KJC65R190CF

Super-Junction Power Mosfet

1. Product Information

Features

- Low FOM $R_{DS(ON)} \times Q_G$
- Better EMI
- Extremely low switching loss
- Good stability and uniformity
- 100% UIS and Isolation Tested

Applications

- Swith Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charge

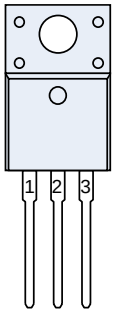
Quick reference

- $V_{DS} \geqq 650$ V
- $I_D \leqq 20$ A
- $R_{DS(ON)} \leqq 190$ mΩ @ V_{GS} = 10V (Type 160 mΩ)

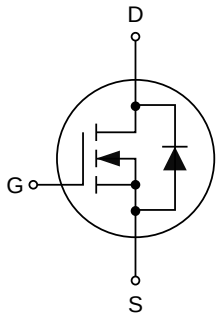
Pin Description

Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline	Symbol



Top View
TO-220F



Package Marking and Ordering Information

Product Name	Marking	Package	Packaging	Quantity (pcs)
KJC65R190CF	**KJC65R190F**	**TO-220F**	**Tube**	**50**

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current (T_C=25℃)	20	A
	Continuous Drain Current (T_C=100℃)	12.5	A
I_{DM}	Pulsed Drain Current [1]	80	A
E_{AS}	Single Pulsed Avalanche Energy [2]	388	mJ
P_D	Power Dissipation [2]	52	W
dv/dt	Peak Diode Recovery dv/dt	5	V/ns
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance, Junction-Ambient [3]	89	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction- Case [3]	2.4	℃/W

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

Symbol	Parameter	Test Conditions	Min	Type	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0 V, I_D=250 μA	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650 V, V_{GS}=0 V, T_J=25℃	-	-	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30 V, V_{DS}=0 V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250 μA	2.5	3.5	4.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10 V, I_D=20 A	-	160	190	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=100 V, V_{GS}=0 V, F=1 MHz	-	1655	-	pF
C_{oss}	Output Capacitance		-	69	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1.2	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=325 V, I_D=20 A, R_G=25 Ω, V_{GS}=10V	-	34	-	ns
t_r	Turn-on Rise Time		-	37	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	148	-	ns
t_f	Turn-off Fall Time		-	36	-	ns
Q_g	Total Gate Charge	V_{DS}=325 V, I_D=20 A, V_{GS}=10 V	-	34	-	nC
Q_{gs}	Gate-Source Charge		-	7	-	nC
Q_{gd}	Gate-Drain Charge		-	12	-	nC
Source-Drain Diode Characteristics						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_F=20 A	-	-	1.4	V
I_S	Diode Continuous Forward Current		-	-	20	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current		-	-	60	A
Q_{rr}	Reverse Recovery Time	V_R=50 V, I_F=20 A, di/dt=100 A/μs	-	4.47	-	uC
T_{rr}	Reverse Recovery Charge		-	301	-	ns

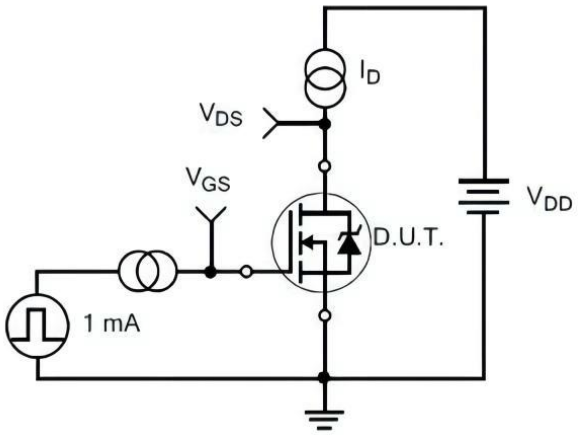
Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.
2. T_J=25℃, V_{DD}=50 V,V_{GS}=10 V, R_G=25 Ω.
3. Mount on minimum PCB layout.

