

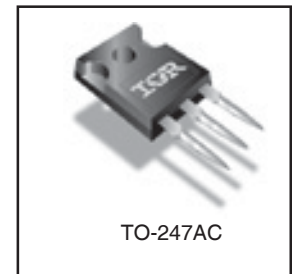
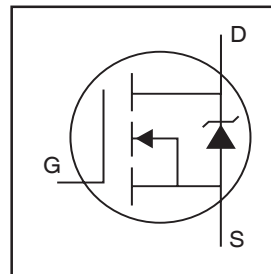
PDP MOSFET

# IRFP4232PbF

**Features**

- Advanced process technology
- Key parameters optimized for PDP Sustain & Energy Recovery applications
- Low  $E_{PULSE}$  rating to reduce the power dissipation in Sustain & ER applications
- Low  $Q_G$  for fast response
- High repetitive peak current capability for reliable operation
- Short fall & rise times for fast switching
- 175°C operating junction temperature for improved ruggedness
- Repetitive avalanche capability for robustness and reliability

Key Parameters		
$V_{DS}$ min	250	V
$V_{DS}$ (Avalanche) typ.	300	V
$R_{DS(ON)}$ typ. @ 10V	30	mΩ
$E_{PULSE}$ typ.	310	μJ
$I_{RP}$ max @ $T_C = 100^\circ\text{C}$	117	A
$T_J$ max	175	°C



**Description**

This HEXFET® Power MOSFET is specifically designed for Sustain; Energy Recovery & Pass switch applications in Plasma Display Panels. This MOSFET utilizes the latest processing techniques to achieve low on-resistance per silicon area and low  $E_{PULSE}$  rating. Additional features of this MOSFET are 175°C operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for PDP driving applications.

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{GS}$	Gate-to-Source Voltage	±20	V
$V_{GS}$ (TRANSIENT)	Gate-to-Source Voltage	±30	
$I_D$ @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	60	A
$I_D$ @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	42	
$I_{DM}$	Pulsed Drain Current ①	240	
$I_{RP}$ @ $T_C = 100^\circ\text{C}$	Repetitive Peak Current ⑤	117	
$P_D$ @ $T_C = 25^\circ\text{C}$	Power Dissipation	430	
$P_D$ @ $T_C = 100^\circ\text{C}$	Power Dissipation	210	
	Linear Derating Factor	2.9	W/°C
$T_J$	Operating Junction and Storage Temperature Range	-40 to + 175	°C
$T_{STG}$			
	Soldering Temperature for 10 seconds	300	
	Mounting Torque, 6-32 or M3 Screw	10lb·in (1.1N·m)	N

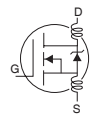
**Thermal Resistance**

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ④	—	0.35	°C/W

Notes ① through ⑤ are on page 8

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	250	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	180	—	mV/°C	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	30	35.7	mΩ	$V_{GS} = 10V, I_D = 42A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	3.0	—	5.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient	—	-15	—	mV/°C	
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	5.0	μA	$V_{DS} = 200V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 200V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
$g_{fs}$	Forward Transconductance	95	—	—	S	$V_{DS} = 25V, I_D = 42A$
$Q_g$	Total Gate Charge	—	160	240	nC	$V_{DD} = 125V, I_D = 42A, V_{GS} = 10V$ ③
$Q_{gd}$	Gate-to-Drain Charge	—	60	—		
$t_{d(on)}$	Turn-On Delay Time	—	37	—	ns	$V_{DD} = 125V, V_{GS} = 10V$ ③ $I_D = 42A$ $R_G = 5.0\Omega$ See Fig. 22
$t_r$	Rise Time	—	100	—		
$t_{d(off)}$	Turn-Off Delay Time	—	64	—		
$t_f$	Fall Time	—	63	—		
$t_{st}$	Shoot Through Blocking Time	100	—	—	ns	$V_{DD} = 200V, V_{GS} = 15V, R_G = 4.7\Omega$
$E_{PULSE}$	Energy per Pulse	—	310	—	μJ	$L = 220nH, C = 0.4\mu F, V_{GS} = 15V$ $V_{DS} = 200V, R_G = 4.7\Omega, T_J = 25^\circ\text{C}$
		—	950	—		$L = 220nH, C = 0.4\mu F, V_{GS} = 15V$ $V_{DS} = 200V, R_G = 4.7\Omega, T_J = 100^\circ\text{C}$
$C_{iss}$	Input Capacitance	—	7290	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0MHz,$ See Fig.5 $V_{GS} = 0V, V_{DS} = 0V$ to 200V
$C_{oss}$	Output Capacitance	—	610	—		
$C_{rss}$	Reverse Transfer Capacitance	—	240	—		
$C_{oss\ eff.}$	Effective Output Capacitance	—	420	—		
$L_D$	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
$L_S$	Internal Source Inductance	—	13	—		

