

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Advanced Trench Technology
Excellent $R_{DS(ON)}$ and Low gate charge

Applications

Uninterruptible power supply
Power Factor Correction

Quick reference

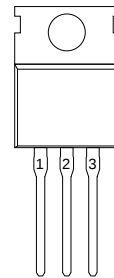
$V_{DS}=250\text{ V}$
 $I_D=50\text{ A}$
 $R_{DS(ON)} \leq 85\text{ m}\Omega @ V_{GS}=10\text{ V}$ (Type: 70 m Ω)

Pin Description

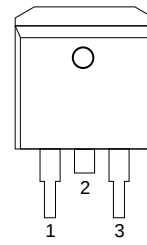
Pin	Description
1	Gate (G)
2	Drain (D)
3	Source (S)

Simplified Outline

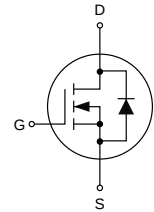
Symbol



TO-220



TO-263



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape Width	Quantity
KJ50N25C	TO-220	KJ50N25C	-	-	1000
KJ50N25D	TO-263	KJ50N25D	-	-	800

2. Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Continuous Drain Current	50	A
I_{DM}	Pulsed Drain Current	180	A
E_{AS}	Single Pulse Avalanche Energy	973	mJ
I_{AS}	Avalanche Current	36	A
E_{AR}	Repetitive Avalanche Energy	584	mJ
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	65	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Steady State) ¹	62.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-Case	1.6	$^\circ\text{C/W}$

3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$	250	275	-	V
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$	2.0	3.0	4.0	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=250\text{ V}$, $V_{GS}=0\text{ V}$	-	-	1	μA
I_{GSS}	Gate-body Leakage current	$V_{DS}=0\text{ V}$, $V_{GS}=\pm 30\text{ V}$	-	-	± 100	nA
$R_{DS(on)}$	Drain-Source on-Resistance	$V_{GS}=10\text{ V}$, $I_D=22.5\text{ A}$	-	70	85	m Ω
C_{iss}	Input Capacitance	$V_{DS}=25\text{ V}$, $V_{GS}=0\text{ V}$, $f=1.0\text{ MHz}$	-	3541	-	pF
C_{oss}	Output Capacitance		-	536	-	
C_{rss}	Reverse Transfer Capacitance		-	310	-	
Q_g	Total Gate Charge	$V_{GS}=10\text{ V}$, $V_{DD}=200\text{ V}$, $I_D=45\text{ A}$	-	245	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	
Q_{gd}	Gate-Drain Charge		-	141	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=125\text{ V}$, $I_D=45\text{ A}$, $R_G=25\text{ }\Omega$	-	56	-	ns
t_r	Turn-on Rise Time		-	147	-	
$t_{d(off)}$	Turn-off Delay Time		-	958	-	
t_f	Turn-off Fall Time		-	241	-	
I_S	Continuous Body Diode Current		-	-	45	A
I_{SM}	Pulsed Diode Forward Current		-	-	180	A
V_{SD}	Body Diode Voltage	$I_{SD}=22.5\text{ A}$, $V_{GS}=0\text{ V}$	-	-	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS}=10\text{ V}$, $I_S=10\text{ A}$, $di_f/dt=100\text{ A}/\mu\text{s}$	-	266	-	ns
Q_{rr}	Reverse Recovery Charge		-	3	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. The E_{AS} data shows Max. rating. $I_{AS}=36\text{ A}$, $V_{DD}=50\text{ V}$, $R_G=25\text{ }\Omega$, Starting $T_J=25\text{ }^{\circ}\text{C}$
3. The test condition is Pulse Test: Pulse width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 1\%$.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

