

# International

## IOR Rectifier

### HEXFET® POWER MOSFET

Provisional Data Sheet No. PD-9.552B

### JANTX2N6845

### JANTXV2N6845

### [REF:MIL-PRF-19500/563]

### [GENERIC:IRFF9120]

### P-CHANNEL

#### -100 Volt, 0.60Ω 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 <sub>DSS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
JANTX2N6845	-100V	0.60Ω	-4.0A
JANTXV2N6845			

#### Features:

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

#### Absolute Maximum Ratings


	Parameter	JANTX2N6845, JANTXV2N6845	Units
I <sub>D</sub> @ V <sub>GS</sub> = -10V, T <sub>C</sub> = 25°C	Continuous Drain Current	-4.0	A
I <sub>D</sub> @ V <sub>GS</sub> = -10V, T <sub>C</sub> = 100°C	Continuous Drain Current	-2.6	
I <sub>DM</sub>	Pulsed Drain Current ①	-16	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Max. Power Dissipation	20	W
	Linear Derating Factor	0.16	W/K ⑤
V <sub>GS</sub>	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
T <sub>J</sub>	Operating Junction	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range		
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10.5 seconds)	
	Weight	0.98 (typical)	g

## JANTX2N6845, JANTXV2N6845 Device

### Electrical Characteristics @ $T_j = 25^\circ\text{C}$ (Unless Otherwise Specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	-100	—	—	V	$V_{GS} = 0V$ , $I_D = -1.0\text{ mA}$
$\Delta BV_{DSS}/\Delta T_j$	Temperature Coefficient of Breakdown Voltage	—	-0.10	—	$V/^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = -1.0\text{ mA}$
$R_{DS(on)}$	Static Drain-to-Source On-State Resistance	—	—	0.60	$\Omega$	$V_{GS} = -10V$ , $I_D = -2.6A$ ④
		—	—	0.69		$V_{GS} = -10V$ , $I_D = -4.0A$
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}$ , $I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	1.25	—	—	S ( $\Omega$ )	$V_{DS} > -15V$ , $I_{DS} = -2.6A$ ④
$I_{DSS}$	Zero Gate Voltage Drain Current	—	—	-25	$\mu A$	$V_{DS} = 0.8 \times \text{Max Rating}$ , $V_{GS} = 0V$
		—	—	-250		$V_{DS} = 0.8 \times \text{Max Rating}$ , $V_{GS} = 0V$ , $T_j = 125^\circ\text{C}$
$I_{GSS}$	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	4.3	—	16.3	nC	$V_{GS} = -10V$ , $I_D = -4.0A$
$Q_{gs}$	Gate-to-Source Charge	1.3	—	4.7		$V_{DS} = \text{Max. Rating} \times 0.5$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	1.0	—	9.0		see figures 6 and 13
$t_{d(on)}$	Turn-On Delay Time	—	—	60	ns	$V_{DD} = -50V$ , $I_D = -4.0A$ , $R_G = 7.5\Omega$ , $V_{GS} = -10V$
$t_r$	Rise Time	—	—	100		
$t_{d(off)}$	Turn-Off Delay Time	—	—	50		
$t_f$	Fall Time	—	—	70		
$L_D$	Internal Drain Inductance	—	5.0	—	nH	Measured from the drain lead, 6mm (0.25 in.) from package to center of die.
$L_S$	Internal Source Inductance	—	15	—		Measured from the source lead, 6mm (0.25 in.) from package to source bonding pad.
$C_{iss}$	Input Capacitance	—	380	—	pF	$V_{GS} = 0V$ , $V_{DS} = -25V$ $f = 1.0\text{ MHz}$ see figure 5
$C_{oss}$	Output Capacitance	—	170	—		
$C_{rss}$	Reverse Transfer Capacitance	—	45	—		

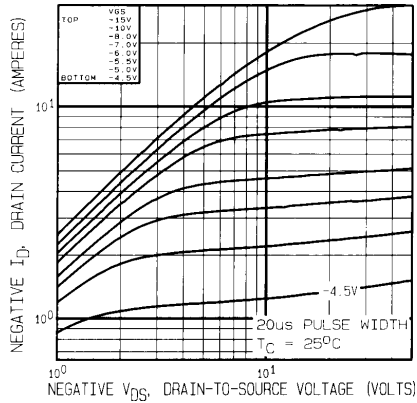
### Source-Drain Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	-4.0	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier. 
ISM	Pulse Source Current (Body Diode) ①	—	—	-16		
VSD	Diode Forward Voltage	—	—	-4.8	V	Tj = 25°C, IS = -4.0A, VGS = 0V ④
trr	Reverse Recovery Time	—	—	200	ns	Tj = 25°C, IF = -4.0A, di/dt ≤ -100A/μs VDD ≤ -50V ④
QRR	Reverse Recovery Charge	—	—	3.1	μC	
ton	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by LS + LD.				

