

Super-Junction Power Mosfet

1. Product Information

Features

- Low FOM $R_{DS(ON)} \times Q_G$
- Fast switching capability
- Lead free product is acquired

Applications

- Power supply
- Charger
- Solar/UPS-Micro inverter system

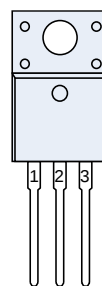
Quick reference

- $V_{DS} \geq 650\text{ V}$
- $I_D \leq 20\text{ A}$
- $R_{DS(ON)} \leq 210\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$ (Type 180 m Ω)

Pin Description

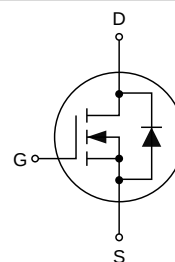
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline



Top View
TO-220F

Symbol



Package Marking and Ordering Information

Part number	Marking	Package	Packaging	Quantity	Reel size	Tape width
KJCF65R200CF	KJCF65R200CF	TO-220F	☐ Tape & Reel	N/A	N/A	N/A
			☒ Tube	1000 PCS	N/A	N/A

2. Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	20	A
	Continuous Drain Current ($T_C=100^\circ\text{C}$)	12.5	A
I_{DM}	Pulsed Drain Current	80	A
E_{AS}	Single Pulsed Avalanche Energy (L=30 mH)	217	mJ
dv/dt	Peak Diode Recovery dv/dt	50	V/ns
I_S	Continuous diode forward current	20	A
P_D	Power Dissipation	178.6	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-Ambient	65	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-Case	0.7	$^\circ\text{C/W}$

3. Electrical Characteristics (T_J=25°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	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650 V, V _{GS} =0 V	-	-	5	μA
		V _{DS} =650 V, T _C =150°C	-	-	1000	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	3.5	-	4.5	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10 V, I _D =10 A	-	180	210	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =100 V, V _{GS} =0 V, f=1 MHz	-	1500	-	pF
C _{oss}	Output Capacitance		-	70	-	pF
C _{rss}	Reverse Transfer Capacitance		-	22	-	pF
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =400 V, I _D =10 A, R _G =25 Ω, V _{GS} =10 V	-	45	-	ns
t _r	Turn-on Rise Time		-	55	-	ns
t _{d(off)}	Turn-off Delay Time		-	110	-	ns
t _f	Turn-off Fall Time		-	35	-	ns
R _g	Gate resistance	f=1 MHz	-	14	-	Ω
Q _g	Total Gate Charge	V _{DS} =400 V, I _D =10 A, V _{GS} =10 V	-	42	-	nC
Q _{gs}	Gate-Source Charge		-	13	-	nC
Q _{gd}	Gate-Drain Charge		-	20	-	nC
Source-Drain Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0 V, I _F =10 A	-	0.85	1.1	V
Q _{rr}	Reverse Recovery Time	V _R =400 V, I _F =10 A, di/dt=100 A/μs	-	0.6	-	μC
T _{rr}	Reverse Recovery Charge		-	120	-	ns

