

Silicon N-Channel Power MOSFE

Description

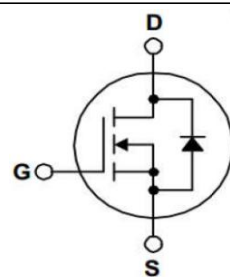
The IRFP150NPBF uses advanced technology and design to provide excellent $R_{DS(ON)}$. It can be used in a wide variety of applications.

General Features

- ① $V_{DS}=100V$, $R_{dson}<36m\Omega$ @ $V_{GS}=10V$, $I_D=50A$ (Typ:27m Ω)
- ② Fast switching
- ③ 100% avalanche tested
- ④ Improved dv/dt capability

Application

- ① Fast Switching
- ② Extended Safe Operating Area
- ③ Low $R_{DS(ON)}$
- ④ Ease of Paralleling
- ⑤ Planner construction



Schematic diagram



TO-247

Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
IRFP150NPBF	TO-247	IRFP150NPBF	Tube

ABSOLUTE RATINGS (at $T_C = 25^{\circ}C$, unless otherwise specified)

Symbol	Parameter	Value	Units
		TO-247	
V_{DSS}	Drain-to-Source Breakdown Voltage	100	V
I_D	Drain Current (continuous) at $T_C=25^{\circ}C$	50	A
	Drain Current (continuous) at $T_C=100^{\circ}C$	30	
I_{DM}	Drain Current (pulsed) at $V_{GS}=10V$	125	A
V_{GS}	Gate to Source Voltage	± 25	V
E_{as}	Single Pulse Avalanche Energy	600	mJ
P_D	Power Dissipation	13	W
T_J	Operating Junction	175	$^{\circ}C$
T_{stg}	Storage Temperature Range	-55 to 175	$^{\circ}C$

Thermal Resistance

Symbol	Parameter	Value	Units
		TO-247	
R_{thJC}	Thermal Resistance, Junction-to-Case	1.20	$^{\circ}\text{C}/\text{W}$
R_{thJA}	Thermal Resistance, Junction-to-Ambient	50.0	

Electrical Characteristics (at $T_c = 25^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
OFF Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	100	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V, T _J = 25°C	--	--	2.0	μA
I _{GSS}	Gate-Source Leakage	V _{GS} = +25V, V _{DS} =0V	--	--	100	nA
		V _{GS} =-25V, V _{DS} =0V	--	--	-100	
ON Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	--	4.0	V
R _{DS(on)}	Drain-Source On-Resistance (Note3)	V _{GS} = 10V, I _D = 25A	--	27	36	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} = 25V, f = 1.0MHz	--	2120	--	pF
C _{oss}	Output Capacitance		--	420	--	
C _{rss}	Reverse Transfer Capacitance		--	110	--	
Q _g	Total Gate Charge	V _{DS} =80V, I _D = 25A, V _{GS} = 10V	--	48	--	nC
Q _{gs}	Gate-Source Charge		--	13.5	--	
Q _{gd}	Gate-Drain Charge		--	17.5	--	
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} = 50V, I _D =25A, V _{GS} = 10V R _G = 5.1 Ω	--	15	--	ns
t _r	Turn-on Rise Time		--	46	--	
t _{d(off)}	Turn-off Delay Time		--	38	--	
t _f	Turn-off Fall Time		--	36	--	



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Source-Drain Diode Characteristics						
I_{SD}	S-D Current(Body Diode)	$T_C = 25\text{ }^{\circ}\text{C}$	--	50	--	A
I_{SDM}	Pulsed S-D Current(Body Diode)		--	125	--	
V_{SD}	Diode Forward Voltage	$T_J = 25^{\circ}\text{C}, I_{SD} = 20\text{A}, V_{GS} = 0\text{V}$	--	0.86	1.2	V
t_{rr}	Reverse Recovery Time	$T_J = 25^{\circ}\text{C}, I_S = 25\text{A},$ $d_{IF}/d_t = 100\text{A}/\mu\text{s}$	--	63	--	ns
Q_{rr}	Reverse Recovery Charge		--	148	--	μC

