100V N-Channel Enhancement Mode MOSFET

Description

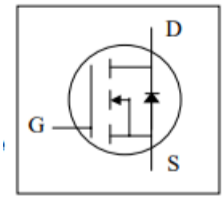
The IRF540NPBF-ML uses advanced trench technology

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.



General Features

V_{DS} = 100V I_D = 30 A

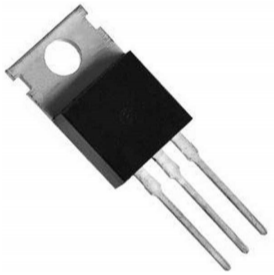
$R_{DS(ON)}$ < 40mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	30	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	26	A
I_{DM}	Pulsed Drain Current[2]	72	A
EAS	Single Pulse Avalanche Energy[3]	126	mJ
I_{AS}	Avalanche Current	13	A
P_D@T_C=25℃	Total Power Dissipation[4]	125	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	1.2	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.098	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=16A	---	36	40	mΩ
		V_{GS}=4.5V , I_D=10A	---	---	50	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.5	---	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.52	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	10	uA
		V_{DS}=80V , V_{GS}=0V , T_J=55℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=16A	---	30	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.6	---	
Q_g	Total Gate Charge (10V)	V_{DS}=80V , V_{GS}=10V , I_D=16A	---	45.6	---	nC
Q_{gs}	Gate-Source Charge		---	6.7	---	
Q_{gd}	Gate-Drain Charge		---	11.8	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=3.3 I_D=10A	---	12	---	ns
T_r	Rise Time		---	32.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	42	---	
T_f	Fall Time		---	13.4	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	2270	---	pF
C_{oss}	Output Capacitance		---	130	---	
C_{rss}	Reverse Transfer Capacitance		---	90	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	36	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=16A , dI/dt=100A/μs , T_J=25℃	---	33	---	nS
Q_{rr}	Reverse Recovery Charge		---	28	---	nC

