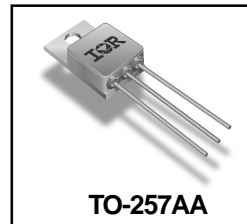# International **I⊗R** Rectifier

POWER MOSFET
THRU-HOLE (TO-257AA)

IRFY340C, IRFY340CM
400V, N-CHANNEL
HEXFET® MOSFET TECHNOLOGY

Product Summary

Part Number	$R_{DS(on)}$	I_D	Eyelets
IRFY340C	0.55 Ω	8.7A	Ceramic
IRFY340CM	0.55 Ω	8.7A	Ceramic

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.

TO-257AA

Features:

- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed
- Electrically Isolated
- Ceramic Eyelets
- Ideally Suited For Space Level Applications

Absolute Maximum Ratings

	Parameter		Units
I_D @ V_{GS} = 10V, T_C = 25°C	Continuous Drain Current	8.7	A
I_D @ V_{GS} = 10V, T_C = 100°C	Continuous Drain Current	5.5	
I_{DM}	Pulsed Drain Current ①	35	
P_D @ T_C = 25°C	Max. Power Dissipation	100	W
	Linear Derating Factor	0.8	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	520	mJ
I_{AR}	Avalanche Current ①	8.7	A
E_{AR}	Repetitive Avalanche Energy ①	10	mJ
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(0.063in./1.6mm from case for 10 sec)	
	Weight	4.3 (Typical)	g

For footnotes refer to the last page

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$_D$ = 1.0mA
ΔBV$_{DSS}$/ΔT$_J$	Temperature Coefficient of Breakdown Voltage	—	0.46	—	V/°C	Reference to 25°C, I$_D$ = 1.0mA
R$_{DS(on)}$	Static Drain-to-Source On-State Resistance	—	—	0.55	Ω	V$_{GS}$ = 10V, I$_D$ = 5.5A ④
V$_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V$_{DS}$ = V$_{GS}$, I$_D$ = 250μA
g$_{fs}$	Forward Transconductance	4.9	—	—	S (℧)	V$_{DS}$ > 15V, I$_{DS}$ = 5.5A ④
I$_{DSS}$	Zero Gate Voltage Drain Current	—	—	25	μA	V$_{DS}$= 320V ,V$_{GS}$=0V
		—	—	250		V$_{DS}$ = 320V, 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	—	—	65	nC	V$_{GS}$ =10V, I$_D$ = 8.7A
Q$_{gs}$	Gate-to-Source Charge	—	—	10		V$_{DS}$ = 200V
Q$_{gd}$	Gate-to-Drain ('Miller') Charge	—	—	40.5		
t$_{d(on)}$	Turn-On Delay Time	—	—	25	ns	V$_{DD}$ = 200V, I$_D$ = 8.7A, R$_G$ = 9.1Ω
t$_r$	Rise Time	—	—	92		
t$_{d(off)}$	Turn-Off Delay Time	—	—	79		
t$_f$	Fall Time	—	—	58		
L$_S$ + L$_D$	Total Inductance	—	6.8	—	nH	Measured from drain lead (6mm/0.25in. from package) to source lead (6mm/0.25in. from package)
C$_{iss}$	Input Capacitance	—	1400	—	pF	V$_{GS}$ = 0V, V$_{DS}$ = 25V
C$_{oss}$	Output Capacitance	—	350	—		f = 1.0MHz
C$_{rss}$	Reverse Transfer Capacitance	—	230	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
I$_S$	Continuous Source Current (Body Diode)	—	—	8.7	A	
I$_{SM}$	Pulse Source Current (Body Diode) ①	—	—	35		
V$_{SD}$	Diode Forward Voltage	—	—	1.5	V	T$_j$ = 25°C, I$_S$ = 8.7A, V$_{GS}$ = 0V ④
t$_{rr}$	Reverse Recovery Time	—	—	600	nS	T$_j$ = 25°C, I$_F$ = 8.7A, di/dt ≤ 100A/μs
Q$_{RR}$	Reverse Recovery Charge	—	—	5.6	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	—	—	1.25	°C/W	
R$_{thCS}$	Case-to-sink	—	0.21	—		
R$_{thJA}$	Junction-to-Ambient	—	—	80		Typical socket mount