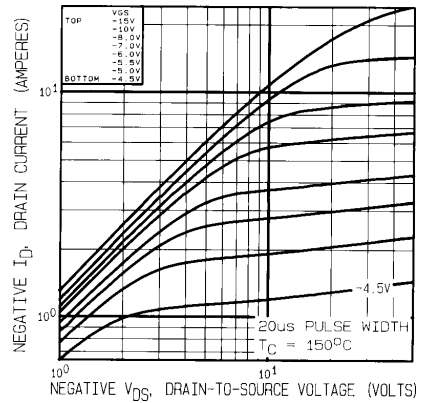
### Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{thJC}$	Junction-to-Case	—	—	6.25	K/W	Typical socket mount
$R_{thJA}$	Junction-to-Ambient	—	—	175		

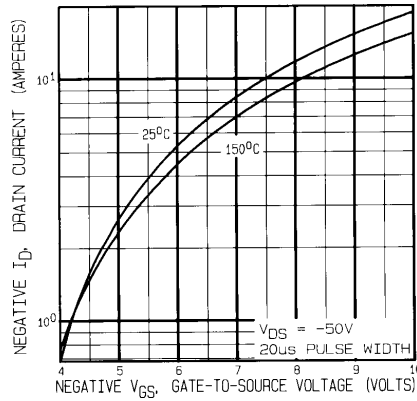
# JANTX2N6845, JANTXV2N6845 Device



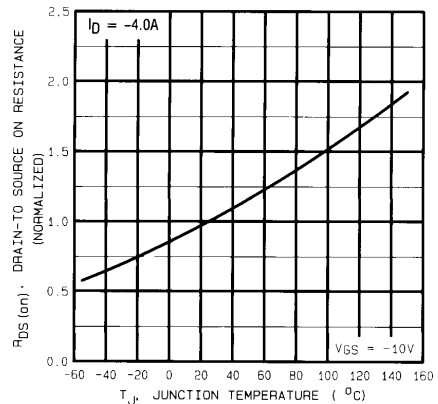
**Fig. 1 — Typical Output Characteristics**  
 $T_C = 25^\circ\text{C}$



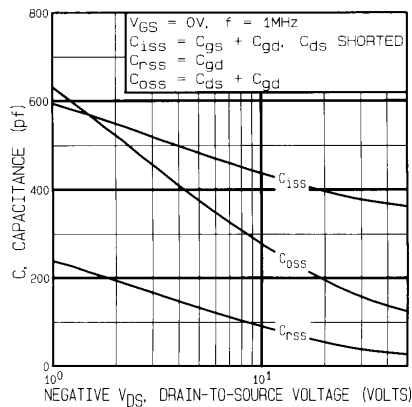
**Fig. 2 — Typical Output Characteristics**  
 $T_C = 150^\circ\text{C}$



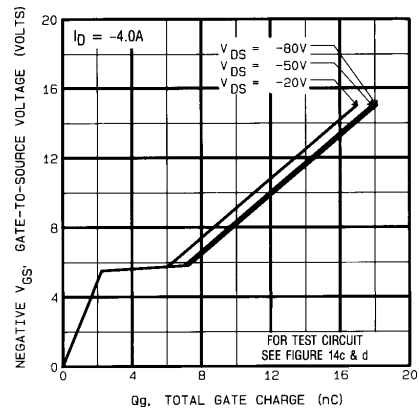
**Fig. 3 — Typical Transfer Characteristics**



