

400 Volt, 3.6Ω 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	BV _{DSS}	R _{DS(on)}	I _D
JANTX2N6786	400V	3.6Ω	1.25A
JANTXV2N6786			

Features:

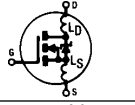
- Avalanche Energy Rating
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed

Absolute Maximum Ratings

	Parameter	JANTX2N6786, JANTXV2N6786	Units
I _D @ V _{GS} = 10V, T _C = 25°C	Continuous Drain Current	1.25	A
I _D @ V _{GS} = 10V, T _C = 100°C	Continuous Drain Current	0.80	
I _{DM}	Pulsed Drain Current ①	5.0	
P _D @ T _C = 25°C	Max. Power Dissipation	15	W
	Linear Derating Factor	0.12	W/K ⑤
V _{GS}	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt ③	4.0	V/ns
T _J	Operating Junction	-55 to 150	°C
T _{STG}	Storage Temperature Range		
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10.5 seconds)	
	Weight	0.98 (typical)	

JANTX2N6786, JANTXV2N6786 Device

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	400	—	—	V	$V_{GS} = 0V, I_D = 1.0 \text{ mA}$
$\Delta BV_{DSS}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	—	0.37	—	V/°C	Reference to 25°C, $I_D = 1.0 \text{ mA}$
RDS(on)	Static Drain-to-Source	—	—	3.6	Ω	$V_{GS} = 10V, I_D = 0.80A$ ④
	On-State Resistance	—	—	4.15		
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	0.7	—	—	S (r)	$V_{DS} > 15V, I_{DS} = 0.80A$ ④
IDSS	Zero Gate Voltage Drain Current	—	—	25	μA	$V_{DS} = 0.8 \times \text{Max Rating}, V_{GS} = 0V$
		—	—	250		
IGSS	Gate-to-Source Leakage Forward	—	—	100	nA	$V_{GS} = 20V$
IGSS	Gate-to-Source Leakage Reverse	—	—	-100	nA	$V_{GS} = -20V$
Qg	Total Gate Charge	6.7	—	8.4	nC	$V_{GS} = 10V, I_D = 1.25A$ $V_{DS} = \text{Max. Rating} \times 0.5$ see figures 6 and 13
Qgs	Gate-to-Source Charge	0.2	—	1.5		
Qgd	Gate-to-Drain ("Miller") Charge	3.5	—	5.0		
td(on)	Turn-On Delay Time	—	—	15	ns	$V_{DD} = 200V, I_D = 1.25A,$ $R_G = 7.5\Omega, V_{GS} = 10V$ see figure 10
tr	Rise Time	—	—	20		
td(off)	Turn-Off Delay Time	—	—	35		
tf	Fall Time	—	—	30		
LD	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> 
LS	Internal Source Inductance	—	15	—		
Ciss	Input Capacitance	—	170	—	pF	$V_{GS} = 0V, V_{DS} = 25V$ $f = 1.0 \text{ MHz}$ see figure 5
Coss	Output Capacitance	—	49	—		
Crss	Reverse Transfer Capacitance	—	10	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	1.25	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier.
ISM	Pulse Source Current (Body Diode) ①	—	—	5.0		
V_{SD}	Diode Forward Voltage	—	—	1.4	V	$T_j = 25^\circ C, I_S = 1.25A, V_{GS} = 0V$ ④
t _{rr}	Reverse Recovery Time	—	—	540	ns	$T_j = 25^\circ C, I_F = 1.25A, di/dt \leq 100A/\mu s$ $V_{DD} \leq 50V$ ④
QRR	Reverse Recovery Charge	—	—	4.5	μC	
ton	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by LS + LD.				