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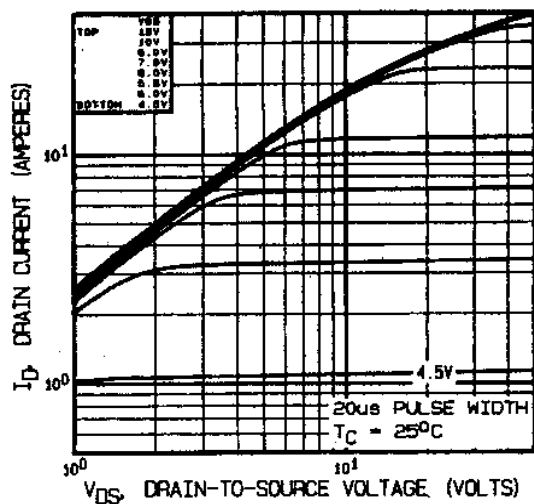For footnotes refer to the last page
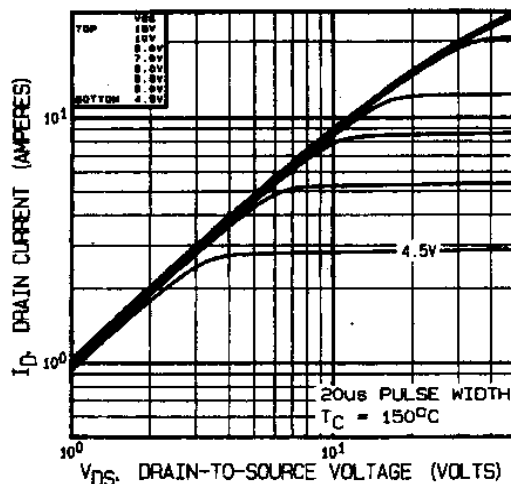
Fig 1. Typical Output Characteristics

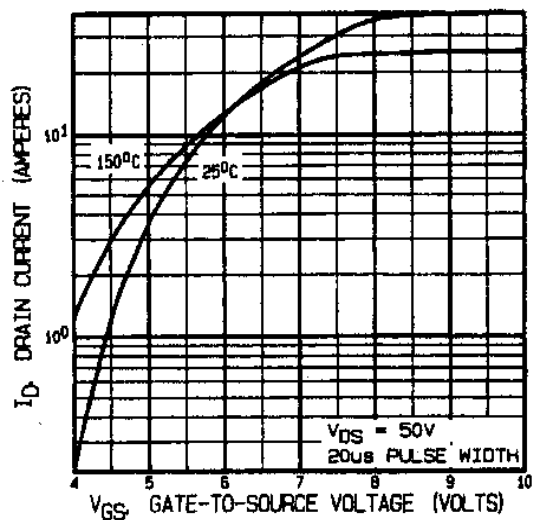**Fig 2.** Typical Output Characteristics

