

-200V P-Channel MOSFET

Description

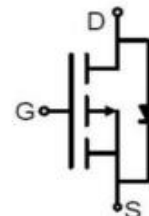
IRF9640PBF, the silicon P-channel Enhanced MOSFETs, is obtained by advanced MOSFET technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor is suitable device for SMPS, high speed switching and general purpose applications.

General Features

- ① Fast switching
- ② 100% avalanche tested
- ③ Improved dv/dt capability

Application

- ① Switch Mode Power Supply (SMPS)
- ② Uninterruptible Power Supply (UPS)
- ③ Power Factor Correction (PFC)



Schematic diagram



TO-220

Package Marking And Ordering Information

Ordering Codes	Package	Product Code	Packing
IRF9640PBF	TO-220	IRF9640PBF	Tube

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage ($V_{GS} = 0V$)	-200	V
I_D	Continuous Drain Current	-11	A
I_{DM}	Pulsed Drain Current(note1)	-44	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy(note2)	165	mJ
I_{AS}	Avalanche Current(note1)	-11	A
P_D	Power Dissipation ($T_C = 25^{\circ}\text{C}$)	78	mJ
	Linear Derating Factor	0.6	W/ $^{\circ}\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55~+150	$^{\circ}\text{C}$

Thermal characteristics

Symbol	Parameter	Value	Units
R_{thJC}	Thermal Resistance, Junction-to-Case	1.6	K/W
R_{thJA}	Thermal Resistance, Junction-to-Ambient	50	

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

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	-200	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -200V, V _{GS} = 0V, T _J = 25°C	--	--	5	μA
I _{GSS}	Gate-Source Leakage	V _{GS} = ±20V	--	--	±120	nA
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-2	--	-4	V
R _{DS(on)}	Drain-Source On-Resistance (Note3)	V _{GS} = -10V, I _D = -6.6A	--	0.34	0.42	Ω
Dynamic						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} =-25V, f = 1.0MHz	--	1200	---	pF
C _{oss}	Output Capacitance		--	370	--	
C _{rss}	Reverse Transfer Capacitance		--	81	--	
Q _g	Total Gate Charge	V _{DD} =-100V,I _D =-13.5A, V _{GS} = -10V	--	52	68	nC
Q _{gs}	Gate-Source Charge		--	9	--	
Q _{gd}	Gate-Drain Charge		--	25	--	
t _{d(on)}	Turn-on Delay Time	V _{DD} =-160V,I _D =-13.5A, R _G = 25 Ω	--	28	56	ns
t _r	Turn-on Rise Time		--	74	148	
t _{d(off)}	Turn-off Delay Time		--	260	520	
t _f	Turn-off Fall Time		--	120	240	

Drain-Source Body Diode Characteristics						
I_S	Continuous Body Diode Current	$T_C = 25^\circ\text{C}$	--	--	-11	A
I_{SM}	Pulsed Diode Forward Current		--	--	-44	
V_{SD}	Body Diode Voltage	$T_J = 25^\circ\text{C}, I_{SD} = -11\text{A}, V_{GS} = 0\text{V}$	--	--	-5	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{V}, I_S = -11\text{A},$ $di_F/dt = 100\text{A}/\mu\text{s}$	--	250	300	ns
Q_{rr}	Reverse Recovery Charge		--	2.9	3.6	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = -11\text{A}$, $V_{DD} = 25\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$