4. Test Circuits and Waveforms (T_j = 25℃)

Table 1. Gate Charge Test Circuit and Waveforms

Gate Charge Test Circuit



Gate Charge Waveforms

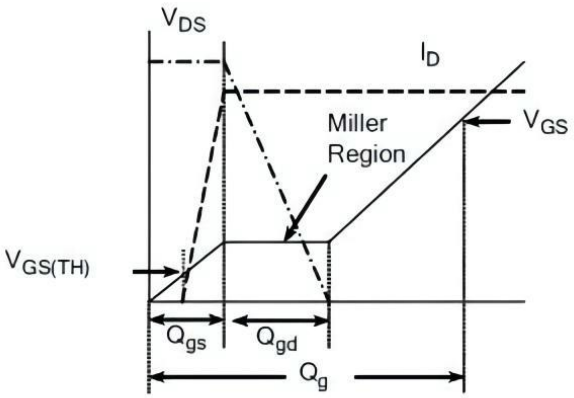
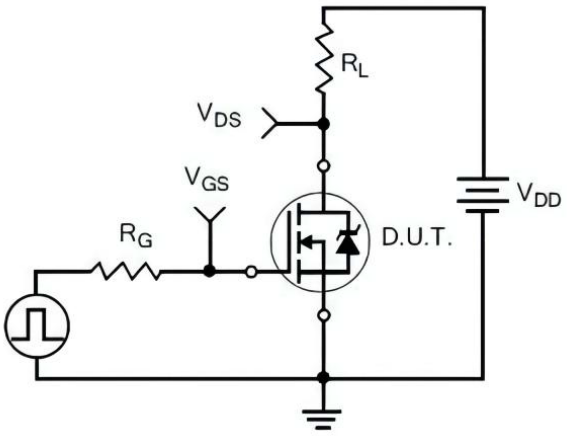


Table 2. Resistive Switching Test Circuit and Waveforms

Resistive Switching Test Circuit



Resistive Switching Waveforms

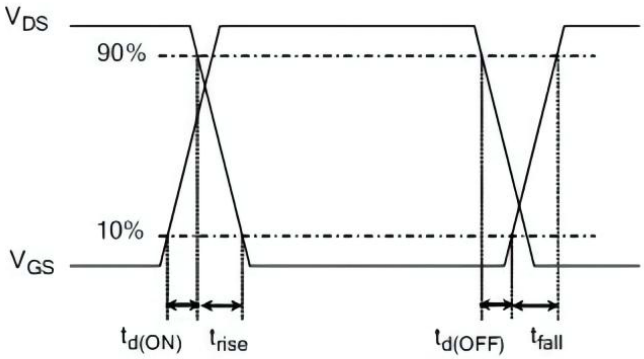
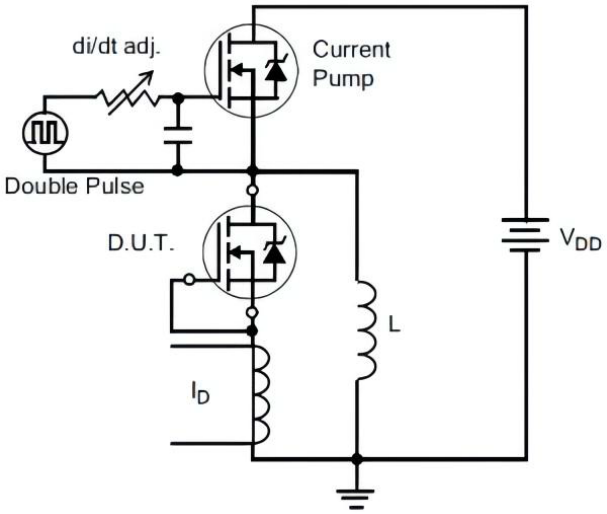