4. Electrical Characteristics

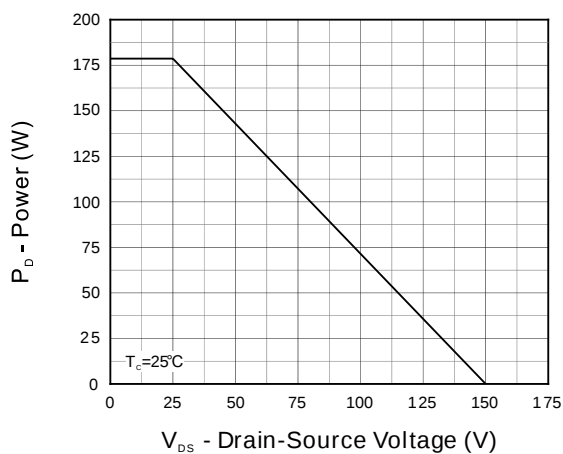


Fig 1. Power Capability

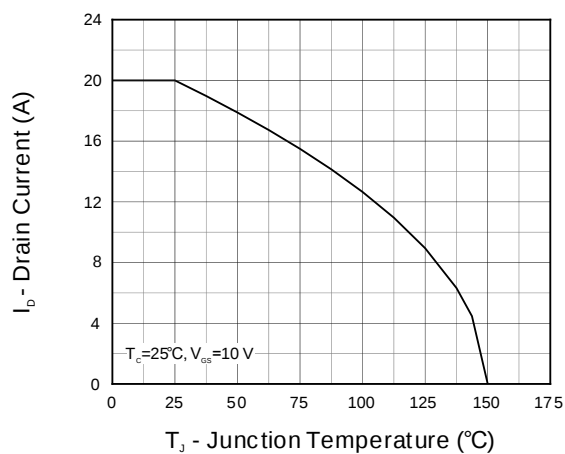


Fig 2. Current Capability

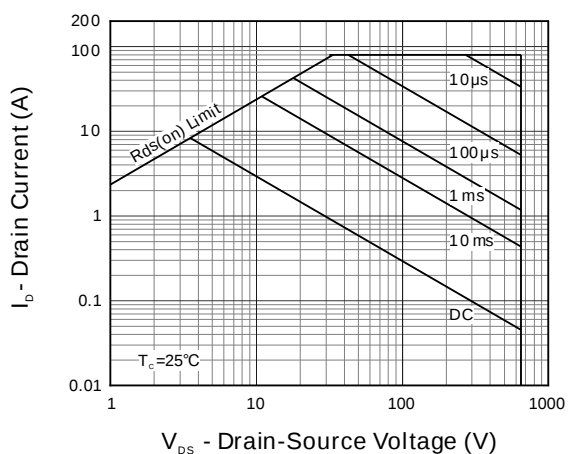


Fig 3. Safe Operation Area

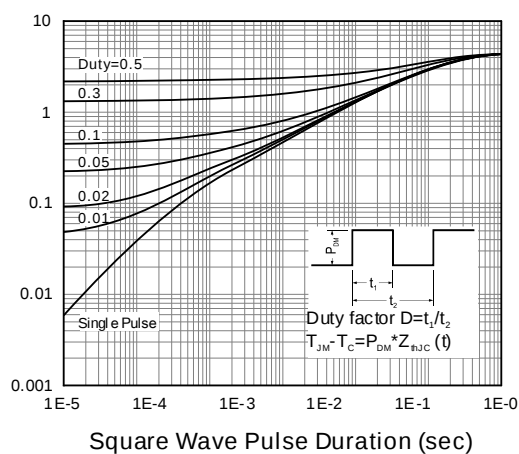


Fig 4. Transient Thermal Impedance

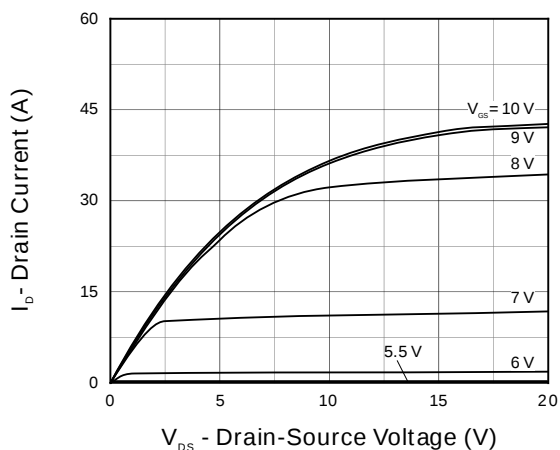


Fig 5. Output Characteristics
 $T_J=25^\circ\text{C}$

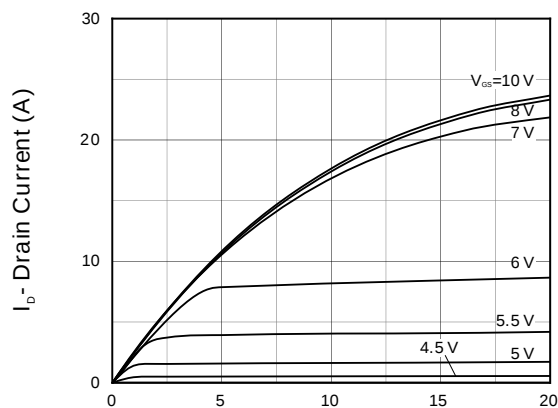


Fig 6. Output Characteristics
 $T_J=150^\circ\text{C}$

5. Electrical Characteristics (cont.)

