

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

- High Switching Speed
- Improved dv/dt capability

Applications

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- LED power supplies

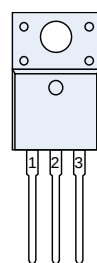
Quick reference

- $V_{DS} = 500\text{ V}$
- $I_D = 20\text{ A}$
- $R_{DS(ON)} \leq 280\text{ m}\Omega$ @ $V_{GS}=10\text{ V}$ (Type: 260 m Ω)
- Q_g @ type = 53 nC

Pin Description

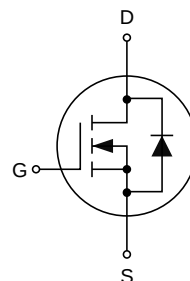
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline



Top View
TO-220F

Symbol



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape Width	Quantity
KJ20N50CF	TO-220F	KJ20N50CF	-	-	50 pcs/Tube

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current Continuous	20	A
I_{DM}	Pulsed Drain Current (note 2)	80	A
E_{AS}	Single Pulse Avalanche Energy (note 3)	1000	mJ
dV/dt	Peak Diode Recovery dV/dt	2.2	V/ns
P_D	Power Dissipation	43	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	W/°C
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.9	°C/W

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature

3. L = 21.5 mH, $I_{AS} = 5\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 5\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

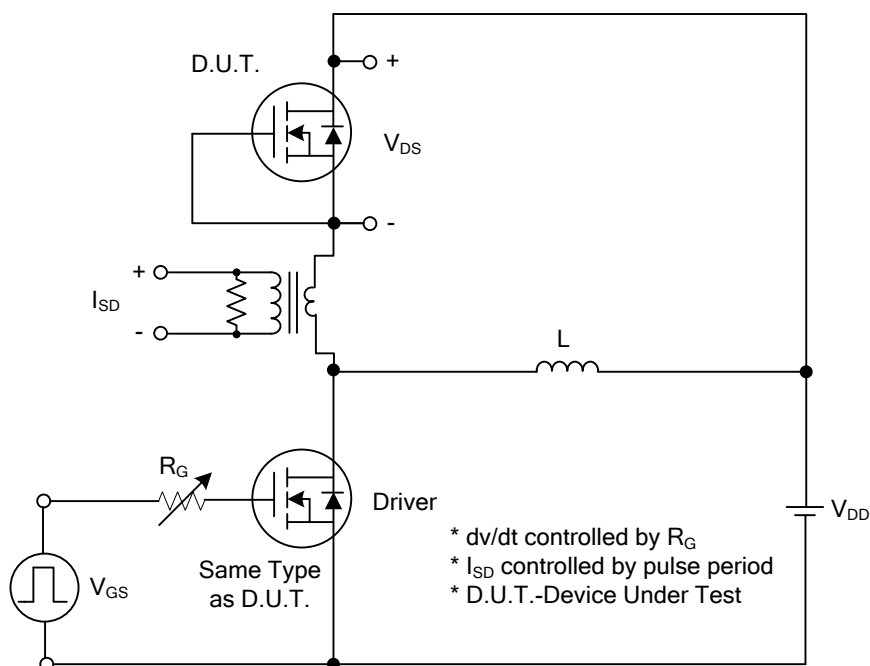
3. Electrical Characteristics (T_C=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	500	-	-	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =500V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0 V, V _{GS} =±30 V	-	-	±100	nA
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA	2.0	-	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10 V, I _D =10 A	-	0.26	0.28	Ω
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =25 V, f=1.0 MHz	-	2450	-	pF
C _{oss}	Output Capacitance		-	275	-	
C _{rss}	Reverse Transfer Capacitance		-	16.5	-	
Q _g	Total Gate Charge	V _{DS} =100 V, V _{GS} =10 V, I _D =20 A, I _G =1mA (note 1,2)	-	53	-	nC
Q _{gs}	Gate-Source Charge		-	11	-	
Q _{gd}	Gate-Drain Charge		-	13	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =100 V, V _{GS} =10 V, I _D =20 A, R _G =25 Ω (note 1,2)	-	32	-	ns
t _r	Turn-on Rise Time		-	30	-	
t _{d(off)}	Turn-off Delay Time		-	162	-	
t _f	Turn-off Fall Time		-	70	-	
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	20	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	80	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0 V, I _S =20 A (note 1)	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0 V, I _S =20 A, dI/dt=100 A/μs (note 1)	-	412	-	ns
Q _{rr}	Reverse Recovery Charge		-	6.5	-	μC

