

International IOR Rectifier HEXFET® POWER MOSFET

IRFY044CM

N-CHANNEL

60 Volt, 0.040Ω HEXFET

HEXFET 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.

Product Summary

Part Number	BVDSS	RDS(on)	ID
IRFY044CM	60V	0.040Ω	16A*

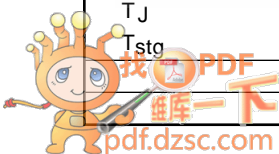
Features

- Hermetically sealed
- Electrically isolated
- Simple Drive Requirements
- Ease of Paralleling
- Ceramic eyelets

Absolute Maximum Ratings

	Parameter	IRFY044CM	Units	
	ID @ VGS=10V, TC = 25°C	16*	A	
	ID @ VGS=10V, TC = 100°C	16*		
	IDM	156		
	PD @ TC = 25°C	100	W	
		Linear Derating Factor	0.8	W/K③
	VGS	Gate-to-Source Voltage	±20	V
	EAS	Single Pulse Avalanche Energy ②	100	mJ
	IAR	Avalanche Current ①	16*	A
	EAR	Repetitive Avalanche Energy ①	10	mJ
	dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
	TJ	Operating Junction	-55 to 150	°C
	Tsto	Storage Temperature Range		
		Lead Temperature	300 (0.063 in (1.6mm) from case for 10 sec)	
		Weight	4.3(typical)	g

* I_D current limited by pin diameter




IRFY044CM Device

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

	Parameter	Min	Typ	Max	Units	Test Conditions
BVDSS	Drain-to-Source Breakdown Voltage	60	—	—	V	VGS = 0V, ID = 1.0mA
$\Delta BVDSS/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	—	0.68	—	V/°C	Reference to 25°C, ID = 1.0mA
RDS(on)	Static Drain-to-Source On-State Resistance	—	—	0.040	Ω	VGS = 10V, ID = 16A ④
		—	—	—		
VGS(th)	Gate Threshold Voltage	2.0	—	4.0	V	VDS = VGS, ID = 250μA
gfs	Forward Transconductance	17	—	—	S (r)	VDS ≥ 15V, IDS = 16A ④
IDSS	Zero Gate Voltage Drain Current	—	—	25	μA	VDS = 0.8 x max. rating, VGS = 0V
		—	—	250		VDS = 0.8 x max. rating VGS = 0V, Tj = 125°C
IGSS	Gate-to-Source Leakage Forward	—	—	100	nA	VGS = 20V
IGSS	Gate-to-Source Leakage Reverse	—	—	-100		VGS = -20V
Qg	Total Gate Charge	29	—	88	nC	VGS = 10V, ID = 16A
Qgs	Gate-to-Source Charge	6.7	—	15		VDS = Max. Rating x 0.5
Qgd	Gate-to-Drain ("Miller") Charge	18	—	52		see figures 6 and 13
td(on)	Turn-On Delay Time	—	—	23	ns	VDD = 30V, ID = 16A, RG = 9.1Ω VGS = 10V see figure 10
tr	Rise Time	—	—	130		
td(off)	Turn-Off Delay Time	—	—	81		
tf	Fall Time	—	—	79		
LD	Internal Drain Inductance	—	8.7	—		
LS	Internal Source Inductance	—	8.7	—		
Ciss	Input Capacitance	—	2400	—	pF	VGS = 0V, VDS = 25V f = 1.0MHz. see figure 5
Coss	Output Capacitance	—	1100	—		
Crss	Reverse Transfer Capacitance	—	230	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	—	—	16	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier. 
ISM	Pulse Source Current (Body Diode) ①	—	—	156		
VSD	Diode Forward Voltage	—	—	2.5	V	Tj = 25°C, IS = 16A, VGS = 0V ④
trr	Reverse Recovery Time	—	—	220	ns	Tj = 25°C, IF = 16A, di/dt ≤ 100 A/μs
QRR	Reverse Recovery Charge	—	—	1.6	μC	VDD ≤ 50 V ④
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	—	—	1.25	K/W ⑤	Typical socket mount Mounting surface flat, smooth
RthJA Junction-to-Ambient	—	—	80		
RthCS Case-to-Sink	—	0.21	—		

