

International

IOR Rectifier

HEXFET® POWER MOSFET

Provisional Data Sheet No. PD-9.551B

JANTX2N6851

JANTXV2N6851

[REF:MIL-PRF-19500/564]

[GENERIC:IRFF9230]

P-CHANNEL

-200 Volt, 0.80Ω 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
JANTX2N6851	-200V	0.80Ω	-4.0A
JANTXV2N6851			

Features:

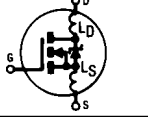
- Avalanche Energy Rating
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed

Absolute Maximum Ratings

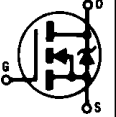
	Parameter	JANTX2N6851, JANTXV2N6851	Units
ID @ VGS = -10V, TC = 25°C	Continuous Drain Current	-4.0	A
ID @ VGS = -10V, TC = 100°C	Continuous Drain Current	-2.4	
IDM	Pulsed Drain Current ①	-16	
PD @ TC = 25°C	Max. Power Dissipation	25	W
	Linear Derating Factor	0.20	W/K ⑤
VGS	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	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

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
B _V D _{SS}	Drain-to-Source Breakdown Voltage	-200	—	—	V	V _{GS} = 0V, I _D = -1.0 mA
ΔB _V D _{SS} /ΔT _J	Temperature Coefficient of Breakdown Voltage	—	-0.22	—	V/°C	Reference to 25°C, I _D = -1.0 mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	0.80	Ω	V _{GS} = -10V, I _D = -2.4A ^④
		—	—	1.68		V _{GS} = -10V, I _D = -4.0A
V _{GS(th)}	Gate Threshold Voltage	-2.0	—	-4.0	V	V _{DS} = V _{GS} , I _D = -250μA
g _{fs}	Forward Transconductance	2.2	—	—	S (Ω)	V _{DS} > -15V, I _{DS} = -2.4A ^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	14.7	—	34.8	nC	V _{GS} = -10V, I _D = -4.0A
Q _{gs}	Gate-to-Source Charge	0.8	—	7.0		V _{DS} = Max. Rating x 0.5
Q _{gd}	Gate-to-Drain ("Miller") Charge	5.0	—	17		see figures 6 and 13
t _{d(on)}	Turn-On Delay Time	—	—	50		V _{DD} = -100V, I _D = -4.0A, R _G = 7.5Ω, V _{GS} = -10V
t _r	Rise Time	—	—	100	ns	see figure 10
t _{d(off)}	Turn-Off Delay Time	—	—	100		
t _f	Fall Time	—	—	80		
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>Modified MOSFET symbol showing the internal inductances.</p> 
L _S	Internal Source Inductance	—	15.0	—		
C _{iss}	Input Capacitance	—	700	—	pF	V _{GS} = 0V, V _{DS} = -25V f = 1.0 MHz see figure 5
C _{oss}	Output Capacitance	—	200	—		
C _{rss}	Reverse Transfer Capacitance	—	40	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	-4.0	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier. 
I _{SM}	Pulse Source Current (Body Diode) ①	—	—	-16		
V _{SD}	Diode Forward Voltage	—	—	-6.0	V	T _j = 25°C, I _S = -4.0A, V _{GS} = 0V ^④
t _{rr}	Reverse Recovery Time	—	—	400	ns	T _j = 25°C, I _F = -4.0A, di/dt ≤ -100A/μs V _{DD} ≤ -50V ^④
Q _R R	Reverse Recovery Charge	—	—	4.0	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		

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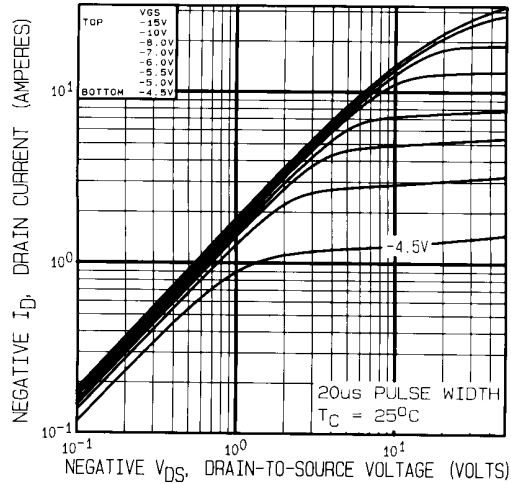


