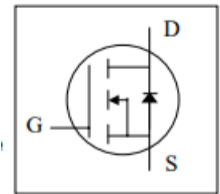


100V N-Channel Enhancement Mode MOSFET

**Description**

The IRF1310NPBF-ML uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.

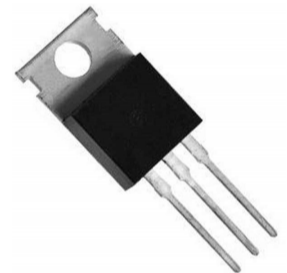


**General Features**

$V_{DS} = 100V$   $I_D = 30 A$   
 $R_{DS(ON)} < 40m\Omega @ V_{GS}=10V$

**Application**

Battery protection  
 Load switch  
 Uninterruptible power supply



**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, $V_{GS} @ 10V^1$	30	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	26	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	72	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	126	mJ
$I_{AS}$	Avalanche Current	13	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	125	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ C$

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R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	1.2	°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> =16A	---	36	40	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage		2	---	4	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	---	-5.52	---	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	---	---	10	uA
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> =16A	---	30	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.6	---	
Q <sub>g</sub>	Total Gate Charge (10V)		---	45.6	---	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =80V, V <sub>GS</sub> =10V, I <sub>D</sub> =16A	---	6.7	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	11.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time		---	12	---	ns
T <sub>r</sub>	Rise Time	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3	---	32.2	---	
T <sub>d(off)</sub>	Turn-Off Delay Time	I <sub>D</sub> =10A	---	42	---	
T <sub>f</sub>	Fall Time		---	13.4	---	
C <sub>iss</sub>	Input Capacitance		---	2270	---	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	130	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	90	---	
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	36	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> =16A, di/dt=100A/μs,	---	33	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	28	---	nC

