

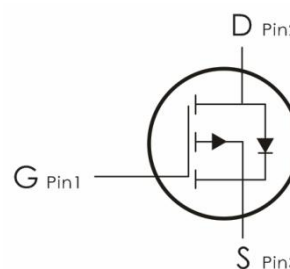
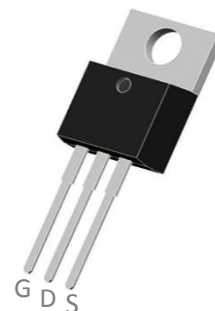
Description:

This P-Channel MOSFET 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.

Features:

- 1) $V_{DS}=-100V, I_D=-20A, R_{DS(on)}<90m\Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	-20	A
	Continuous Drain Current- $T_C=100^\circ C$	-14	A
I_{DM}	Pulsed Drain Current ¹	-85	A
P_D	Total Power Dissipation	58	W
E_{AS}	Single Pulsed Avalanche Energy	177	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.15	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	$^{\circ}\text{C}/\text{W}$

Package Marking and Ordering Information:

Part NO.	Marking	Package
IRF530NPBF	IRF530NPBF	TO-220

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourctce Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-100	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-100V	---	---	-50	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =-250 μ A	-1.2	-1.7	-2.5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-10A	---	78	90	m Ω
		V _{GS} =-4.5V, I _D =-8A	---	86	110	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	3020	---	pF
C _{oss}	Output Capacitance		---	120	---	
C _{rss}	Reverse Transfer Capacitance		---	73	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{2,3}	V _{DD} =-50V, I _D =-10A, V _{GS} =-10V, R _G =3.3 Ω	---	11	---	ns
t _r	Rise Time ^{2,3}		---	27	---	ns
t _{d(off)}	Turn-Off Delay Time ^{2,3}		---	78	---	ns
t _f	Fall Time ^{2,3}		---	53	---	ns
Q _g	Total Gate Charge ^{2,3}	V _{GS} =-10V, V _{DS} =-50V,	---	44	---	nC

Q_{gs}	Gate-Source Charge ^{2,3}	I _D =-20A	---	9	---	nC
Q_{gd}	Gate-Drain “Miller” Charge ^{2,3}		---	5.5	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage ²	V _{GS} =0V,I _S =-1A	---	---	-1.2	V
I_S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	-20	A
T_{rr}	Reverse Recovery Time	I _F =-8A , di/dt=-100A/μs , T _J =25℃	---	38.7	---	nS
Q_{rr}	Reverse Recovery Charge		---	22.4	---	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.88mH, I_{AS}=-18.9A$
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