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RthJC	Junction-to-Case	—	—	8.3	K/W	Typical socket mount
RthJA	Junction-to-Ambient	—	—	175		

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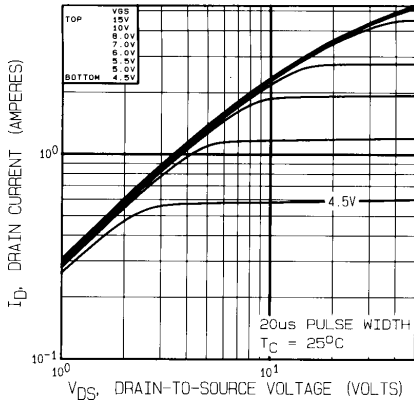


Fig. 1 — Typical Output Characteristics
 $T_C = 25^\circ\text{C}$

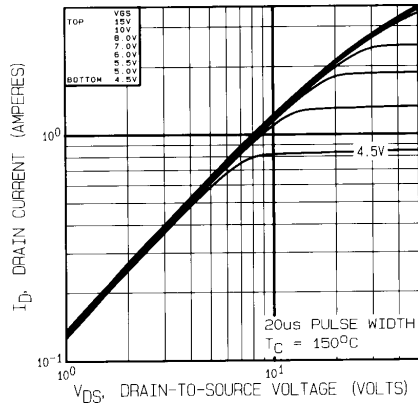


Fig. 2 — Typical Output Characteristics
 $T_C = 150^\circ\text{C}$

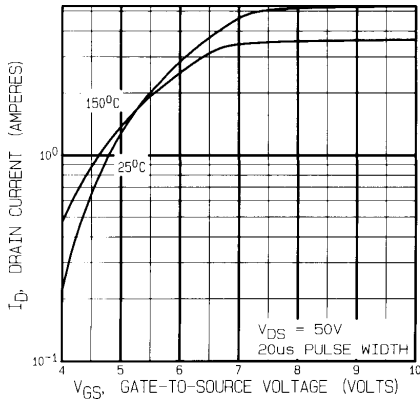


Fig. 3 — Typical Transfer Characteristics

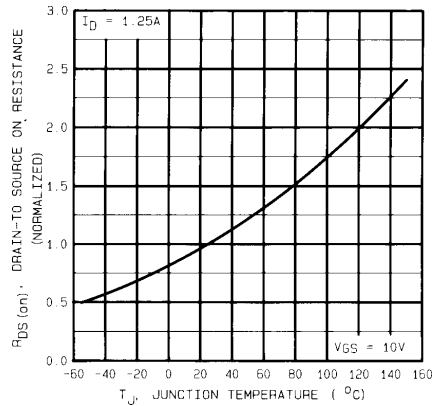


Fig. 4 — Normalized On-Resistance Vs. Temperature

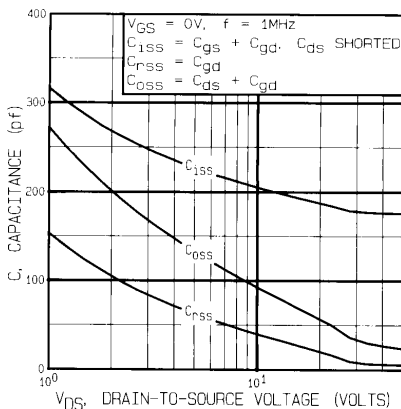


Fig. 5 — Typical Capacitance Vs. Drain-to-Source Voltage

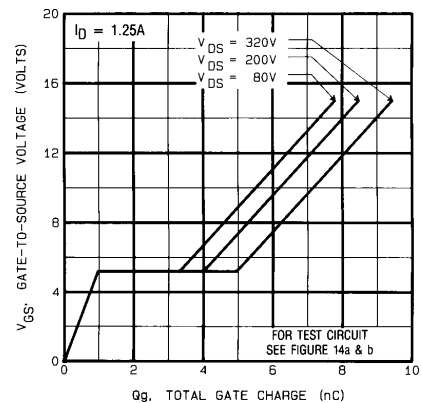


Fig. 6 — Typical Gate Charge Vs. Gate-to-Source Voltage

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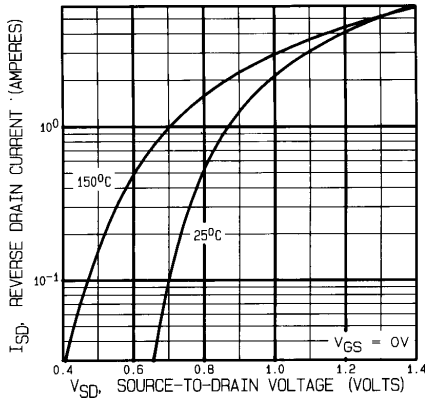


