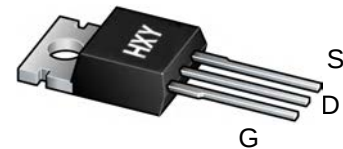




Description

The IRF640NPBF uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



TO-220
(TO-220AB)

General Features

$V_{DS} = 200V, I_D = 18A$

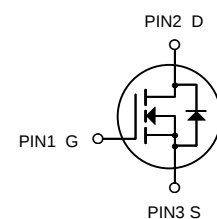
$R_{DS(ON)} < 145m\Omega @ V_{GS}=10V$

Application

High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Units Tube
IRF640NPBF	TO-220(TO-220AB)	HXY IRF640N YYYY	50

Absolute Maximum Ratings@ $T_j=25^{\circ}C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	200	V
VGS	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Drain Current	18	A
IDM	Pulsed Drain Current ¹	72	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	125	W
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$



Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage ^(Note 1)	BV _{DSS}	V _{GS} =0V I _D =250μA	200	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =200V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	-	4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =9A	-	120	145	mΩ
Forward Transconductance	g _{FS}	V _{DS} =40V,I _D =5A	8	-	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	1100	-	PF
Output Capacitance	C _{oss}		-	180	-	PF
Reverse Transfer Capacitance	C _{rss}		-	30	-	PF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =100V,I _D =18A R _G =2.5Ω,V _{GS} =10V ^(Note 2)	-	11	-	nS
Turn-on Rise Time	t _r		-	33	-	nS
Turn-Off Delay Time	t _{d(off)}		-	25	-	nS
Turn-Off Fall Time	t _f		-	7	-	nS
Total Gate Charge	Q _g	V _{DS} =100V,I _D =18A, V _{GS} =10V ^(Note 2)	-	25	-	nC
Gate-Source Charge	Q _{gs}		-	7.5	-	nC
Gate-Drain Charge	Q _{gd}		-	9.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S =9A	-		1.4	V
Diode Forward Current ^(Note 2)	I _S		-	-	18	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.



