

P-Channel Enhancement Mode MOSFET

1. Product Information

Features

Self-aligned Planar Technology
Excellent Switching Performance

Applications

Power amplifier
Motor drive

Quick reference

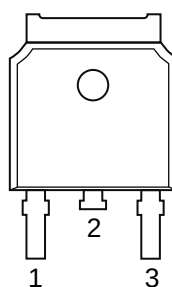
$B_V \geq -200V$
 $I_D \leq -13A$
 $R_{DS(ON)} \leq 420m\Omega @ V_{GS} = -10V$

Pin Description

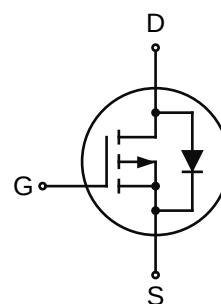
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline

Symbol



Top View
TO-252



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape width	Quantity
KJ13P20K	TO-252	13P20 YWWXXX	YWWXXX: Date Code		2500

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

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-200	V
V _{GS}	Gate-Source Voltage	±20	V
I _D T _C =25°C	Continuous Drain Current	-13	A
I _D T _C =100°C	Continuous Drain Current	-7.2	A
I _{DM}	Pulsed Drain Current ^a	-52	A
E _{AS}	Single Pulse Avalanche Energy ^b	750	mJ
I _{AR}	Repetitive Avalanche Current ^a	-11	A
E _{AR}	Repetitive Avalanche Energy ^a	13	mJ
P _D T _C =25°C	Maximum Power Dissipation	125	W
dV/dt	Peak Diode Recovery dV/dt ^c	-5.0	V/ns
T _J , T _{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R _{thJA}	Maximum Junction-to-Ambient	62	°C/W
R _{thCS}	Case-to-Sink, Flat, Greased Surface	0.50	°C/W
R _{thJC}	Maximum Junction-to-Case (Drain)	1.0	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{DS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-200	-	-	V
ΔV _{DS} /T _J	V _{DS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	-	-0.2	-	V/°C
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-2.0	-	-4.0	V
I _{GSS}	Gate-Source Leakage	V _{GS} =±20V	-	-	±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-200V, V _{GS} =0V	-	-	-100	μA
		V _{DS} =-160V, V _{GS} =0V, T _J =125°C	-	-	-500	
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-5.5A ^b	-	0.34	0.42	Ω
g _{fs}	Forward Transconductance	V _{DS} =-50V, I _D =-6.6A ^b	4.1	-	-	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz, see fig.5	-	1200	-	pF
C _{oss}	Output Capacitance		-	370	-	
C _{rss}	Reverse Transfer Capacitance		-	81	-	
Q _g	Total Gate Charge	V _{GS} =-10V I _D =-11A, V _{DS} =-160V, see fig.6	-	-	44	nC
Q _{gs}	Gate-Source Charge		-	-	7.1	
Q _{gd}	Gate-Drain Charge		-	-	27	
t _{d(on)}	Turn-On Delay Time	V _{DD} =-100V, I _D =-11A R _g =9.1Ω, R _D =8.6Ω, see fig.10 ^b	-	14	-	ns
t _r	Rise Time		-	43	-	
t _{d(off)}	Turn-Off Delay Time		-	39	-	
t _f	Fall Time		-	38	-	
R _g	Gate Input Resistance	f=1MHz, open drain	0.3	-	1.7	Ω
I _S	Continuous Source-Drain Diode Current	Between lead, 6 mm (0.25") from package and center of die contact 	-	-	-11	A
I _{SM}	Pulsed Diode Forward Current ^a		-	-	-44	
V _{SD}	Body Diode Voltage	T _J =25°C, I _S =-11A, V _{GS} =0V ^b	-	-	-5	V
t _{rr}	Body Diode Reverse Recovery Time	T _J =25°C, I _F =-11A, dI/dt=100 A/μs ^b	-	250	300	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	2.9	3.6	μC
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)				

Notes :

- a. Repetitive rating; pulse width limited by maximum junction temperature
 b. Pulse width ≤ 300μs; duty cycle ≤ 2%.