Fig. 7 — Typical Source-to-Drain Diode Forward Voltage

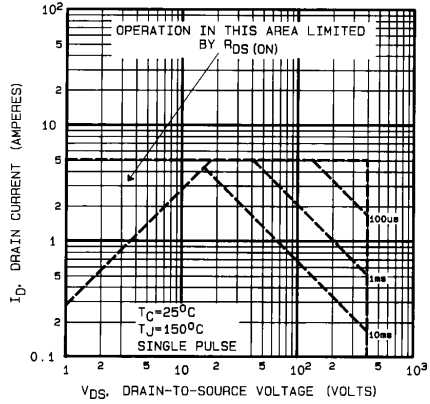


Fig. 8 — Maximum Safe Operating Area

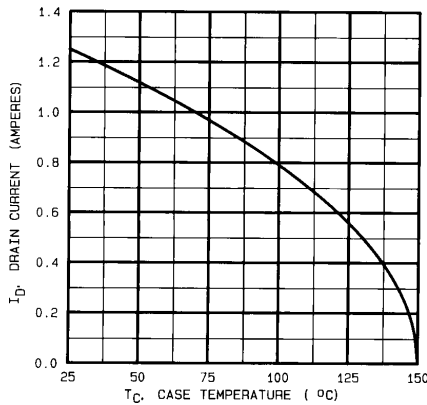


Fig. 9 — Maximum Drain Current Vs. Case Temperature

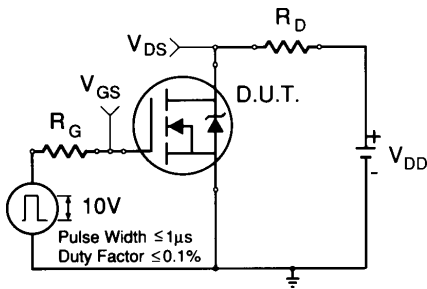


Fig. 10a — Switching Time Test Circuit

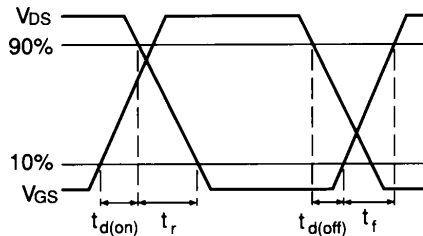


Fig. 10b — Switching Time Waveforms

JANTX2N6786, JANTXV2N6786 Device

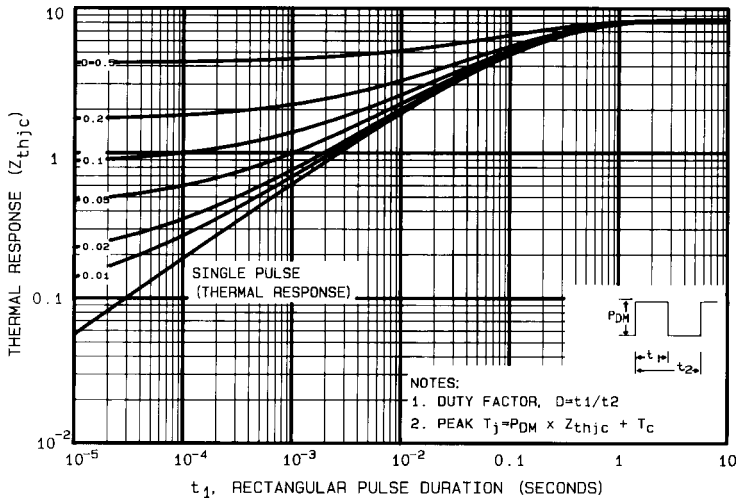


Fig. 11 — Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

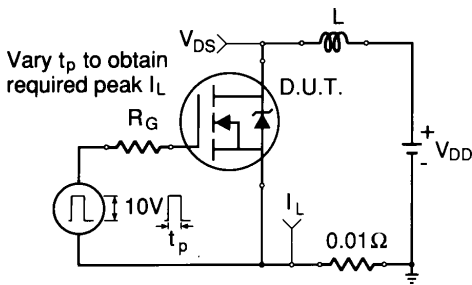


Fig. 12a — Unclamped Inductive Test Circuit

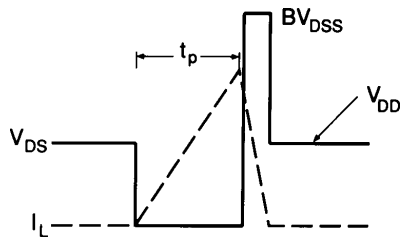