Fig 3. Typical Transfer Characteristics
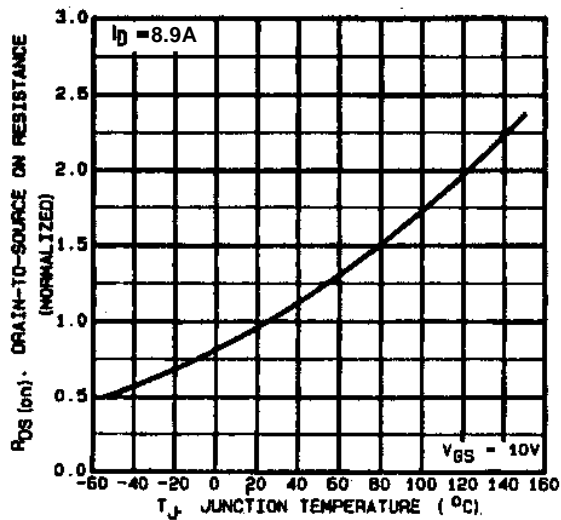

Fig 4. Normalized On-Resistance Vs. Temperature
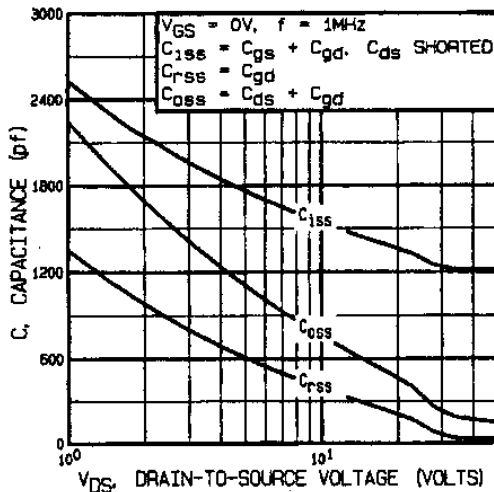
Fig 5. Typical Capacitance Vs.
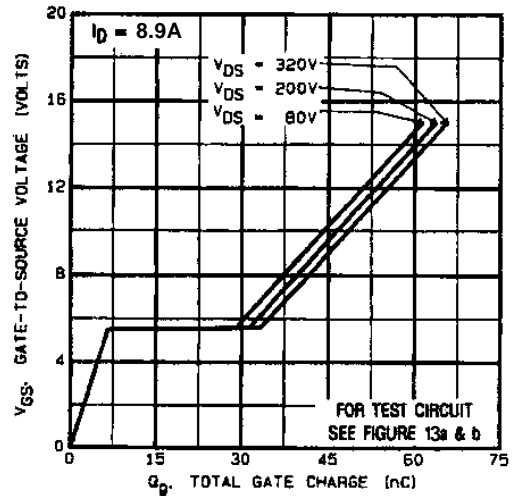Drain-to-Source Voltage

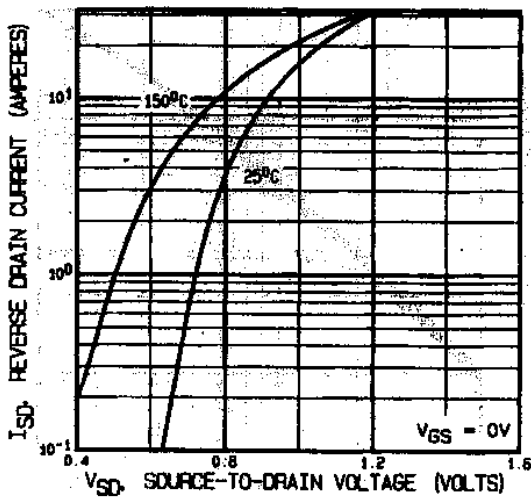**Fig 6.** Typical Gate Charge Vs.
Gate-to-Source Voltage

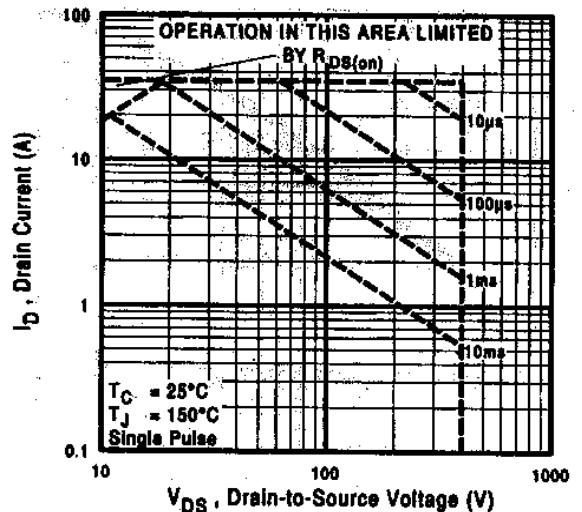**Fig 7.** Typical Source-Drain Diode
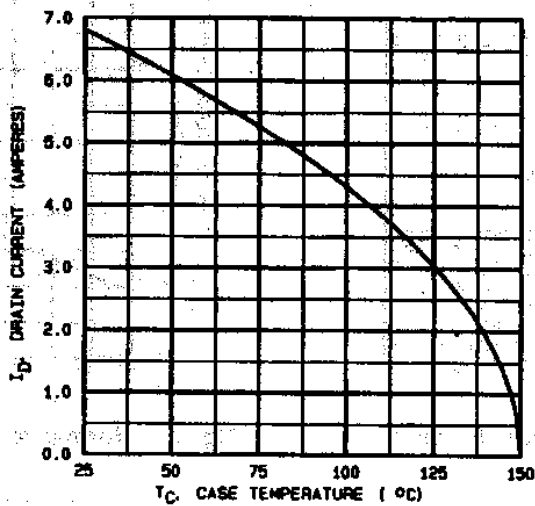Forward Voltage

