General Description

The SJF188R65 uses advanced SIC technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 13V. This device is suitable for use as a wide variety of applications.

Features

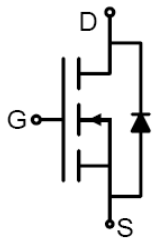
- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery
- Easy to Parallel and Simple to Drive

Application

- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Solar Inverters

Key Performance Parametes

Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(ON)_TYP}$	196	mΩ
I_D	14.9	A
Q_G	13	nC



Schematic Diagram



TO-220F top view

RoHS

Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJF188R65	SJF188R65	TO-220F	Tube	\	\	1000 Pcs

Table 1. Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	650	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	-4/+18	V
I_D	Drain Current-Continuous(T_C=25℃)	14.9	A
	Drain Current-Continuous(T_C=100℃)	9.4	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	26	A
P_D	Maximum Power Dissipation(T_C=25℃)	50	W
	Maximum Power Dissipation(T_C=100℃)	20	W
E_{AS}	Avalanche energy (Note 2)	156	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2.5	°C/W

Table 3. Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=1mA	650			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V, V_{GS}=0V			10	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=18V, V_{DS}=0V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=1mA	2.5		4.4	V
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=2A		0.6		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=18V, I_D=2A		196	250	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=500V,V_{GS}=0V, f=1MHz		303		pF
C_{oss}	Output Capacitance			27		pF
C_{rss}	Reverse Transfer Capacitance			2		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		11.3		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=18V, V_{DS}=400V, L=120uH, R_{GEN}=2.5Ω		7.5		nS
t_r	Turn-on Rise Time			7.2		nS
$t_{d(off)}$	Turn-Off Delay Time			11.7		nS
t_f	Turn-Off Fall Time			20.8		nS
Q_g	Total Gate Charge	V_{GS}=18V, V_{DS}=400V, I_D=2A		13		nC
Q_{gs}	Gate-Source Charge			3.2		nC
Q_{gd}	Gate-Drain Charge			6.2		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				14.9	A
V_{SD}	Forward on Voltage (Note 2)	V_{GS}=-4V, I_S=1A		4		V
t_{rr}	Reverse Recovery Time	I_F=2A, dI/dt=1000A/μs		7.1		ns
Q_{rr}	Reverse Recovery Charge	I_F=2A, dI/dt=1000A/μs		17.6		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=60V,V_G=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

