

Super-Junction Power Mosfet

1. Product Information

Features

- Low FOM $R_{DS(ON)} \times Q_G$
- Extremely Low Switching Loss
- Good Stability and Uniformity
- 100% UIS and Isolation Tested

Pin Description

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

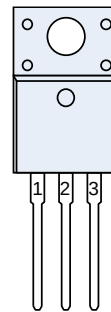
Applications

- EV Charger
- Sever/Telecom/PC Power
- AC-DC Power Management
- Motor Driver

Quick reference

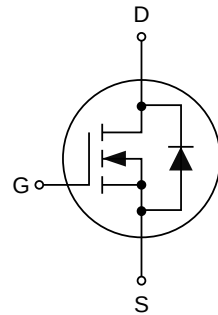
- $V_{DS} \geq 600\text{ V}$
- $I_D \leq 55\text{ A}$
- $R_{DS(ON)} \leq 68\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$ (Type 57 m Ω)

Simplified Outline



Top View
TO-220F

Symbol



Package Marking and Ordering Information

Product Name	Marking	Package	Packaging	Quantity (pcs)
KJC60R068CF	KJC60R068F	TO-220F	Tube	50

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current (T _C =25°C) ^[1]	55	A
	Continuous Drain Current (T _C =100°C) ^[1]	38	A
I_{DM}	Pulsed Drain Current ^[1]	220	A
E_{AS}	Single Pulsed Avalanche Energy ^[2]	410	mJ
dv/dt	Peak Diode Recovery dv/dt	50	V/ns
P_D	Power Dissipation	50	W
T _J , T _{stg}	Operating Junction and Storage Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance, Junction-Ambient	80	°C/W
R _{θJC}	Thermal Resistance, Junction-Case	2.3	°C/W

3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, 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	600	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600 V, V _{GS} =0 V	-	-	10	μA
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	3.0	-	5.0	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10 V, I _D =27 A	-	57	68	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =100 V, V _{GS} =0 V, f=1 MHz	-	3012	-	pF
C _{oss}	Output Capacitance		-	145	-	pF
C _{rss}	Reverse Transfer Capacitance		-	2.9	-	pF
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =400 V, I _D =27 A, R _G =25 Ω, V _{GS} =10V	-	88	-	ns
t _r	Turn-on Rise Time		-	75	-	ns
t _{d(off)}	Turn-off Delay Time		-	170	-	ns
t _f	Turn-off Fall Time		-	50	-	ns
Q _g	Total Gate Charge	V _{DS} =480 V, I _D =27 A, V _{GS} =10 V	-	79	-	nC
Q _{gs}	Gate-Source Charge		-	21	-	nC
Q _{gd}	Gate-Drain Charge		-	23	-	nC
Source-Drain Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _F =27 A	-	-	1.4	V
I _S	Diode Continuous Forward Current		-	-	55	A
I _{SM}	Maximum Pulsed Body-Diode Forward Current		-	-	220	A
T _{rr}	Reverse Recovery Time	V _R =400 V, I _F =27 A, di/dt=100 A/μs	-	176	-	ns
Q _{rr}	Reverse Recovery Charge		-	1.4	-	μC

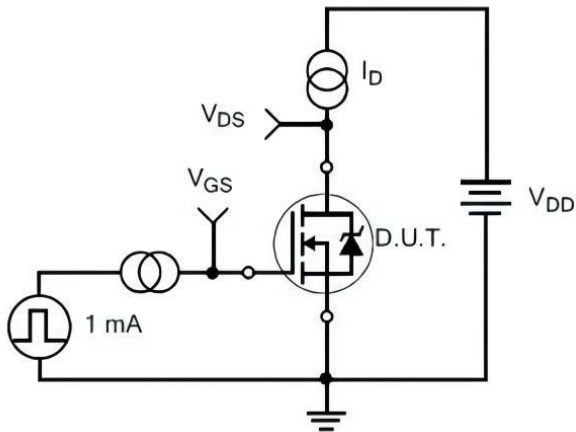
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $T_J=25^{\circ}\text{C}$, $V_{DD}=50\text{ V}$, $V_G=10\text{ V}$, $R_G=25\text{ }\Omega$.