Fig 8. Maximum Safe Operating Area
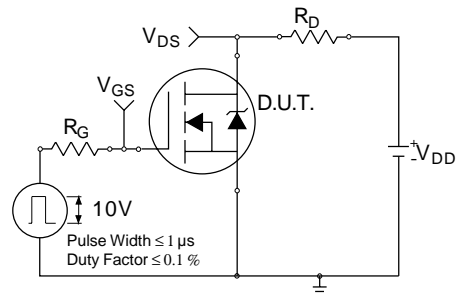
Fig 9. Maximum Drain Current Vs. Case Temperature

Fig 10a. Switching Time Test Circuit

Fig 10b. Switching Time Waveforms

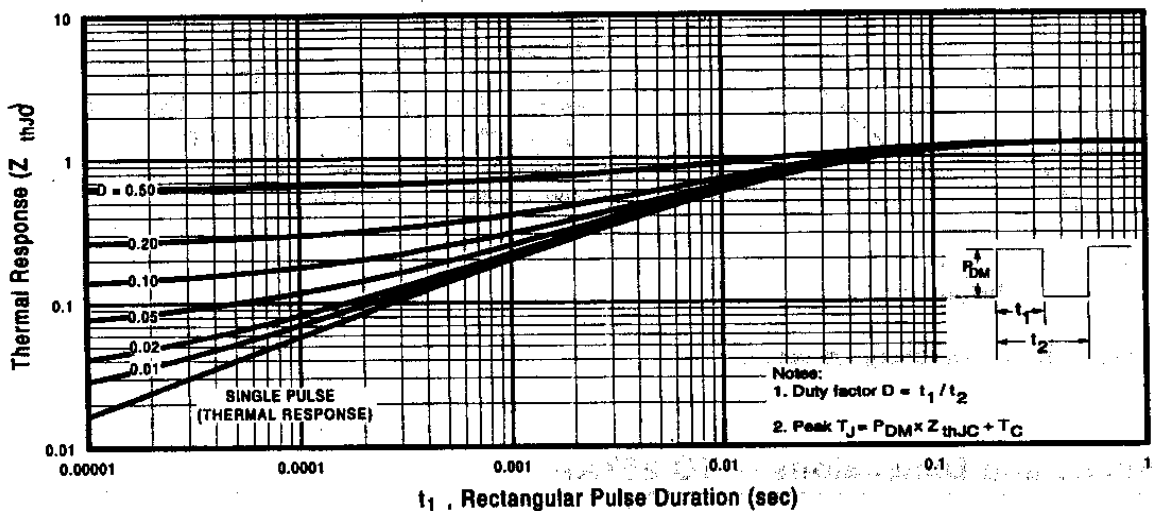**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case
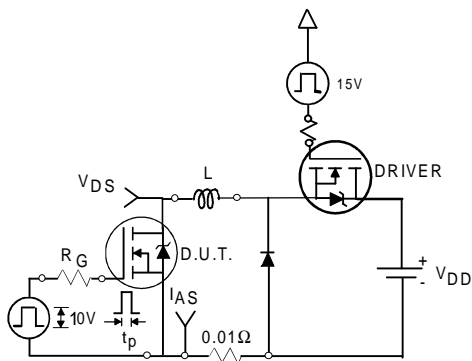
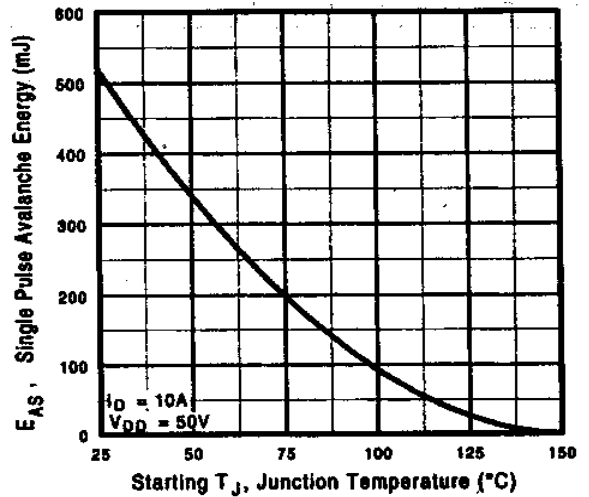**Fig 12a.** Unclamped Inductive Test Circuit

