International **IR** Rectifier

IRFG110
JANTX2N7334
JANTXV2N7334
REF:MIL-PRF-19500/597
100V, QUAD N-CHANNEL
HEXFET® MOSFET TECHNOLOGY

POWER MOSFET
THRU-HOLE (MO-036AB)

Product Summary

Part Number	$R_{DS(on)}$	I_D
IRFG110	0.7 Ω	1.0A

HEXFET® MOSFET technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry design 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, high energy pulse circuits, and virtually any application where high reliability is required. The HEXFET transistor's totally isolated package eliminates the need for additional isolating material between the device and the heatsink. This improves thermal efficiency and reduces drain capacitance.

MO-036AB
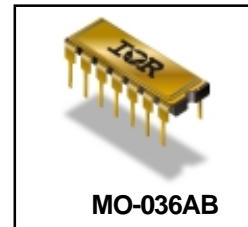
Features:

- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed
- Electrically Isolated
- Dynamic dv/dt Rating
- Light-weight

Absolute Maximum Ratings

	Parameter		Units
I_D @ V_{GS} = 10V, T_C = 25°C	Continuous Drain Current	1.0	
I_D @ V_{GS} = 10V, T_C = 100°C	Continuous Drain Current	0.6	A
I_{DM}	Pulsed Drain Current ①	4.0	
P_D @ T_C = 25°C	Max. Power Dissipation	1.4	W
	Linear Derating Factor	0.011	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	75	mJ
I_{AR}	Avalanche Current ①	—	A
E_{AR}	Repetitive Avalanche Energy ①	—	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.5	V/ns
T_J	Operating Junction	-55 to 150	°C
T_{STG}	Storage Temperature Range		
	Lead Temperature	300 (0.63 in./1.6 mm from case for 10s)	
	Weight	1.3 (Typical)	g

For footnotes refer to the last page

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

	Parameter	Min	Typ	Max	Units	Test Conditions
BV$_{DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	V$_{GS}$ = 0V, I$_D$ = 1.0mA
ΔBV$_{DSS}$/ΔT$_J$	Temperature Coefficient of Breakdown Voltage	—	0.13	—	V/°C	Reference to 25°C, I$_D$ = 1.0mA
R$_{DS(on)}$	Static Drain-to-Source On-State Resistance	—	—	0.7	Ω	V$_{GS}$ = 10V, I$_D$ = 0.6A ④
		—	—	0.8		V$_{GS}$ = 10V, I$_D$ = 1.0A
V$_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V$_{DS}$ = V$_{GS}$, I$_D$ = 250µA
gfs	Forward Transconductance	0.86	—	—	S (℧)	V$_{DS}$ > 15V, I$_{DS}$ = 0.6A ④
I$_{DSS}$	Zero Gate Voltage Drain Current	—	—	25	µA	V$_{DS}$= 80V , V$_{GS}$=0V
		—	—	250		V$_{DS}$ = 80V, 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	—	—	15	nC	V$_{GS}$ =10V, I$_D$ = 1.0A
Q$_{gs}$	Gate-to-Source Charge	—	—	7.5		V$_{DS}$ = 50V
Q$_{gd}$	Gate-to-Drain ('Miller') Charge	—	—	7.5		
t$_{d(on)}$	Turn-On Delay Time	—	—	20	ns	V$_{DD}$ = 50V, I$_D$ = 1.0A, V$_{GS}$ =10V, R$_G$ = 7.5Ω
t$_r$	Rise Time	—	—	25		
t$_{d(off)}$	Turn-Off Delay Time	—	—	40		
t$_f$	Fall Time	—	—	40		
L$_S$ + L$_D$	Total Inductance	—	10	—	nH	Measured from drain lead (6mm/0.25in. from package) to source lead (6mm/0.25in. from package)
C$_{iss}$	Input Capacitance	—	180	—	pF	V$_{GS}$ = 0V, V$_{DS}$ = 25V
C$_{oss}$	Output Capacitance	—	82	—		f = 1.0MHz
C$_{rss}$	Reverse Transfer Capacitance	—	15	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
I$_S$	Continuous Source Current (Body Diode)	—	—	1.0	A	
I$_{SM}$	Pulse Source Current (Body Diode) ①	—	—	4.0		
V$_{SD}$	Diode Forward Voltage	—	—	1.5	V	T$_j$ = 25°C, I$_S$ = 1.0A, V$_{GS}$ = 0V ④
t$_{rr}$	Reverse Recovery Time	—	—	200	nS	T$_j$ = 25°C, I$_F$ = 1.0A, di/dt ≤ 100A/µs
Q$_{RR}$	Reverse Recovery Charge	—	—	0.83	µC	V$_{DD}$ ≤ 50V ④
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	—	—	17	°C/W	
R$_{thJA}$	Junction-to-Ambient	—	—	90		Typical socket mount