**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**

JANTX2N6845, JANTXV2N6845 Device

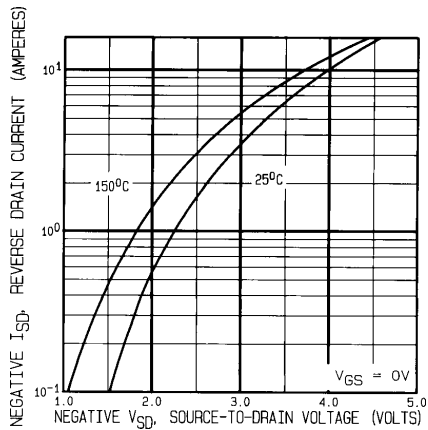


Fig. 7 — Typical Source-to-Drain Diode Forward Voltage

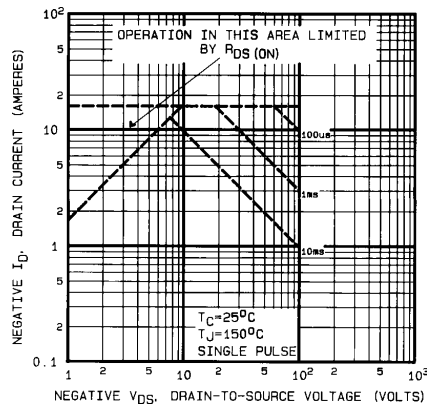


Fig. 8 — Maximum Safe Operating Area

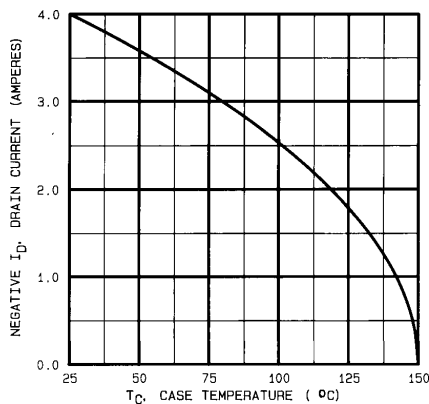


Fig. 9 — Maximum Drain Current Vs. Case Temperature

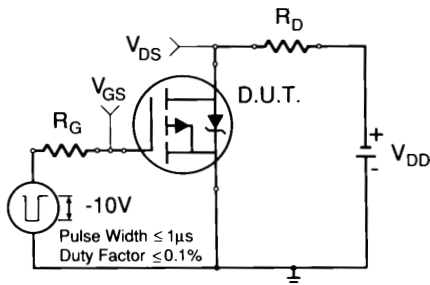


Fig. 10a — Switching Time Test Circuit

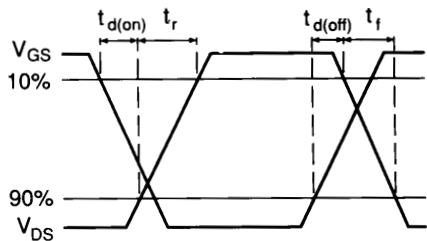


Fig. 10b — Switching Time Waveforms

# JANTX2N6845, JANTXV2N6845 Device

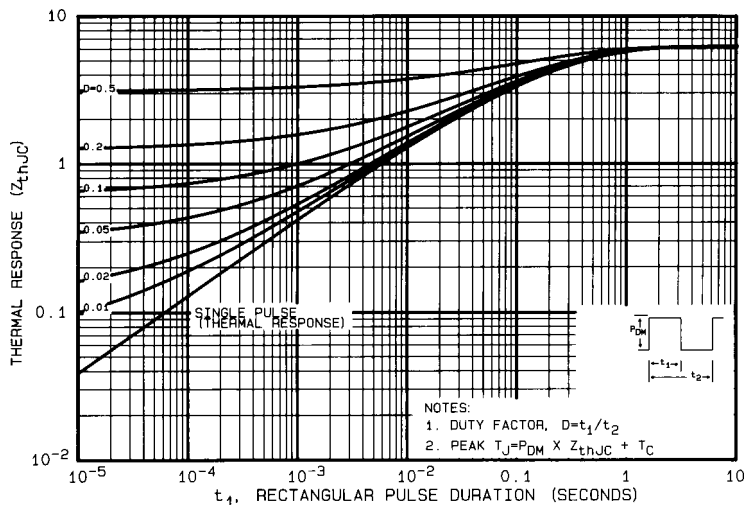


Fig. 11 — Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

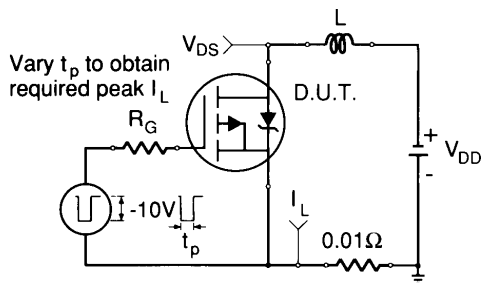


Fig. 12a — Unclamped Inductive Test Circuit

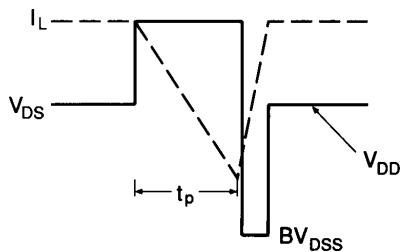


Fig. 12b — Unclamped Inductive Waveforms

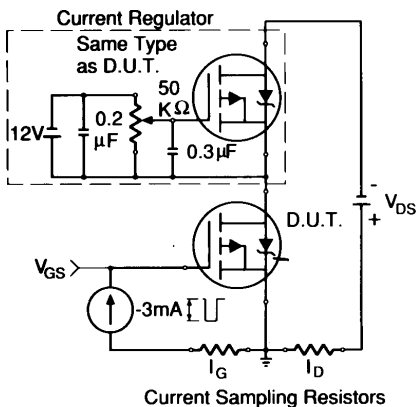


