

International

IOR Rectifier

HEXFET® POWER MOSFET

Provisional Data Sheet No. PD-9.432B

JANTX2N6800

JANTXV2N6800

[REF:MIL-PRF-19500/557]

[GENERIC:IRFF330]

N-CHANNEL

400 Volt, 1.0Ω HEXFET

HEXFET technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry achieves very low on-state resistance combined with high transconductance.

HEXFET transistors also feature all of the well-established advantages of MOSFETs, such as voltage control, very fast switching, ease of paralleling and electrical parameter temperature stability. They are well-suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers, and high energy pulse circuits, and virtually any application where high reliability is required.

Product Summary

Part Number	BVDSS	RDS(on)	ID
JANTX2N6800	400V	1.0Ω	3.0A
JANTXV2N6800			

Features:

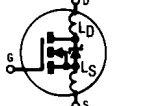
- Avalanche Energy Rating
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed

Absolute Maximum Ratings

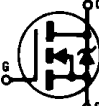
	Parameter	JANTX2N6800, JANTXV2N6800	Units
ID @ VGS = 10V, TC = 25°C	Continuous Drain Current	3.0	A
ID @ VGS = 10V, TC = 100°C	Continuous Drain Current	2.0	
IDM	Pulsed Drain Current ①	12.0	
PD @ TC = 25°C	Max. Power Dissipation	25	W
	Linear Derating Factor	0.20	W/K ⑤
VGS	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt ③	4.0	V/ns
TJ	Operating Junction	-55 to 150	°C
TSTG	Storage Temperature Range		
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10.5 seconds)	
	Weight	0.98 (typical)	g

JANTX2N6800, JANTXV2N6800 Device

Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
B _V DSS	Drain-to-Source Breakdown Voltage	400	—	—	V	V _{GS} = 0V, I _D = 1.0 mA
ΔB _V DSS/ΔT _J	Temperature Coefficient of Breakdown Voltage	—	0.37	—	V/°C	Reference to 25°C, I _D = 1.0 mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	1.0	Ω	V _{GS} = 10V, I _D = 2.0A ④
		—	—	1.15		V _{GS} = 10V, I _D = 3.0A
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	2.0	—	—	S (S)	V _{DS} > 15V, I _{DS} = 2.0A ④
I _{DSS}	Zero Gate Voltage Drain Current	—	—	25	μA	V _{DS} = 0.8 x Max Rating, V _{GS} = 0V
		—	—	250		V _{DS} = 0.8 x Max Rating V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	100	nA	V _{GS} = 20V
I _{GSS}	Gate-to-Source Leakage Reverse	—	—	-100		V _{GS} = -20V
Q _g	Total Gate Charge	19.1	—	33	nC	V _{GS} = 10V, I _D = 3.0A
Q _{gs}	Gate-to-Source Charge	1.0	—	5.8		V _{DS} = Max. Rating x 0.5 see figures 6 and 13
Q _{gd}	Gate-to-Drain ("Miller") Charge	6.7	—	19.9		
t _{d(on)}	Turn-On Delay Time	—	—	30	ns	V _{DD} = 200V, I _D = 3.0A, R _G = 7.5Ω, V _{GS} = 10V see figure 10
t _r	Rise Time	—	—	35		
t _{d(off)}	Turn-Off Delay Time	—	—	55		
t _f	Fall Time	—	—	35		
L _D	Internal Drain Inductance	—	5.0	—	nH	<p>Measured from the drain lead, 6mm (0.25 in.) from package to center of die.</p> <p>Measured from the source lead, 6mm (0.25 in.) from package to source bonding pad.</p> 
L _S	Internal Source Inductance	—	15	—		
C _{iss}	Input Capacitance	—	620	—	pF	V _{GS} = 0V, V _{DS} = 25V f = 1.0 MHz see figure 5
C _{oss}	Output Capacitance	—	200	—		
C _{rss}	Reverse Transfer Capacitance	—	75	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	3.0	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier. 
I _{SM}	Pulse Source Current (Body Diode) ①	—	—	12.0		
V _{SD}	Diode Forward Voltage	—	—	1.4	V	T _j = 25°C, I _S = 3.0A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	—	700	ns	T _j = 25°C, I _F = 3.0A, di/dt ≤ 100A/μs V _{DD} ≤ 50V ④
Q _R R	Reverse Recovery Charge	—	—	6.2	μC	
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L _S + L _D .				