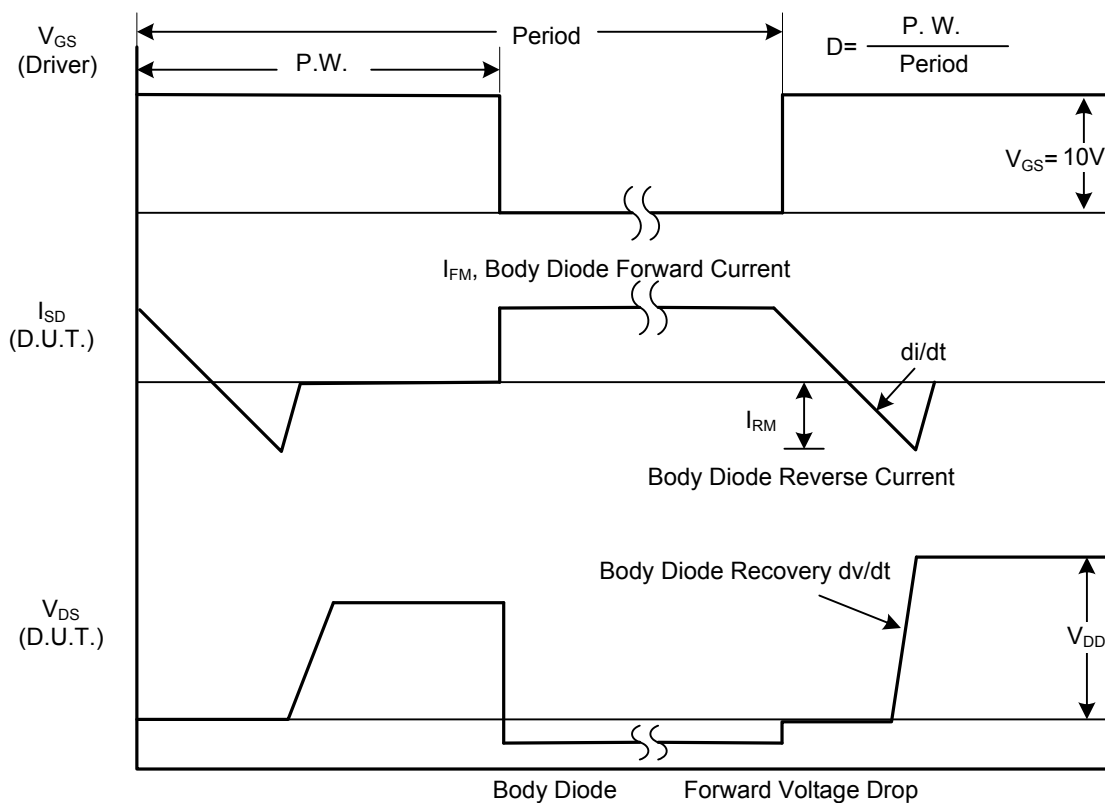
Note:

1. Pulse Test: Pulse width ≤ 300 μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature.

4. Test Circuits and Waveforms

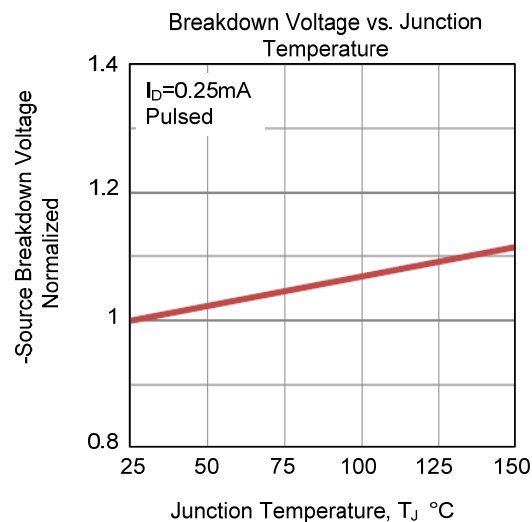
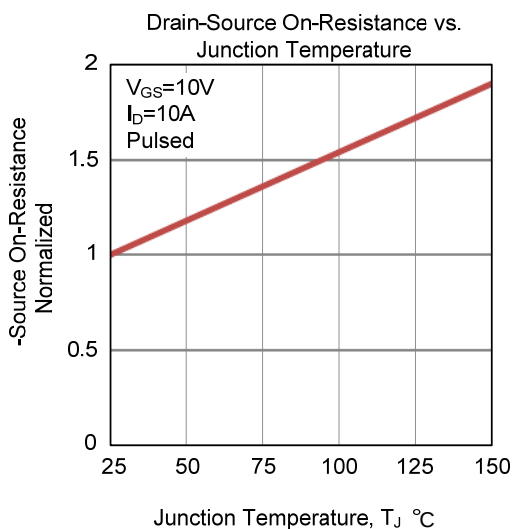
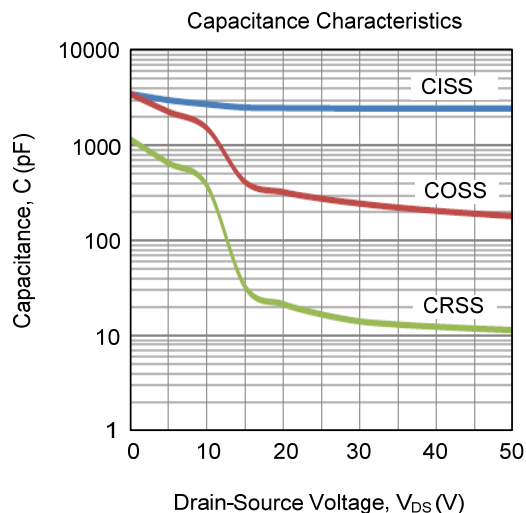
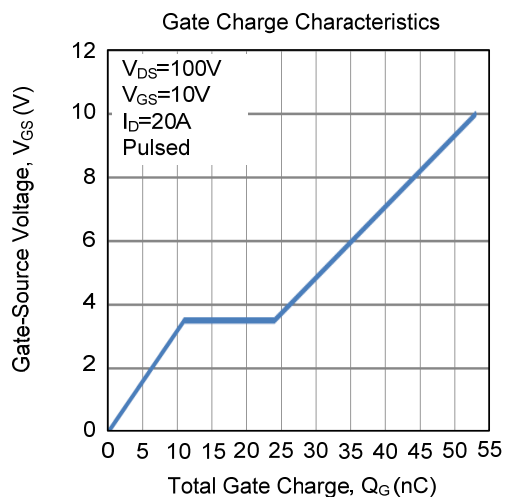
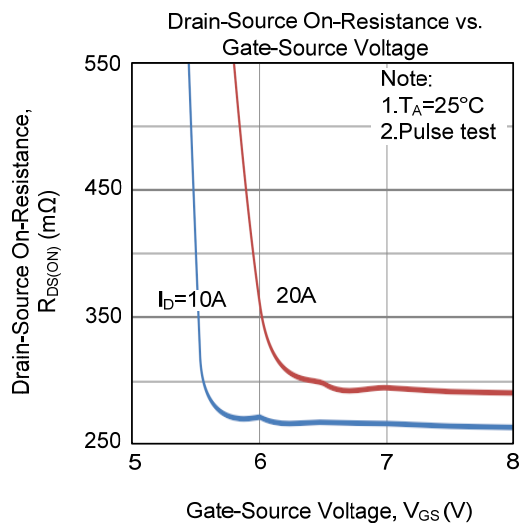
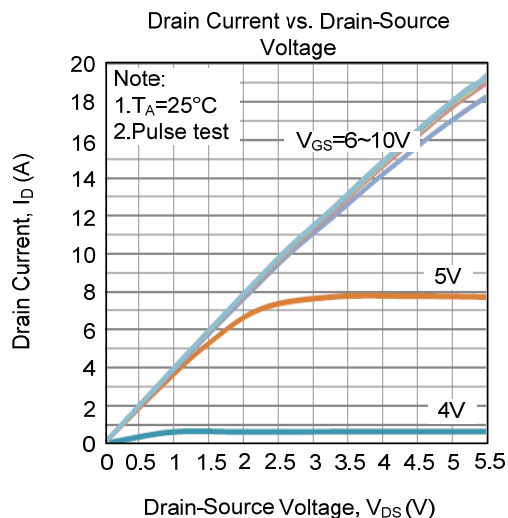