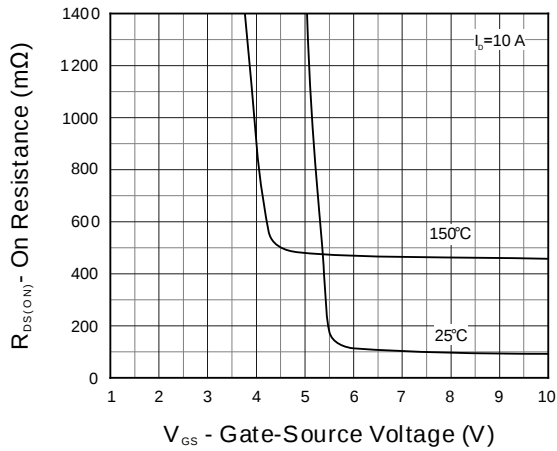


Fig 7. Transfer Characteristics

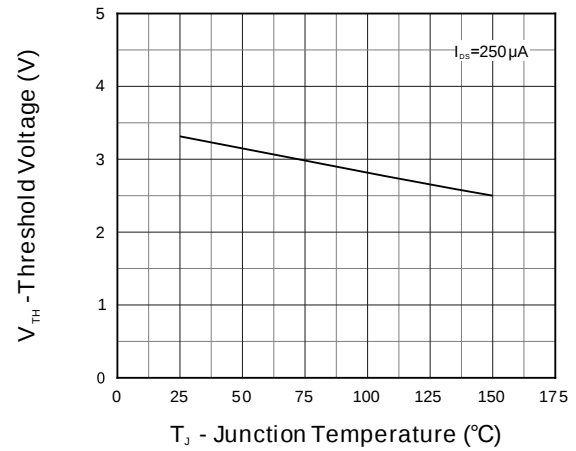


Fig 8. V_{TH} vs. Junction Temperature

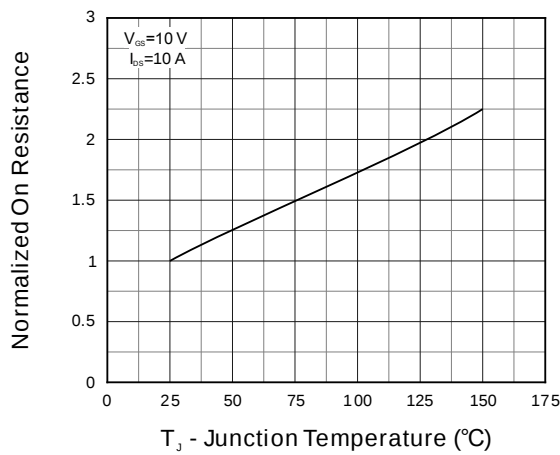


Fig 9. Normalized On Resistance

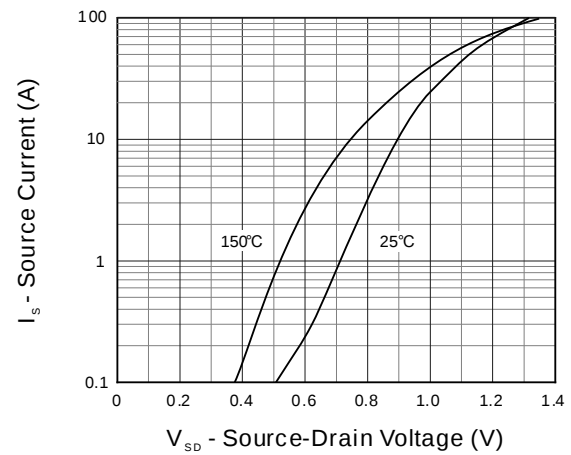


Fig 10. Diode Forward Current

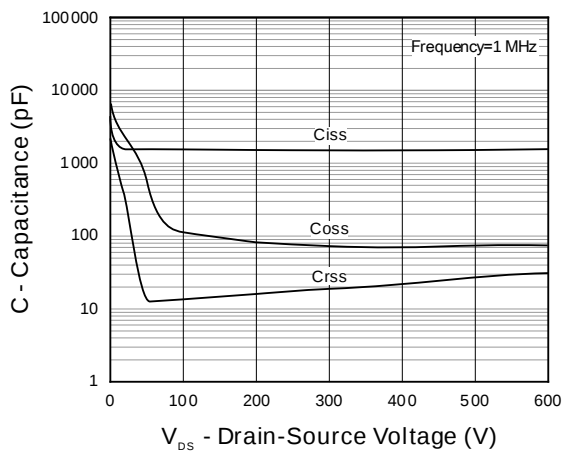


Fig 11. Capacitance

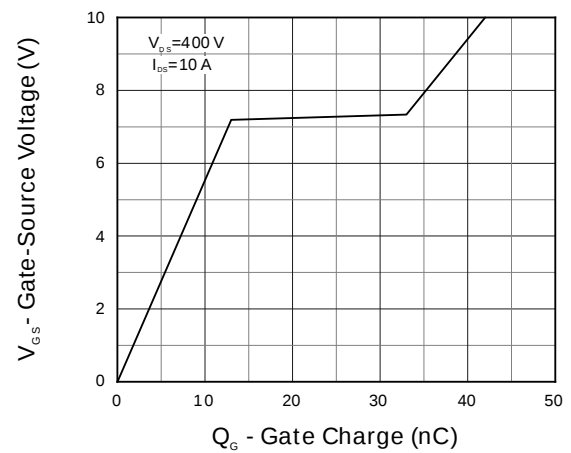
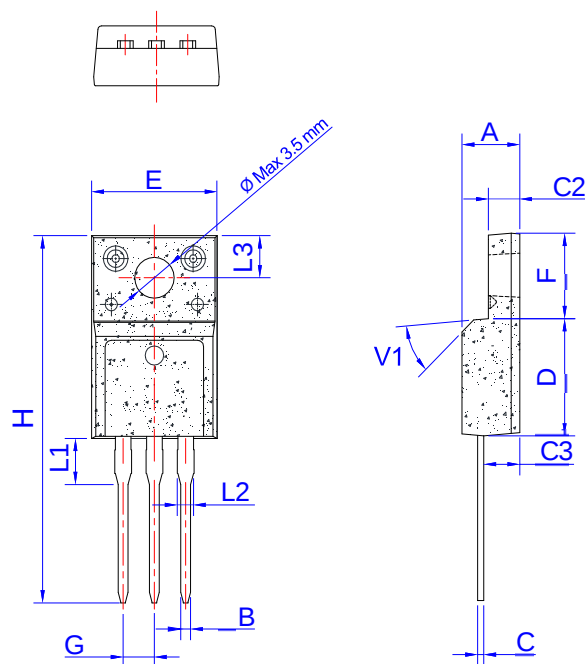


Fig 12. Gate Charge

5. 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°	