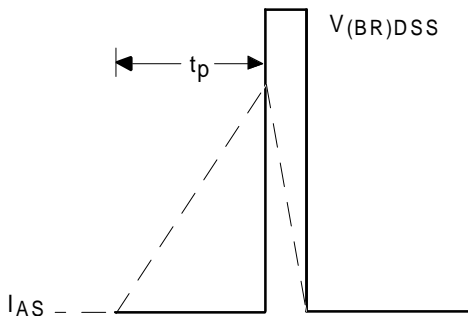**Fig 12c.** Maximum Avalanche Energy
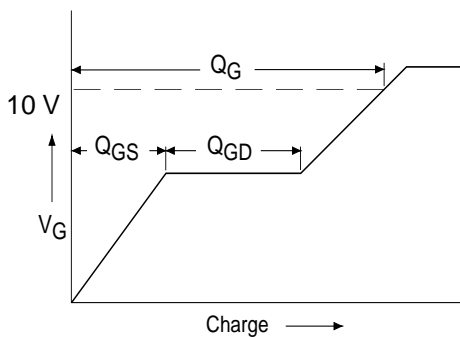Vs. Drain Current

Fig 12b. Unclamped Inductive Waveforms

Fig 13a. Basic Gate Charge Waveform
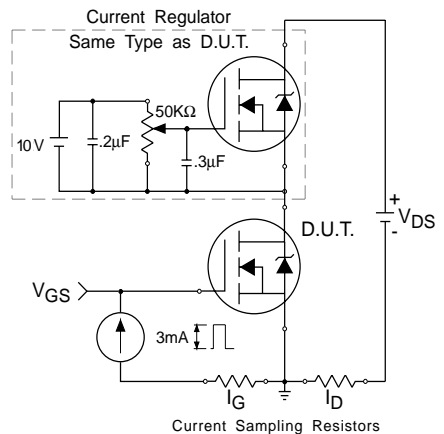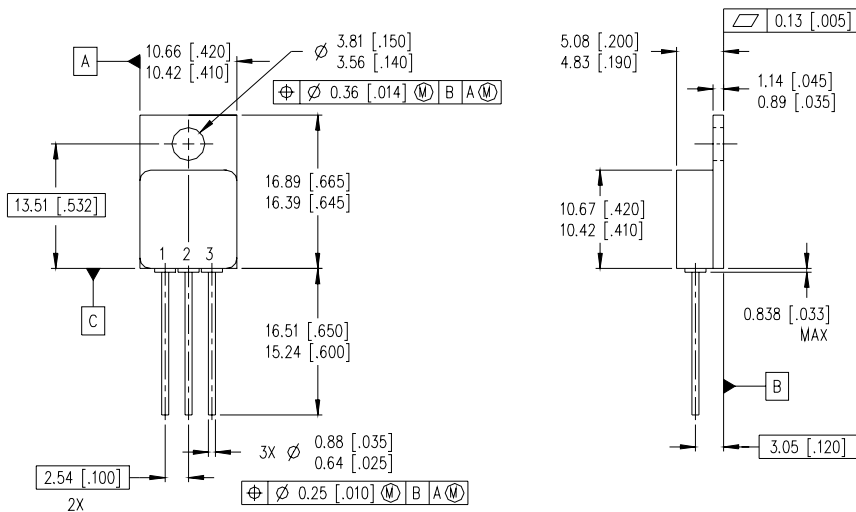

Fig 13b. Gate Charge Test Circuit

www.irf.com

Footnotes:

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

② V_{DD} = 50V, starting T_J = 25°C, L= 13mH
Peak I_L = 8.7A, V_{GS} = 10V

③ I_{SD} ≤ 8.7A, di/dt ≤ 120A/μs,
V_{DD} ≤ 400V, T_J ≤ 150°C

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

Case Outline and Dimensions — TO-257AA

NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE TO–257AA.

LEGEND
D – DRAIN
S – SOURCE
G – GATE

CERAMIC EYELETS

International **IƧR** Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903
Visit us at www.irf.com for sales contact information**.**
Data and specifications subject to change without notice. 04/01