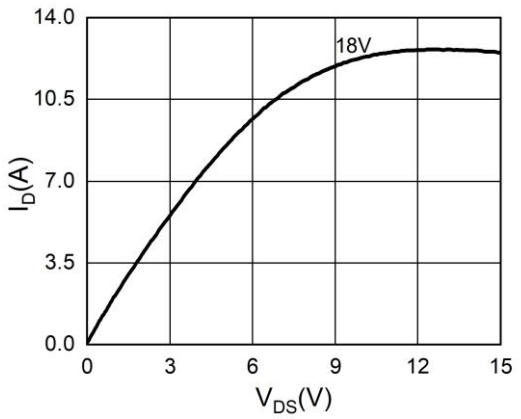


Figure 2. Transfer Characteristics

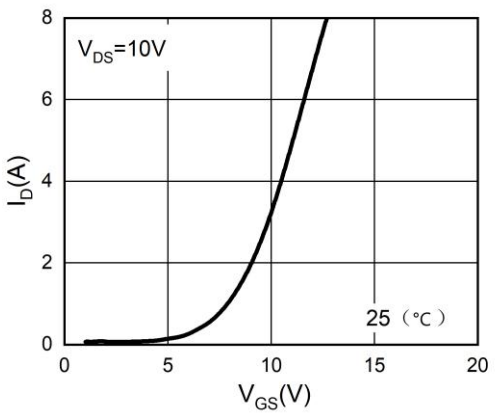


Figure 3. Power Dissipation

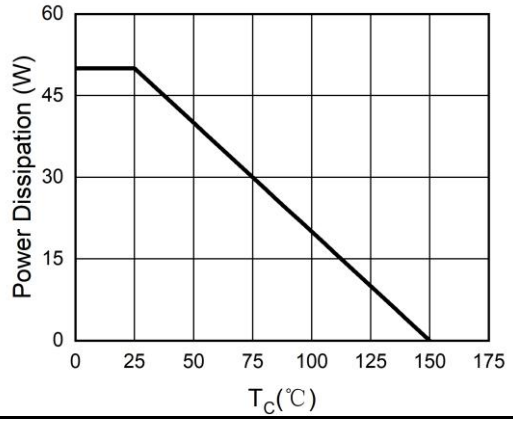


Figure 4. Drain Current

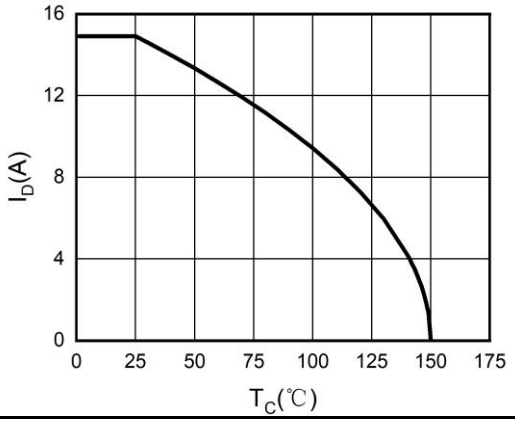


Figure 5. BV_{DSS} vs Junction Temperature

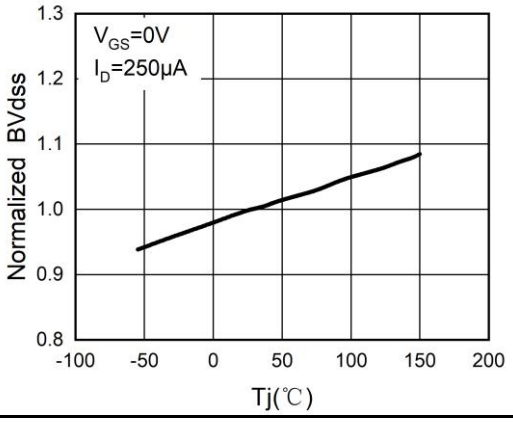
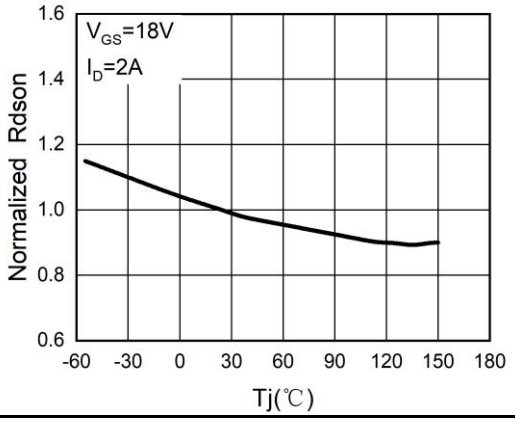