Notes

Note1: Repetitive Rating: Pulse width limited by maximum junction temperature

Note2: $I_{AS} = 30\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\text{ }\Omega$, Starting $T_J = 25^{\circ}\text{C}$

Note3: Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

Characteristics Curves

Figure 1. Typical Output Characteristics

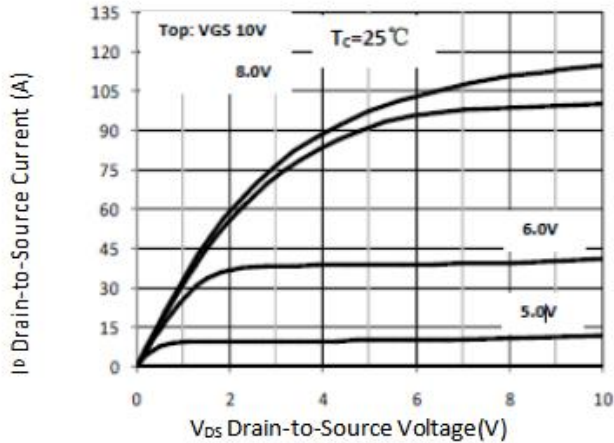


Figure 2. Typical Transfer Characteristics

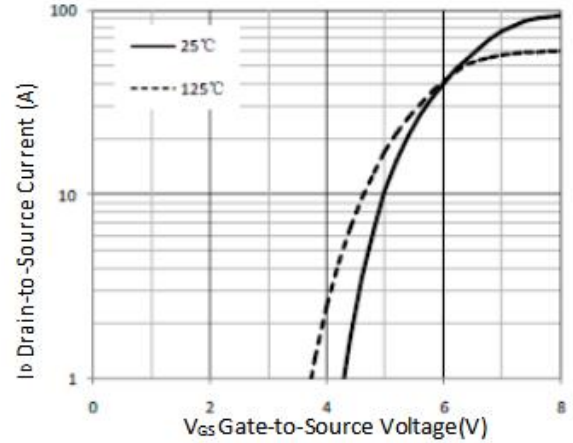


Figure 3. Normalized On-Resistance Vs Temperature

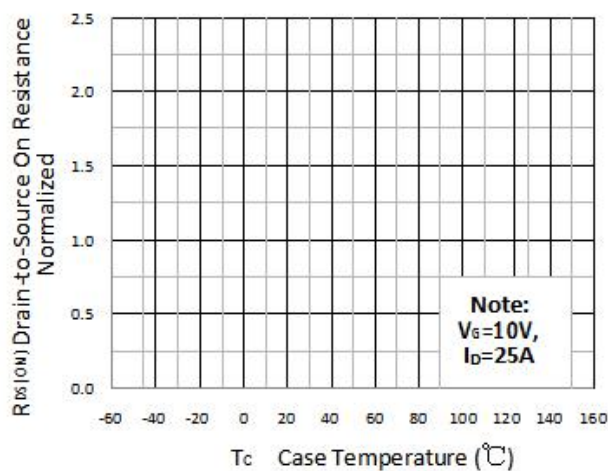


Figure 4. On-Resistance Vs Drain Current

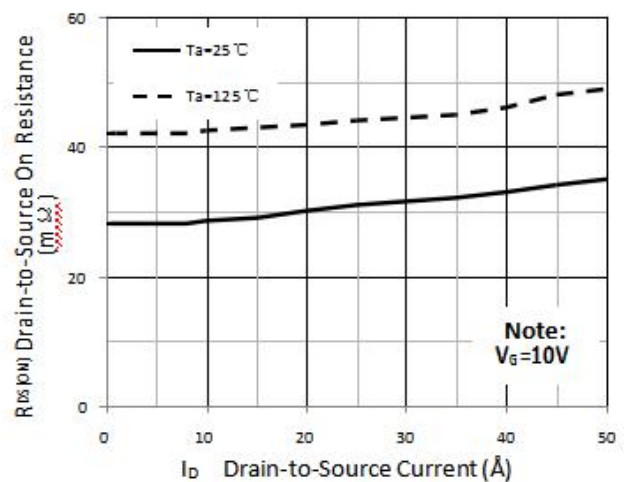


Figure 5. Typical Capacitance Vs Drain-Source Voltage

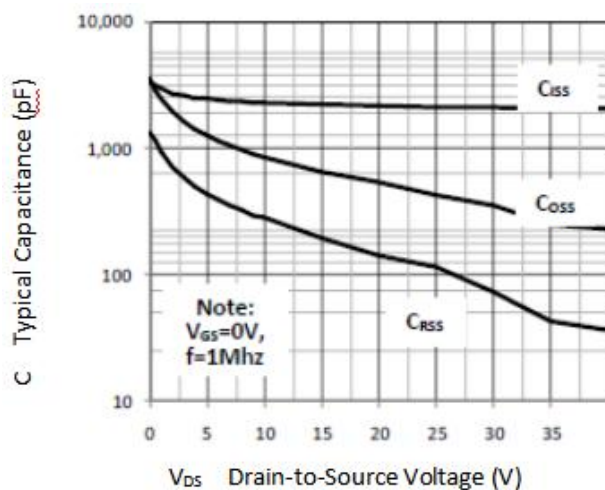