Characteristics Curves

Figure 1. Output Characteristics

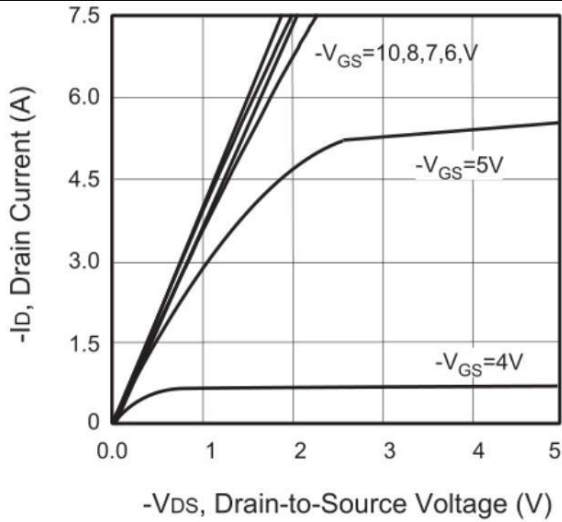


Figure 2. Transfer Characteristics

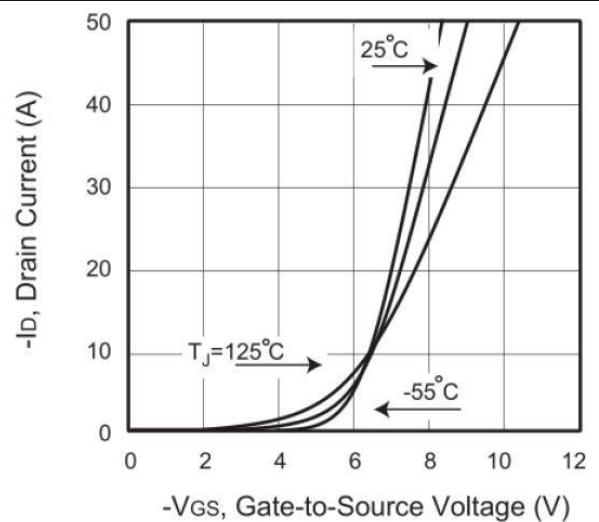


Figure 3. Capacitance

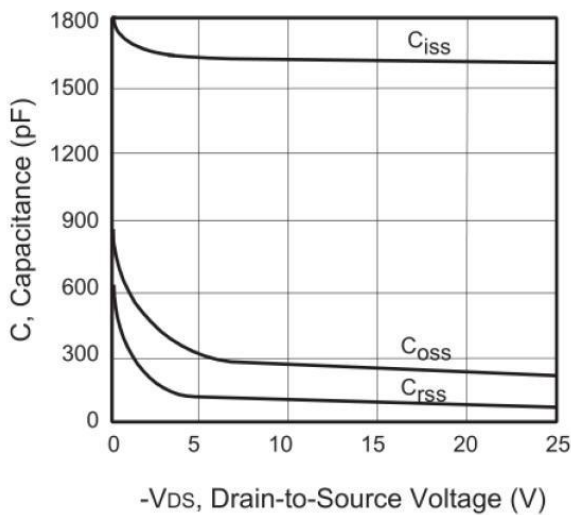


Figure 4. On-Resistance Variation with Temperature

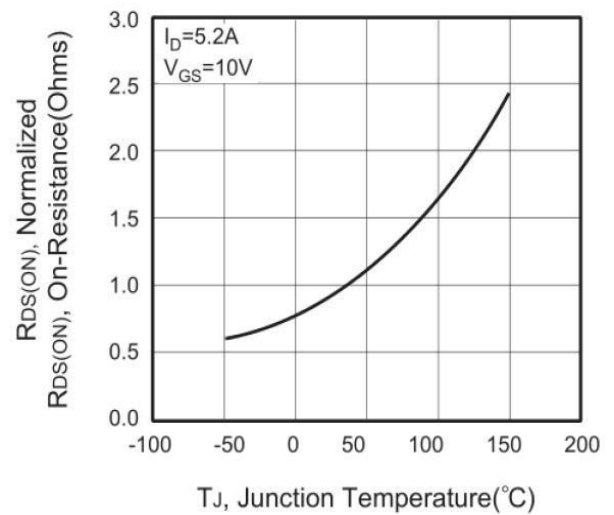


Figure 5. Gate Threshold Variation with Temperature

