

P-Channel Enhancement Mode MOSFET

1. Product Information

Features

Self-aligned Planar Technology
Excellent Switching Performance

Applications

Power amplifier
Motor drive

Quick reference

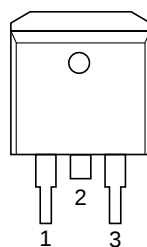
$B_V \geq -200V$
 $I_D \leq -13A$
 $R_{DS(ON)} \leq 420m\Omega @ V_{GS} = -10V$

Pin Description

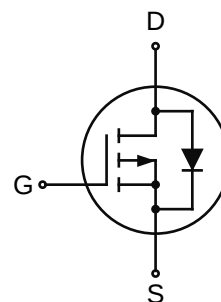
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline

Symbol



Top View
TO-263



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape width	Quantity
KJ13P20D	TO-263	13P20 YWWXXX	YWWXXX: Date Code		800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D T_C=25^\circ C$	Continuous Drain Current	-13	A
$I_D T_C=100^\circ C$	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
$P_D T_C=25^\circ C$	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
V _{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 ≤ 300 μs; duty cycle ≤ 2%.

4. Typical Characteristics

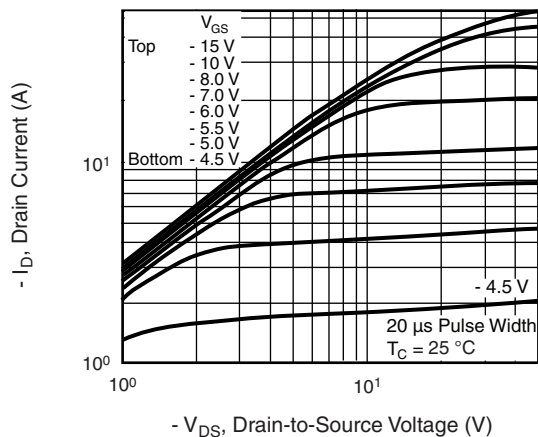


Fig. 1 - Typical Output Characteristics, $T_C = 25^\circ\text{C}$

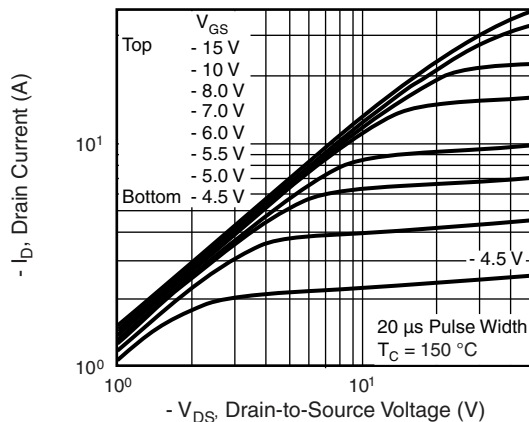


Fig. 2 - Typical Output Characteristics, $T_C = 150^\circ\text{C}$

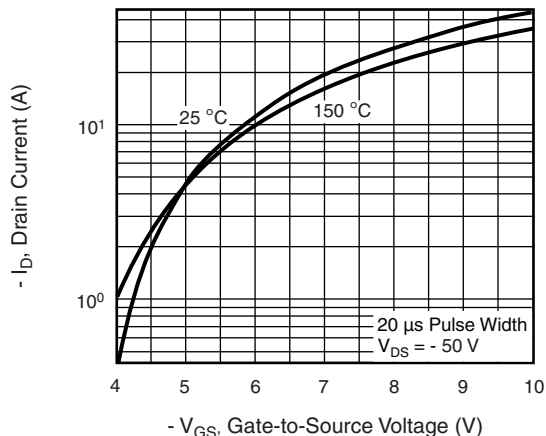


Fig. 3 - Typical Transfer Characteristics

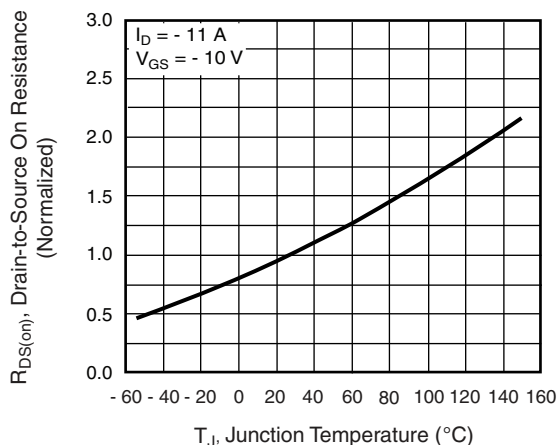


Fig. 4 - Normalized On-Resistance vs. Temperature

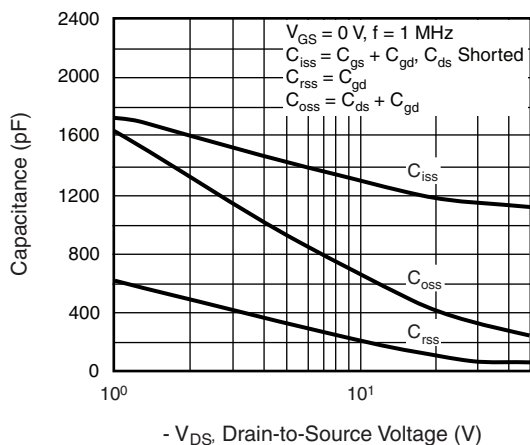


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

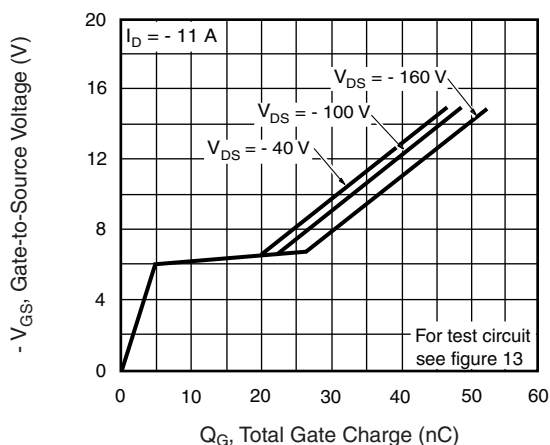


Fig. 6 - Typical Gate Charge vs. Drain-to-Source Voltage