4. Typical Characteristics

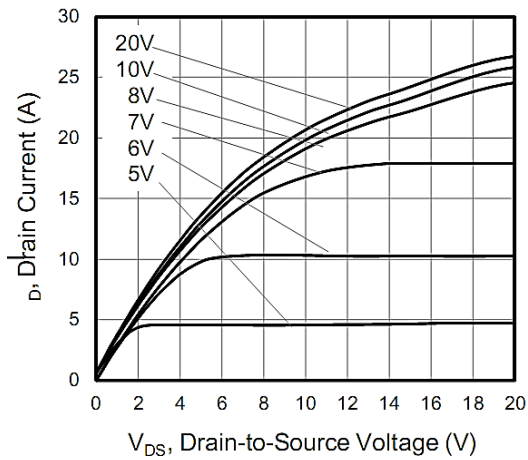


Figure 1. Output Characteristics

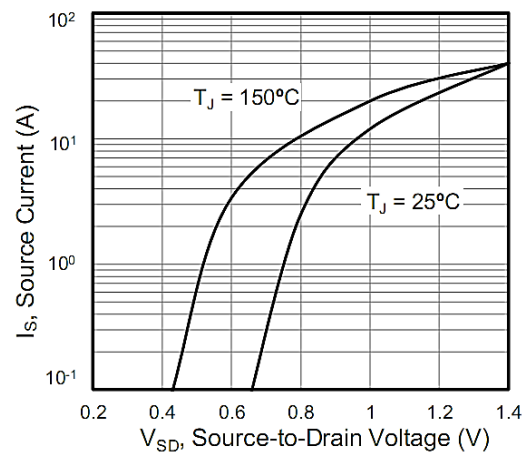


Figure 2. Body Diode Forward Voltage

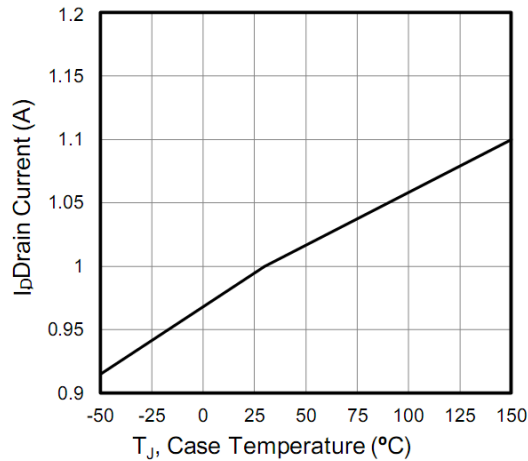


Figure 3. Drain Current vs. Temperature

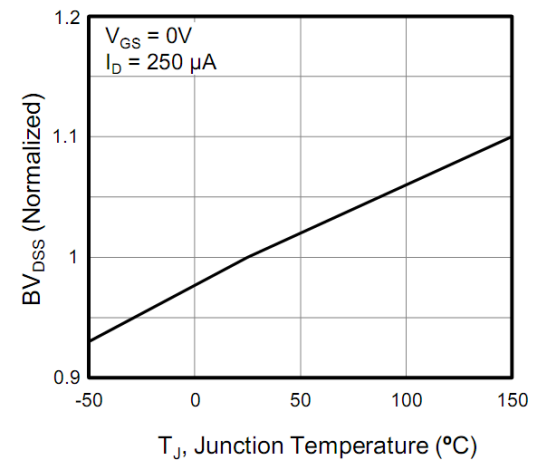


Figure 4. BV_{DSS} Variation vs. Temperature

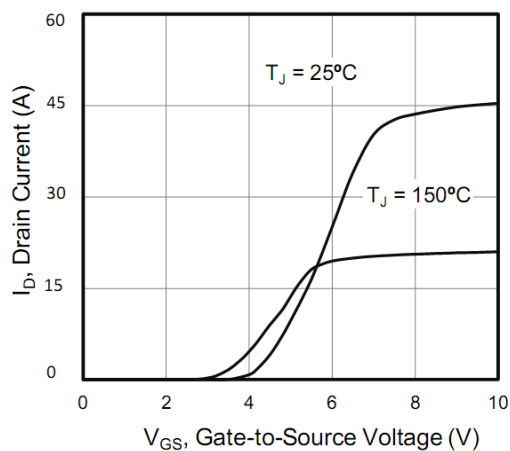


