



## Description

The IRLR120NPBF 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.

## General Features

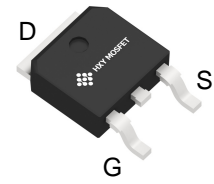
$V_{DS} = 100V, I_D = 15A$

$R_{DS(ON)} < 112m\Omega @ V_{GS} = 10V$

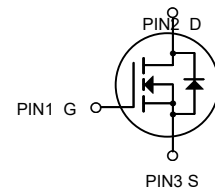
## Application

Power switch

DC/DC converters



**TO-252-2L  
(DPAK)**



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRLR120NPBF	TO-252-2L(DPAK)	HXY MOSFET	2500

## Absolute Maximum Ratings ( $T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	15	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.7	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	24	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	6.1	mJ
$I_{AS}$	Avalanche Current	11	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation <sup>3</sup>	34.7	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	3.6	$^\circ C/W$



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	100	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25 °C , I <sub>D</sub> =1mA	---	0.098	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =10A	---	100	112	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =8A	---	117	130	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage		1.0	---	2.5	V
		V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA				
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4.57	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =80V , V <sub>GS</sub> =0V , T <sub>J</sub> =25 °C	---	---	1	uA
		V <sub>DS</sub> =80V , V <sub>GS</sub> =0V , T <sub>J</sub> =55 °C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ± 20V , V <sub>DS</sub> =0V	---	---	± 100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =10A	---	13	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz	---	2	---	Ω
Q <sub>g</sub>	Total Gate Charge (10V)		---	26.2	---	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =80V , V <sub>GS</sub> =10V , I <sub>D</sub> =10A	---	4.6	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	5.1	---	
T <sub>d(on)</sub>	Turn-On Delay Time		---	4.2	---	ns
T <sub>r</sub>	Rise Time	V <sub>DD</sub> =50V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3	---	8.2	---	
T <sub>d(off)</sub>	Turn-Off Delay Time	I <sub>D</sub> =10A	---	35.6	---	
T <sub>f</sub>	Fall Time		---	9.6	---	
C <sub>iss</sub>	Input Capacitance		---	1535	---	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz	---	60	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	37	---	
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>		---	---	12	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	24	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25 °C	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =10A , di/dt=100A/μs ,	---	37	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25 °C	---	27.3	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=25V,V<sub>GS</sub>=10V,L=0.1mH,I<sub>AS</sub>=11A
- 4.The power dissipation is limited by 150 °C junction temperature
- 5 .The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.



