

- Advanced Process Technology
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The TO-247 package is preferred for commercial-industrial applications where higher power levels preclude the use of TO-220 devices. The TO-247 is similar but superior to the earlier TO-218 package because of its isolated mounting

Absolute Maximum Ratings

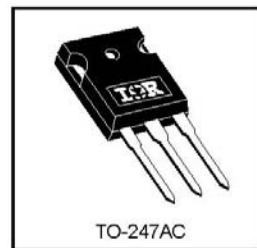
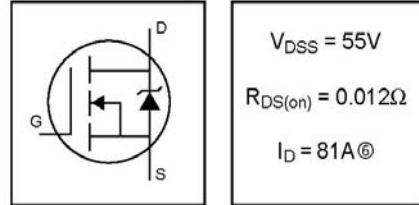
	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	81 ^⑥	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	57	
I_{DM}	Pulsed Drain Current ^{①⑤}	290	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	170	W
	Linear Derating Factor	1.1	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ^{②③}	360	mJ
I_{AR}	Avalanche Current ^①	43	A
E_{AR}	Repetitive Avalanche Energy ^①	17	mJ
dv/dt	Peak Diode Recovery dv/dt ^{③⑤}	5.0	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 srew	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	0.90	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	---	
$R_{\theta JA}$	Junction-to-Ambient	---	40	

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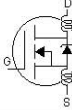
HEXFET[®] Power MOSFET



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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.06	—	$V/^\circ C$	Reference to $25^\circ C, I_D = 1mA$ ⑤
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.012	Ω	$V_{GS} = 10V, I_D = 43A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	30	—	—	S	$V_{DS} = 25V, I_D = 43A$ ⑤
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 55V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 44V, V_{GS} = 0V, T_J = 150^\circ C$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
Q_g	Total Gate Charge	—	—	130	nC	$I_D = 43A$
Q_{gs}	Gate-to-Source Charge	—	—	23		$V_{DS} = 44V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	53		$V_{GS} = 10V$, See Fig. 6 and 13 ④⑤
$t_{d(on)}$	Turn-On Delay Time	—	11	—	ns	$V_{DD} = 28V$
t_r	Rise Time	—	66	—		$I_D = 43A$
$t_{d(off)}$	Turn-Off Delay Time	—	40	—		$R_G = 3.6\Omega$
t_f	Fall Time	—	46	—		$R_D = 0.62\Omega$, See Fig. 10④⑤
L_D	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	13	—		
C_{iss}	Input Capacitance	—	2900	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	880	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	330	—		$f = 1.0MHz$, See Fig. 5③

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	81⑥	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	290		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ C, I_S = 43A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	81	120	ns	$T_J = 25^\circ C, I_F = 43A$
Q_{rr}	Reverse Recovery Charge	—	240	370	nC	$di/dt = 100A/\mu s$ ④⑤

Notes:

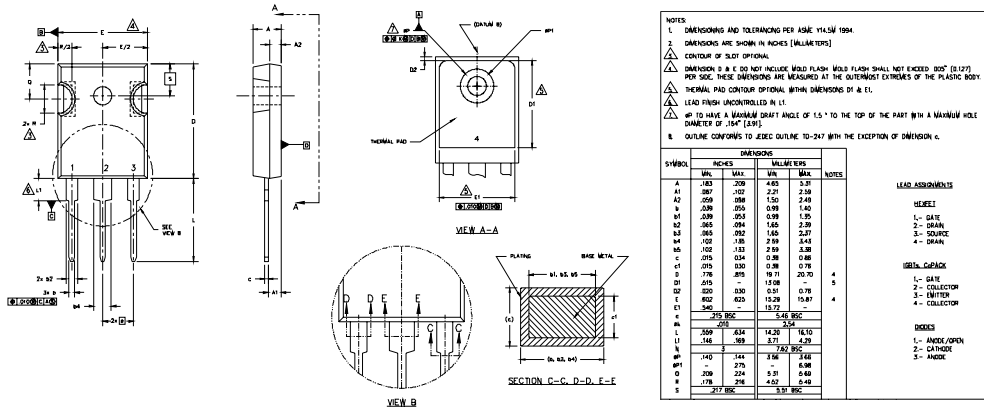
- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $V_{DD} = 25V$, starting $T_J = 25^\circ C$, $L = 390\mu H$
 $R_G = 25\Omega, I_{AS} = 43A$. (See Figure 12)
- ③ $I_{SD} \leq 43A, di/dt \leq 260A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 175^\circ C$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ Uses IRF1010N data and test conditions
- ⑥ Calculated continuous current based on maximum allowable junction temperature; for recommended current-handling of the package refer to Design Tip # 93-4

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TO-247AC Package Outline

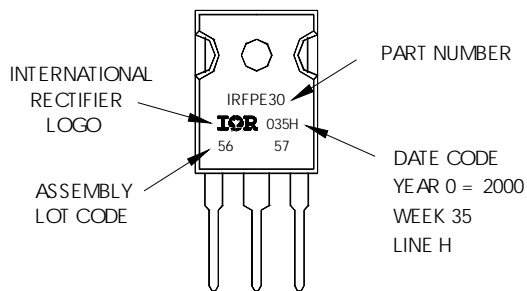
Dimensions are shown in millimeters (inches)



TO-247AC Part Marking Information

EXAMPLE: THIS IS AN IRFPE30
WITH ASSEMBLY
LOT CODE 5657
ASSEMBLED ON WW 35, 2000
IN THE ASSEMBLY LINE "H"

Note: "P" in assembly line position indicates "Lead-Free"



Data and specifications subject to change without notice.

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