

HEXFET® POWER MOSFET

IRFY430CM

N-CHANNEL

500 Volt, 1.5Ω 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	BV _{DSS}	R _{DS(on)}	I _D
IRFY430CM	500V	1.5Ω	4.5A

Features

- Hermetically Sealed
- Electrically Isolated
- Simple Drive Requirements
- Ease of Paralleling
- Ceramic Eyelets

Absolute Maximum Ratings

	Parameter	IRFY430CM	Units
I _D @ V _{GS} =10V, T _C = 25°C	Continuous Drain Current	4.5	A
I _D @ V _{GS} =10V, T _C = 100°C	Continuous Drain Current	2.8	
I _{DM}	Pulsed Drain Current ①	18	
P _D @ T _C = 25°C	Max. Power Dissipation	75	W
	Linear Derating Factor	0.6	W/K ⑤
V _{GS}	Gate-to-Source Voltage	±20	V
E _{AS}	Single Pulse Avalanche Energy ②	280	mJ
I _{AR}	Avalanche Current ①	4.5	A
E _{AR}	Repetitive Avalanche Energy ①	7.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.5	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 sec)	°C
	Weight	4.3 (typical)	g

IRFY430CM Device

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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	500	—	—	V	V _{GS} = 0V, I _D = 1.0mA
ΔBV _{DSS} /ΔT _J	—	0.78	—	V/°C	Reference to 25°C, I _D = 1.0mA
R _{DS(on)}	—	—	1.5	Ω	V _{GS} = 10V, I _D = 2.8A④
	—	—	1.8		V _{GS} = 10V, I _D = 4.5A
V _{GS(th)}	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	1.5	—	—	S (S)	V _{DS} ≥ 15V, I _{DS} = 2.8A ④
I _{DSS}	—	—	25	μA	V _{DS} = 0.8 × max. rating, V _{GS} = 0V
	—	—	250		V _{DS} = 0.8 × max. rating V _{GS} = 0V, T _J = 25°C
I _{GSS}	—	—	100	nA	V _{GS} = 20V
I _{GSS}	—	—	-100		V _{GS} = -20V
Q _g	19.8	—	29.5	nC	V _{GS} = 10V, I _D = 4.5A
Q _{gs}	2.2	—	4.6		V _{DS} = Max. Rating × 0.5
Q _{gd}	5.5	—	19.7		see figures 5 and 13
t _{d(on)}	—	—	35	ns	V _{DD} = 250V, I _D = 4.5A, R _G = 7.5, V _{GS} = 10V
t _r	—	—	30		
t _{d(off)}	—	—	55		
t _f	—	—	30		see figure 10
L _D	—	8.7	—	nH	Measured from the drain lead, 6mm (0.25 in.) from package to center of die. Modified MOSFET symbol showing the internal inductances.
L _S	—	8.7	—		Measured from the source lead, 6mm (0.25 in.) from package to source bonding pad.
C _{iss}	—	6.0	—	pF	V _{GS} = 0V, V _{DS} = 25V
C _{oss}	—	135	—		f = 1.0MHz.
C _{rss}	—	65	—		see figure 5

Source-Drain Diode Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	—	—	4.5	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier.
I _{SM}	—	—	18		
V _{SD}	—	—	1.4	V	T _J = 25°C, I _S = 4.5A, V _{GS} = 0V ④
t _{rr}	—	—	900	ns	T _J = 25°C, I _F = 4.5A, di/dt ≤ 100 A/μs
Q _{RR}	—	—	7.0	μC	V _{DD} ≤ 50V ④
t _{on}	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}	—	—	1.67		
R _{thJA}	—	—	80	K/W⑤	Typical socket mount
R _{thCS}	—	0.21	—		Mounting surface flat, smooth