Fig. 1 — Typical Output Characteristics
 $T_C = 25^\circ\text{C}$

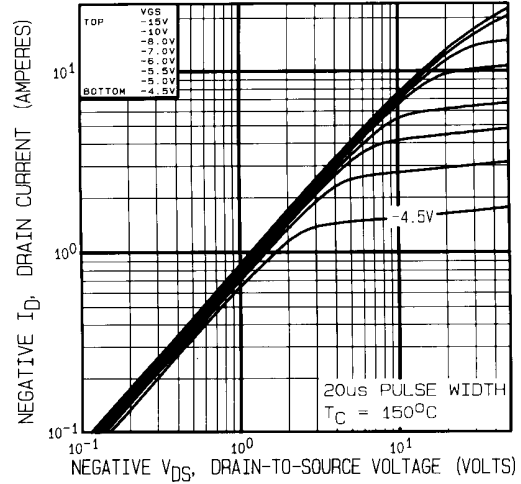


Fig. 2 — Typical Output Characteristics
 $T_C = 150^\circ\text{C}$

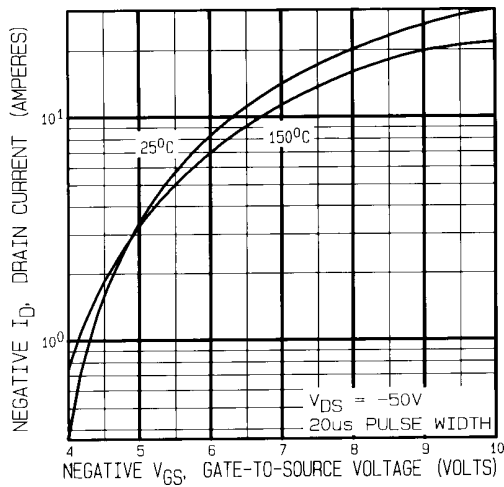


Fig. 3 — Typical Transfer Characteristics

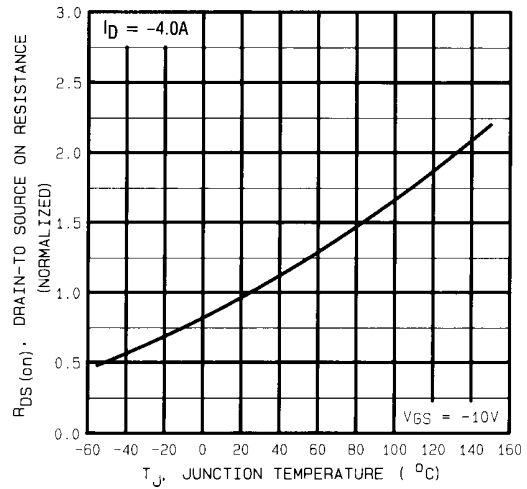


Fig. 4 — Normalized On-Resistance Vs. Temperature

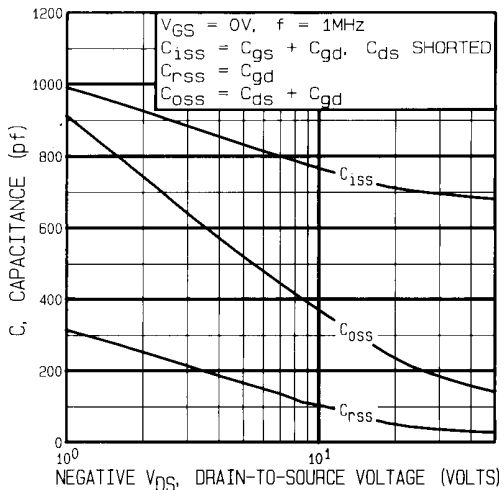


Fig. 5 — Typical Capacitance Vs. Drain-to-Source Voltage

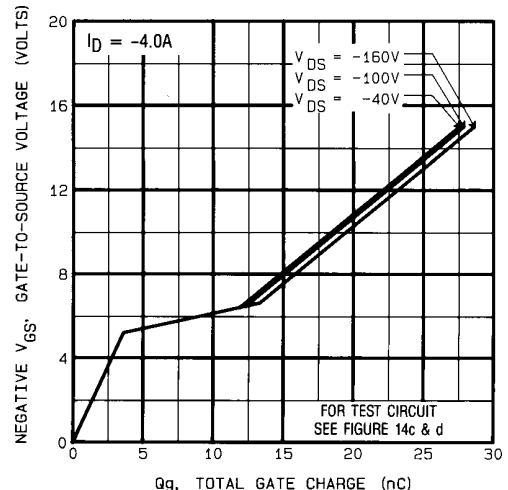


Fig. 6 — Typical Gate Charge Vs. Gate-to-Source Voltage

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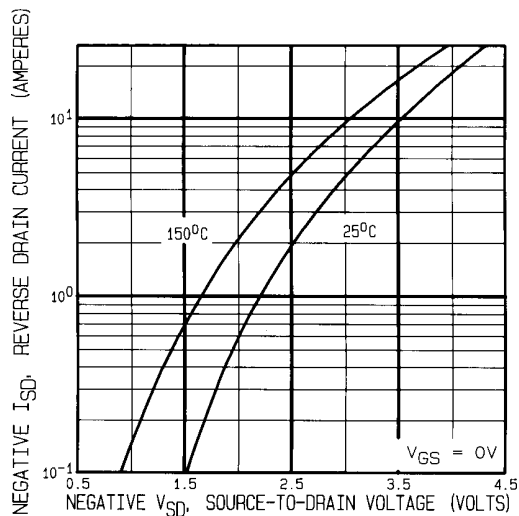