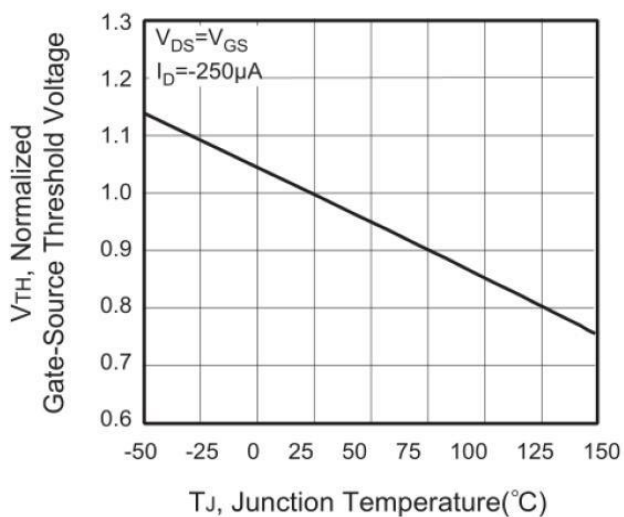


Figure 6. Body Diode Forward Voltage Variation with Source Current

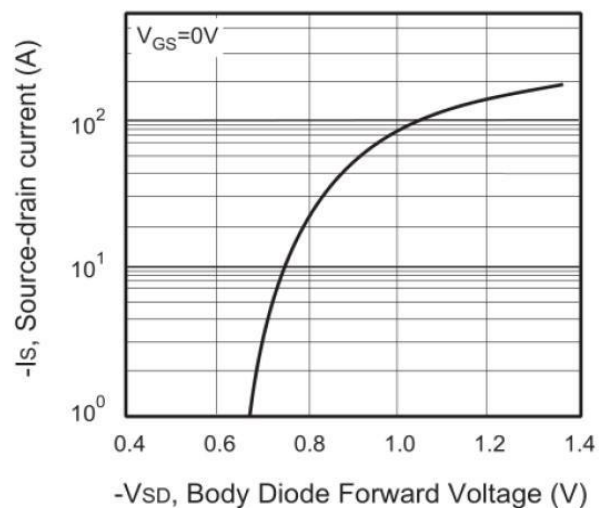


Figure 7. Gate Charge

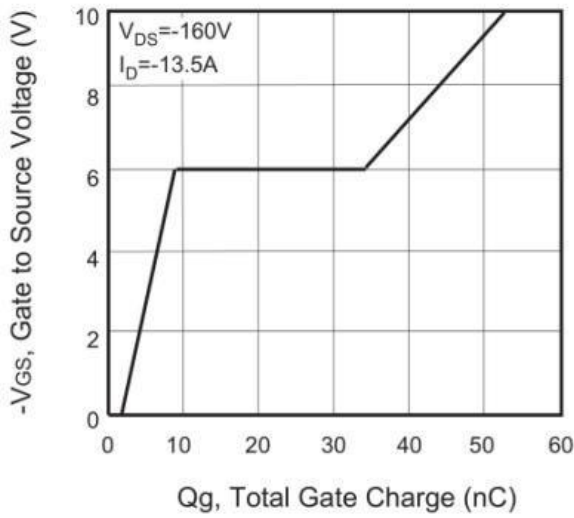


Figure 8. Maximum Safe Operating Area

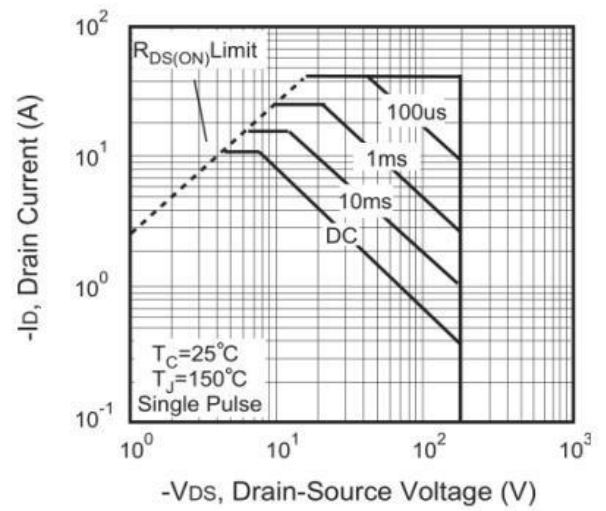


Figure 9. Switching Test Circuit

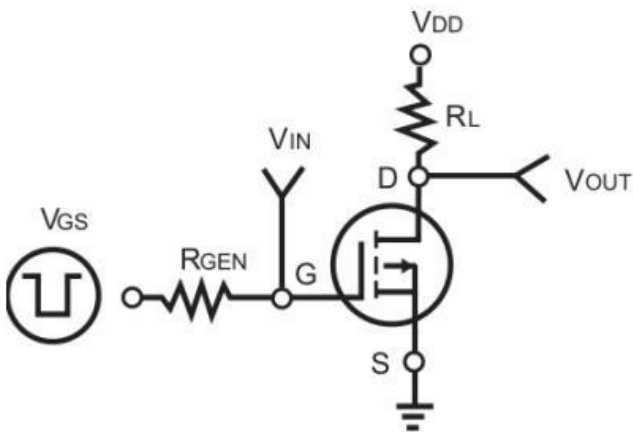


Figure 10. Switching Waveforms