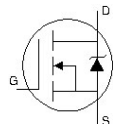


## Avalanche Characteristics

	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy ②	—	220	mJ
$E_{AR}$	Repetitive Avalanche Energy ①	—	43	mJ
$V_{DS(Avalanche)}$	Repetitive Avalanche Voltage ①	300	—	V
$I_{AS}$	Avalanche Current ②	—	42	A

## Diode Characteristics

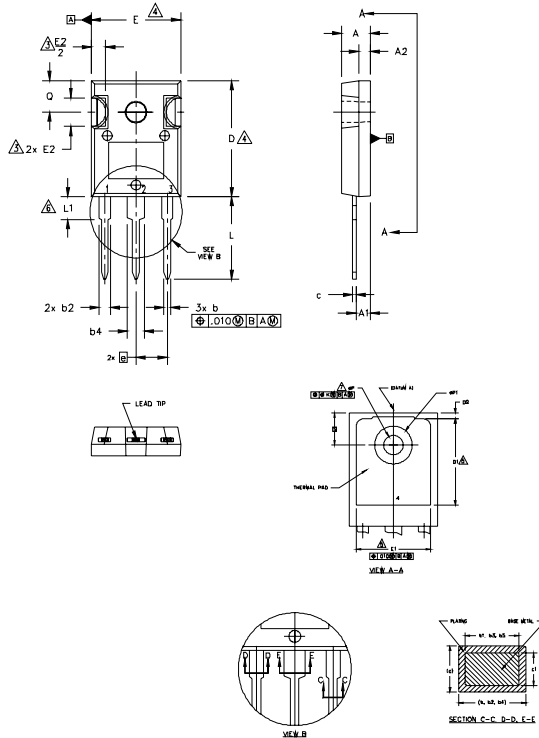
	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S @ T_C = 25^\circ\text{C}$	Continuous Source Current (Body Diode)	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	240		
$V_{SD}$	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 42A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	—	240	360	ns	$T_J = 25^\circ\text{C}, I_F = 42A, V_{DD} = 50V$
$Q_{rr}$	Reverse Recovery Charge	—	1230	1850	nC	$di/dt = 100A/\mu s$ ③



# IRFP4232PbF

## TO-247AC Package Outline

Dimensions are shown in millimeters (inches)



- NOTES:
1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
  2. DIMENSIONS ARE SHOWN IN INCHES.
  3. CONTOUR OF SLOT OPTIONAL.
  4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
  5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
  6. LEAD FINISH UNCONTROLLED IN L1.
  7. ØP TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5 ° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154 INCH.
  8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247AC.

SYMBOL	DIMENSIONS				NOTES
	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	.183	.209	4.65	5.31	
A1	.087	.102	2.21	2.59	
A2	.059	.098	1.50	2.49	
b	.039	.065	0.99	1.40	
b1	.039	.053	0.99	1.35	
b2	.065	.094	1.65	2.39	
b5	.065	.092	1.65	2.34	
b4	.102	.135	2.59	3.43	
b5	.102	.133	2.59	3.38	
c	.015	.035	0.38	0.89	
c1	.015	.033	0.38	0.84	
D	.776	.815	19.71	20.70	4
D1	.515	-	13.08	-	5
D2	.020	.053	0.51	1.35	
E	.602	.625	15.29	15.87	4
E1	.530	-	13.46	-	
E2	.178	.216	4.52	5.49	
e	.215 BSC		5.46 BSC		
Øk	.010		0.25		
L	.559	.634	14.20	16.10	
L1	.146	.169	3.71	4.29	
ØP	.140	.144	3.56	3.66	
ØP1	-	.291	-	7.39	
Q	.209	.224	5.31	5.69	
S	.217 BSC		5.51 BSC		

**LEAD ASSIGNMENTS**

**HEXFLET**

- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

**IGBTs, CoPACK**

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

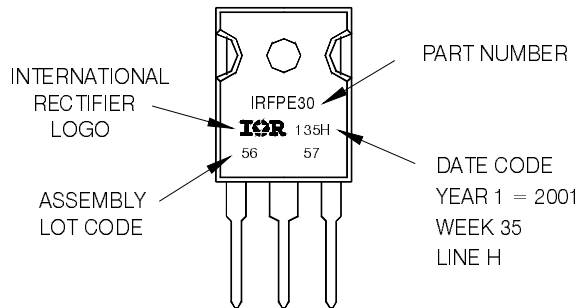
**DIODES**

- 1.- ANODE/OPEN
- 2.- CATHODE
- 3.- ANODE

## TO-247AC Part Marking Information

EXAMPLE: THIS IS AN IRFPE30  
WITH ASSEMBLY  
LOT CODE 5657  
ASSEMBLED ON WW 35, 2001  
IN THE ASSEMBLY LINE "H"

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



### TO-247AC package is not recommended for Surface Mount Application.

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.25\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 42\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④  $R_\theta$  is measured at  $T_J$  of approximately  $90^\circ\text{C}$ .
- ⑤ Half sine wave with duty cycle = 0.25,  $t_{on} = 1\mu\text{sec}$ .

Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

Data and specifications subject to change without notice.  
This product has been designed for the Consumer market.  
Qualification Standards can be found on IR's Web site.