Figure 6. Typical Gate Charge Vs Gate-Source Voltage

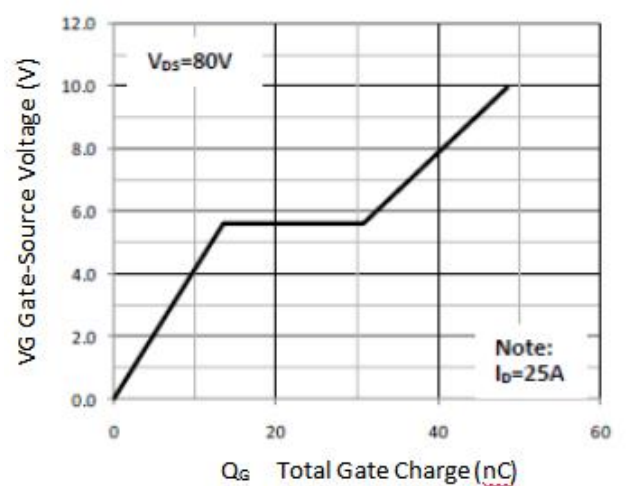


Figure 7. Typical Source-Drain Diode Forward Voltage

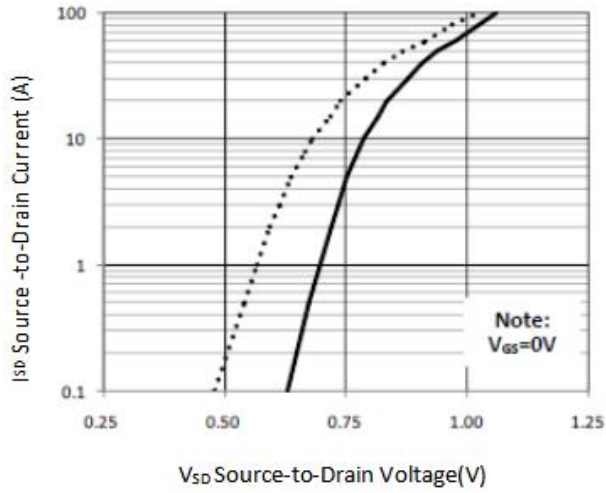


Figure 8. Maximum Safe Operating Area

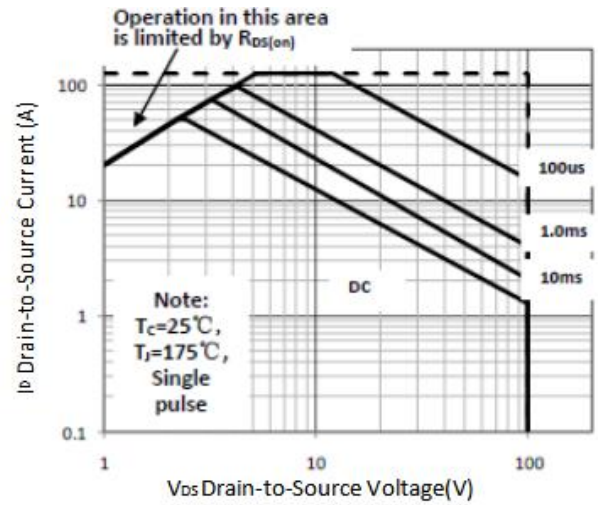


Figure 9. Maximum Drain Current Vs Temperature

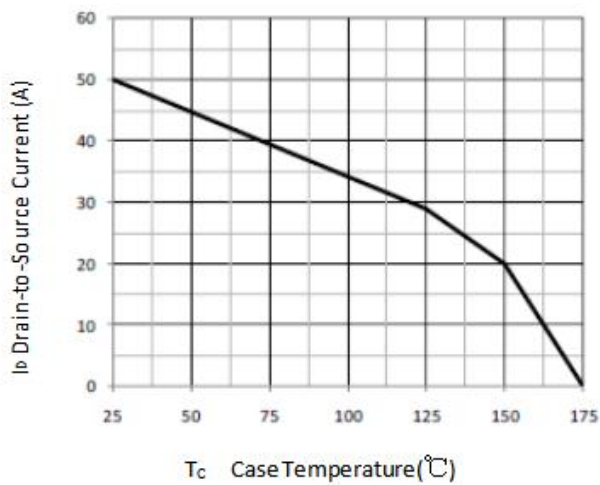
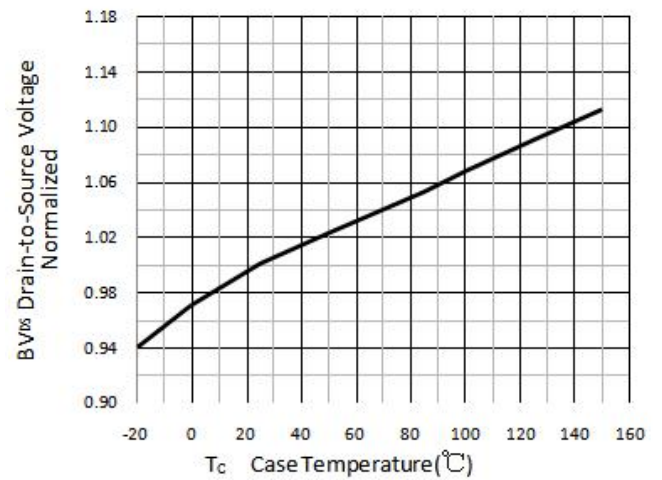