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R _{thJC}	Junction-to-Case	—	—	5.0	K/W	Typical socket mount
R _{thJA}	Junction-to-Ambient	—	—	175		

JANTX2N6800, JANTXV2N6800 Device

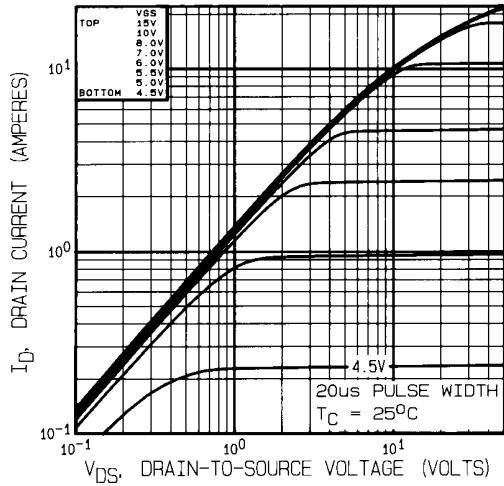


Fig. 1 — Typical Output Characteristics
 $T_C = 25^\circ\text{C}$

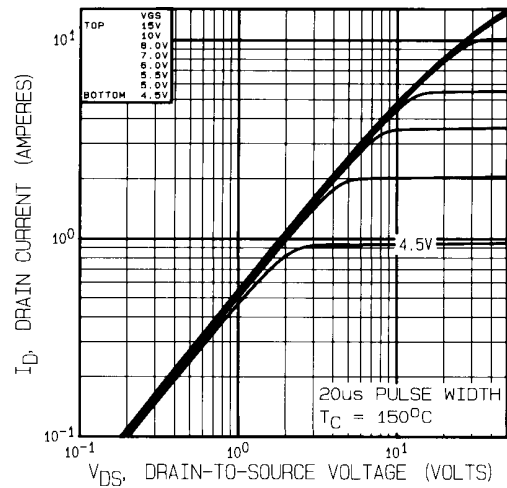


Fig. 2 — Typical Output Characteristics
 $T_C = 150^\circ\text{C}$

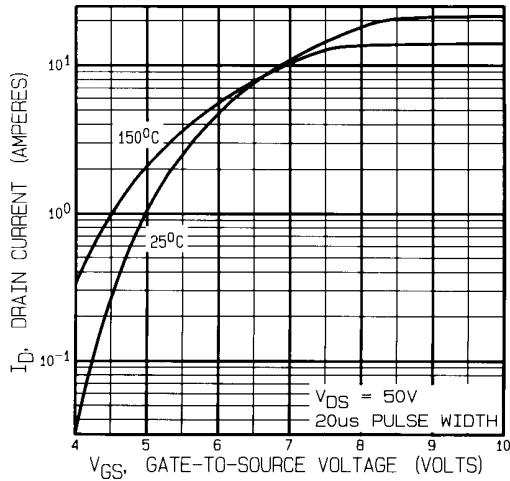


Fig. 3 — Typical Transfer Characteristics