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Typical Characteristics

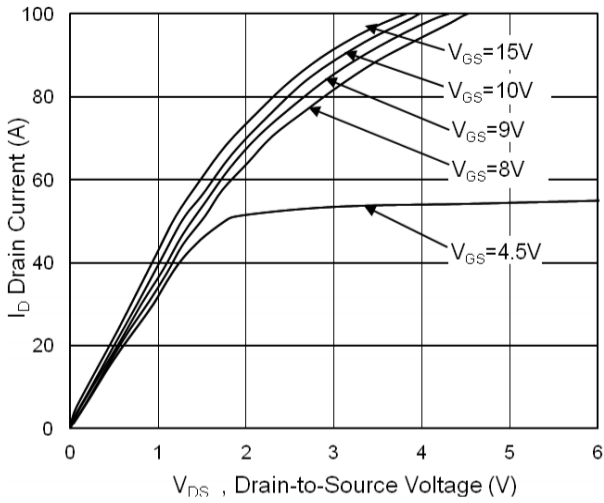


Fig.1 Typical Output Characteristics

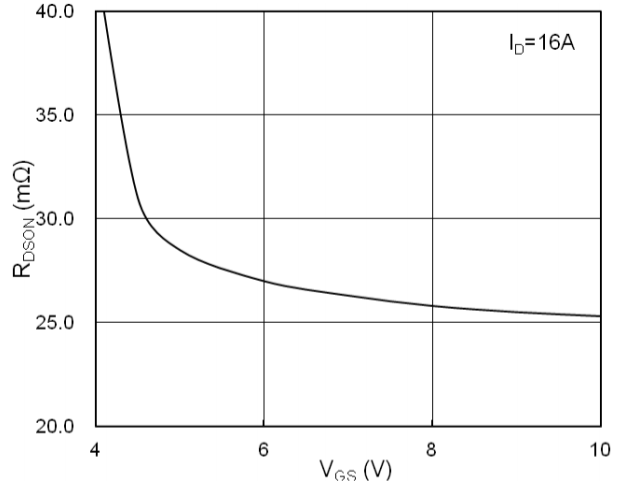


Fig.2 On-Resistance vs. G-S Voltage

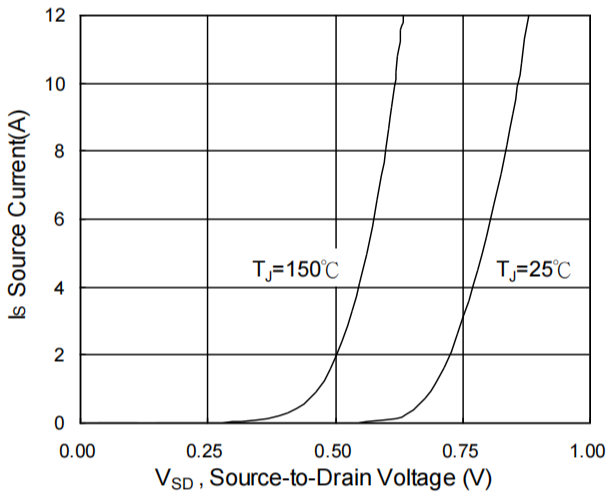


Fig.3 Source Drain Forward Characteristics

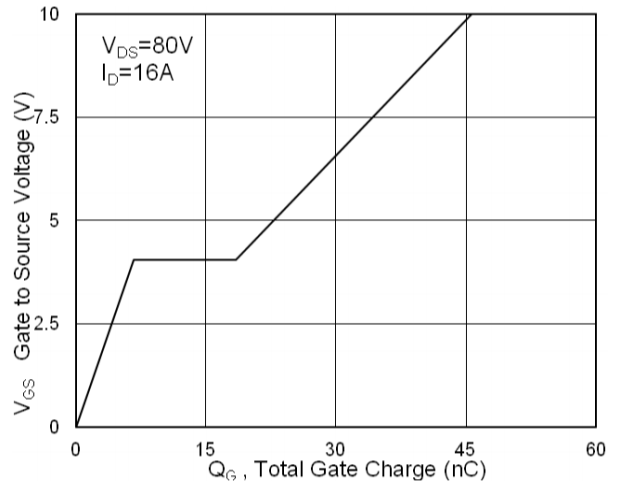


Fig.4 Gate-Charge Characteristics

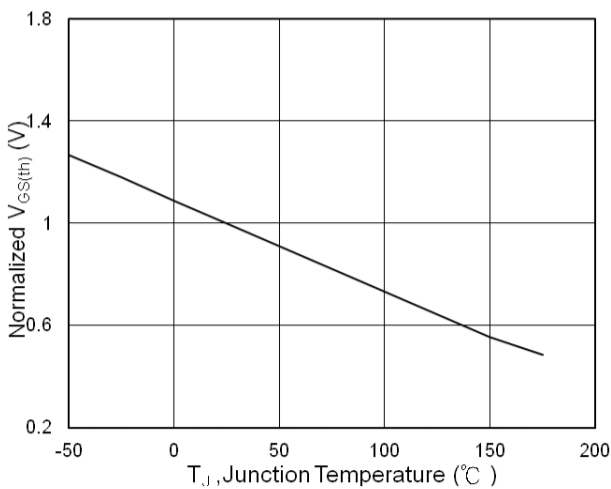


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

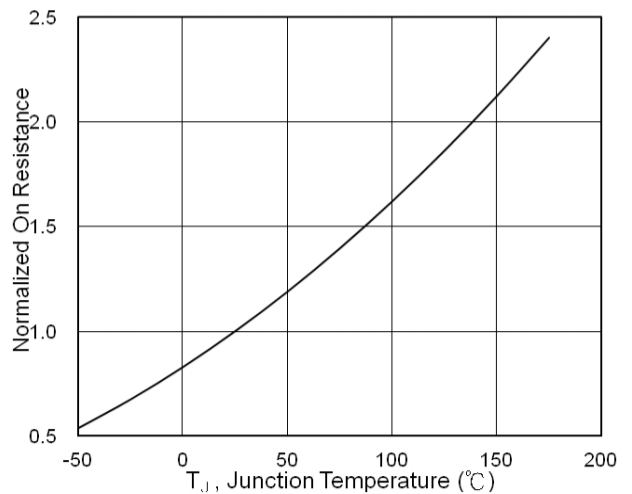


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

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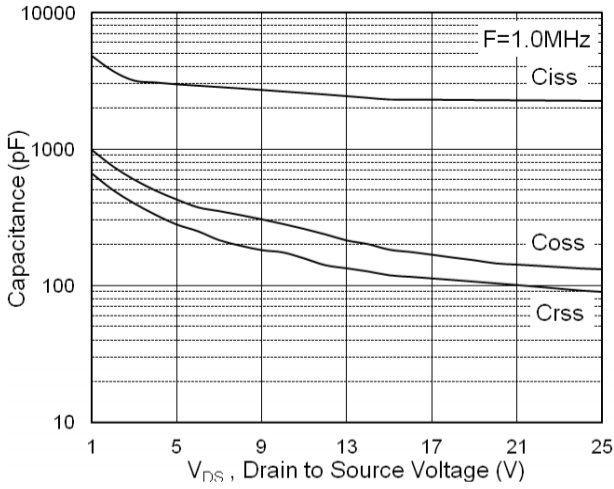