Figure 10. Normalized Drain-Source Voltage Vs Temperature



Test Circuit and Waveform

Figure 11a. Switching Time Test Circuit

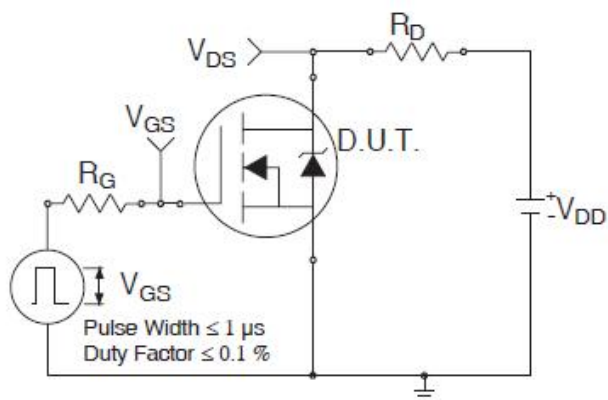


Figure 11b. Switching Time Waveforms

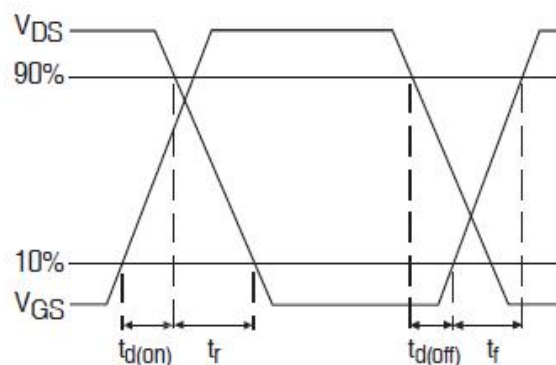


Figure 12a. Gate Charge Test Circuit

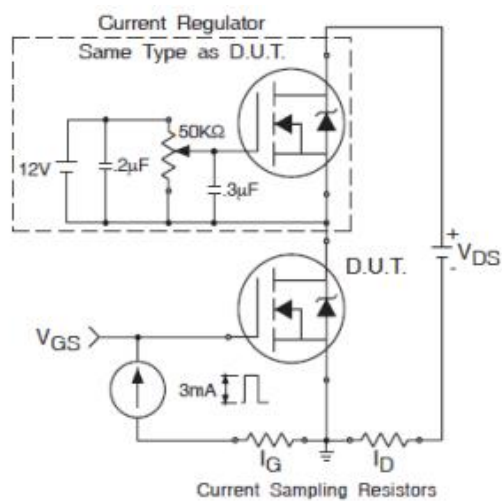
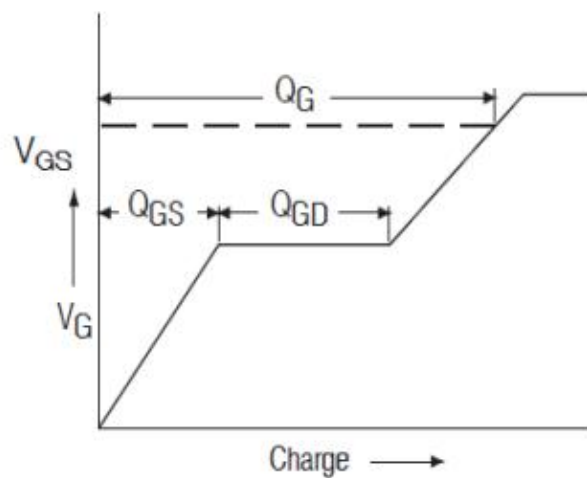
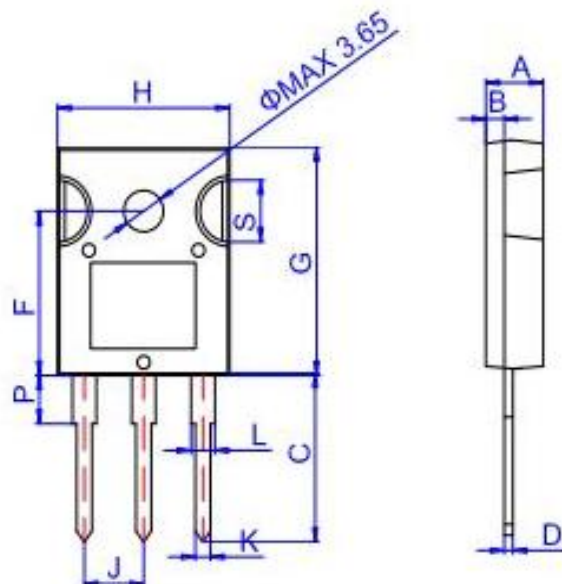


Figure 12b. Basic Gate Charge Waveforms



Package Information



Symbol	Values(mm)	
	MIN	MAX
A	4.9	5.4
B	1.6	2.0
C	14.35	15.4
D	0.5	0.8
F	14.4	15.1
G	19.7	20.6
H	15.4	16.2
J	5.3	5.6
K	1.3	1.5
L	2.8	3.3
ϕp	3.7	4.2
S	5.35	5.65

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NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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