4. Typical Characteristics

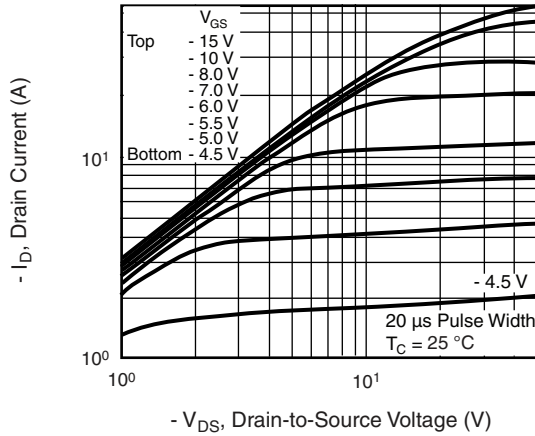


Fig. 1 - Typical Output Characteristics, $T_C = 25^\circ C$

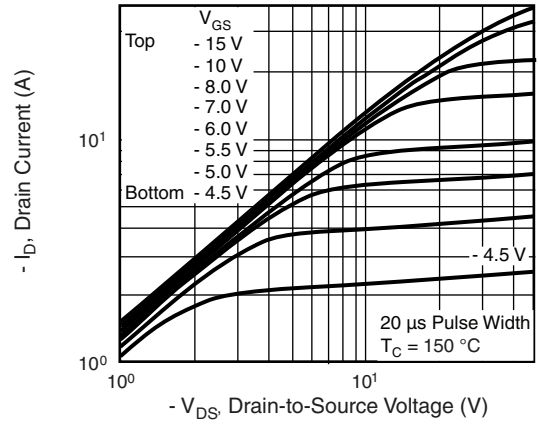


Fig. 2 - Typical Output Characteristics, $T_C = 150^\circ C$

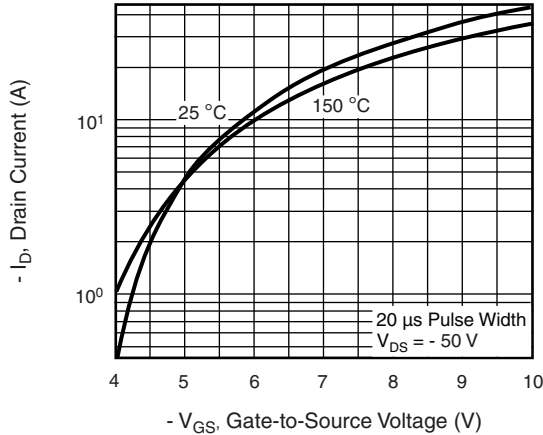


Fig. 3 - Typical Transfer Characteristics

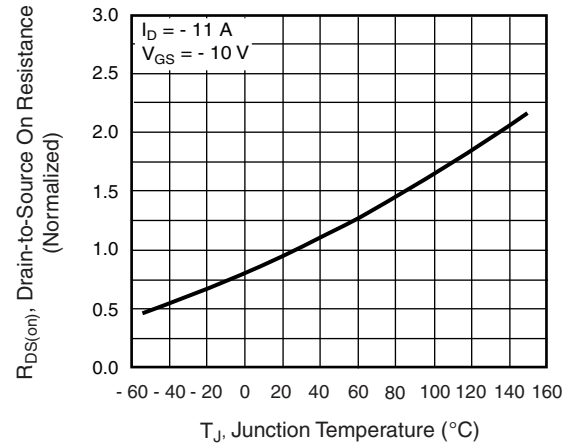


Fig. 4 - Normalized On-Resistance vs. Temperature

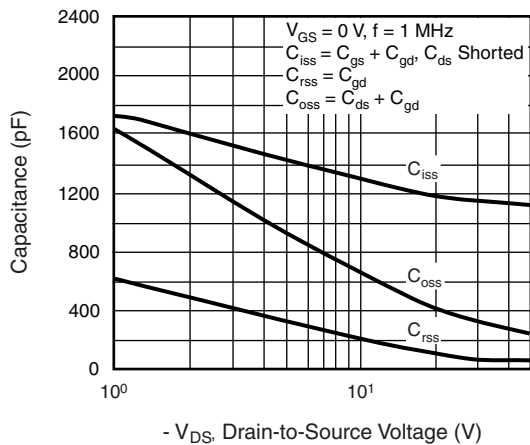


