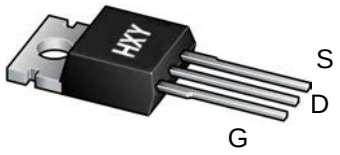
Description

The IRF1407PBF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



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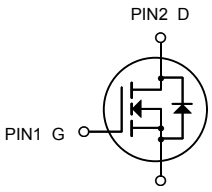
General Features

V_{DS} = 120V I_D = 120A

$R_{DS(ON)}$ < 7.5mΩ @ V_{GS}=10V



N-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRF1407PBF	TO-220	HXY MOSFET	50

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain CurrentTC=25 ℃	120	A
I_{DM}	PuledDrainCurrentnote1	320	A
EAS	Single Pulse Avalanche Energy[3]	326	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	119	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	52	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Ambient [1]	1.05	℃/W

Electrical Characteristics： (T_C=25℃ unless otherwise noted)

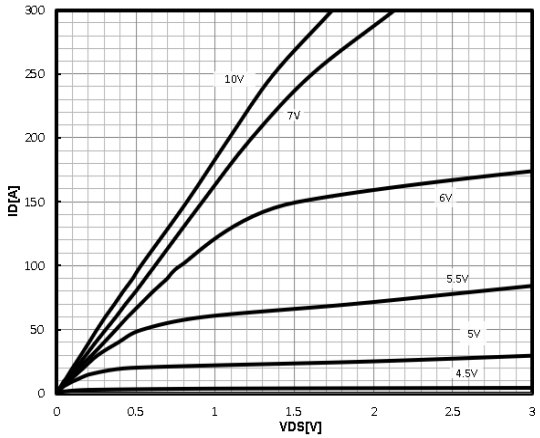
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	120	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} = 120V, V_{GS}= 0V	--	--	1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D = 250μA	2.5	3	3.5	V
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V, I_D=20A	--	6	7.5	mΩ
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 60V f = 1.0MHz	--	3614	--	pF
C_{oss}	Output Capacitance		--	423	--	
C_{rss}	Reverse Transfer Capacitance		--	12	--	
R_g	Gate resistance		--	0.84	--	Ω
$t_{d(ON)}$	Turn-on Delay Time	I_D =20A V_{DS} = 60V V_{GS} = 10V R_G = 5Ω	--	20	--	ns
tr	Rise Time		--	65	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	32	--	
t_f	Fall Time		--	49	--	
Q_g	Total Gate Charge	V_{GS} =0~10V V_{DS} = 60V I_D =20A	--	60.8	--	nC
Q_{gs}	Gate Source Charge		--	18.8	--	
Q_{gd}	Gate Drain Charge		--	14.7	--	
I_S	Diode Forward Current	T_C =25 °C	--	--	120	A
V_{SD}	Diode Forward Voltage	I_S=20A, V_{GS}=0V	--	0.83	1.2	V
t_{rr}	Reverse Recovery time	I_S=40A, dI/dt=100A/μs	--	60	--	ns
Q_{rr}	Reverse Recovery Charge		--	109	--	nC

[a1]: Repetitive rating; pulse width limited by maximum junction temperature
[a2]: VDD=60V, L=0.5mH, Rg=25Ω, Starting TJ=25 ℃

Typical Characteristics： (T_C=25℃ unless otherwise noted)

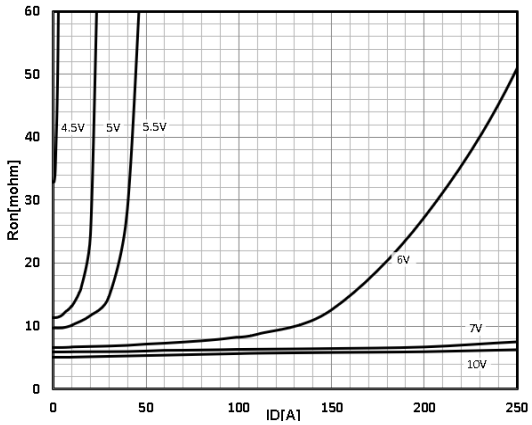
Typ. output characteristics

$I_D=f(V_{DS})$



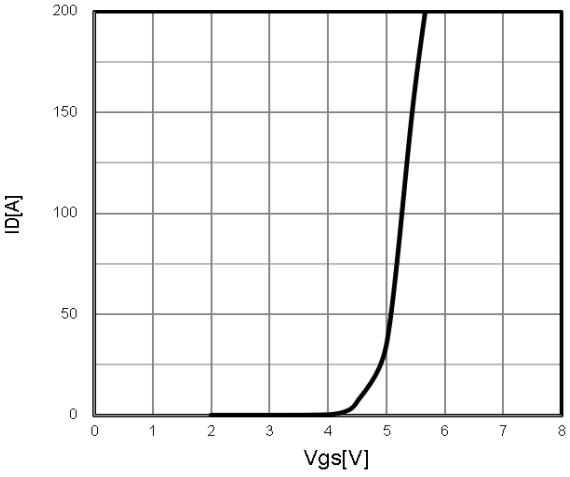
Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$