4. Test Circuits and Waveforms ($T_J=25^{\circ}\text{C}$)

Table 1. Gate Charge Test Circuit and Waveforms

Gate Charge Test Circuit



Gate Charge Waveforms

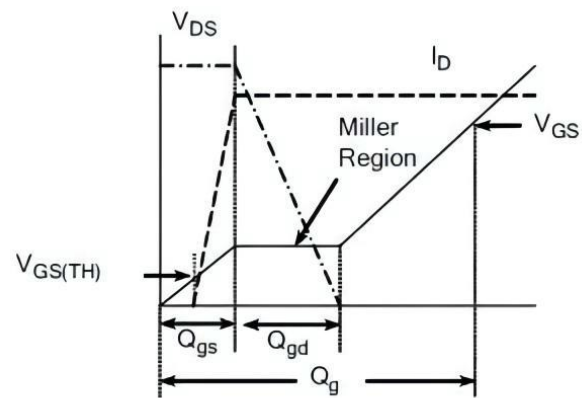
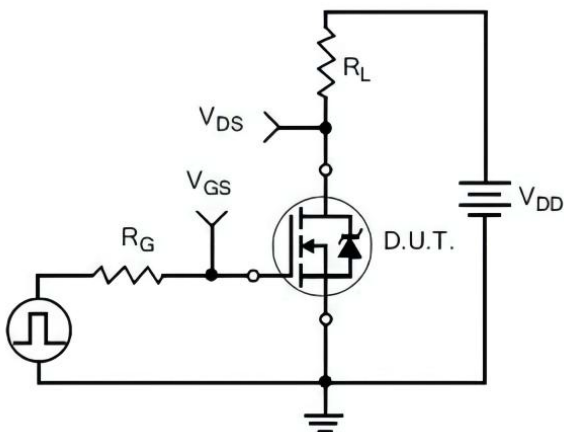


Table 2. Resistive Switching Test Circuit and Waveforms

Resistive Switching Test Circuit



Resistive Switching Waveforms

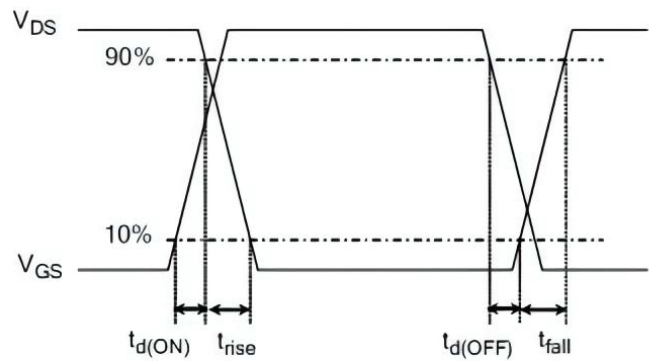
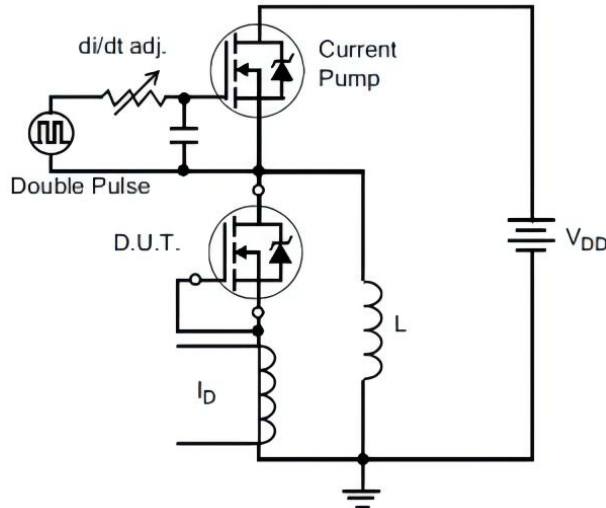