Fig. 7 — Typical Source-to-Drain Diode Forward Voltage

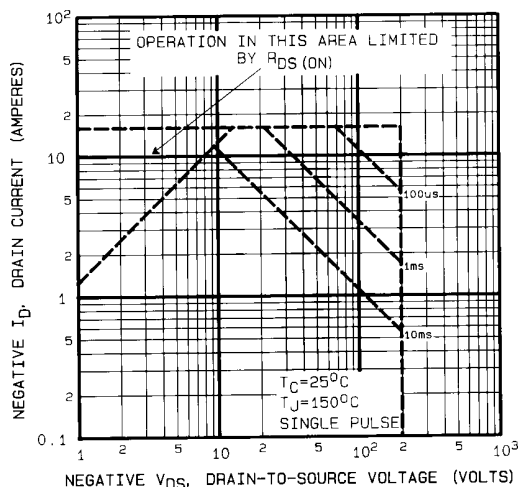


Fig. 8 — Maximum Safe Operating Area

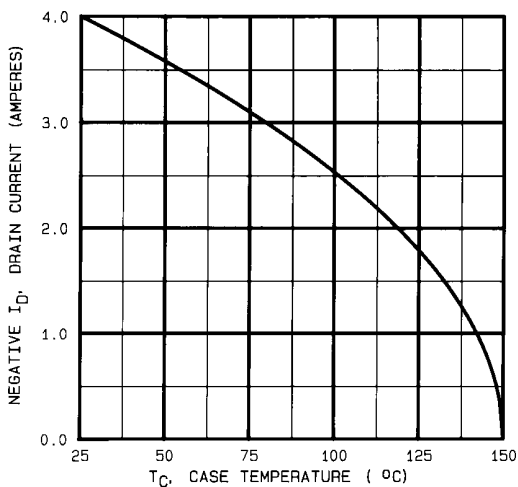


Fig. 9 — Maximum Drain Current Vs. Case Temperature

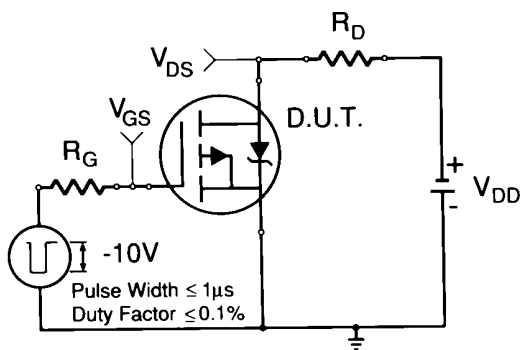


Fig. 10a — Switching Time Test Circuit

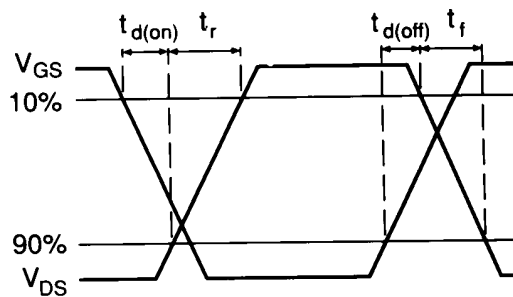


Fig. 10b — Switching Time Waveforms

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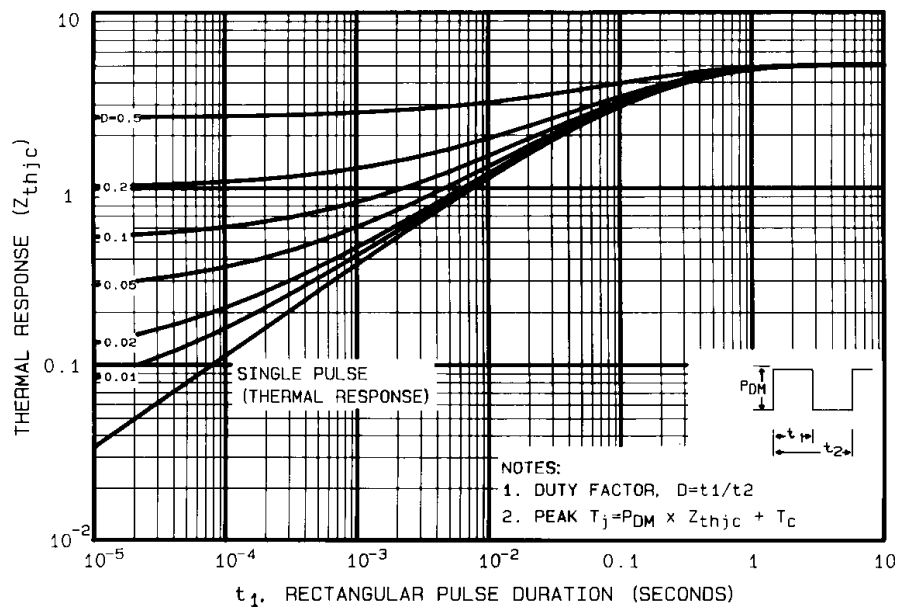