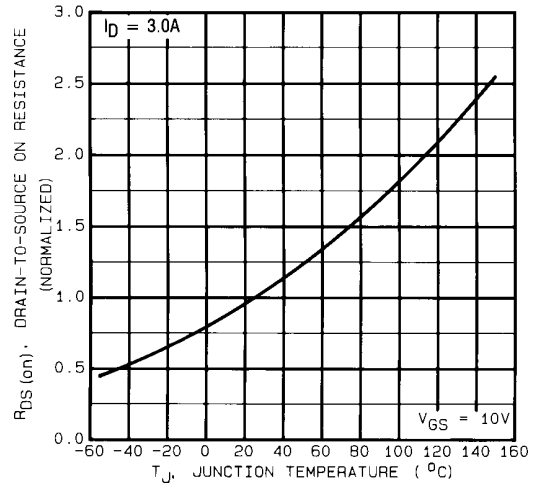


Fig. 4 — Normalized On-Resistance Vs. Temperature

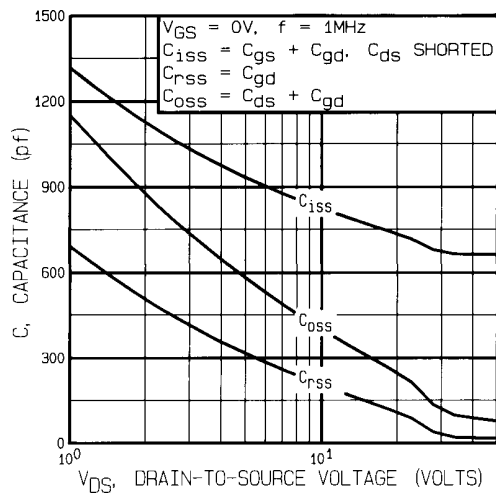


Fig. 5 — Typical Capacitance Vs. Drain-to-Source Voltage

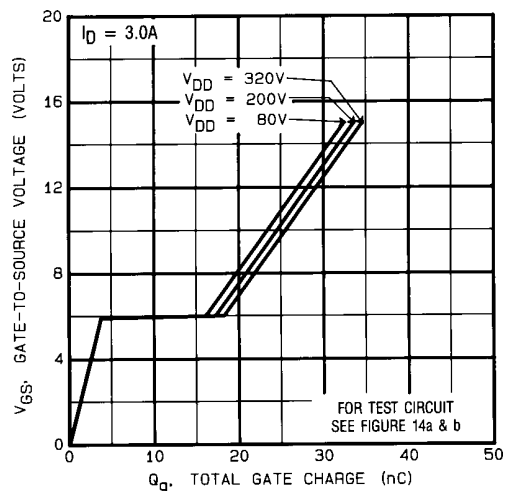


Fig. 6 — Typical Gate Charge Vs. Gate-to-Source Voltage

JANTX2N6800, JANTXV2N6800 Device

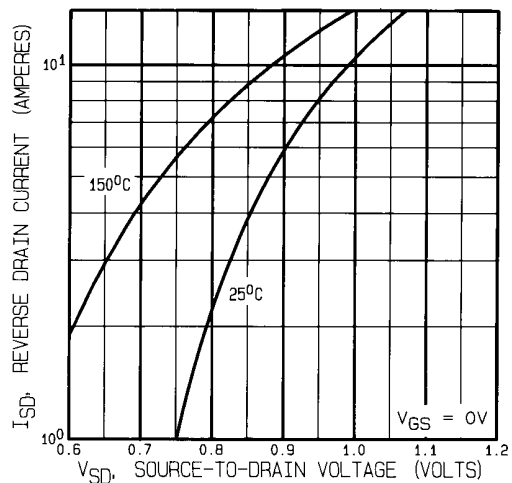


Fig. 7 — Typical Source-to-Drain Diode Forward Voltage

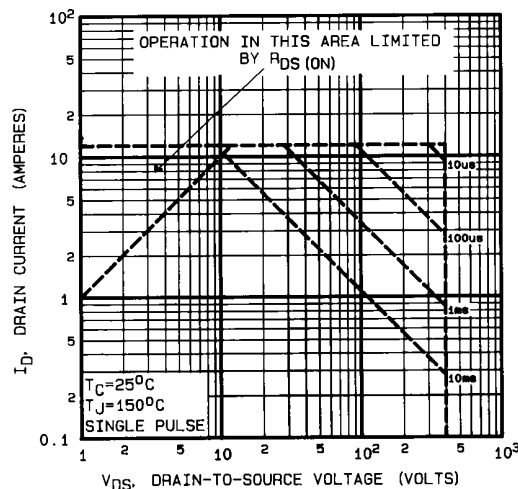