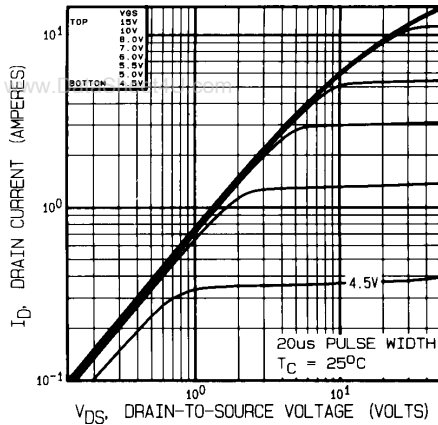


Fig. 1 — Typical Output Characteristics
 $T_C = 25^\circ\text{C}$

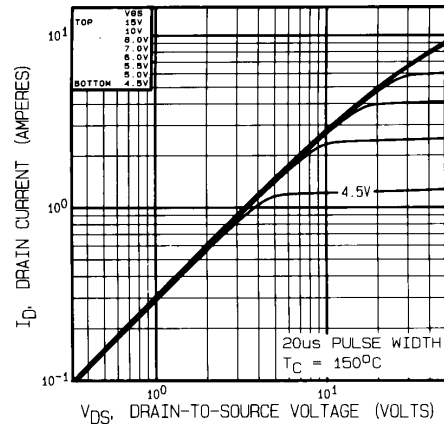


Fig. 2 — Typical Output Characteristics
 $T_C = 150^\circ\text{C}$

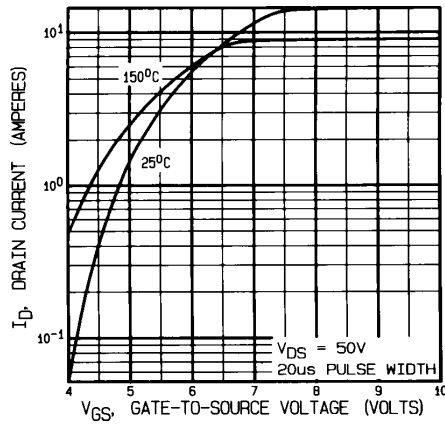


Fig. 3 — Typical Transfer Characteristics

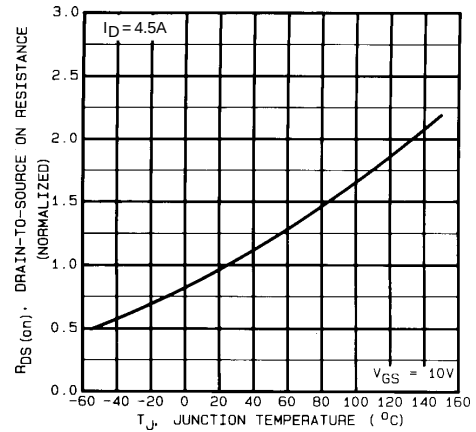


Fig. 4 — Normalized On-Resistance Vs. Temperature

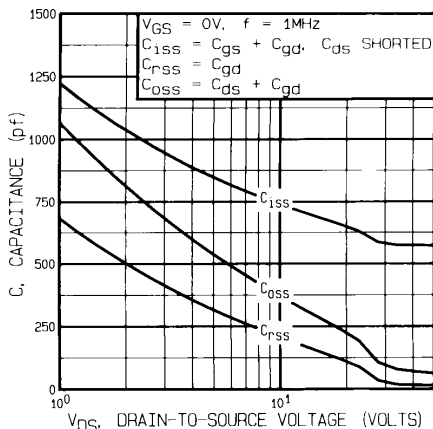


Fig. 5 — Typical Capacitance Vs. Drain-to-Source Voltage

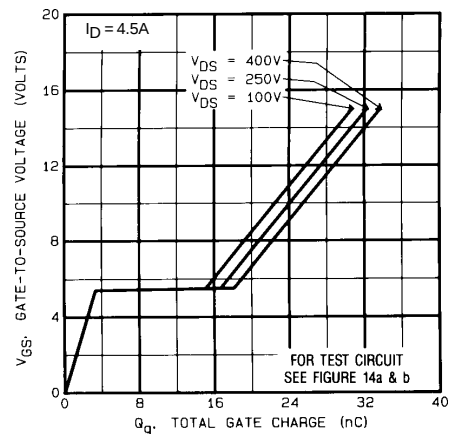
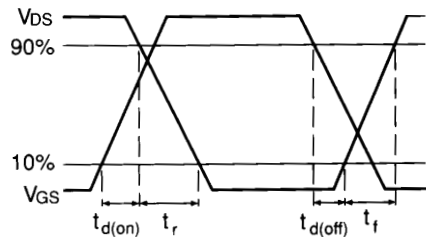
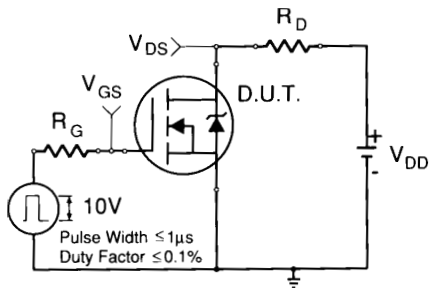
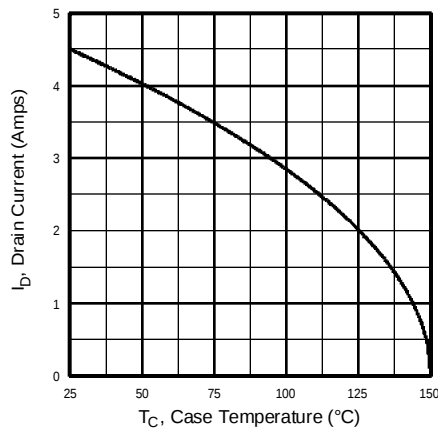
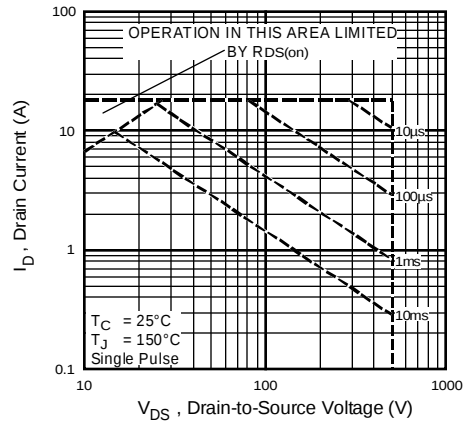
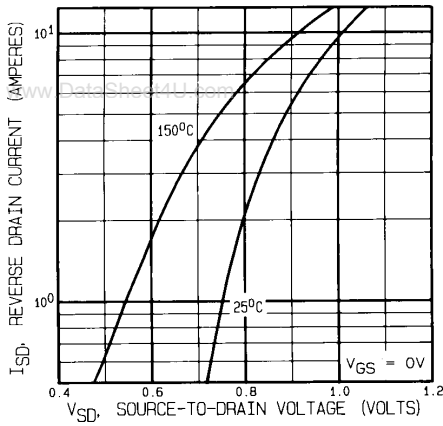