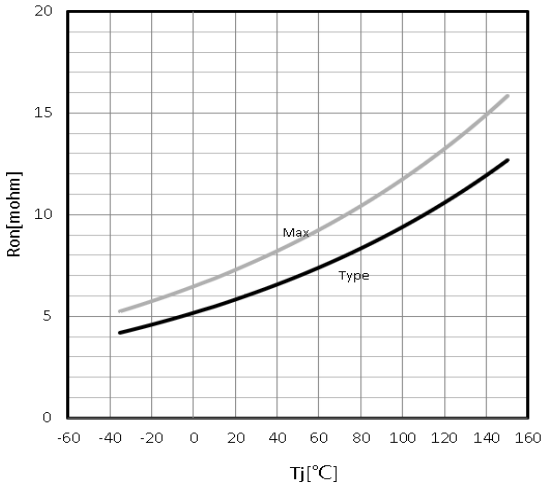
Typ. transfer characteristics

$I_D=f(V_{GS})$



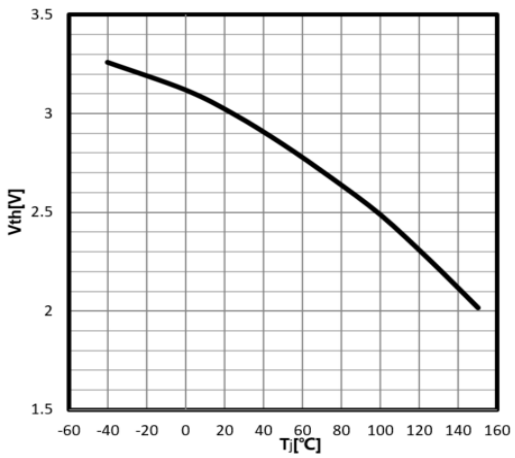
Drain-source on-state resistance

$R_{DS(on)}=f(T_j)$; I_D=20A; V_{GS}=10V



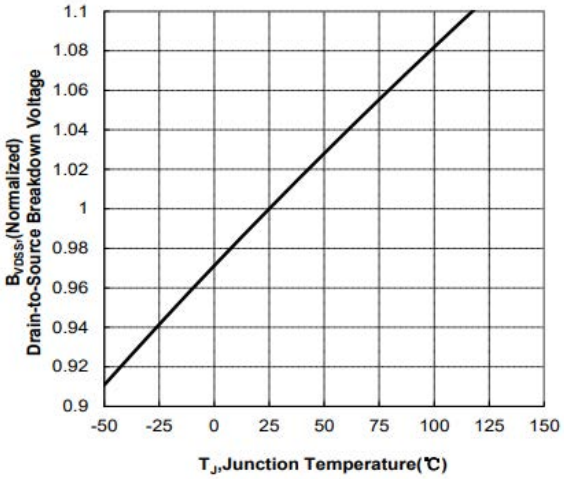
Gate Threshold Voltage

$V_{TH}=f(T_j)$; I_D=250uA

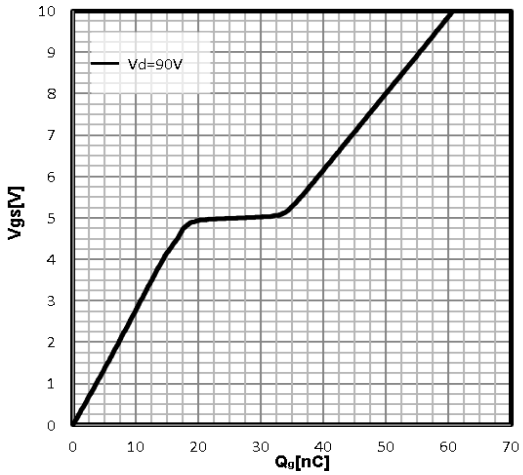


Drain-source breakdown voltage

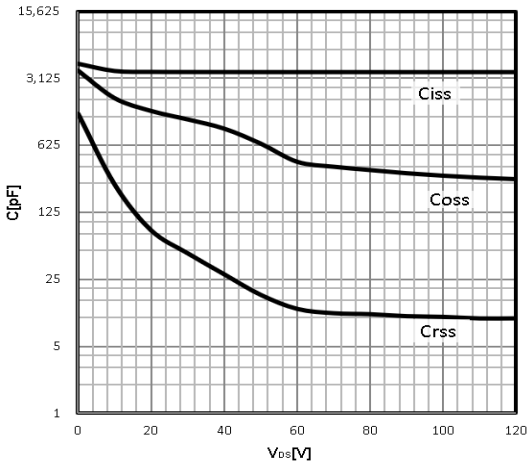
$V_{BR(DSS)}=f(T_j)$; I_D=250uA



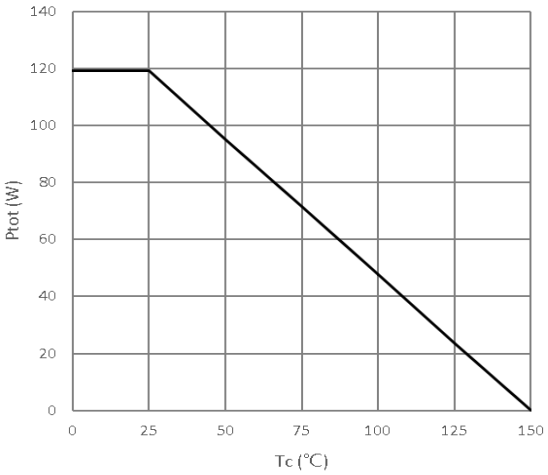
Typ. gate charge
$V_{GS}=f(Q_{gate})$



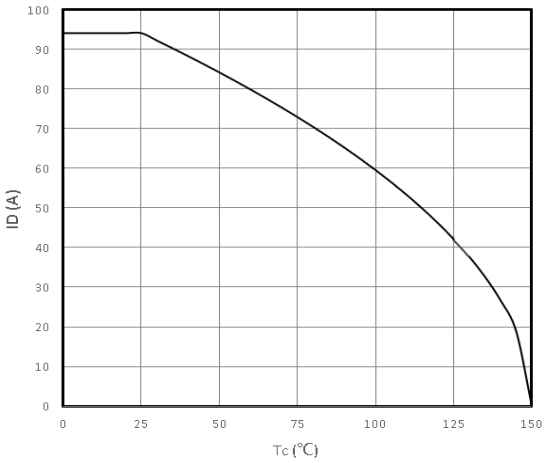
Typ. capacitances