Fig. 13a — Gate Charge Test Circuit

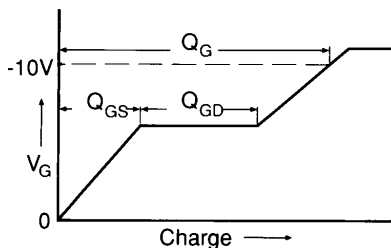
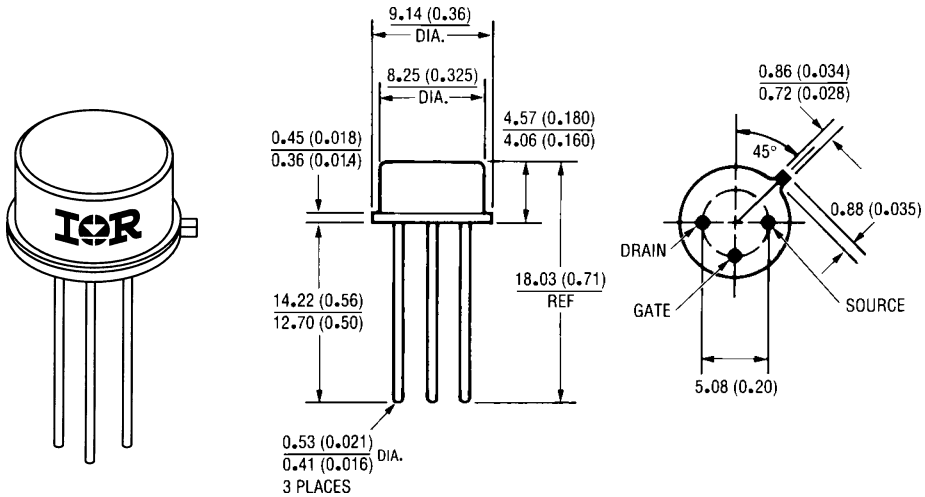


Fig. 13b — Basic Gate Charge Waveform

## JANTX2N6845, JANTXV2N6845 Device

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.  
(see figure 11)
- ② @  $V_{DD} = -25V$ , Starting  $T_J = 25^\circ C$ ,  
 $EAS = [0.5 * L * (I_L^2) * [BVDSS/(BVDSS - V_{DD})]]$   
Peak  $I_L = -4.0A$ ,  $V_{GS} = -10V$ ,  $25 \leq R_G \leq 200\Omega$
- ③  $I_{SD} \leq -4.0A$ ,  $di/dt \leq -110A/\mu s$ ,  
 $V_{DD} \leq BVDSS$ ,  $T_J \leq 150^\circ C$
- 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)



All dimensions are shown millimeters (inches)

International  
**IOR** Rectifier

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Data and specifications subject to change without notice.

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