IRFY044CM Device

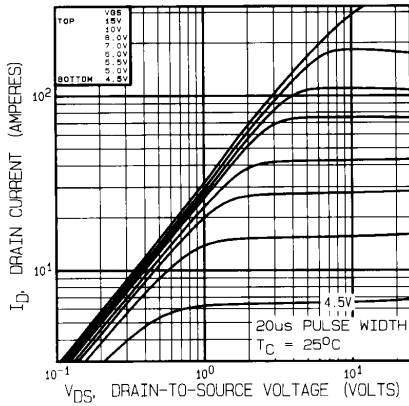


Fig. 1 — Typical Output Characteristics
 $T_C = 25^\circ\text{C}$

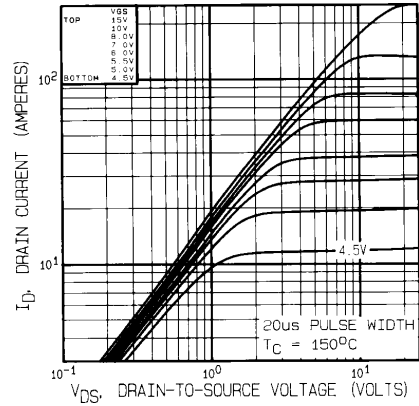


Fig. 2 — Typical Output Characteristics
 $T_C = 150^\circ\text{C}$

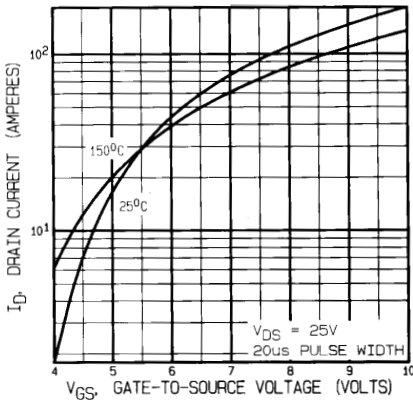


Fig. 3 — Typical Transfer Characteristics

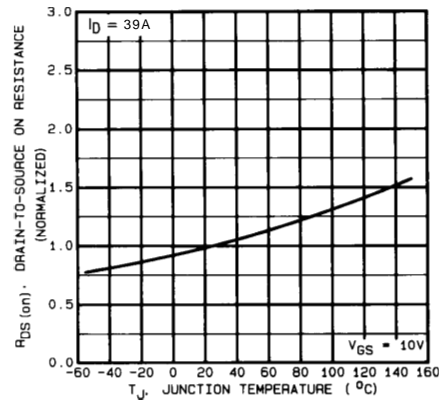


Fig. 4 — Normalized On-Resistance Vs. Temperature

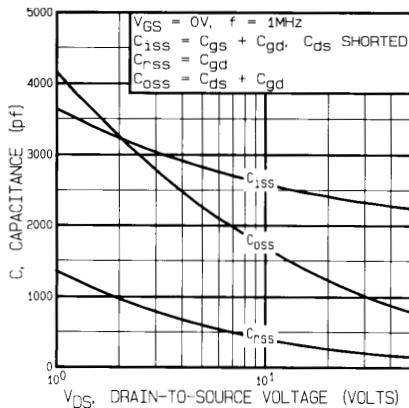


Fig. 5 — Typical Capacitance Vs. Drain-to-Source Voltage

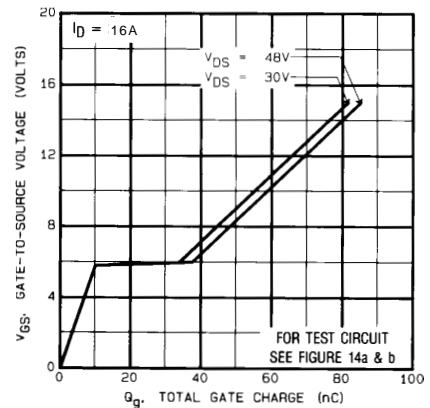


Fig. 6 — Typical Gate Charge Vs. Gate-to-Source Voltage

IRFY044CM Device

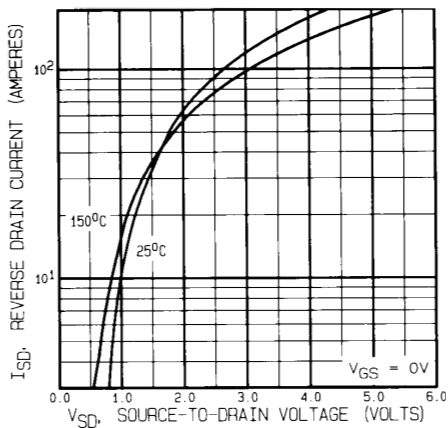


Fig. 7 — Typical Source-to-Drain Diode Forward Voltage

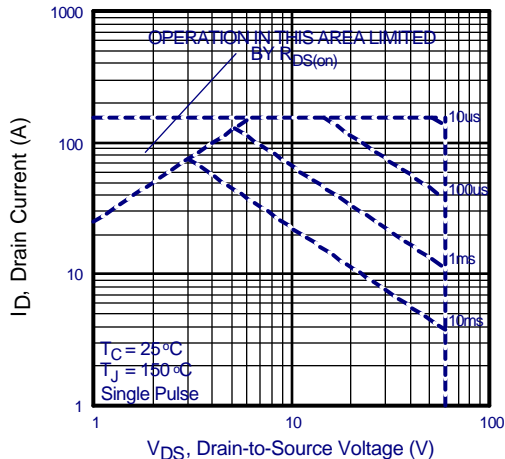


Fig. 8 — Maximum Safe Operating Area

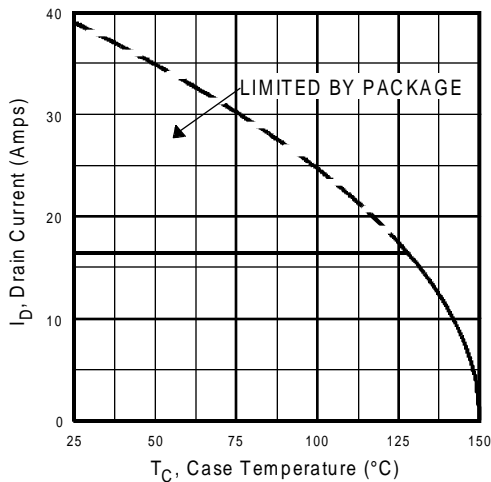


Fig. 9 — Maximum Drain Current Vs. Case Temperature