Note: Corresponding Spice and Saber models are available on the G&S Website.
For footnotes refer to the last page
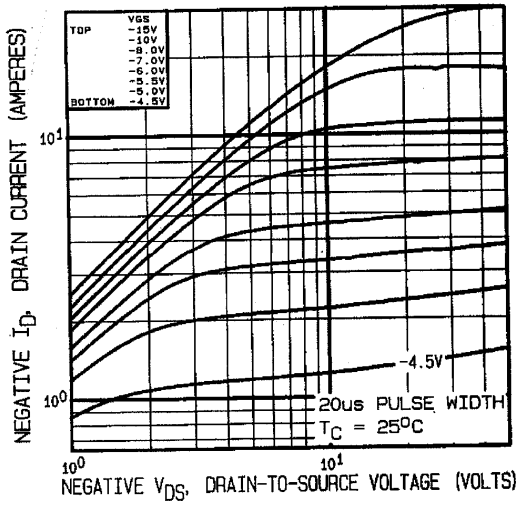
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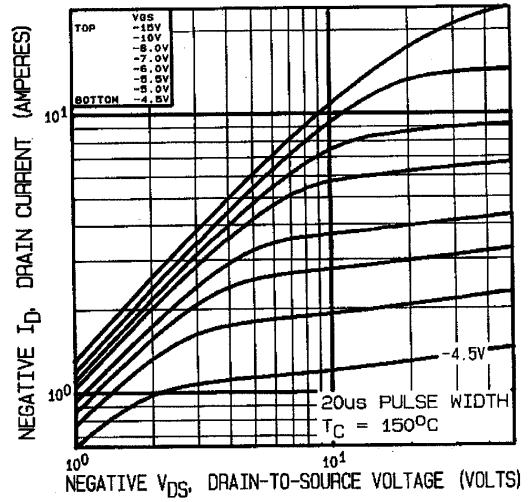**Fig 1.** Typical Output Characteristics

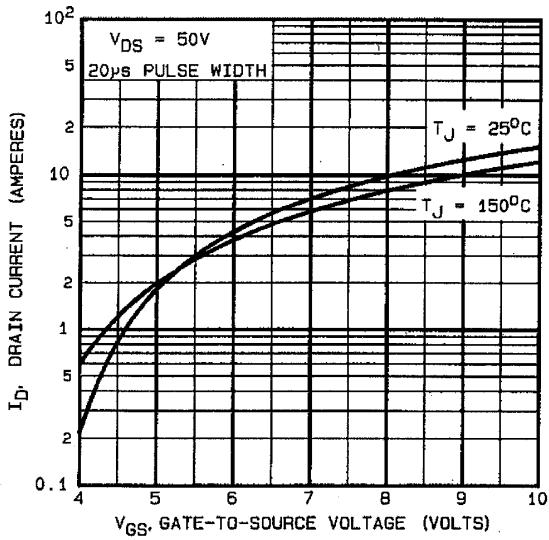**Fig 2.** Typical Output Characteristics

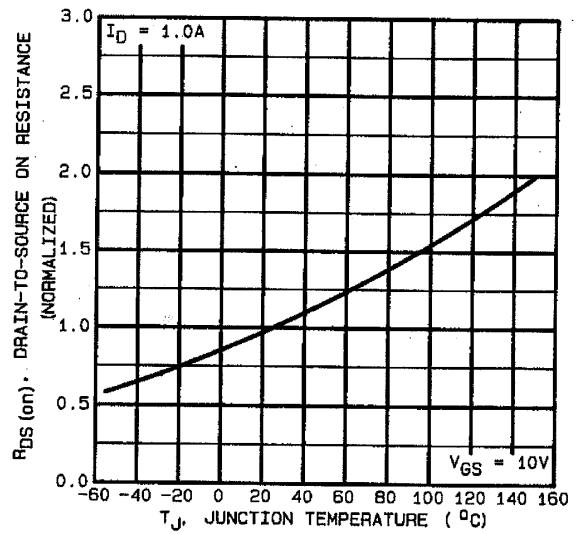**Fig 3.** Typical Transfer Characteristics