Fig. 11 — Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

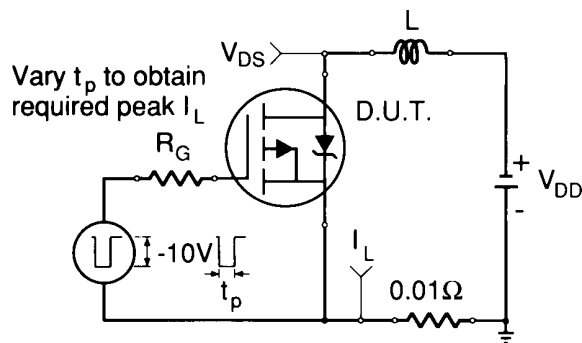


Fig. 12a — Unclamped Inductive Test Circuit

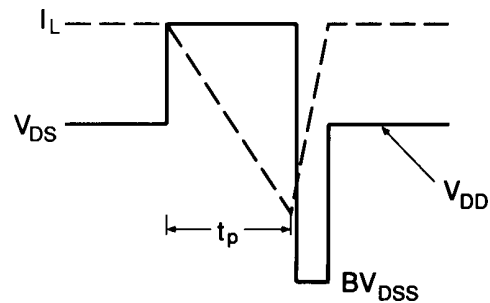


Fig. 12b — Unclamped Inductive Waveforms

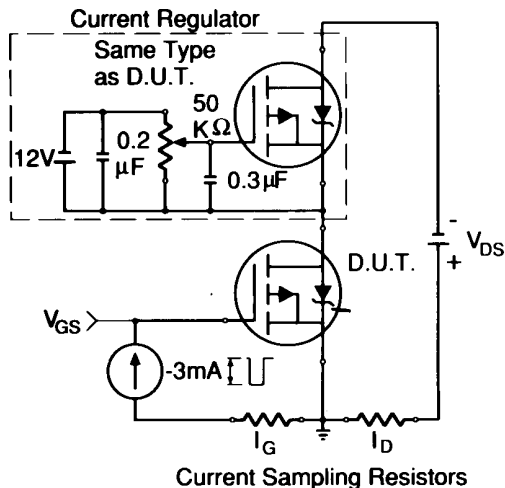


Fig. 13a — Gate Charge Test Circuit

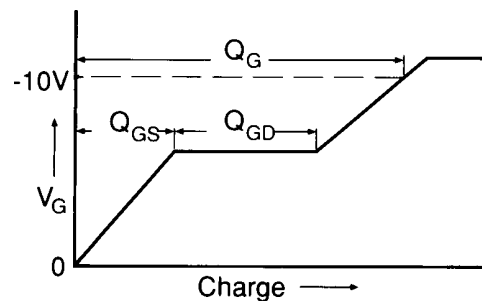
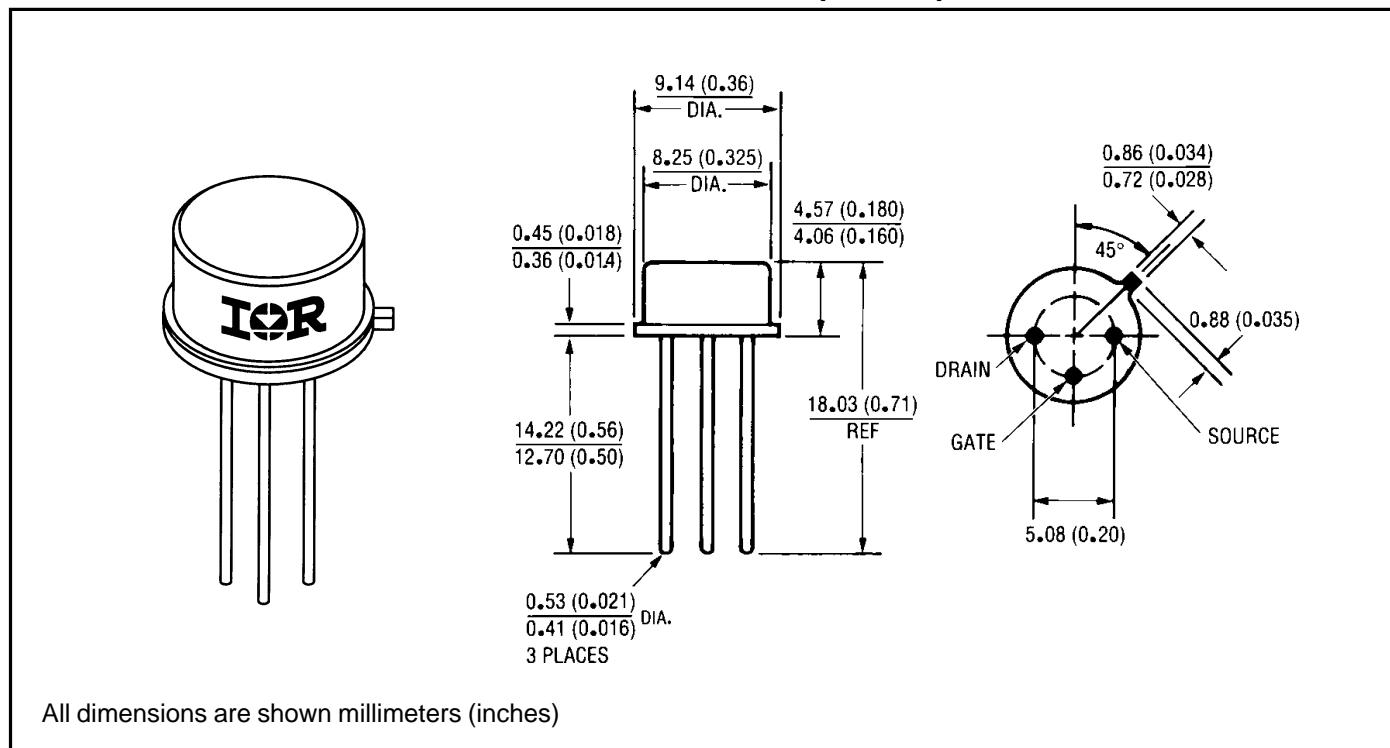


Fig. 13b — Basic Gate Charge Waveform

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- 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 $I_L = -4.0A$, $V_{GS} = -10V$, $25 \leq R_G \leq 200\Omega$
- ③ $I_{SD} \leq -4.0A$, $di/dt \leq -120A/\mu s$,
 $V_{DD} \leq BV_{DSS}$, $T_J \leq 150^\circ C$
- 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 (TO-39)



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