Figure 5. Transfer Characteristics

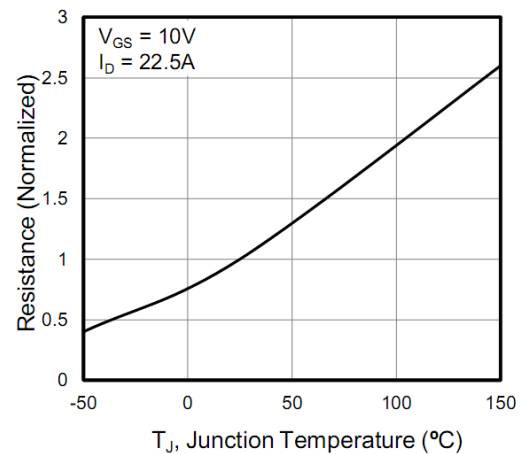


Figure 6. On-Resistance vs. Temperature

4. Typical Characteristics (Cont.)

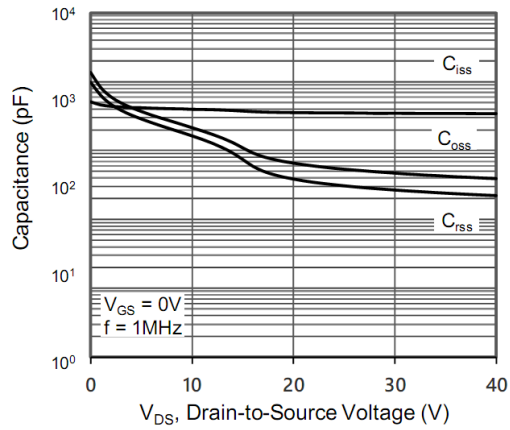


Figure 7. Capacitance

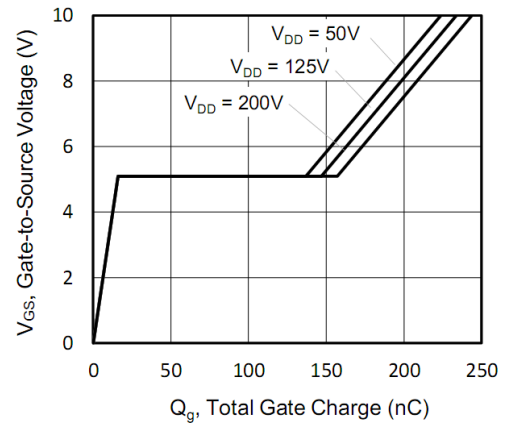


Figure 8. Gate Charge

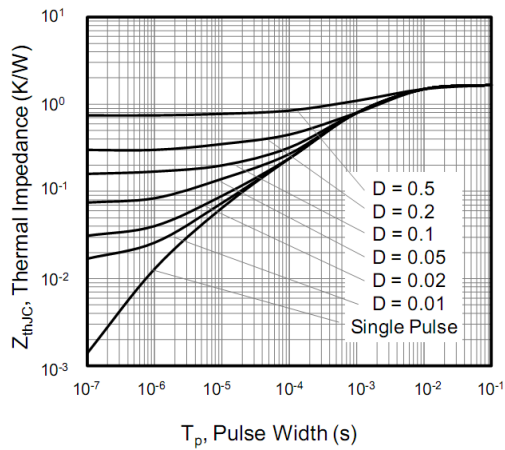
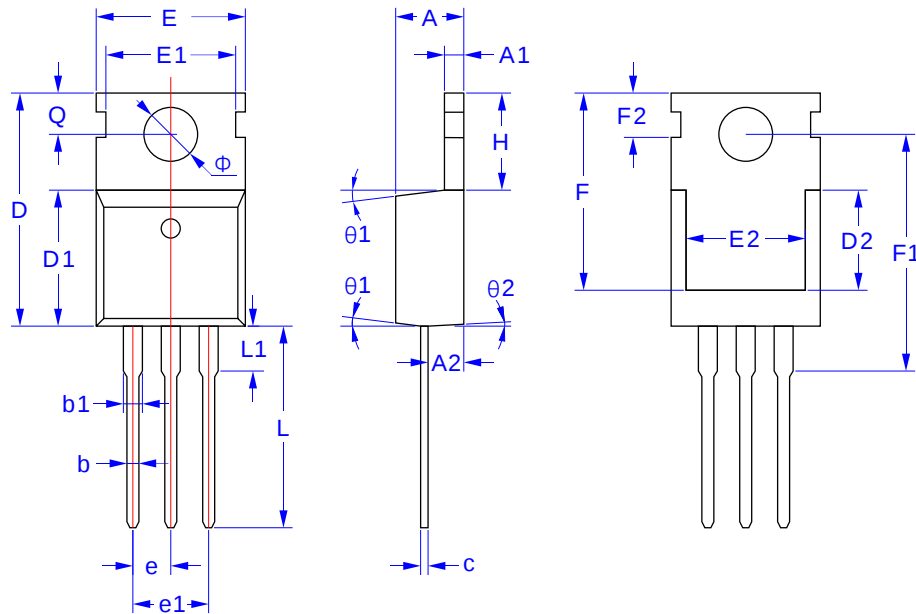