Table 3. Diode Recovery Test Circuit and Waveforms

Diode Recovery Test Circuit



Diode Recovery Waveforms

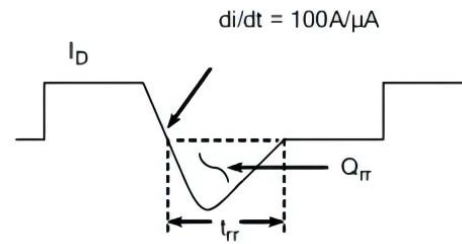
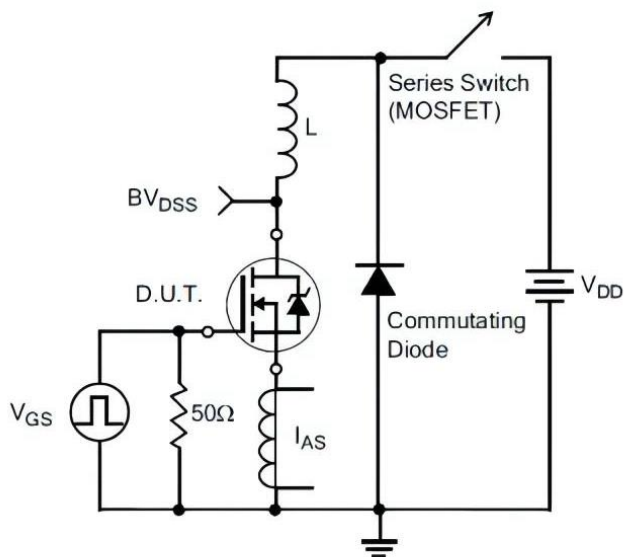
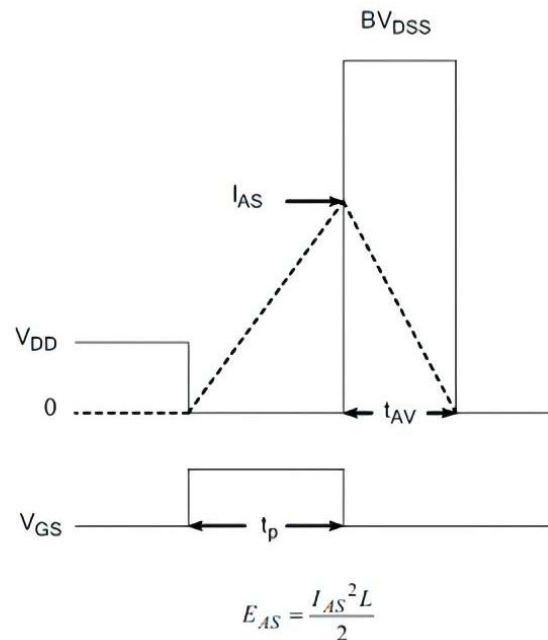