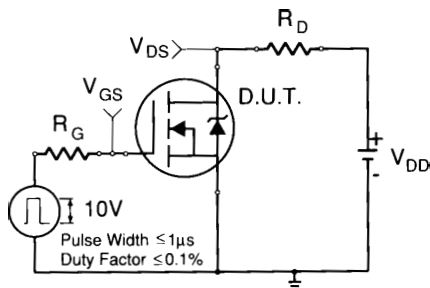


Fig. 10a — Switching Time Test Circuit

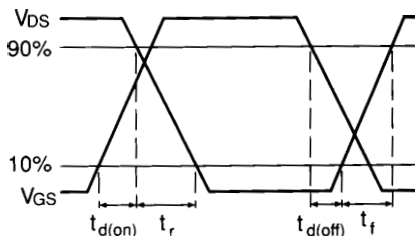


Fig. 10b — Switching Time Waveforms

IRFY044CM Device

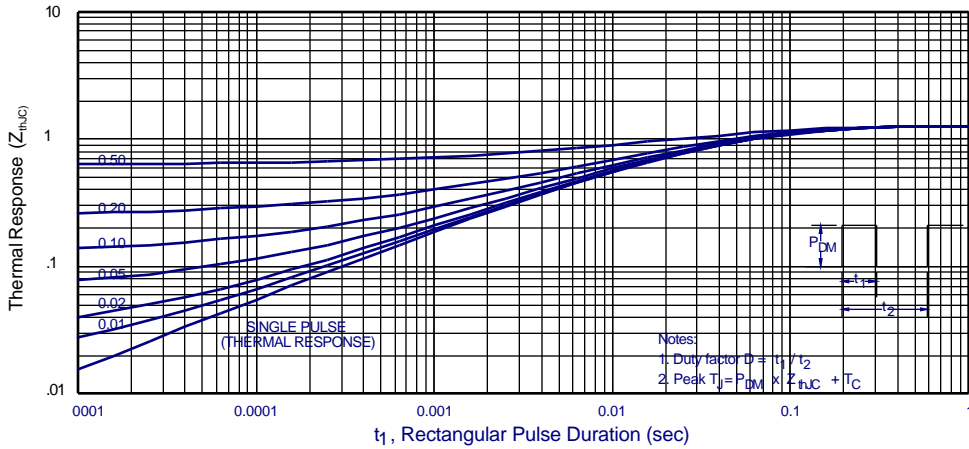


Fig. 11 — Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

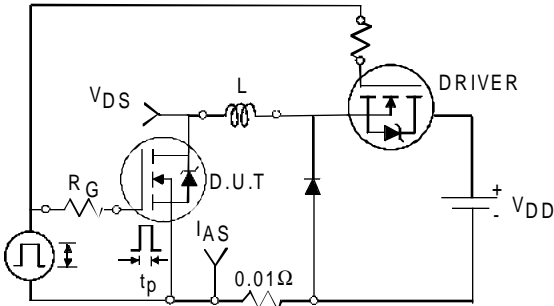


Fig. 12a — Unclamped Inductive Test Circuit

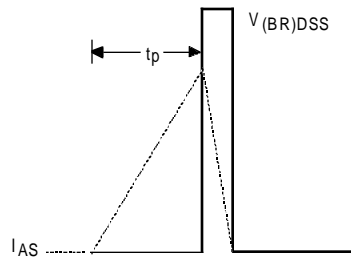


Fig. 12b — Unclamped Inductive Waveforms

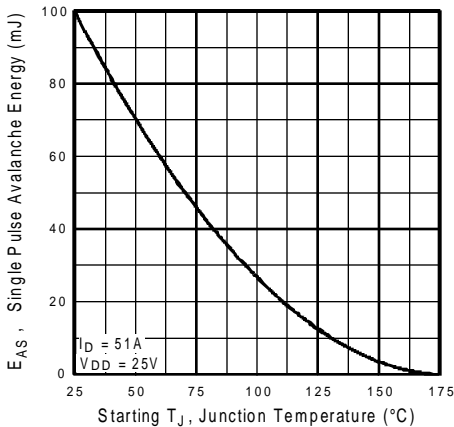


Fig. 12c — Max. Avalanche Energy vs. Current

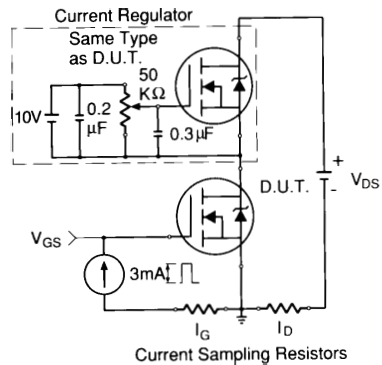


Fig. 13a — Gate Charge Test Circuit

IRFY044CM Device

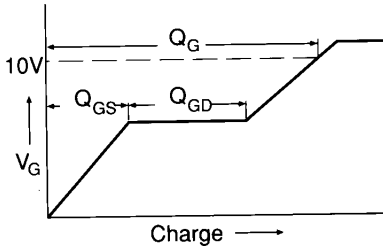


Fig. 13b — Basic Gate Charge Waveform

Notes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature (see figure 11).
- ② @ $V_{DD} = 25V$, Starting $T_J = 25^\circ C$,
 $EAS = [0.5 * L * (I_L^2) * [BV_{DSS}/(BV_{DSS}-V_{DD})]]$
 Peak $I_L = 16A$, $V_{GS} = 10V$, $25 \leq R_G \leq 200\Omega$
- ③ $I_{SD} \leq 16A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq BV_{DSS}$, $T_J \leq 150^\circ C$
- 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

Pin 1 - Drain
Pin 2 - Source
Pin 3 - Gate

TO-257AA

NON-STANDARD PIN CONFIGURATION

Pin 1 - Gate
Pin 2 - Drain
Pin 3 - Source

Order Part Type IRFY044C

NOTES:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982
2. Controlling dimension: Inch
3. Dimensions are shown in millimeters (Inches)
4. Outline conforms to JEDEC outline TO-257AA

CAUTION

BERYLLIA WARNING PER MIL-PRF-19500

Packages containing beryllia shall not be ground, sandblasted, machined or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce fumes containing beryllium.



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