	5.08 BSC		0.200 BSC	
L	17.31	17.82	0.681	0.702
L1	3.97	4.37	0.156	0.172
L2	2.35	2.65	0.093	0.104
Φp	3.51	3.65	0.138	0.144
Φp1	7.19 REF.		0.283 RES.	
Q	5.49	6.00	0.216	0.236
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

Revison	Date	Major changes
1.2	2021-9-26	Update Ron Spec

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.