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



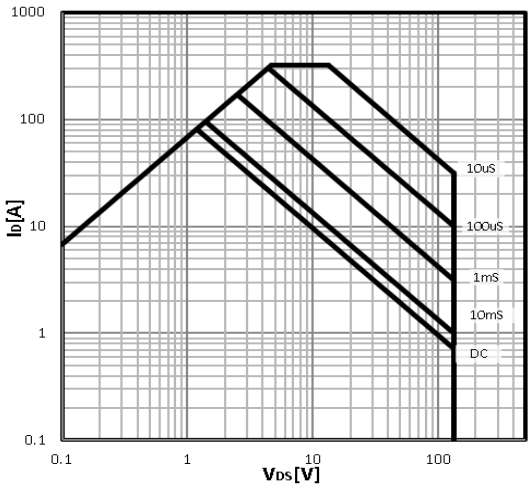
Power Dissipation
$P_{tot}=f(T_j)$



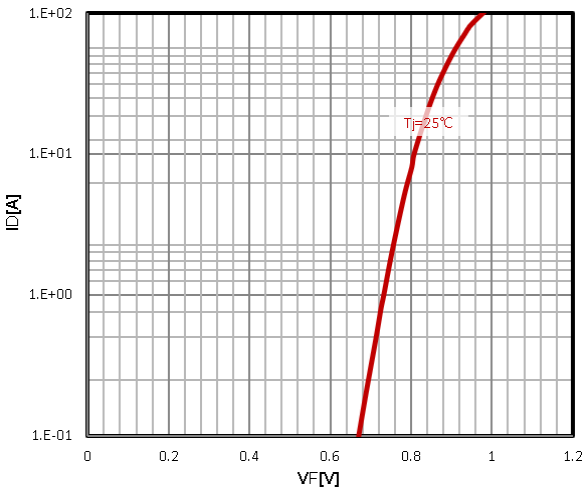
Maximum Drain Current
$I_D=f(T_C)$



Safe operating area
$I_D=f(V_{DS})$



Body Diode Forward Voltage Variation
$I_F=f(V_{GS})$



Package Information

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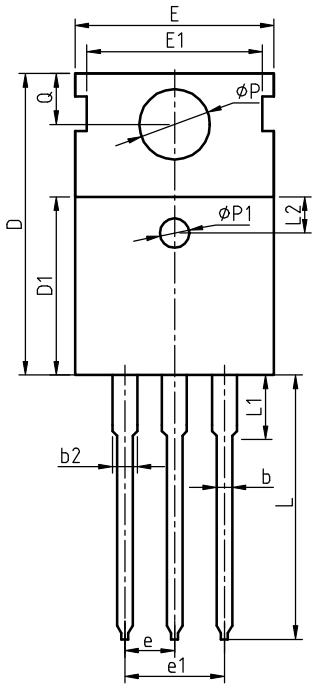

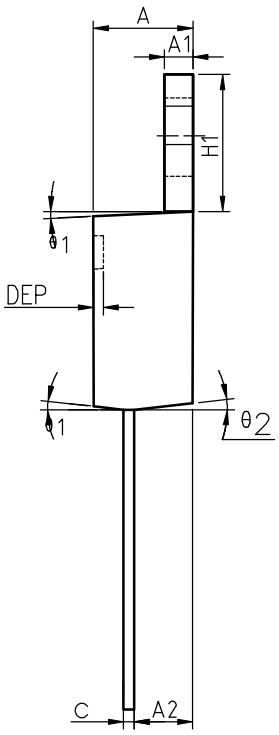

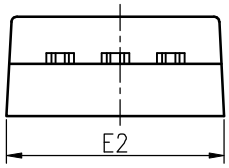

COMMON DIMENSIONS

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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