Typical Characteristics

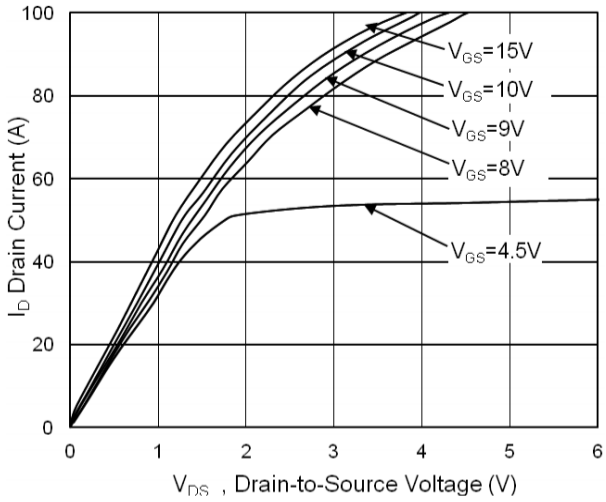


Fig.1 Typical Output Characteristics

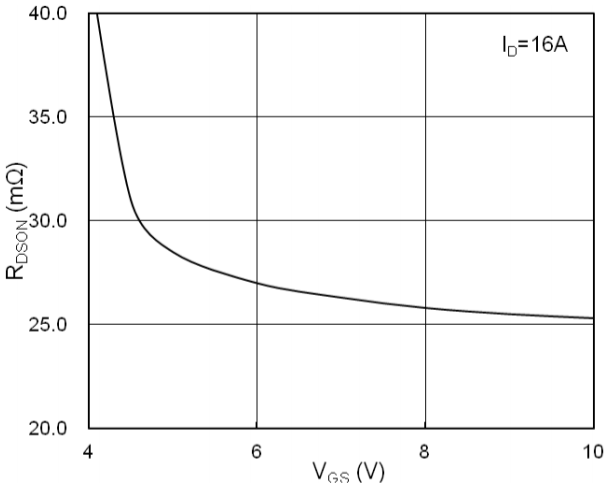


Fig.2 On-Resistance vs. G-S Voltage

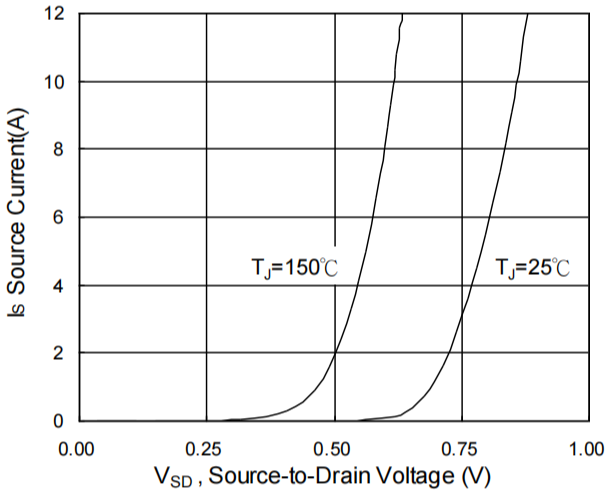


Fig.3 Source Drain Forward Characteristics

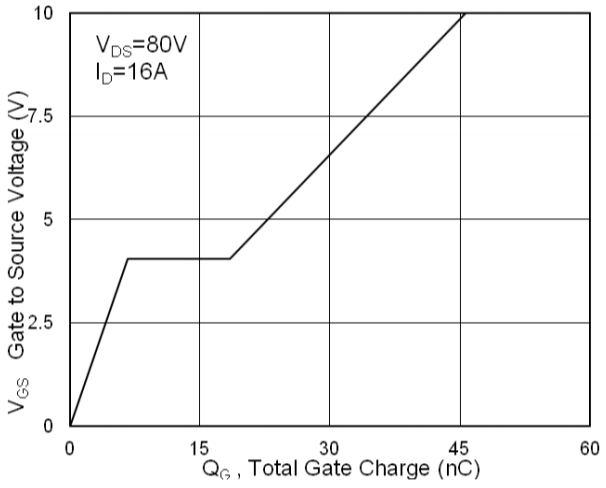


Fig.4 Gate-Charge Characteristics

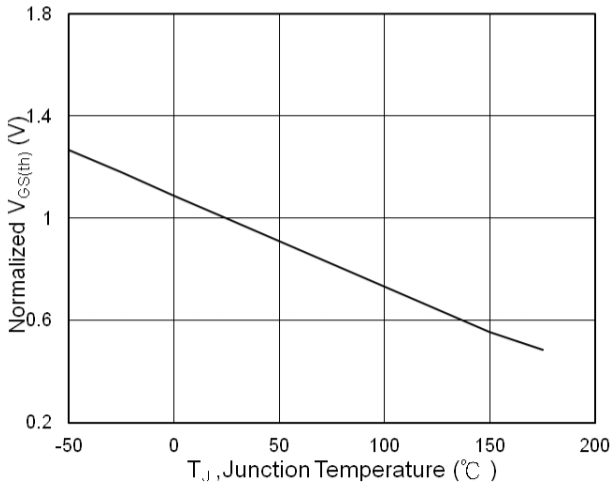


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

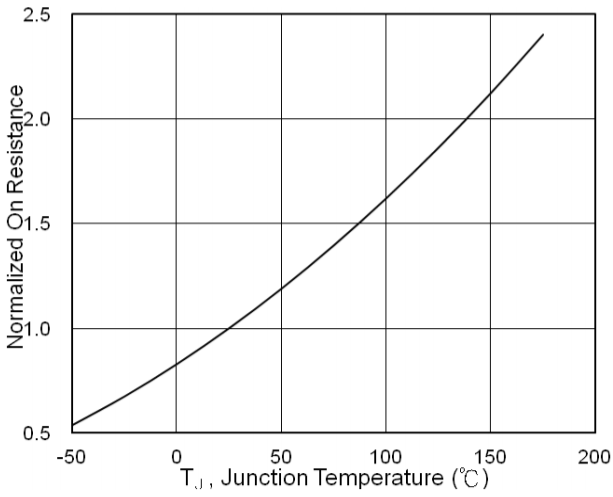


Fig.6 Normalized R_{DSON} vs. T_J