Fig. 8 — Maximum Safe Operating Area

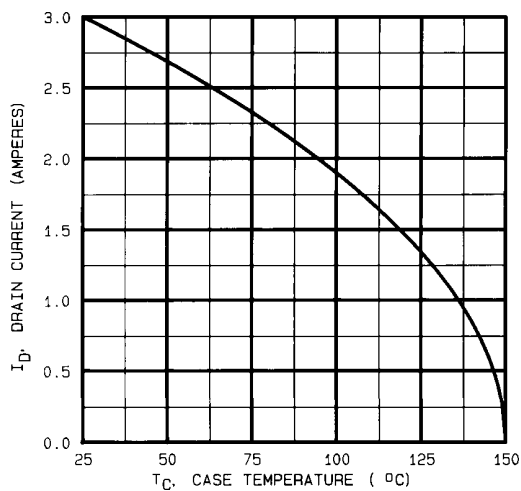


Fig. 9 — Maximum Drain Current Vs. Case Temperature

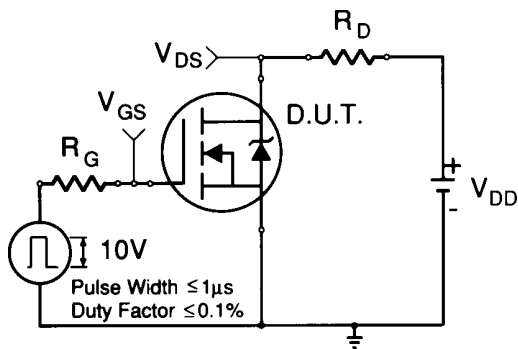


Fig. 10a — Switching Time Test Circuit

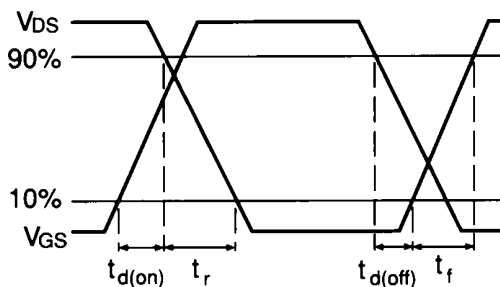


Fig. 10b — Switching Time Waveforms

JANTX2N6800, JANTXV2N6800 Device

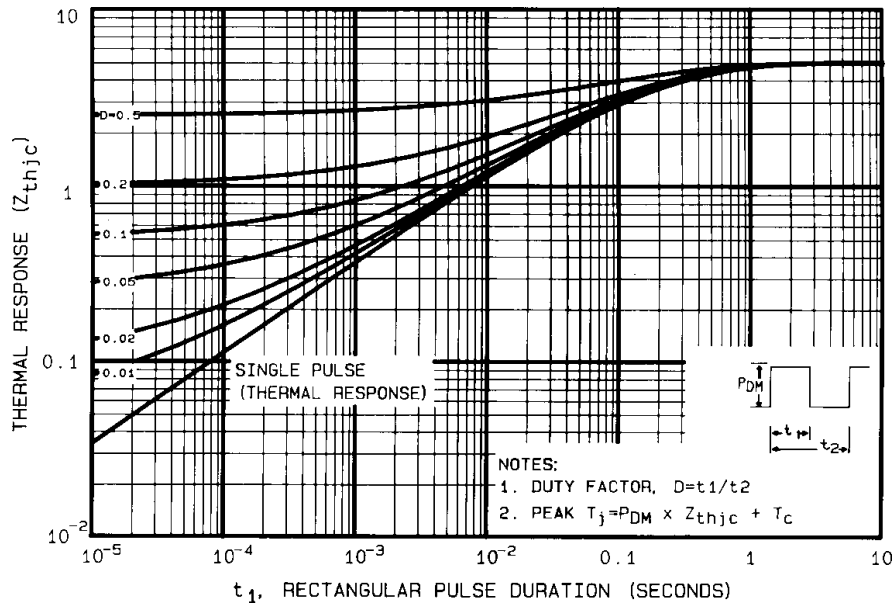


Fig. 11 — Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