Table 3. Diode Recovery Test Circuit and Waveforms

Diode Recovery Test Circuit



Diode Recovery Waveforms

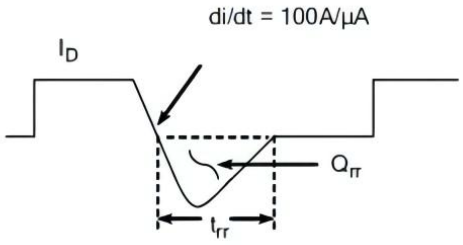
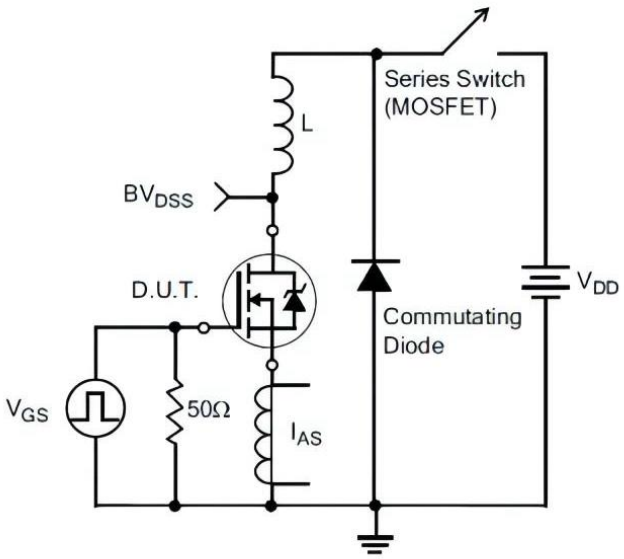
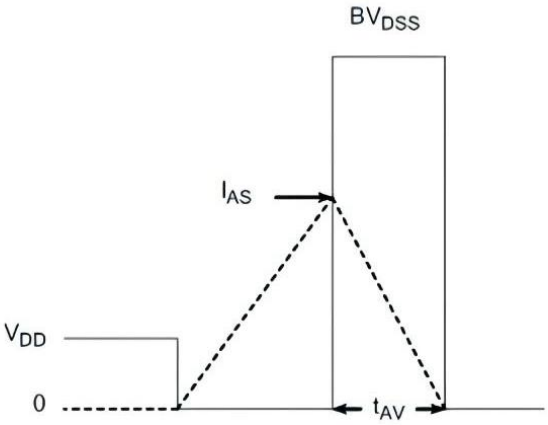