Fig.7 Capacitance

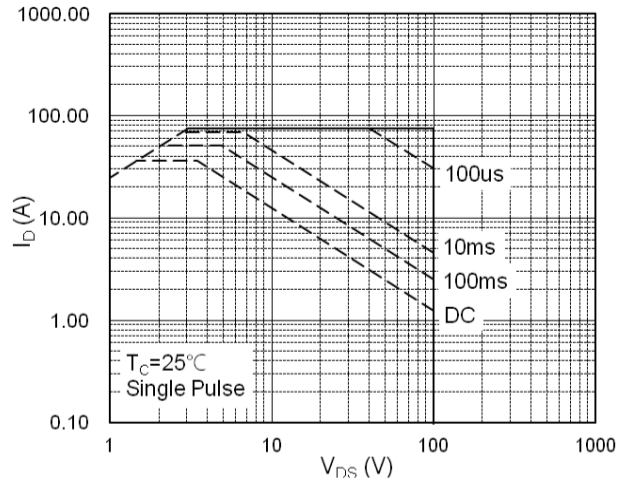


Fig.8 Safe Operating Area

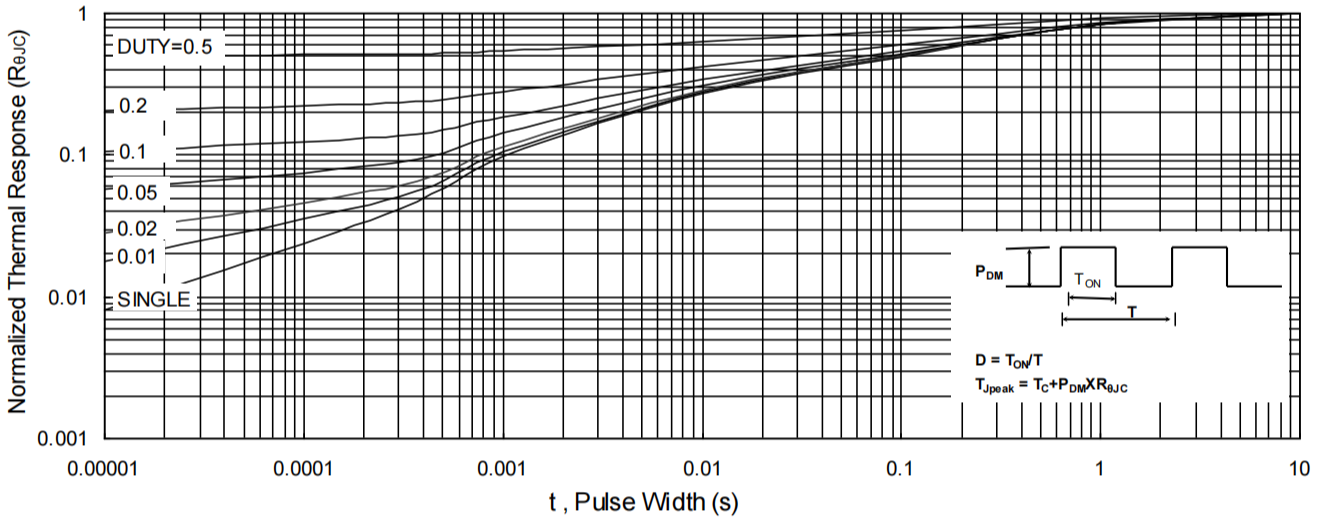


Fig.9 Normalized Maximum Transient Thermal Impedance

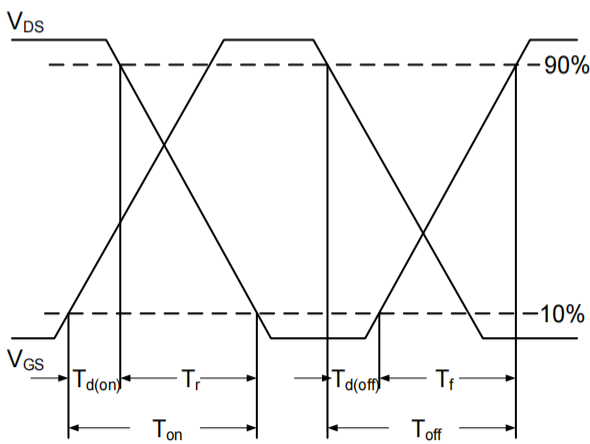