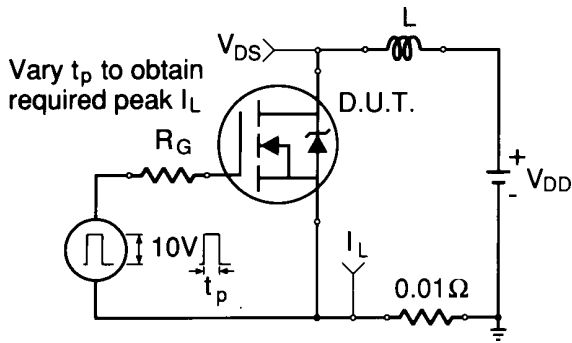


Fig. 12a — Unclamped Inductive Test Circuit

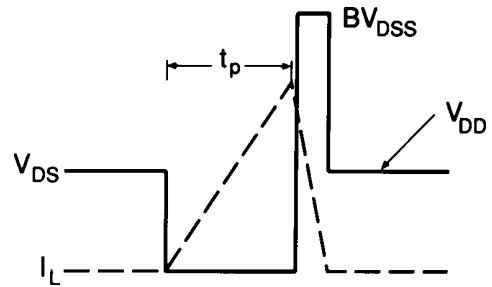


Fig. 12b — Unclamped Inductive Waveforms

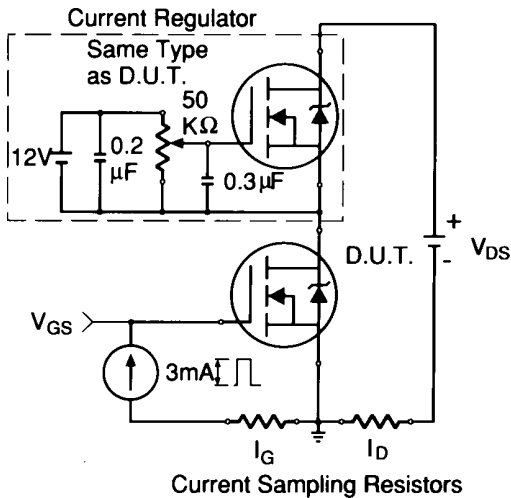


Fig. 13a — Gate Charge Test Circuit

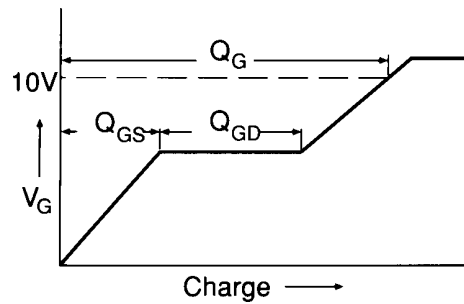
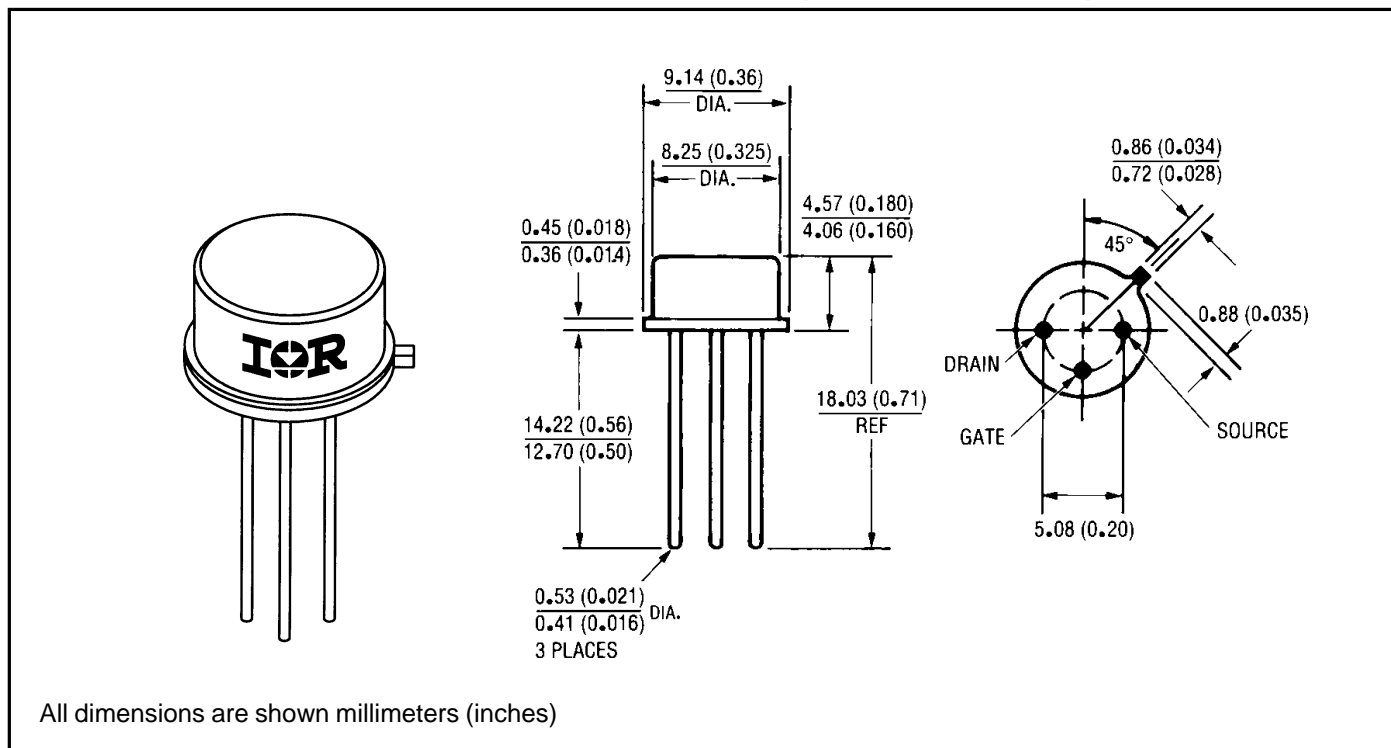


Fig. 13b — Basic Gate Charge Waveform

JANTX2N6800, JANTXV2N6800 Device

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
(see figure 11)
- ② @ $V_{DD} = 50V$, Starting $T_J = 25^\circ C$,
 $EAS = [0.5 * L * (I_L^2) * [BV_{DSS}/(BV_{DSS}-V_{DD})]]$
 Peak $I_L = 3.0A$, $V_{GS} = 10V$, $25 \leq R_G \leq 200\Omega$
- ③ $I_{SD} \leq 3.0A$, $di/dt \leq 90A/\mu s$,
 $V_{DD} \leq BV_{DSS}$, $T_J \leq 150^\circ C$
- ④ Pulse width $\leq 300 \mu s$; Duty Cycle $\leq 2\%$
- ⑤ $K/W = ^\circ C/W$
 $W/K = W/^\circ C$

Case Outline and Dimensions — TO-205AF (Modified TO-39)



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10/96