Fig. 6 — Typical Gate Charge Vs. Gate-to-Source Voltage

IRFY430CM Device





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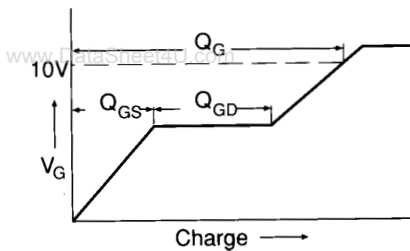
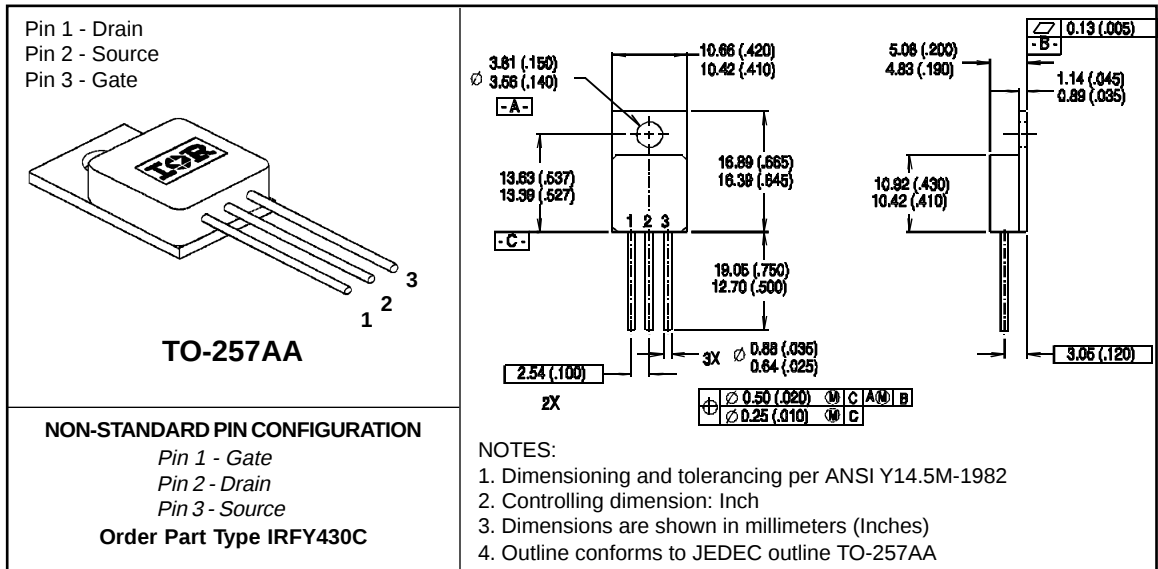


Fig. 13b — Basic Gate Charge Waveform

Notes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature (see figure 11).
- ② @ $V_{DD} = 50V$, Starting $T_J = 25^\circ C$,
 $E_{AS} = [0.5 * L * (I_L^2) * [BV_{DSS}/(BV_{DSS} - V_{DD})]]$
 Peak $I_L = 4.5A$, $V_{GS} = 10V$, $25 \leq R_G \leq 200\Omega$ (figure 12)
- ③ $I_{SD} \leq 4.5A$, $di/dt \leq 75A/\mu s$, $V_{DD} \leq BV_{DSS}$, $T_J \leq 150^\circ C$
- 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-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.

International
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Data and specifications subject to change without notice

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