Fig.10 Switching Time Waveform

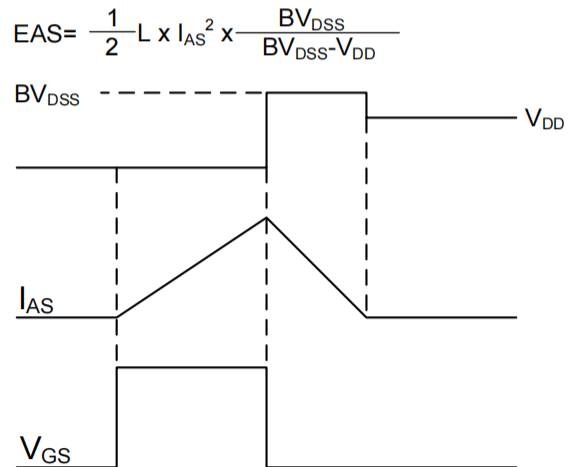
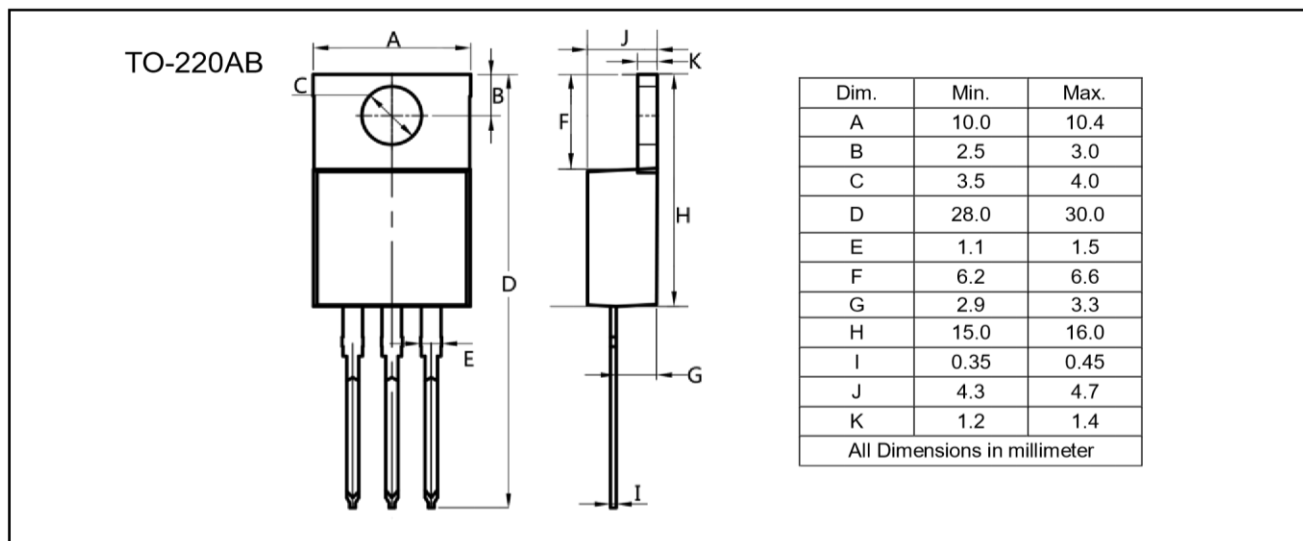


Fig.11 Unclamped Inductive Switching Waveform

100V N-Channel Enhancement Mode MOSFET



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