Table 4. Unclamped inductive Switching (UIS) Test Circuit and Waveforms

Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



5. Electrical Characteristics

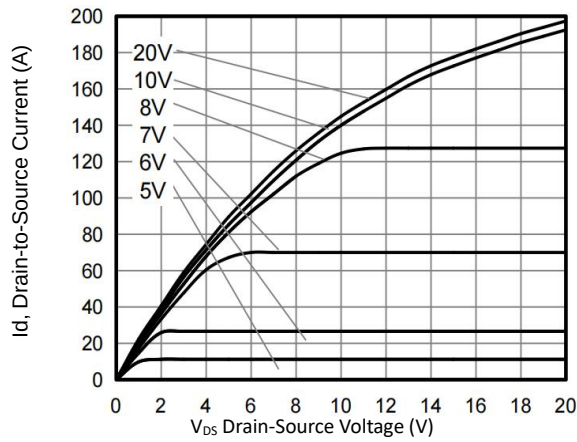


Figure 1. Typical Output Characteristics

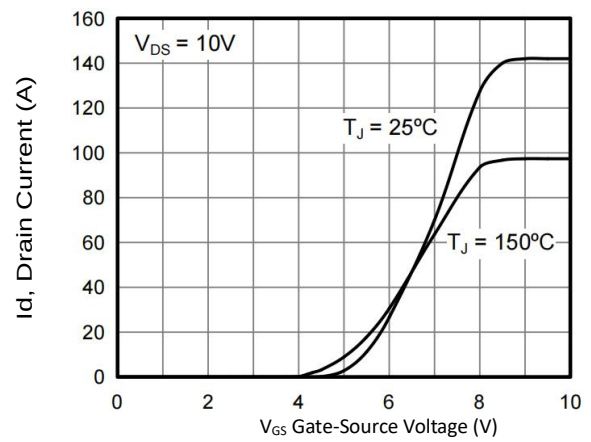


Figure 2. Typical Transfer Characteristics

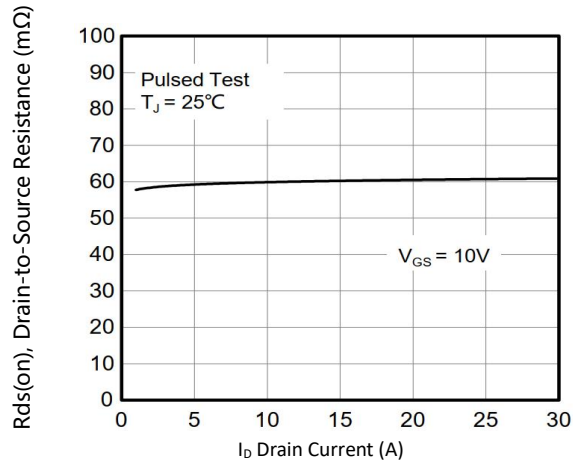


Figure 3. On-Resistance versus Drain Current

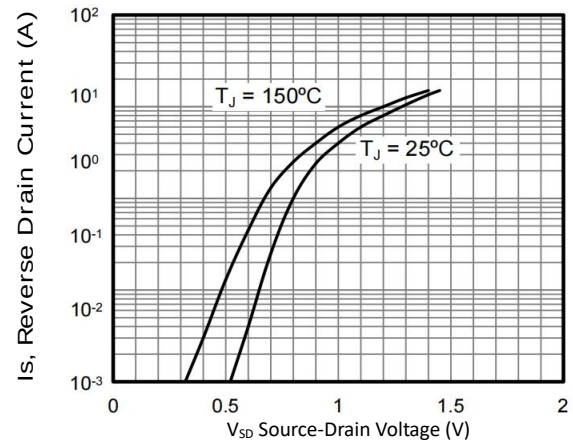


Figure 4. Diode forward voltage versus Current

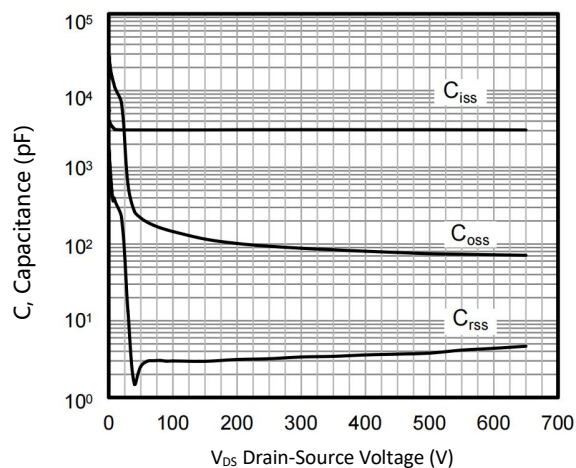


Figure 5. Typical Capacitance versus V_{DS}

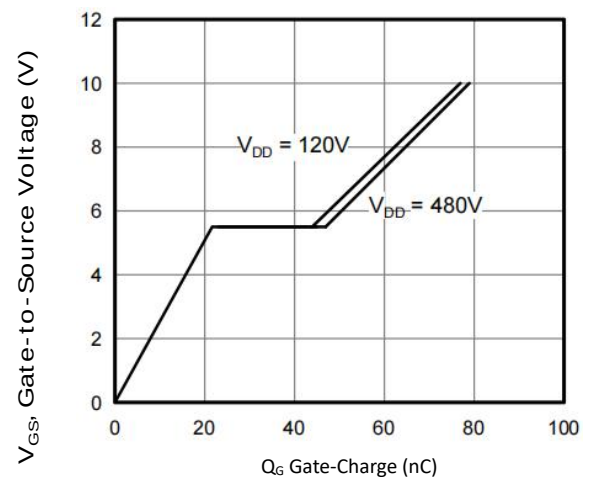