### Typical Characteristics

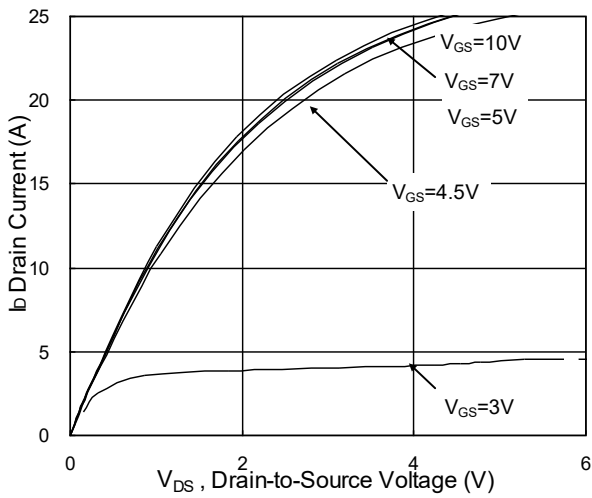


Fig.1 Typical Output Characteristics

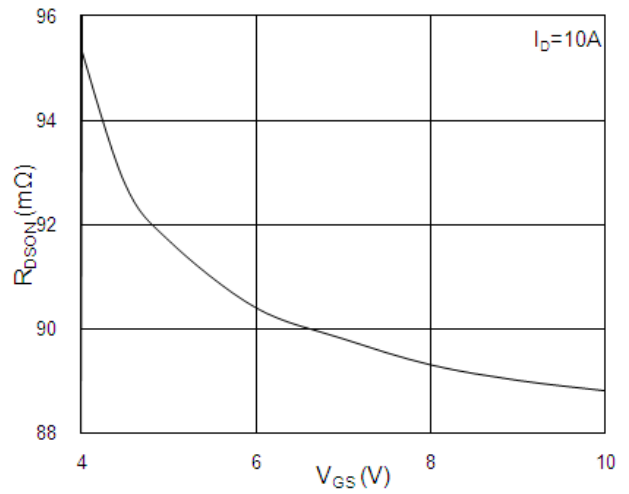


Fig.2 On-Resistance vs. Gate-Source

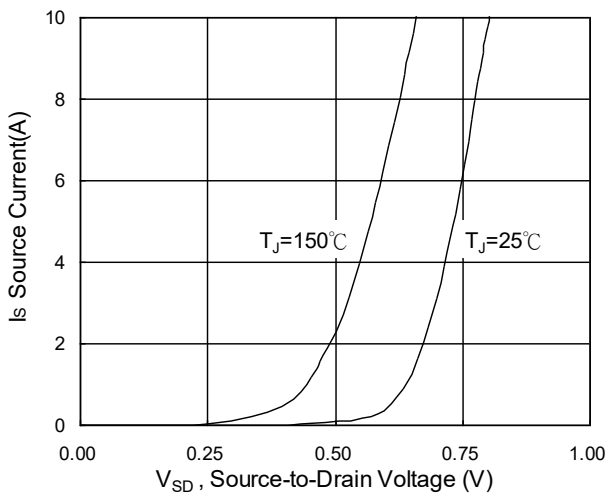


Fig.3 Forward Characteristics Of Reverse

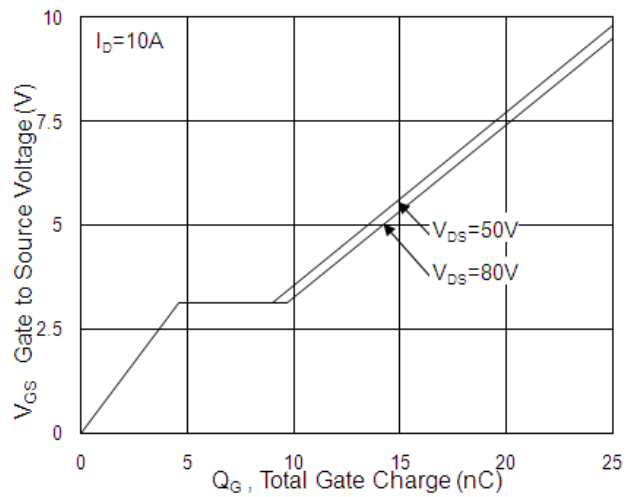


Fig.4 Gate-Charge Characteristics

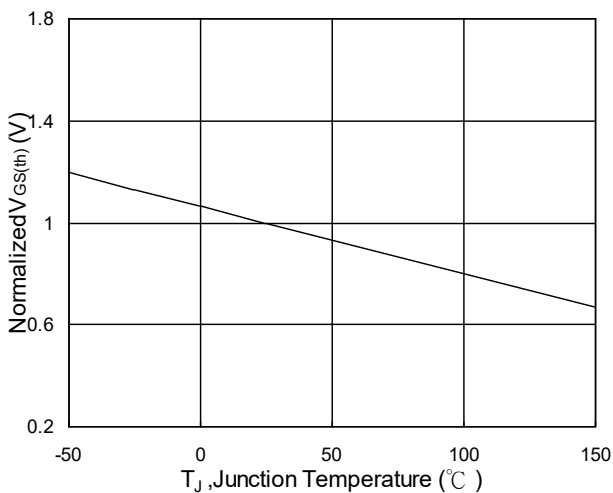


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

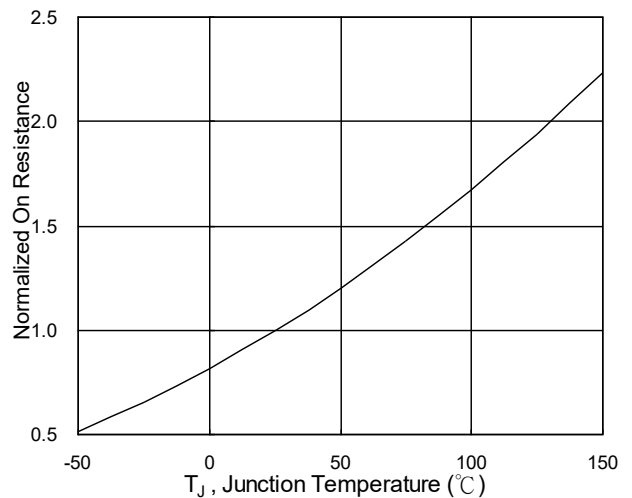


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