Figure 9. Transient Thermal Impedance

5. Package Mechanical Data

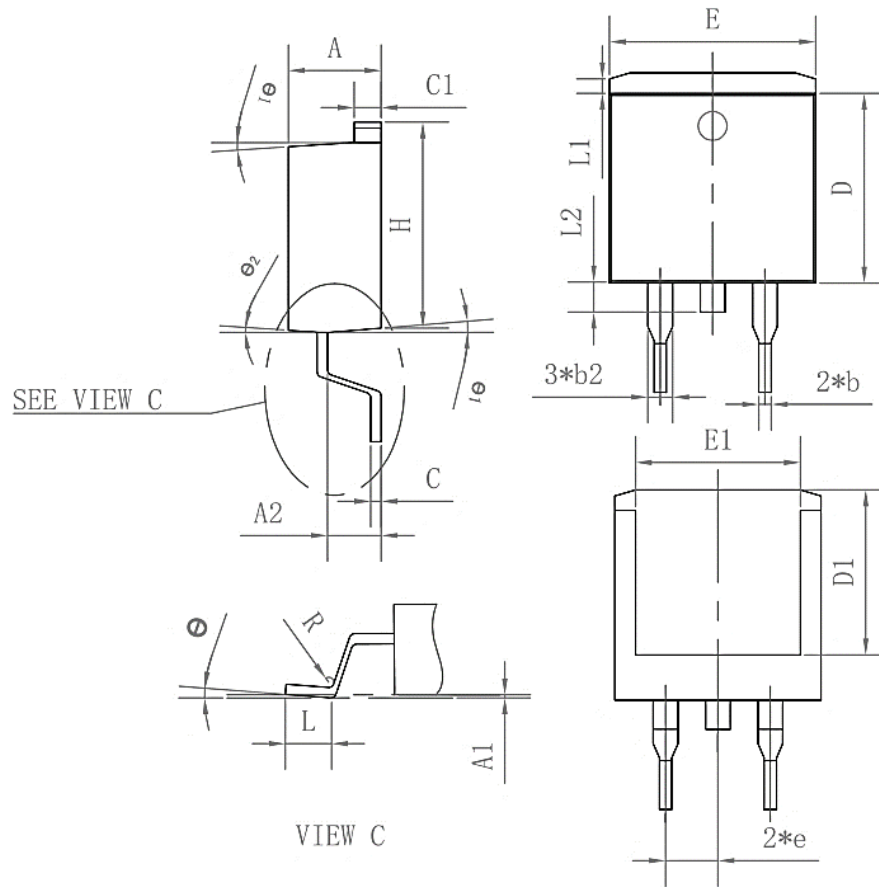
TO-220 Package



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.27	4.57	4.87	0.1681	0.1799	0.1917
A1	1.15	1.30	1.45	0.0453	0.0512	0.0571
A2	2.10	2.40	2.70	0.0827	0.0945	0.1063
b	0.70	0.80	1.00	0.0276	0.0315	0.0394
b1	1.17	1.27	1.50	0.0461	0.0500	0.0591
c	0.40	0.50	0.65	0.0157	0.0197	0.0256
D	15.50	15.80	16.10	0.6102	0.6220	0.6339
D1	8.80	9.10	9.40	0.3465	0.3583	0.3701
D2	5.70	6.70	7.00	0.2244	0.2638	0.2756
E	9.70	10.00	10.30	0.3819	0.3937	0.4055
E1	-	8.70	-	-	0.3425	-
E2	7.00	8.00	8.40	0.2756	0.3150	0.3307
e	2.54			0.1000		
e1	5.08			0.2000		
F	13.30	13.50	13.70	0.5236	0.5315	0.5394
F1	15.50	15.90	16.30	0.6102	0.6260	0.6417
F2	2.80	3.00	3.20	0.1102	0.1181	0.1260
H	6.00	6.50	6.85	0.2362	0.2559	0.2697
L	12.75	13.50	13.90	0.5020	0.5315	0.5472
L1	-	3.10	3.40	-	0.1220	0.1339
Q	2.60	2.80	3.00	0.1024	0.1102	0.1181
Φ	3.45	3.60	3.75	0.1358	0.1417	0.1476
θ1	4°	7°	10°	4°	7°	10°
θ2	0°	3°	6°	0°	3°	6°

5. Package Mechanical Data

TO-263 Package



Symbol	Dimensions in Millimeters		
	Mim	Nom	Max
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.70
b	0.70	0.80	1.00
b2	1.25	1.36	1.50
C	0.45	0.50	0.65
C1	1.29	1.30	9.40
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
θ	0°	4°	8°
θ_1	4°	7°	10°
θ_2	0°	3°	6°