Table 4. Unclamped inductive Switching (UIS) Test Circuit and Waveforms

Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

5. Electrical Characteristics

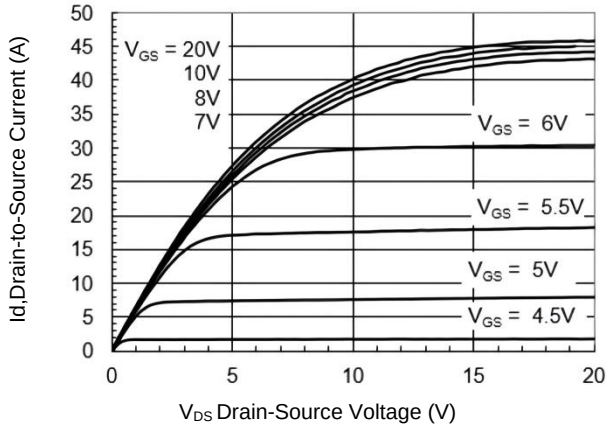


Figure 1. Typical Output Characteristics

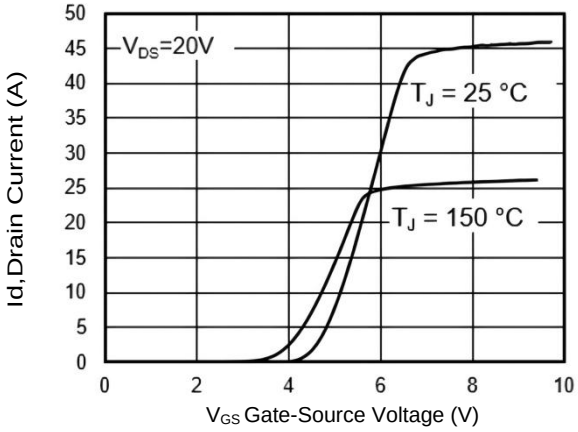


Figure 2. Typical Transfer Characteristics

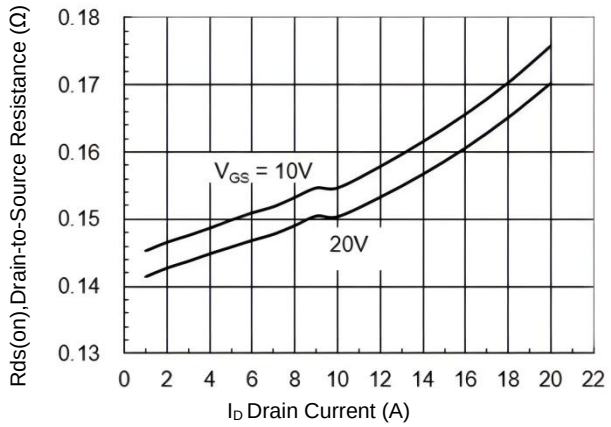


Figure 3. On-Resistance versus Drain Current

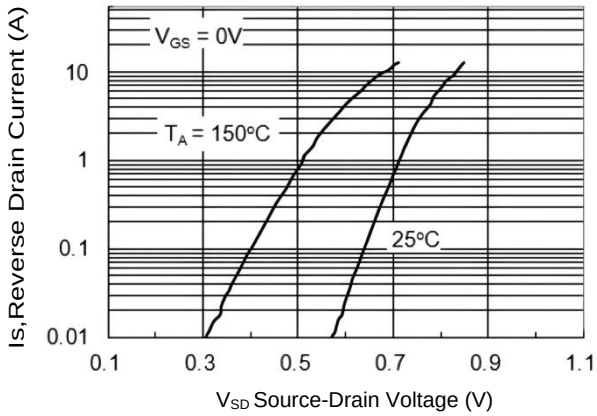


Figure 4. Diode forward voltage versus Current

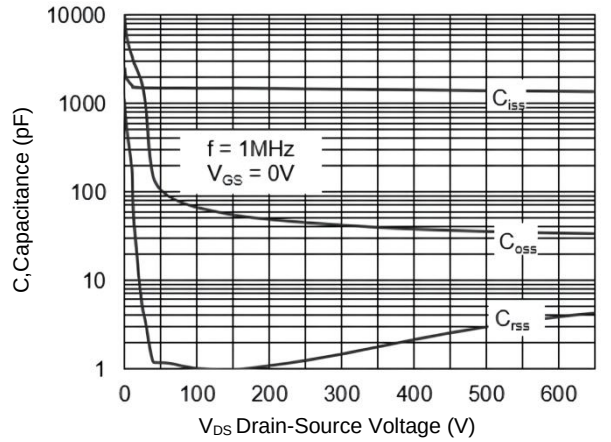


Figure 5. Typical Capacitance versus V_{DS}

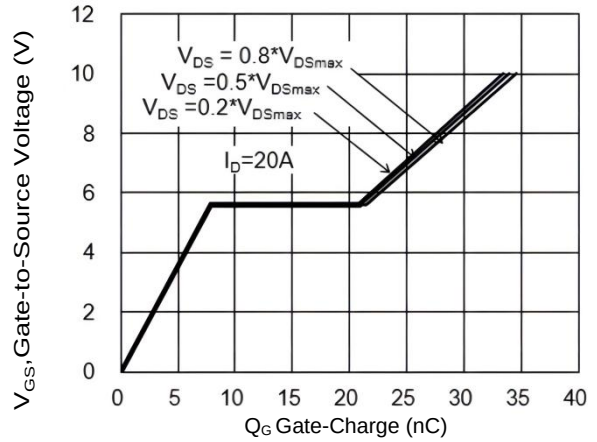


Figure 6. Typical Gate Charge versus V_{GS}

5. Electrical Characteristics (cont.)