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

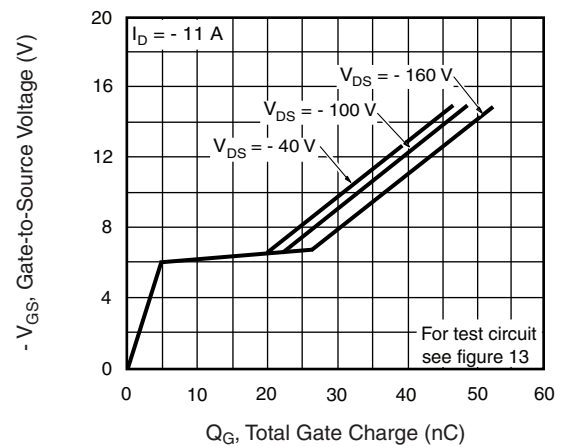


Fig. 6 - Typical Gate Charge vs. Drain-to-Source Voltage

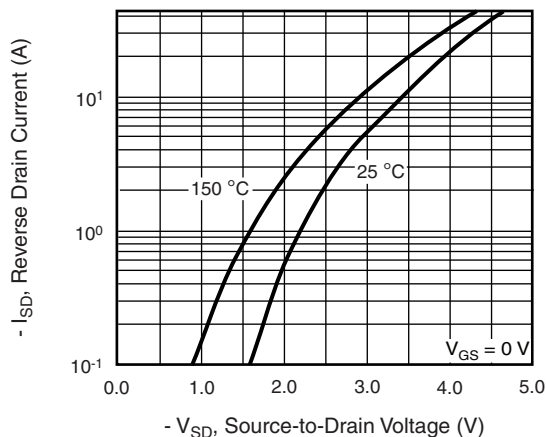


Fig. 7 - Typical Source-Drain Diode Forward Voltage

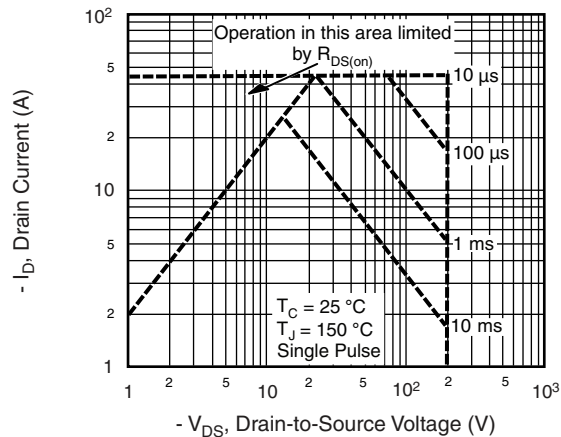


Fig. 8 - Maximum Safe Operating Area

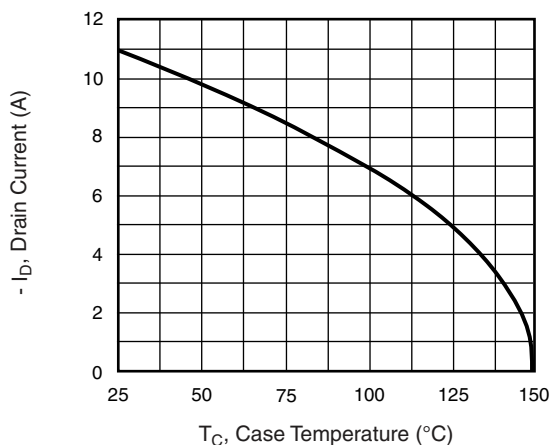


Fig. 9 - Maximum Drain Current vs. Case Temperature

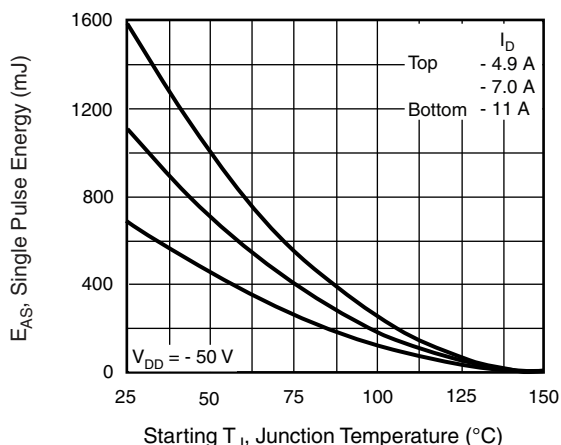