Peak Diode Recovery dv/dt Test Circuit

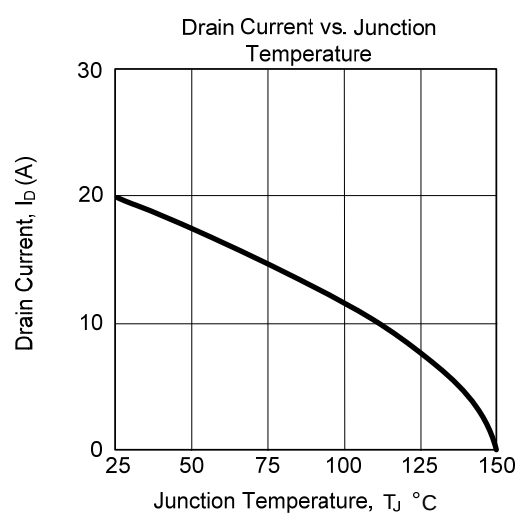
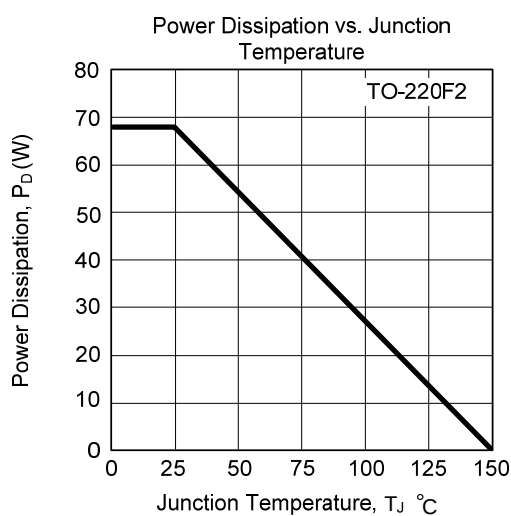
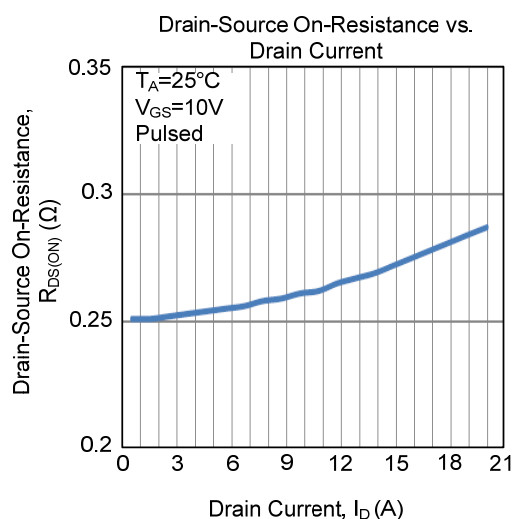
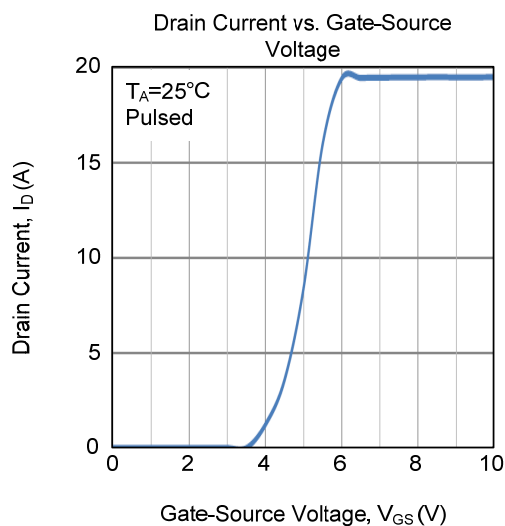
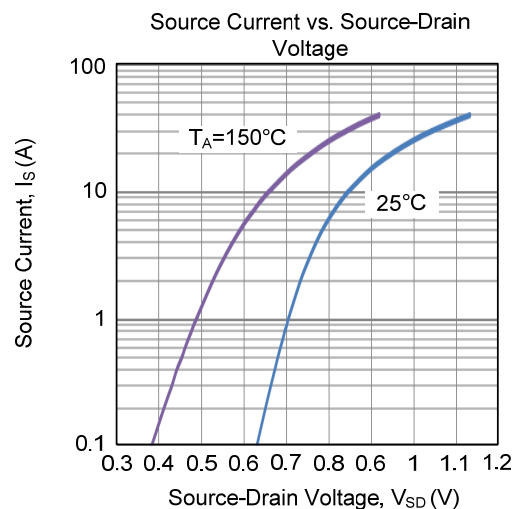
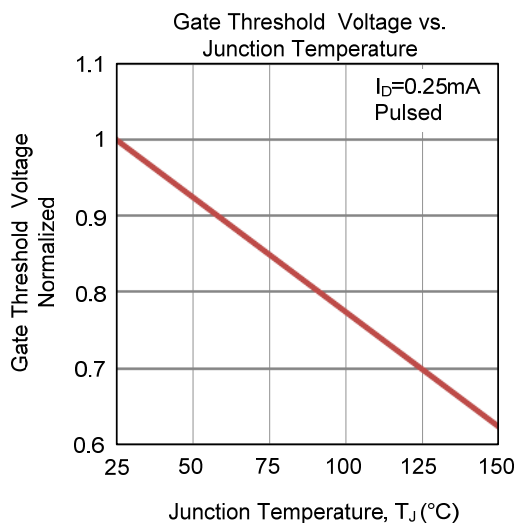


Peak Diode Recovery dv/dt Waveforms

5. Typical Characteristics



5. Typical Characteristics(cont.)



6. Package Mechanical Data

TO-220F Package