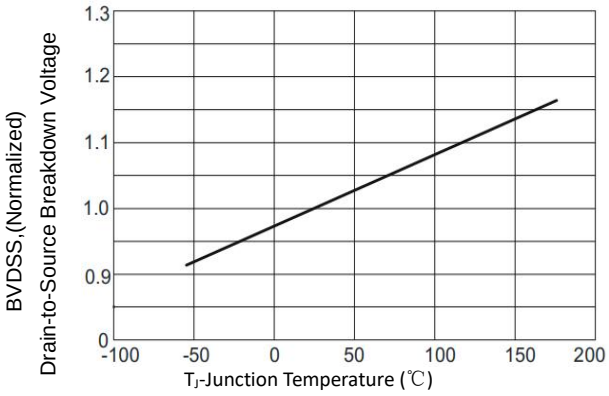


Figure 7. BV_{DSS} Variation with Temperature

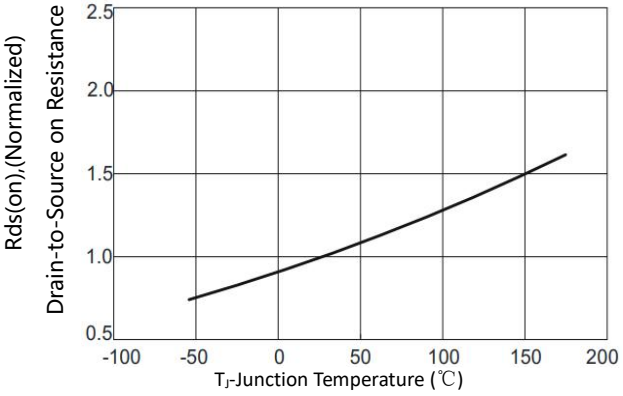


Figure 8. On-Resistance Variation with Temperature

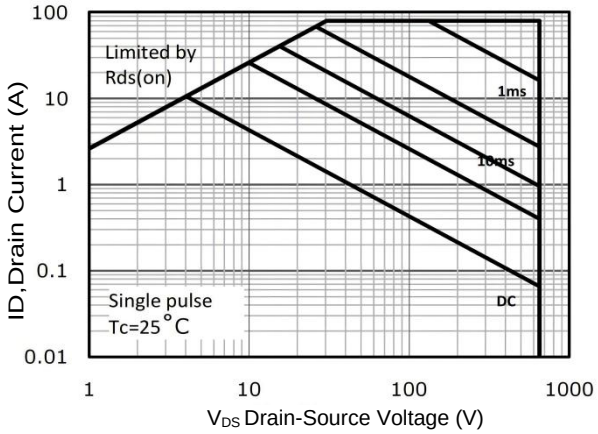


Figure 9. Maximum Safe Operating Area

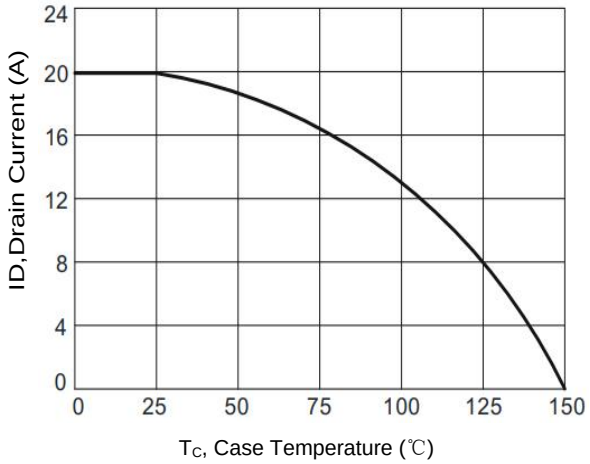
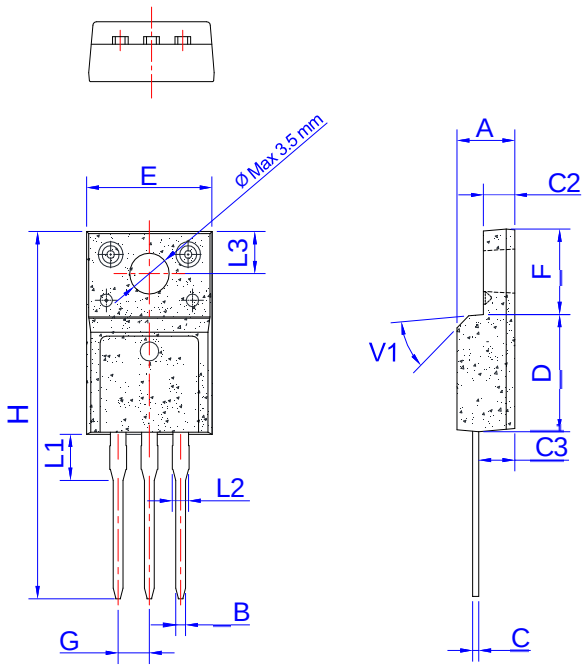


Figure 10. Maximum Continuous Drain Current versus Case Temperature

6. Package Mechanical Data

TO-220F Package



Ref.	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	4.50		4.90
B	0.74	0.80	0.83
C	0.47		0.65
C2	2.45		2.75
C3	2.60		3.00
D	8.80		9.30
E	9.80		10.4
F	6.40		6.80
G		2.54	
H	28.0		29.8
L1		3.63	
L2	1.14		1.70
L3		3.30	
V1		45°	