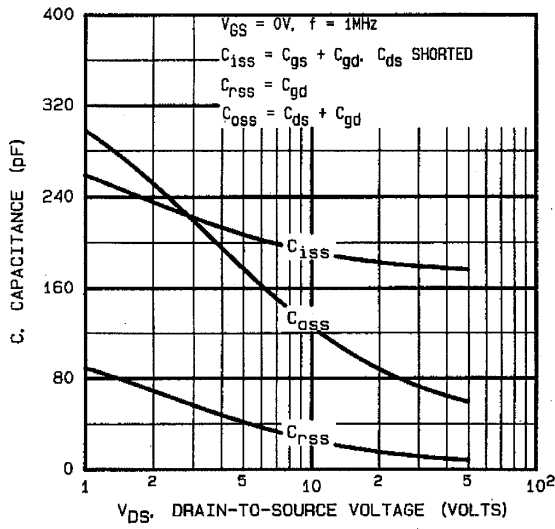**Fig 4.** Normalized On-Resistance
Vs. Temperature

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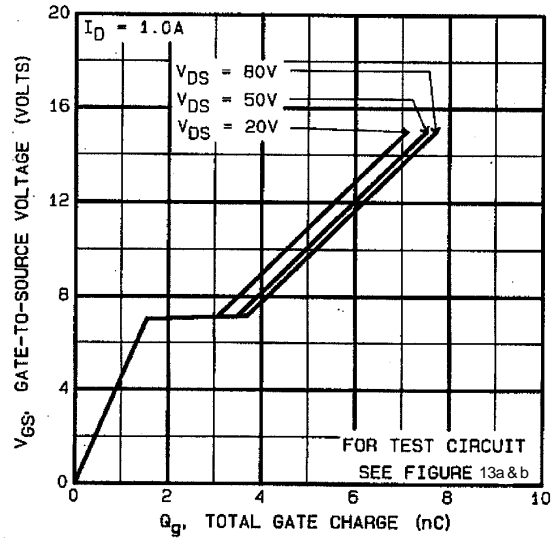Drain-to-Source Voltage
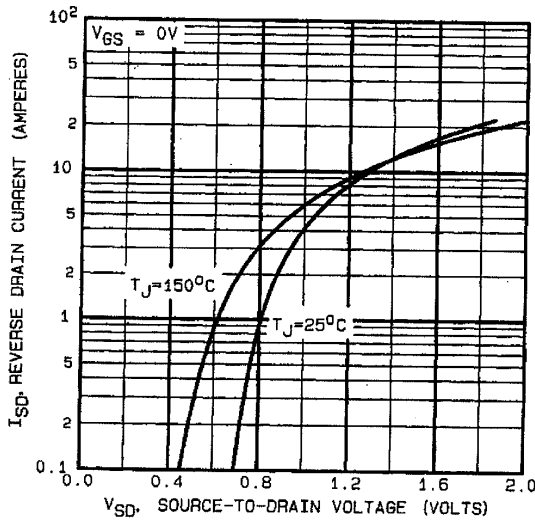

Fig 6. Typical Gate Charge Vs.
Gate-to-Source Voltage
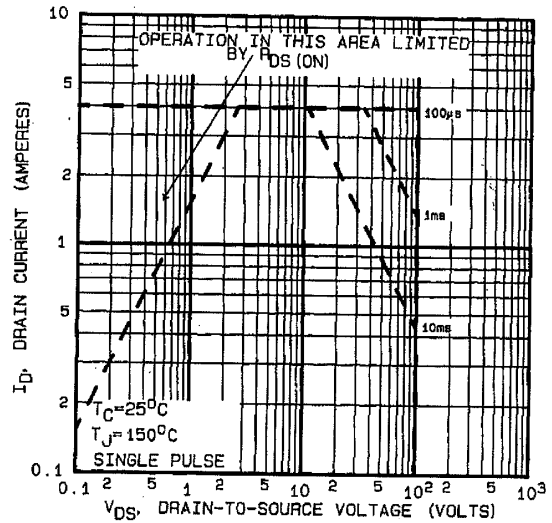