Typical Electrical

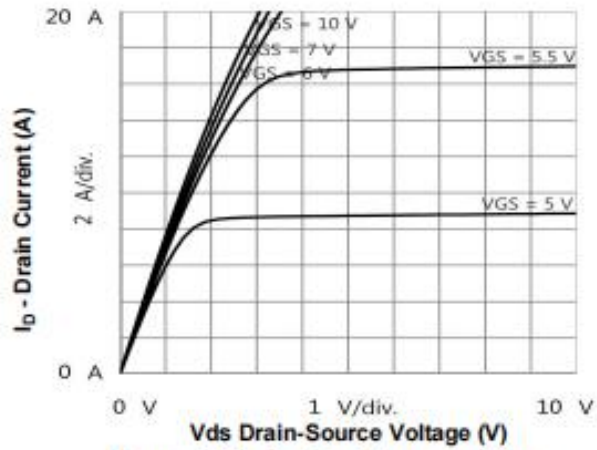


Figure 1. On-Region Characteristics

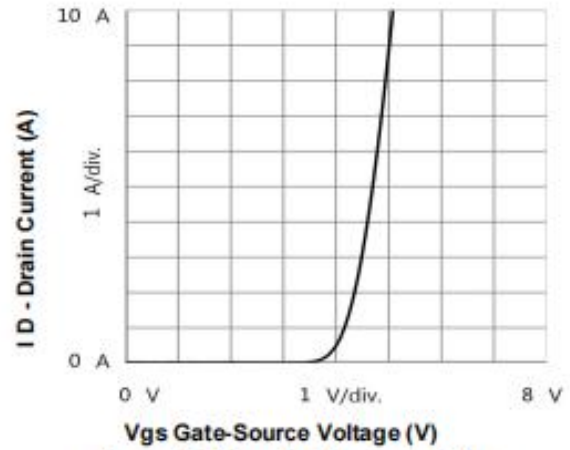


Figure 2. Transfer Characteristics

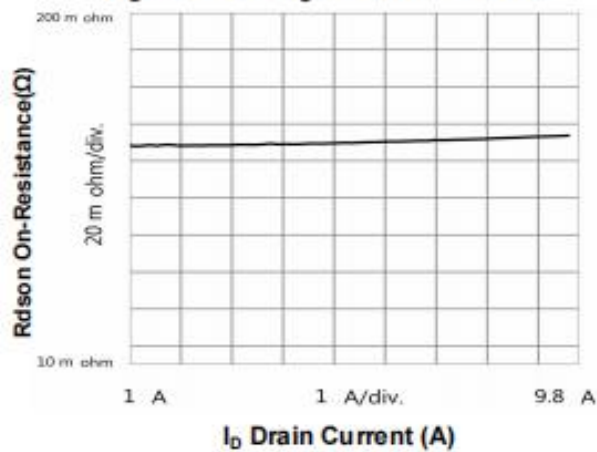


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

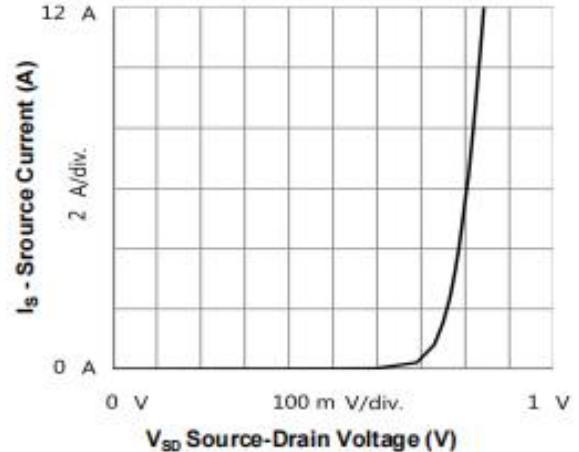


Figure 4. Source Current vs Source-Drain Voltage

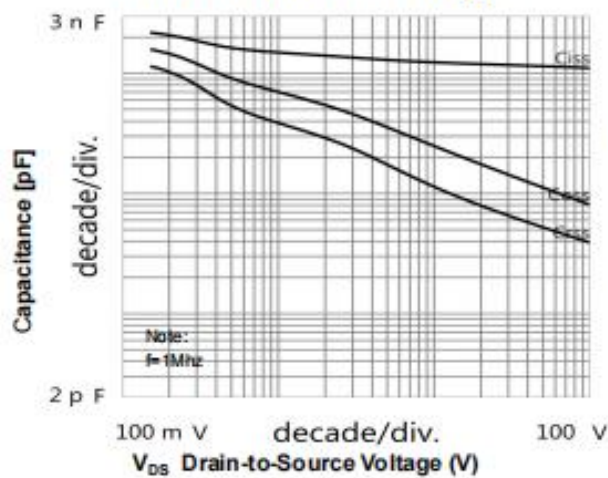


Figure 5.1 Capacitance Characteristics

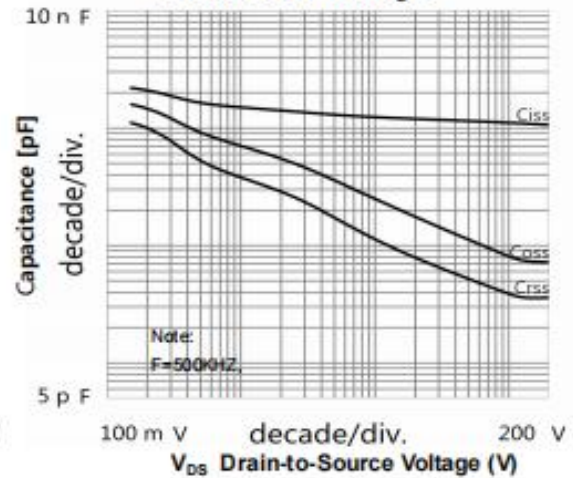


Figure 5.2 Capacitance Characteristics

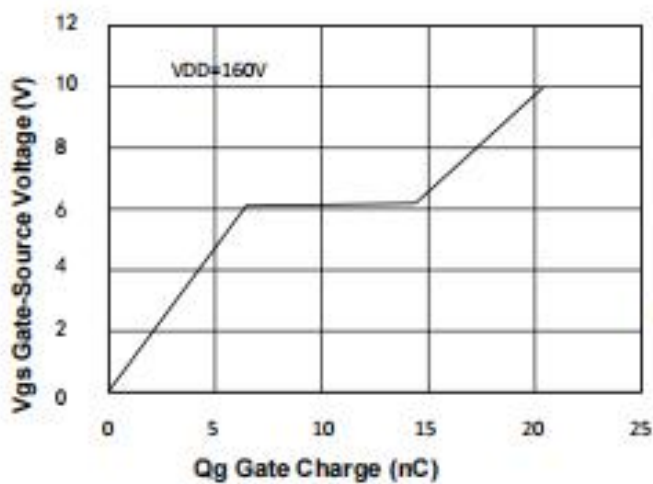


Figure 6. Gate Charge Characteristics

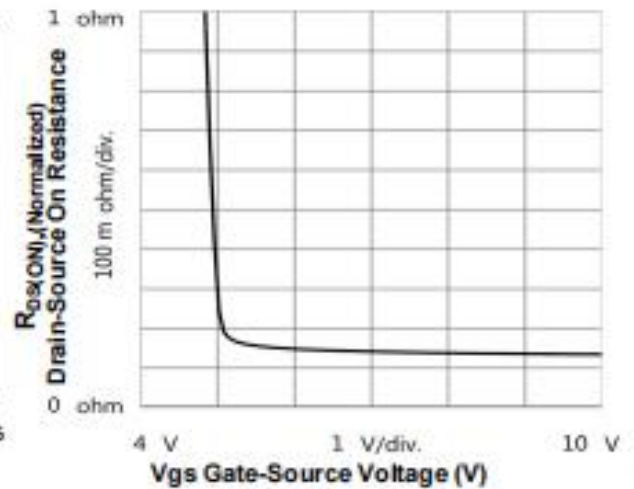