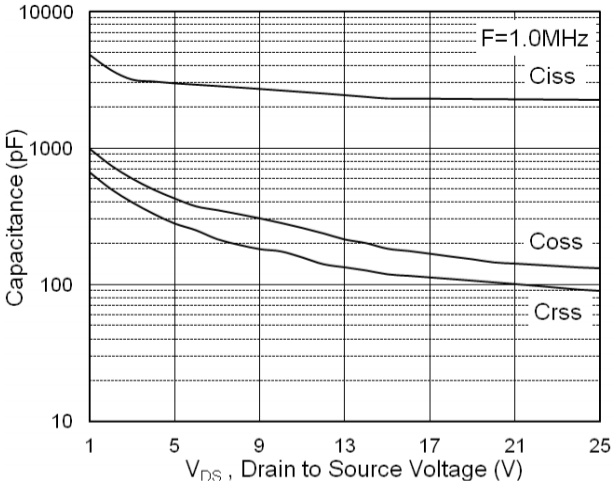


Fig.7 Capacitance

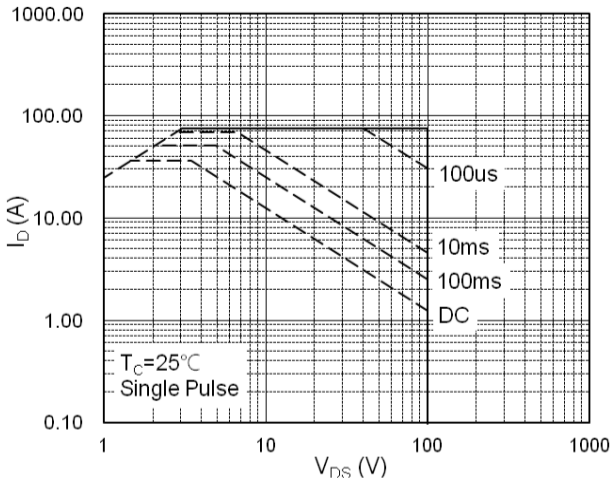


Fig.8 Safe Operating Area

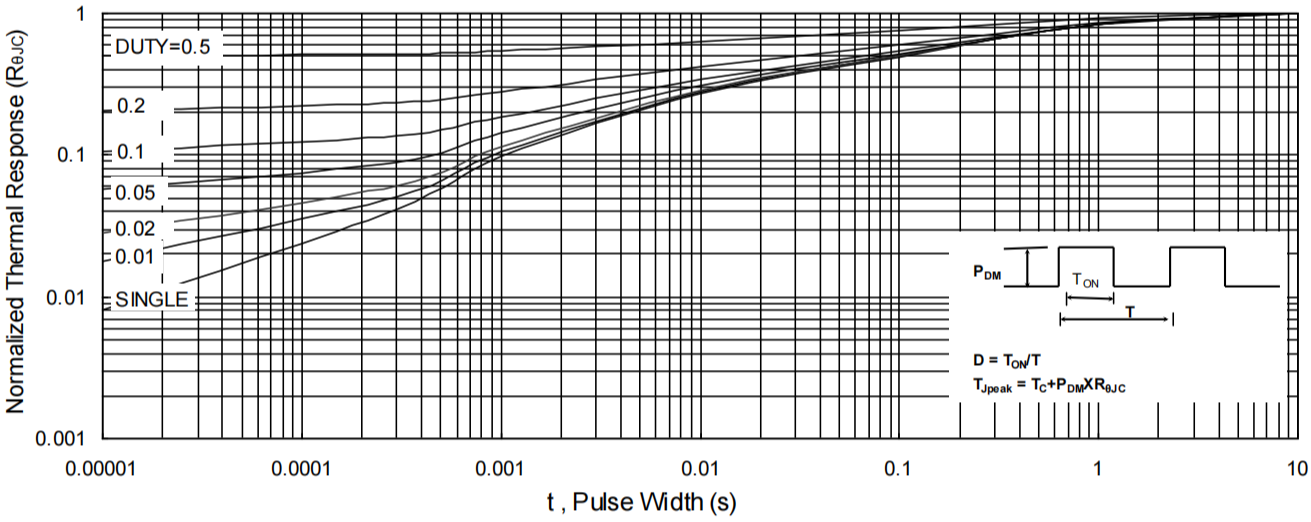


Fig.9 Normalized Maximum Transient Thermal Impedance

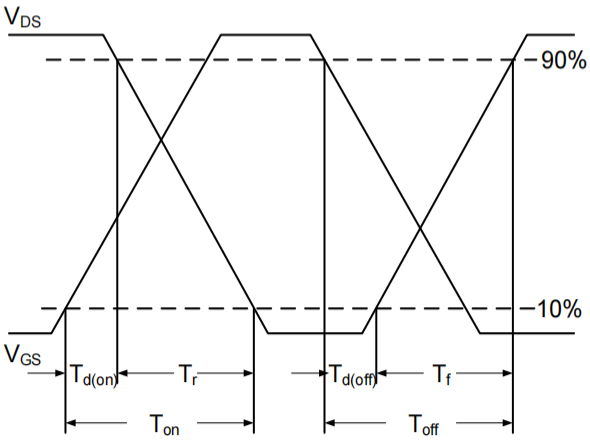


Fig.10 Switching Time Waveform

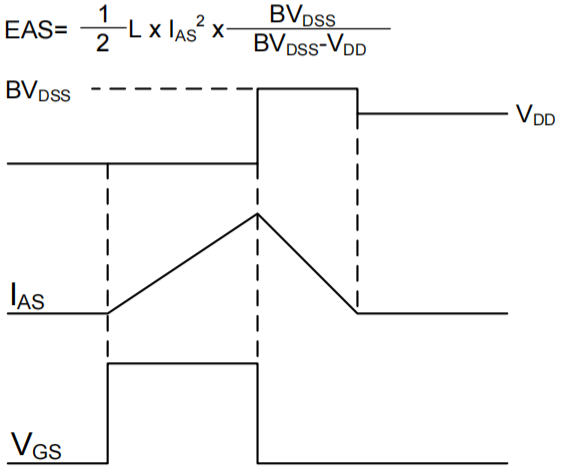
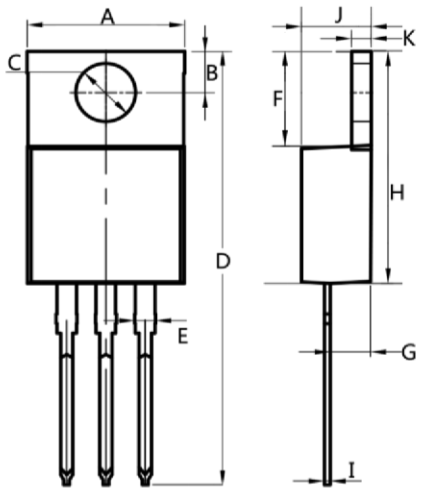


Fig.11 Unclamped Inductive Switching Waveform

TO-220AB



Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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