

APENDICE C

Hojas técnicas del IRFP460

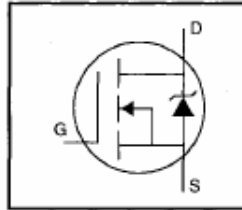
International Rectifier

PD-9.512B

IRFP460

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



$$V_{DS} = 500V$$

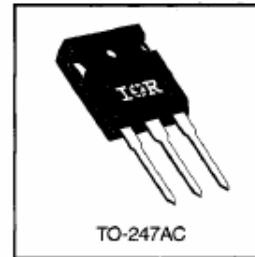
$$R_{DS(on)} = 0.27\Omega$$

$$I_D = 20A$$

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

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 hole. It also provides greater creepage distance between pins to meet the requirements of most safety specifications.



TO-247AC

DATA SHEETS

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{ V}$	20	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{ V}$	13	
I_{DM}	Pulsed Drain Current ①	80	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	280	W
	Linear Derating Factor	2.2	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	960	mJ
I_{AR}	Avalanche Current ①	20	A
E_{AR}	Repetitive Avalanche Energy ①	28	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.5	V/ns
T_J	Operating Junction and Storage Temperature Range	-55 to +150	
T_{STG}			
	Mounting Torque, 6-32 or M3 screw	10 lbf·in (1.1 N·m)	


Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	0.45	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	40	


IRFP460



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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	500	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.63	—	V/°C	Reference to $25^\circ\text{C}, I_D=1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.27	Ω	$V_{GS}=10V, I_D=12A$ ①
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	Forward Transconductance	13	—	—	S	$V_{DS}=50V, I_D=12A$ ①
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS}=500V, V_{GS}=0V$
		—	—	250		$V_{DS}=400V, V_{GS}=0V, T_J=125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{DS}=20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS}=-20V$
Q_g	Total Gate Charge	—	—	210	nC	$I_D=20A$
Q_{gs}	Gate-to-Source Charge	—	—	29		$V_{DS}=400V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	110		$V_{GS}=10V$ See Fig. 6 and 13 ②
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD}=250V$
t_r	Rise Time	—	59	—		$I_D=20A$
$t_{d(off)}$	Turn-Off Delay Time	—	110	—		$R_G=4.3\Omega$
t_f	Fall Time	—	58	—		$R_D=13\Omega$ See Figure 10 ③
L_D	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact 
L_S	Internal Source Inductance	—	13	—		
C_{iss}	Input Capacitance	—	4200	—	pF	$V_{DS}=0V$
C_{oss}	Output Capacitance	—	870	—		$V_{DS}=25V$
C_{rss}	Reverse Transfer Capacitance	—	350	—		$f=1.0MHz$ See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	20	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	80		
V_{SD}	Diode Forward Voltage	—	—	1.8	V	$T_J=25^\circ\text{C}, I_S=20A, V_{GS}=0V$ ③
t_{rr}	Reverse Recovery Time	—	570	860	ns	$T_J=25^\circ\text{C}, I_S=20A$
Q_{rr}	Reverse Recovery Charge	—	5.7	8.6	μC	$di/dt=100A/\mu s$ ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)
- ② $V_{DD}=50V$, starting $T_J=25^\circ\text{C}$, $L=4.3mH$, $R_G=25\Omega$, $I_{AS}=20A$ (See Figure 12)
- ③ $I_{SD}\leq 20A$, $di/dt\leq 160A/\mu s$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.