Figure 7. On-Resistance Variation vs Gate-Source Voltage

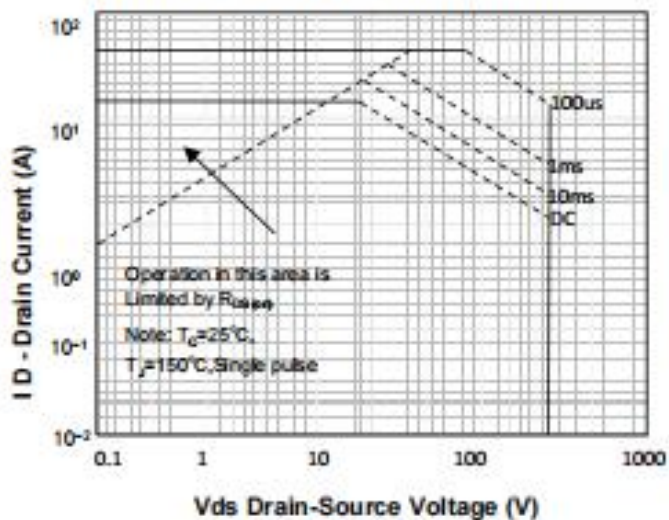


Figure 8. Maximum Safe Operating Area

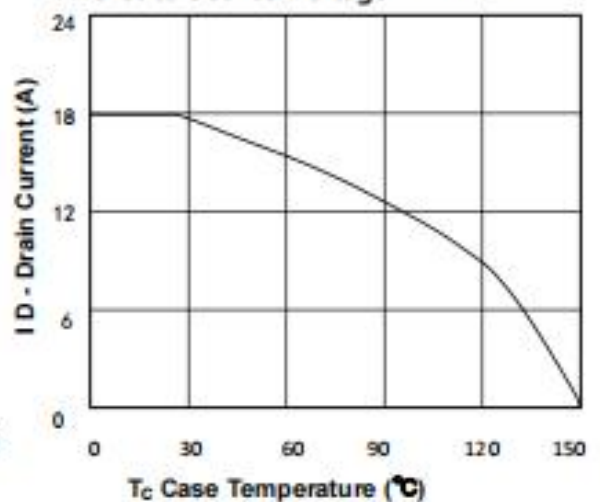


Figure 9. Maximum Drain Current vs Case Temperature

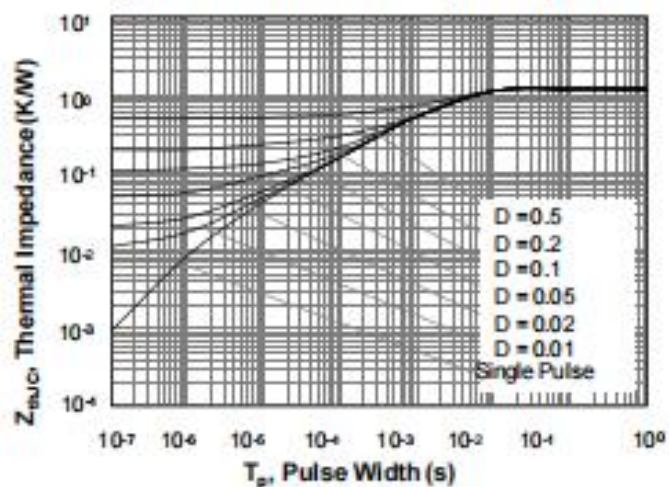
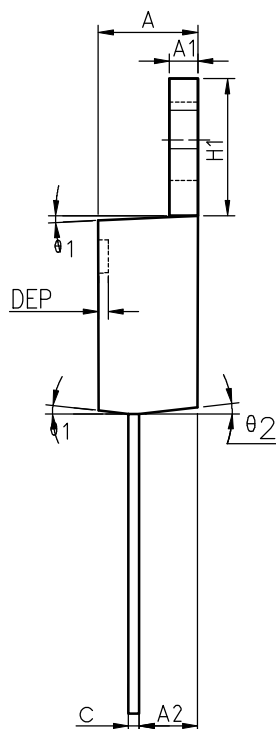
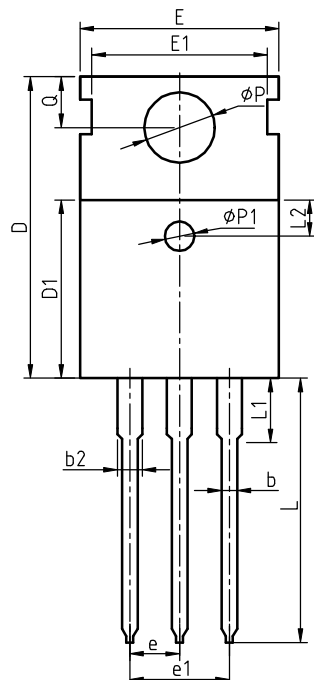


Figure 10. Transient Thermal Response Curve



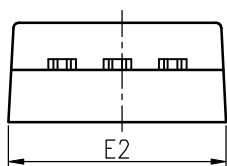
Package Information

TO-220(TO-220AB)



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
θ 1	5°	7°	9°	5°	7°	9°
θ 2	1°	3°	5°	1°	3°	5°
θ 3	1°	3°	5°	1°	3°	5°





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