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

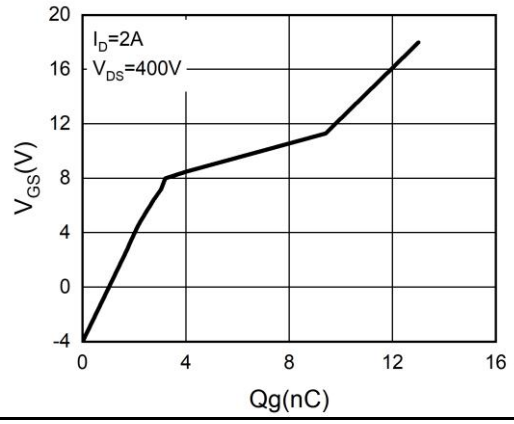


Figure 8. Capacitance

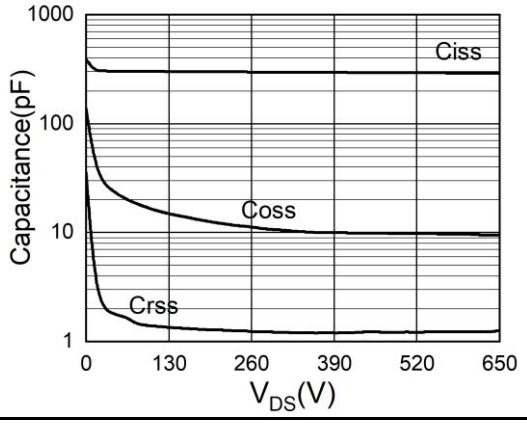


Figure 9. Body-Diode Characteristics

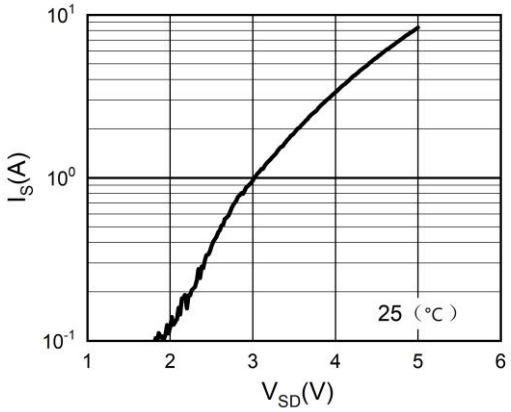
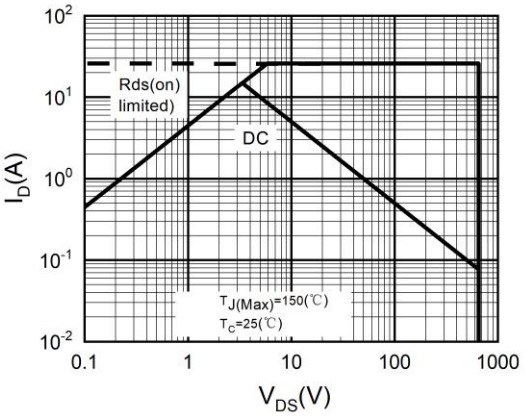
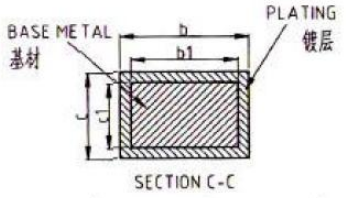


Figure 10. Maximum Safe Operating Area

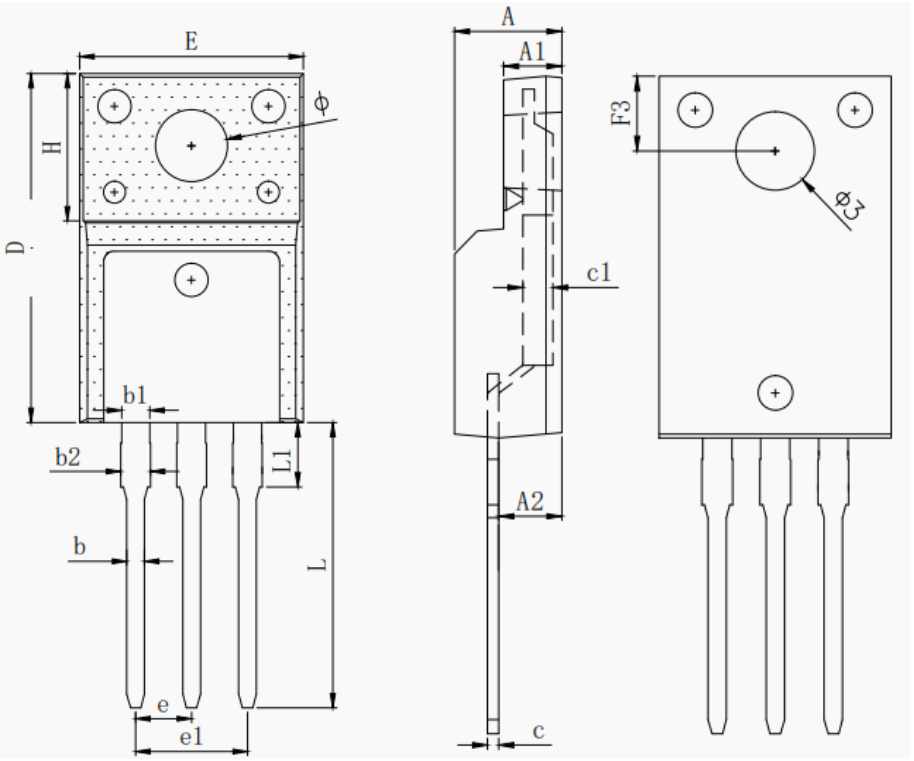






NOTES
1.ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 AA.
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

L2		0.51BSC	
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
θ	0°	-	8°
θ1	5°	7°	9°
θ2	5°	7°	9°
K		0.40REF	



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.500	4.700	4.900
A1	2.340	2.540	2.740
A2	2.560	2.760	2.960
b	0.700	0.800	0.950
b1	1.180	1.280	1.430
b2	1.250	1.350	1.550
c	0.400	0.500	0.650
c1	1.200	1.300	1.350
D	15.570	15.870	16.170
H		6.700 REF	
E	9.960	10.160	10.360
e		2.540 BSC	
e1		5.080 BSC	
L	12.680	12.980	13.280
L1	2.780	2.930	3.080
F3	3.150	3.300	3.450
Φ	3.030	3.180	3.450
Φ3	3.150	3.450	3.650

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