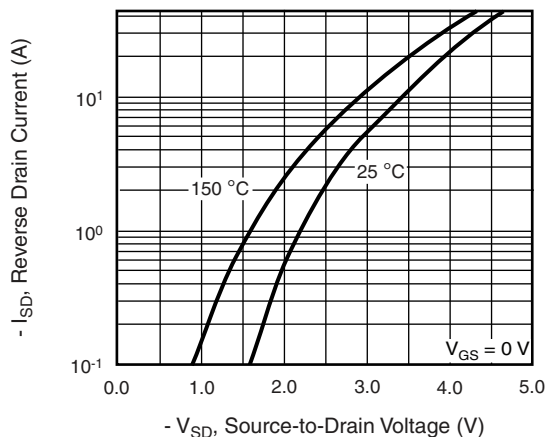


Fig. 7 - Typical Source-Drain Diode Forward Voltage

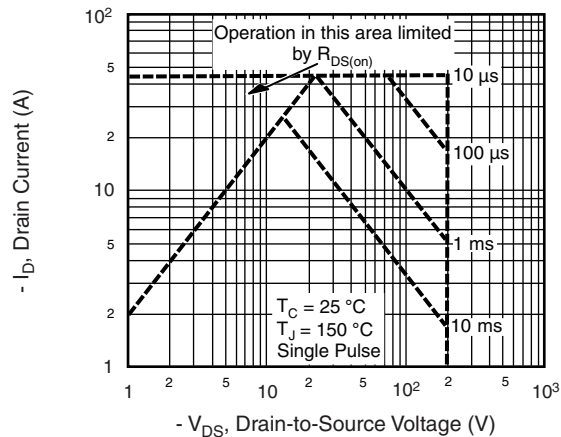


Fig. 8 - Maximum Safe Operating Area

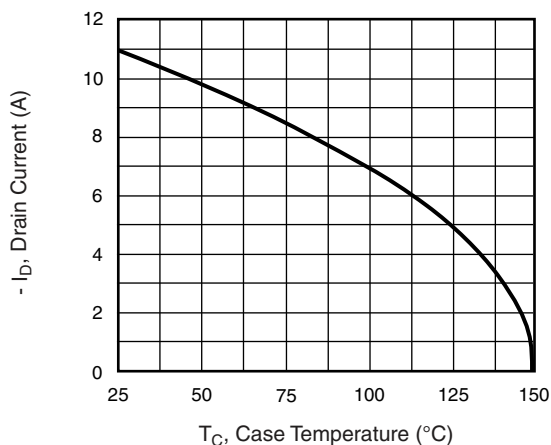


Fig. 9 - Maximum Drain Current vs. Case Temperature

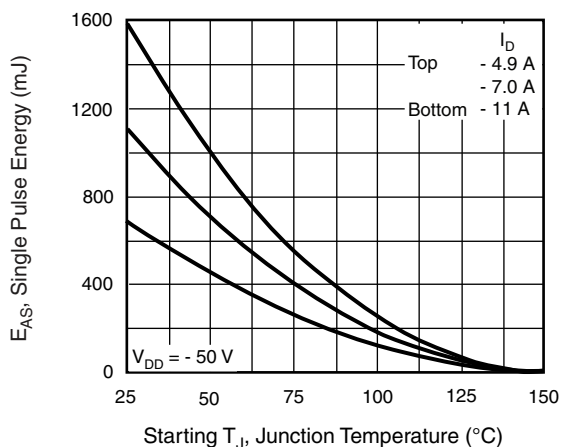


Fig. 10 - Maximum Avalanche Energy vs. Drain Current

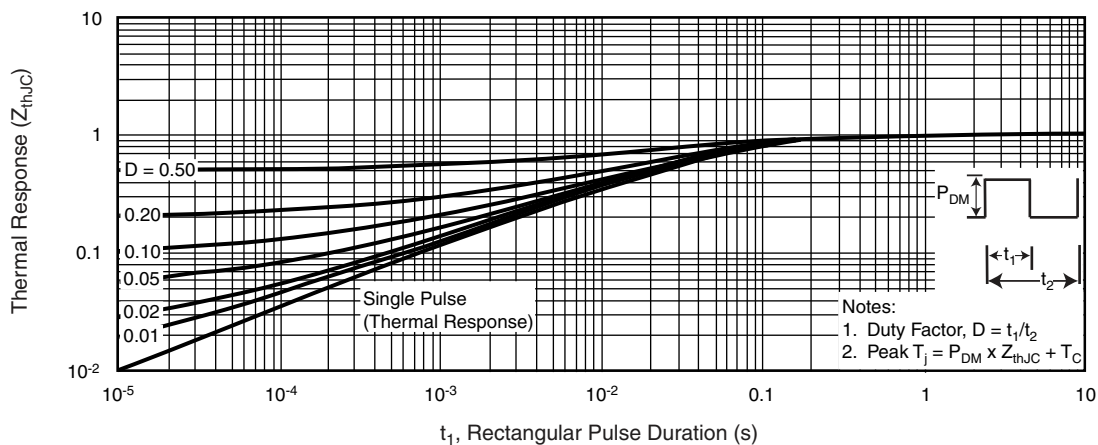
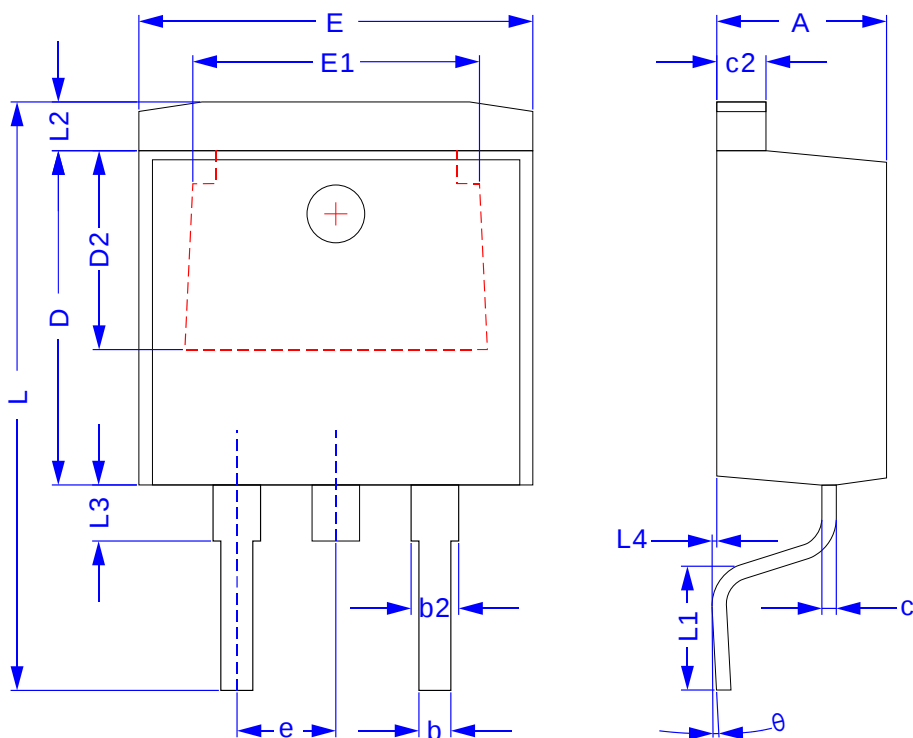


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

5. Package Mechanical Data

TO-263 Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.40	4.80
b	0.76	1.00
b2	1.17	1.47
c	0.36	0.50
c2	1.25	1.45
D	8.60	9.00
D1	5.10 REF	
E	9.80	10.40
E1	7.40 REF	
e	2.54 REF	
L	14.6	15.8
L1	2.29	2.79
L2	1.27 REF	
L3	1.50 REF	
L4	0.00	0.25
θ	0° ± 3°	