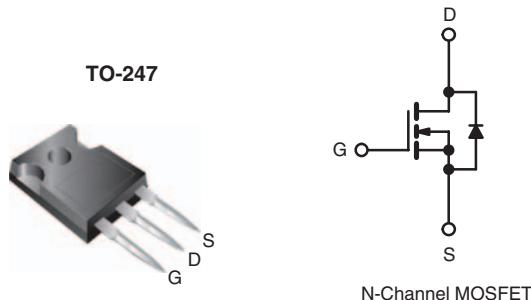


Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	200	
$R_{DS(on)}$ (Ω)	$V_{GS} = 10$ 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 Parallelizing
- Simple Drive Requirements
- Lead (Pb)-free 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 $T_C = 25$ °C, unless otherwise noted

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	30	A
		19	
Pulsed Drain Current ^a	I_{DM}	120	
Linear Derating Factor		1.5	W/°C
Single Pulse Avalanche Energy ^b	E_{AS}	410	mJ
Repetitive Avalanche Current ^a	I_{AR}	30	A
Repetitive Avalanche Energy ^a	E_{AR}	19	mJ
Maximum Power Dissipation	P_D	190	W
Peak Diode Recovery dV/dt ^c	dV/dt	5.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d	
Mounting Torque	6-32 or M3 screw	10	lbf · in
		1.1	N · m

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. $V_{DD} = 50$ V, starting $T_J = 25$ °C, $L = 683$ μ H, $R_G = 25$ Ω , $I_{AS} = 30$ A (see fig. 12).

c. $I_{SD} \leq 30$ A, $dI/dt \leq 190$ A/ μ s, $V_{DD} \leq V_{DS}$, $T_J \leq 150$ °C.

d. 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	$^{\circ}\text{C}/\text{W}$
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.24	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.65	

SPECIFICATIONS $T_J = 25^{\circ}\text{C}$, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$	$I_D = 250 \mu\text{A}$	200	-	-	V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25°C , $I_D = 1 \text{ mA}$		-	0.27	-	$^{\circ}\text{C}/\text{V}$	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$		2.0	-	4.0	V	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20 \text{ V}$		-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 200 \text{ V}$, $V_{GS} = 0 \text{ V}$		-	-	25	μA	
		$V_{DS} = 160 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^{\circ}\text{C}$		-	-	250		
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$	$I_D = 18 \text{ A}^b$	-	-	0.085	Ω	
Forward Transconductance	g_{fs}	$V_{DS} = 50 \text{ V}$, $I_D = 18 \text{ A}$		12	-	-	S	
Dynamic								
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 ^b	-	-	140	nC	
Gate-Source Charge	Q_{gs}			-	-	28		
Gate-Drain Charge	Q_{gd}			-	-	74		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100 \text{ V}$, $I_D = 30 \text{ A}$, $R_G = 6.2 \Omega$, $R_D = 3.2 \Omega$, see fig. 10 ^b		-	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	-		
Drain-Source Body Diode Characteristics								
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	30	A	
Pulsed Diode Forward Current ^a	I_{SM}			-	-	120		
Body Diode Voltage	V_{SD}	$T_J = 25^{\circ}\text{C}$, $I_S = 30 \text{ A}$, $V_{GS} = 0 \text{ V}^b$		-	-	2.0	V	
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}$, $I_F = 30 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$	-	360	540	ns		
Body Diode Reverse Recovery Charge	Q_{rr}		-	4.6	6.9	μC		
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 $\leq 300 \mu\text{s}$; duty cycle $\leq 2\%$.