Fig 7. Typical Source-Drain Diode
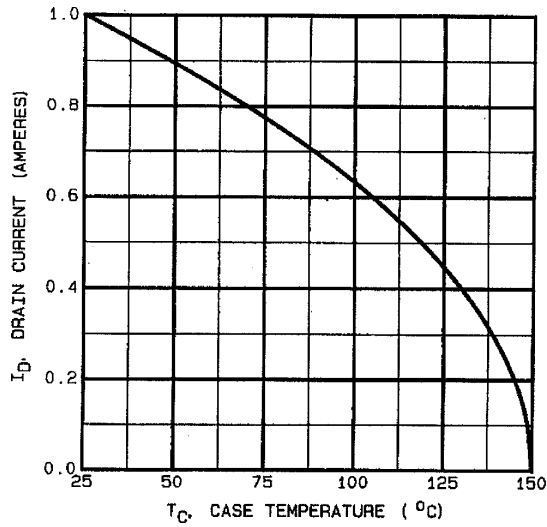Forward Voltage

Fig 8. Maximum Safe Operating Area

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Fig 9. Maximum Drain Current Vs.
Case Temperature
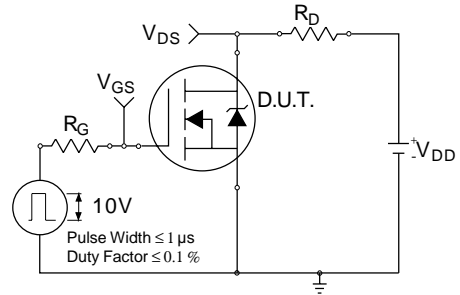
Fig 10a. Switching Time Test Circuit
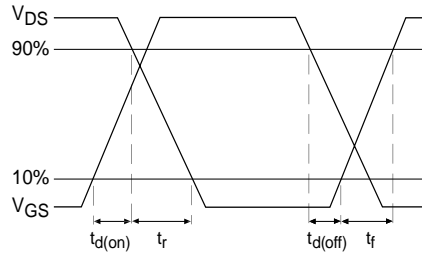
Fig 10b. Switching Time Waveforms

NOTES:
1. DUTY FACTOR, D=t_1/t_2
2. PEAK T_J=P_{DM} X Z_{thJA} + T_C
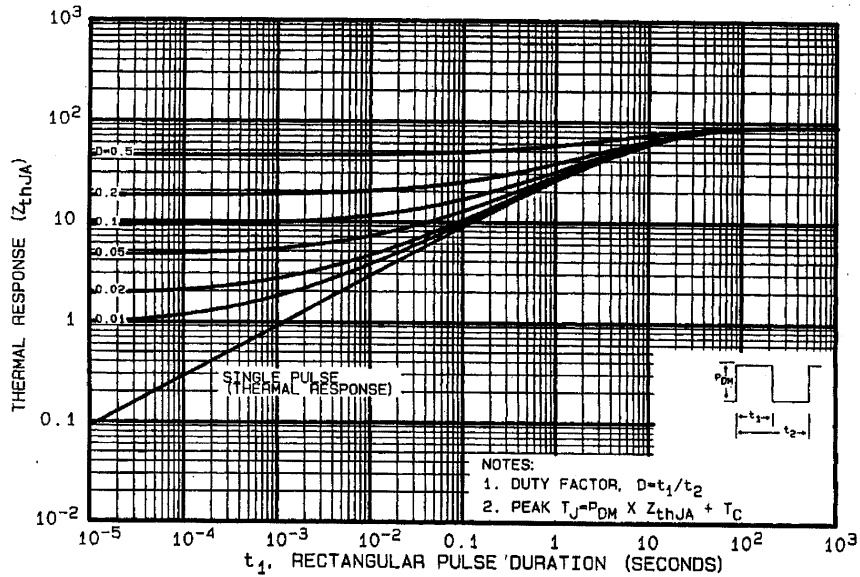
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient
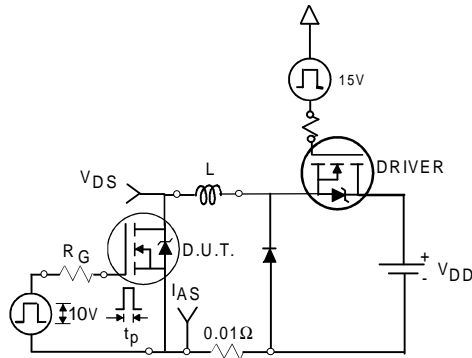
Fig 12a. Unclamped Inductive Test Circuit
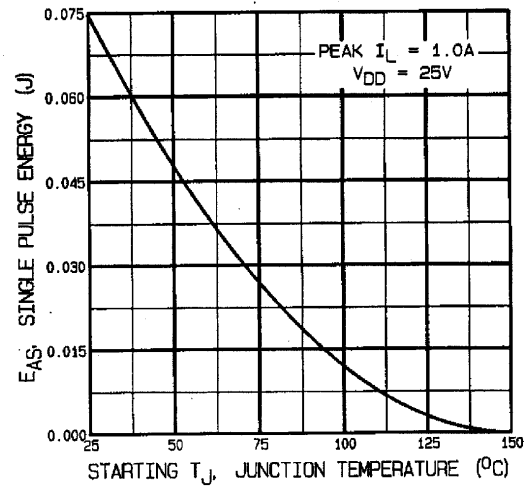
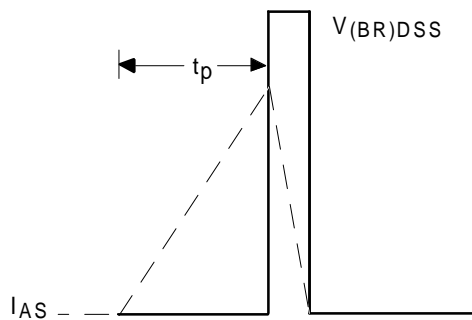**Fig 12c.** Maximum Avalanche Energy
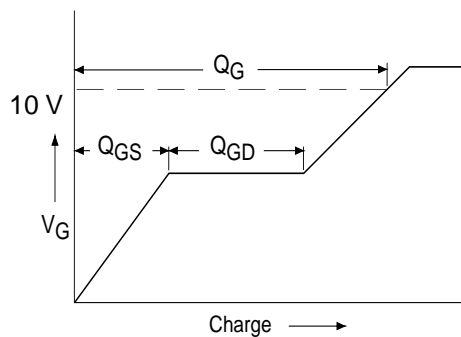Vs. Drain Current