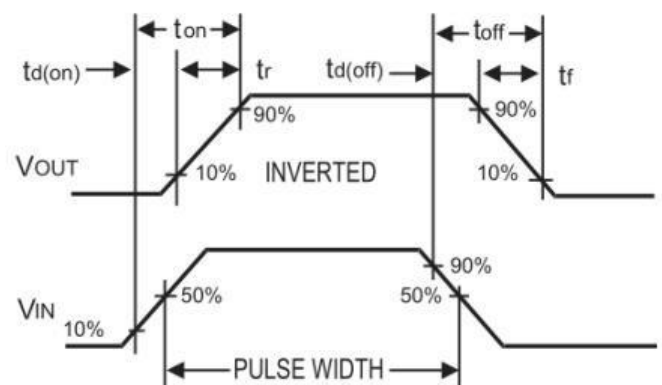
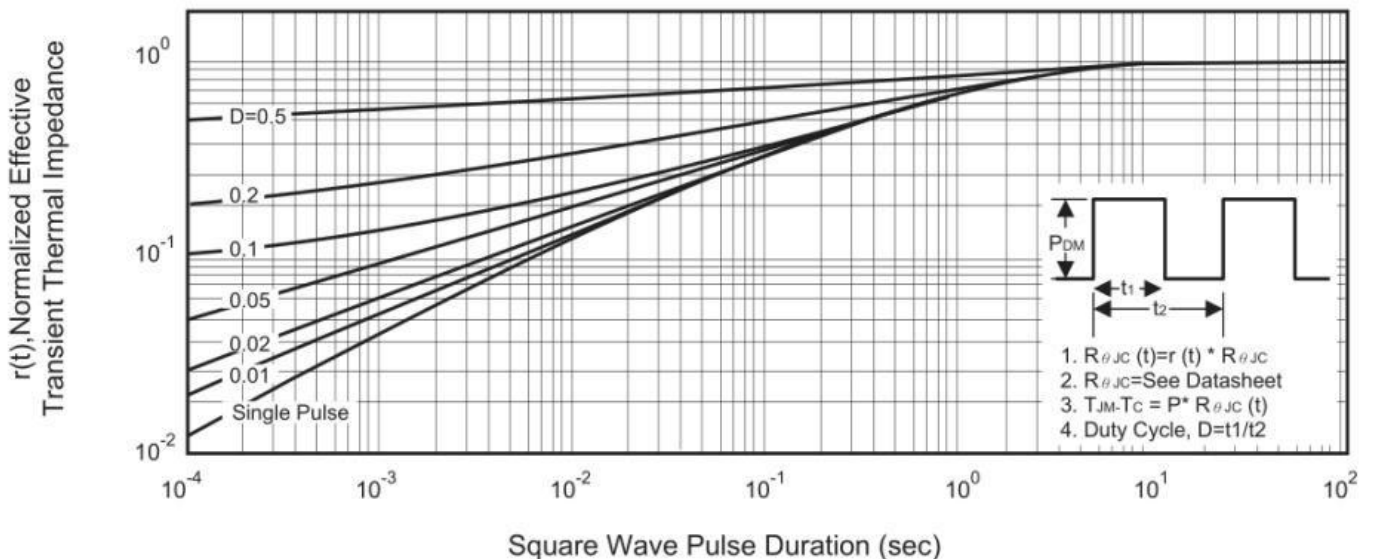
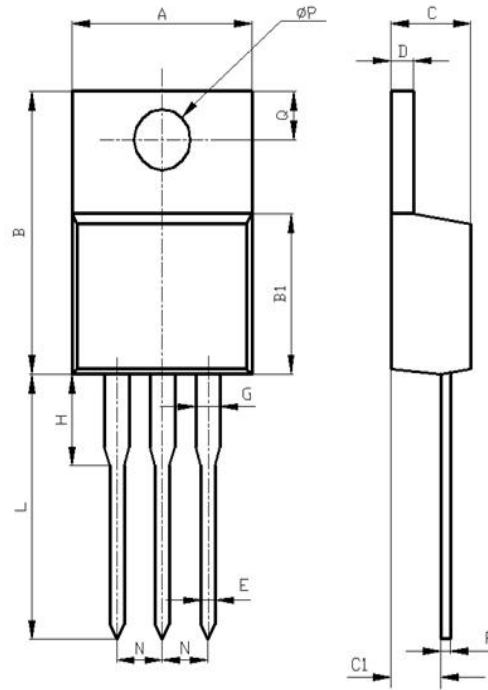


Figure 11. Normalized Thermal Transient Impedance Curve



Package Description



Symbol	Values(mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
ØP	3.50	3.90

TO-220 package



迈诺斯科技

IRF9640PBF

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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