Fig. 10 - Maximum Avalanche Energy vs. Drain Current

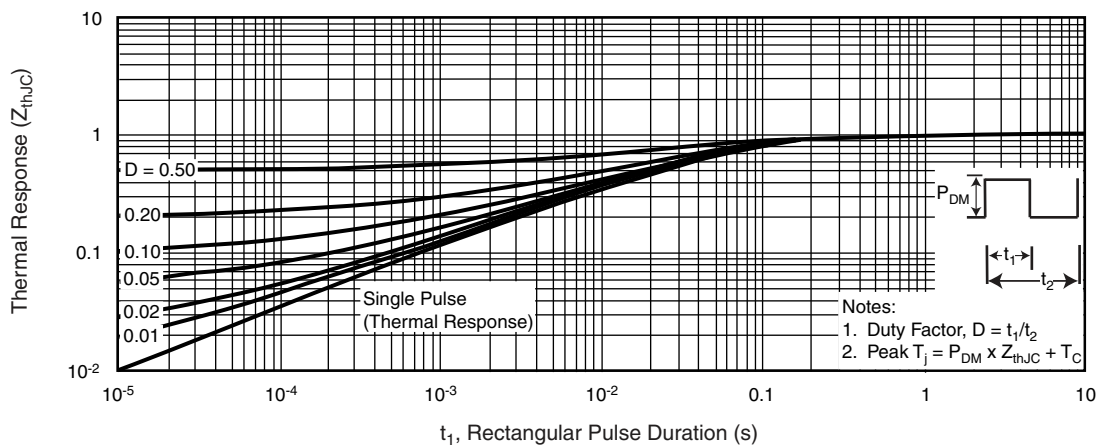
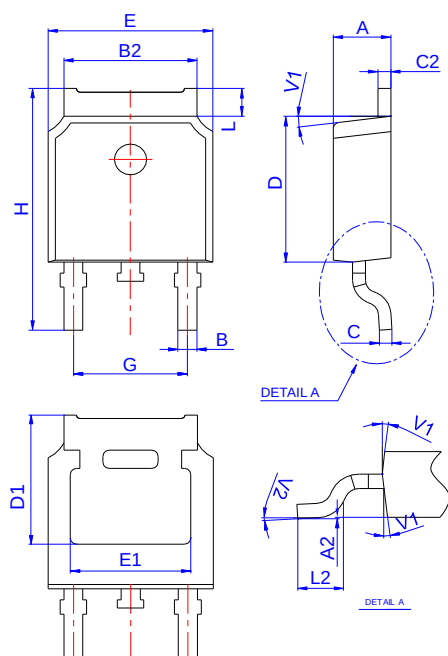


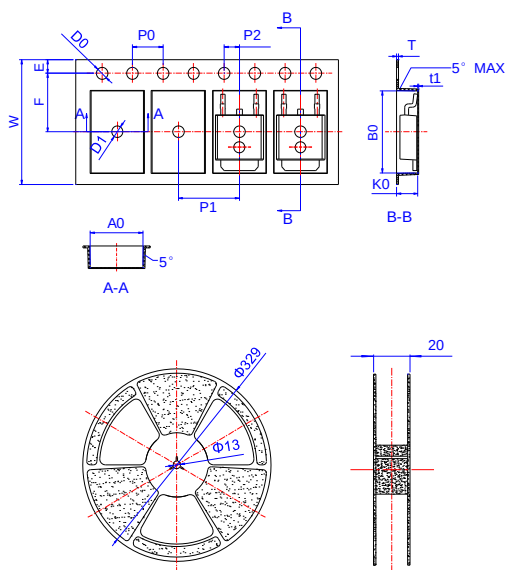
Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

5.Package Mechanical Data

TO-252 Package



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.63	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.27	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583