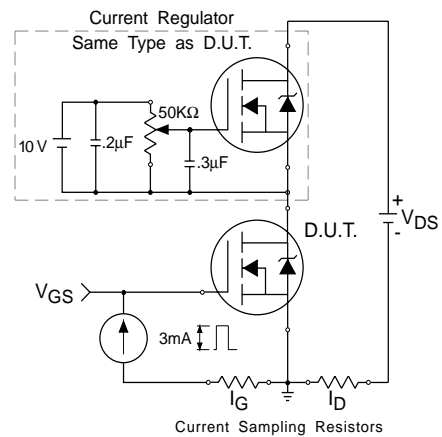**Fig 12b.** Unclamped Inductive Waveforms
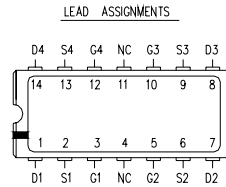

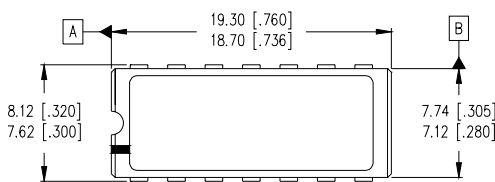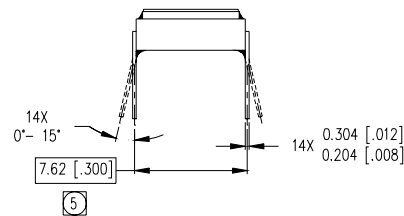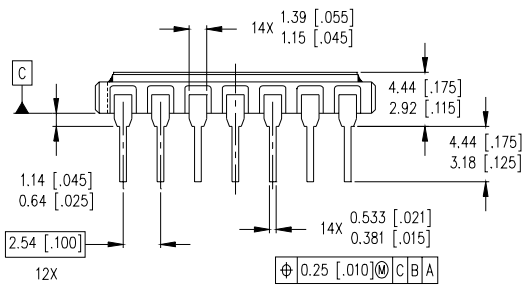**Fig 13a.** Basic Gate Charge Waveform

Fig 13b. Gate Charge Test Circuit

Footnotes:

① Repetitive Rating; Pulse width limited by maximum junction temperature.

② V_{DD} = 25V, starting T_J = 25°C, L= 150mH Peak I_L = 1.0A, V_{GS} = 10V

③ I_{SD} ≤ 1.0A, di/dt ≤ 75A/μs, V_{DD} ≤ 100V, T_J ≤ 150°C

④ Pulse width ≤ 300 μs; Duty Cycle ≤ 2%

Case Outline and Dimensions — MO-036AB

NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M−1994.

2. CONTROLLING DIMENSION: INCH.

3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].

4. OUTLINE CONFORMS TO JEDEC OUTLINE MO−036AB.

5. MEASURED WITH THE LEADS CONSTRAINED TO BE PERPENDICULAR TO DATUM PLANE C.

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