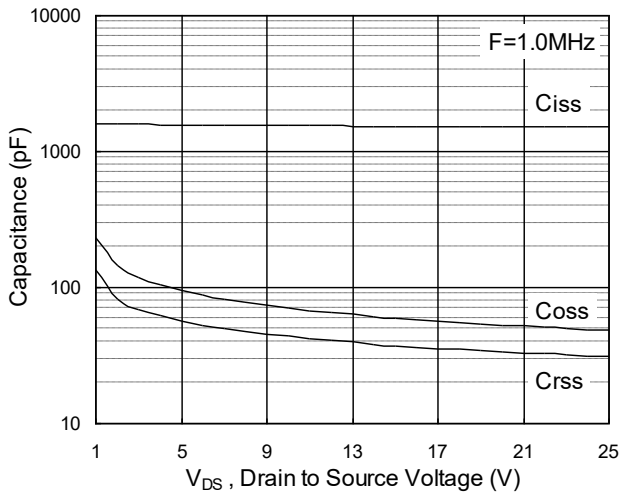


Fig.7 Capacitance

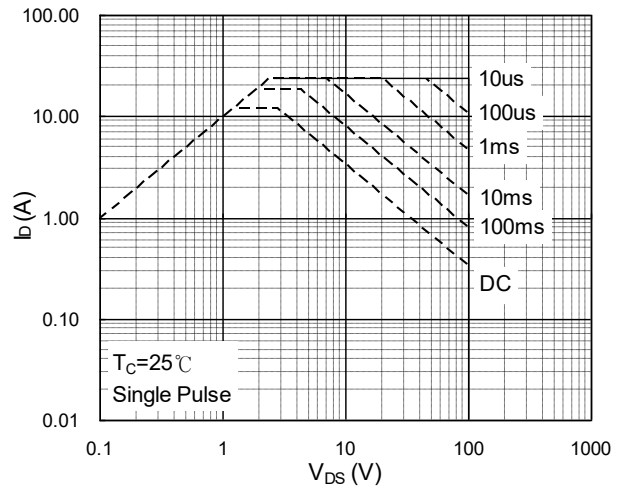


Fig.8 Safe Operating Area

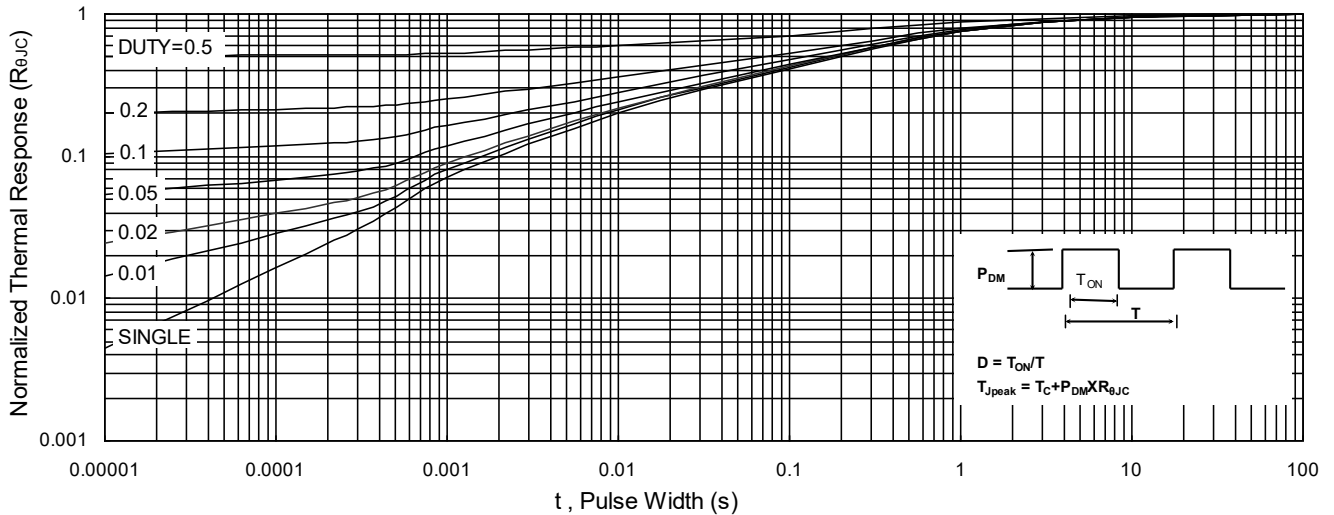


Fig.9 Normalized Maximum Transient Thermal Impedance

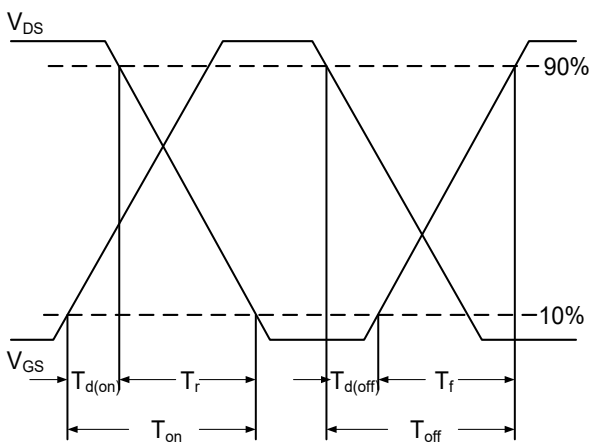


Fig.10 Switching Time Waveform

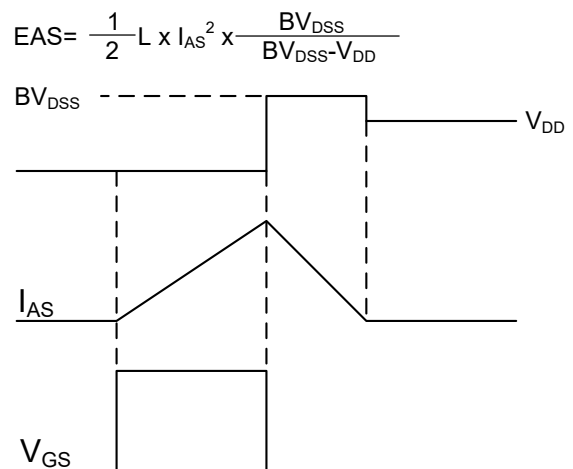


Fig.11 Unclamped Inductive Switching Waveform



### TO-252-2L(DPAK) Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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