Fig. 12b — Unclamped Inductive Waveforms

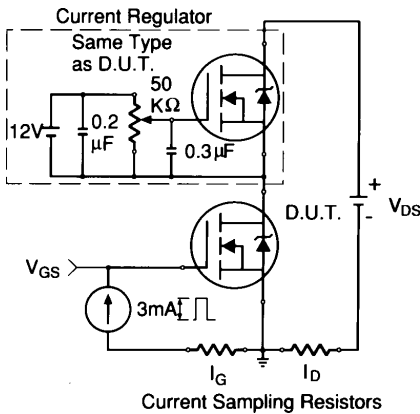


Fig. 13a — Gate Charge Test Circuit

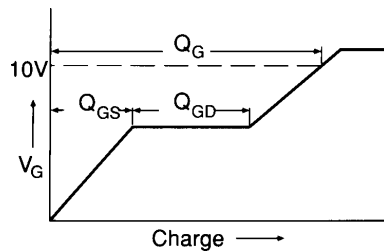
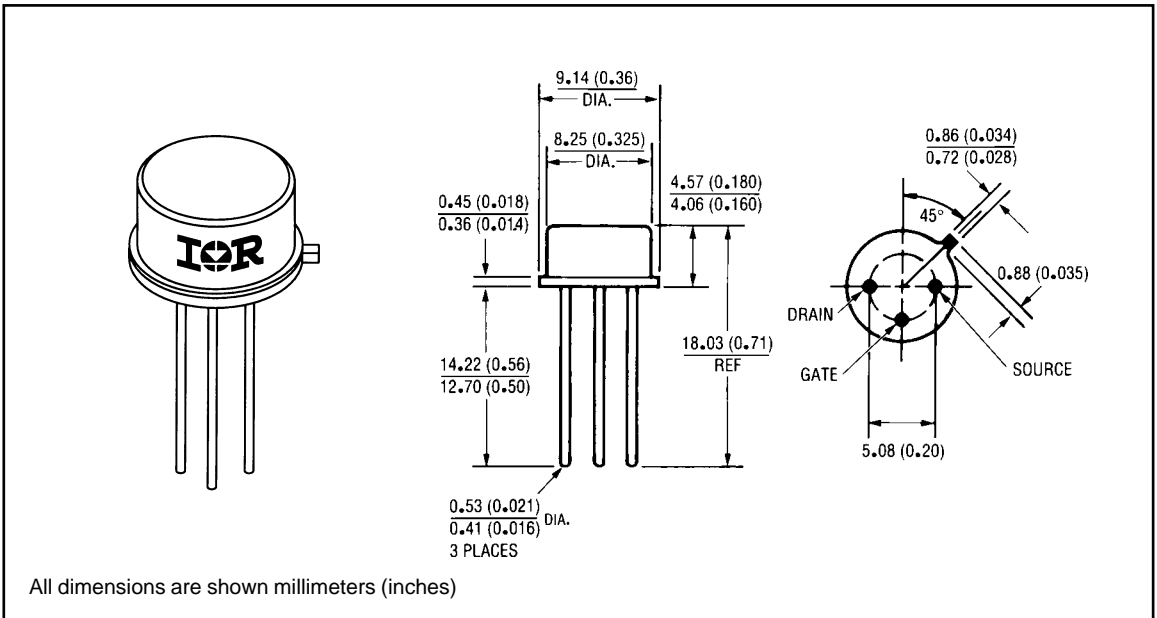


Fig. 13b — Basic Gate Charge Waveform

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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 $I_L = 1.25A$, $V_{GS} = 10V$, $25 \leq R_G \leq 200\Omega$
- ③ $ISD \leq 1.25A$, $di/dt \leq 40A/\mu s$,
 $V_{DD} \leq BV_{DSS}$, $T_J \leq 150^\circ C$
- 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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Data and specifications subject to change without notice. 10/96