Figure 6. Typical Gate Charge versus V_{GS}

5. Electrical Characteristics (cont.)

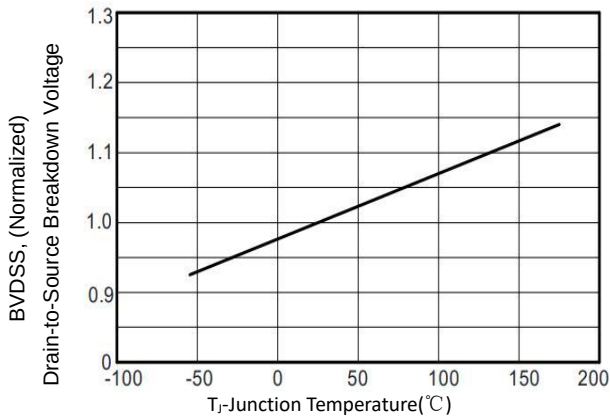


Figure 7. BV_{DSS} Variation with Temperature

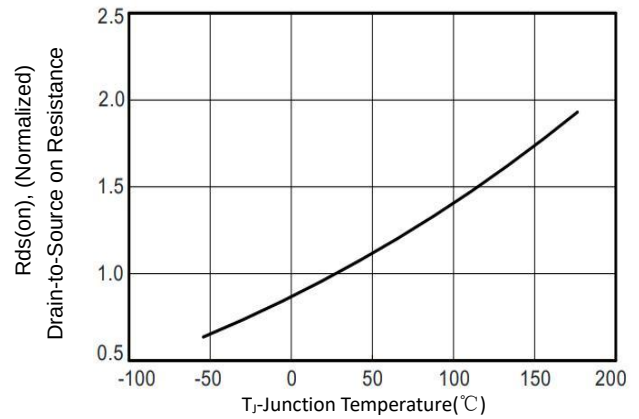


Figure 8. On-Resistance Variation with Temperature

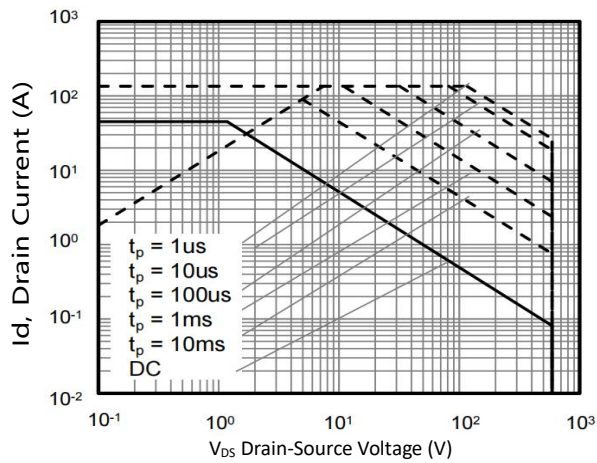


Figure 9. Maximum Safe Operating Area

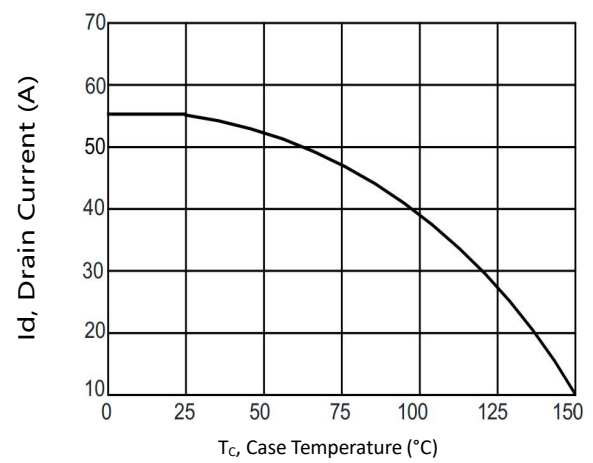
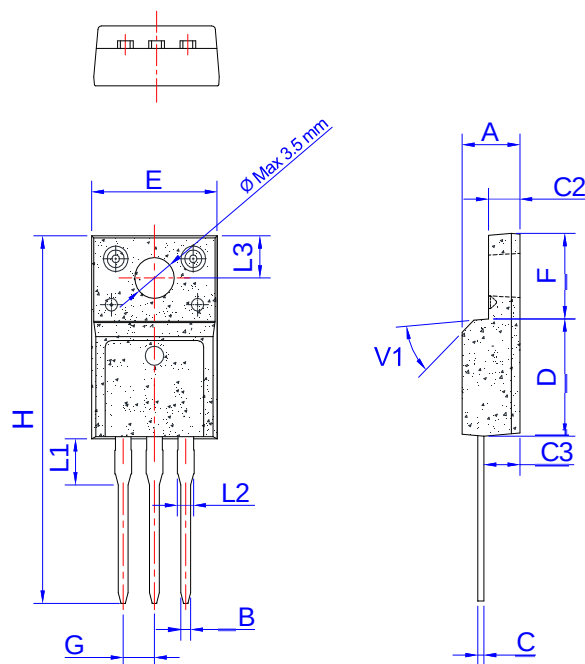


Figure10. Maximum Continuous Drain Current versus Case Temperature

6. Package Mechanical Data

● TO-220F Package



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	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°	