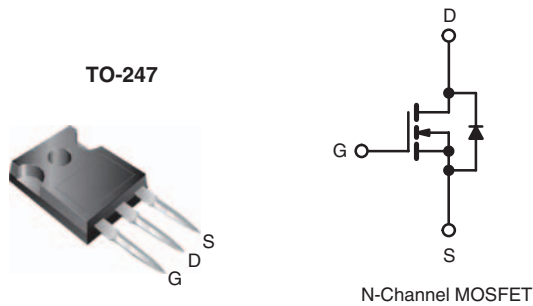


## Power MOSFET

PRODUCT SUMMARY	
$V_{DS}$ (V)	200
$R_{DS(on)}$ ( $\Omega$ )	$V_{GS} = 10\text{ V}$ 0.085
$Q_g$ (Max.) (nC)	140
$Q_{gs}$ (nC)	28
$Q_{gd}$ (nC)	74
Configuration	Single



### FEATURES

- Dynamic  $dV/dt$  Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Lead (Pb)-free Available



Available

**RoHS\***  
COMPLIANT

### DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 package is universally 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.

ORDERING INFORMATION	
Package	TO-247
Lead (Pb)-free	IRFP250PbF SiHFP250-E3
SnPb	IRFP250 SiHFP250

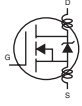
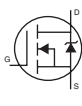
ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current	$V_{GS}$ at 10 V	$T_C = 25\text{ }^\circ\text{C}$	30
		$T_C = 100\text{ }^\circ\text{C}$	19
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	120	A
Linear Derating Factor		1.5	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>b</sup>	$E_{AS}$	410	mJ
Repetitive Avalanche Current <sup>a</sup>	$I_{AR}$	30	A
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	19	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	$P_D$	190
Peak Diode Recovery $dV/dt^c$		$dV/dt$	5.0
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)	for 10 s		300 <sup>d</sup>
Mounting Torque	6-32 or M3 screw		10
			1.1

#### Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 50\text{ V}$ , starting  $T_J = 25\text{ }^\circ\text{C}$ ,  $L = 683\text{ }\mu\text{H}$ ,  $R_G = 25\text{ }\Omega$ ,  $I_{AS} = 30\text{ A}$  (see fig. 12).
- $I_{SD} \leq 30\text{ A}$ ,  $dI/dt \leq 190\text{ A}/\mu\text{s}$ ,  $V_{DD} \leq V_{DS}$ ,  $T_J \leq 150\text{ }^\circ\text{C}$ .
- 1.6 mm from case.

\* Pb containing terminations are not RoHS compliant, exemptions may apply

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	$R_{thJA}$	-	40	°C/W
Case-to-Sink, Flat, Greased Surface	$R_{thCS}$	0.24	-	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	-	0.65	

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		200	-	-	V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^\circ\text{C}$ , $I_D = 1\text{ mA}$		-	0.27	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2.0	-	4.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20\text{ V}$		-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}$		-	-	25	$\mu\text{A}$
		$V_{DS} = 160\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$		-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 18\text{ A}^b$	-	-	0.085	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 50\text{ V}, I_D = 18\text{ A}$		12	-	-	S
<b>Dynamic</b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1.0\text{ MHz}$ , see fig. 5		-	2800	-	pF
Output Capacitance	$C_{oss}$			-	780	-	
Reverse Transfer Capacitance	$C_{rss}$			-	250	-	
Total Gate Charge	$Q_g$	$V_{GS} = 10\text{ V}$	$I_D = 30\text{ A}, V_{DS} = 160\text{ V}$ , see fig. 6 and 13 <sup>b</sup>	-	-	140	nC
Gate-Source Charge	$Q_{gs}$			-	-	28	
Gate-Drain Charge	$Q_{gd}$			-	-	74	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100\text{ V}, I_D = 30\text{ A}, R_G = 6.2\text{ }\Omega, R_D = 3.2\text{ }\Omega$ , see fig. 10 <sup>b</sup>		-	16	-	ns
Rise Time	$t_r$			-	86	-	
Turn-Off Delay Time	$t_{d(off)}$			-	70	-	
Fall Time	$t_f$			-	62	-	
Internal Drain Inductance	$L_D$	Between lead, 6 mm (0.25") from package and center of die contact 		-	5.0	-	nH
Internal Source Inductance	$L_S$			-	13	-	
<b>Drain-Source Body Diode Characteristics</b>							
Continuous Source-Drain Diode Current	$I_S$	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	30	A
Pulsed Diode Forward Current <sup>a</sup>	$I_{SM}$			-	-	120	
Body Diode Voltage	$V_{SD}$	$T_J = 25\text{ }^\circ\text{C}, I_S = 30\text{ A}, V_{GS} = 0\text{ V}^b$		-	-	2.0	V
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}, I_F = 30\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$		-	360	540	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			-	4.6	6.9	$\mu\text{C}$
Forward Turn-On Time	$t_{on}$	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S$ and $L_D$ )					

**Notes**

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- b. Pulse width  $\leq 300\text{ }\mu\text{s}$ ; duty cycle  $\leq 2\%$ .