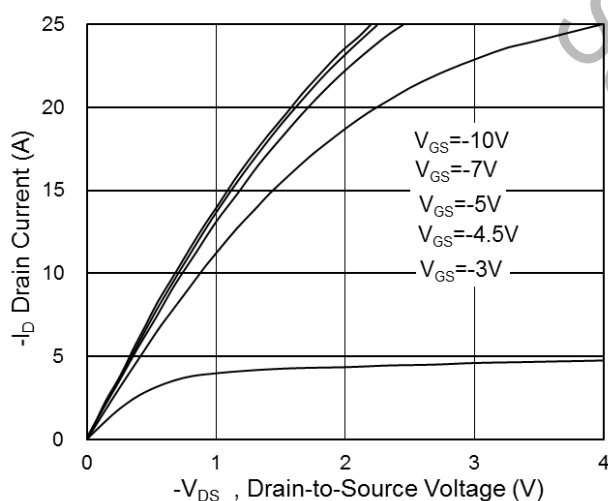


Fig.1 Typical Output Characteristics

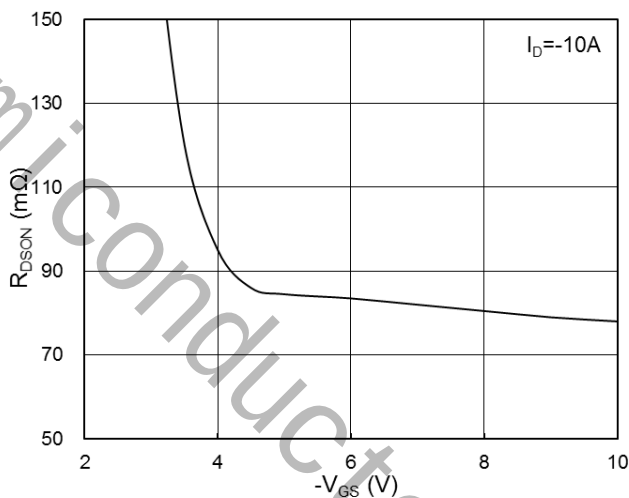
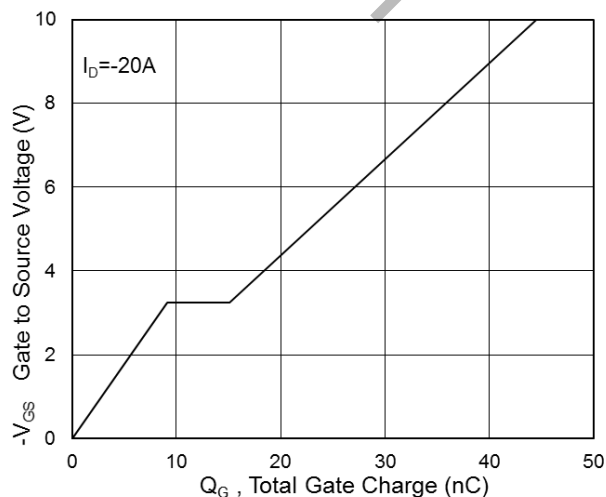
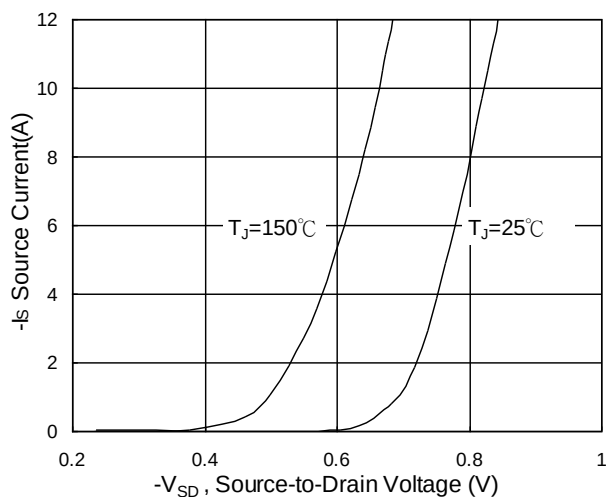


Fig.2 On-Resistance vs G-S Voltage



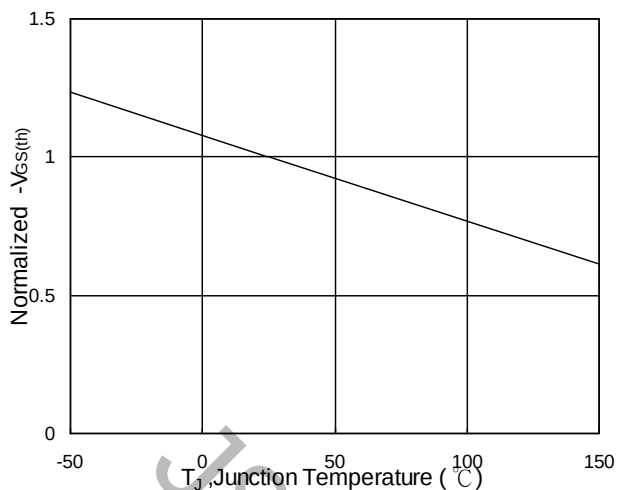
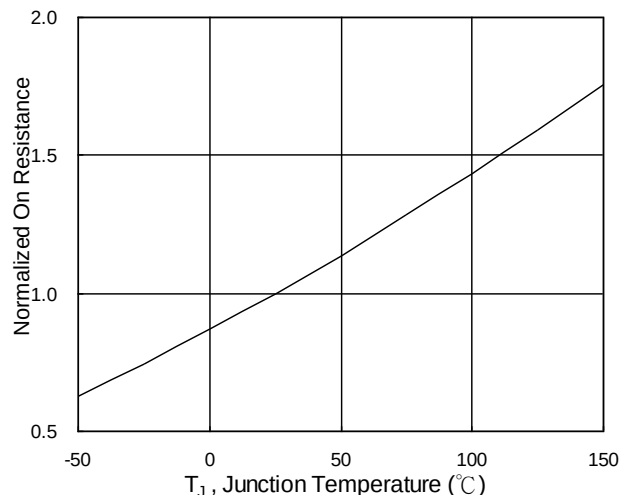
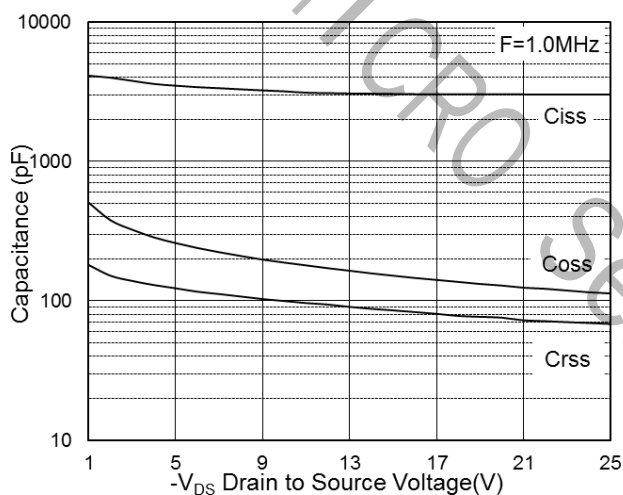

 Fig.5 Normalized $V_{GS(th)}$ vs T_J

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


Fig.7 Capacitance

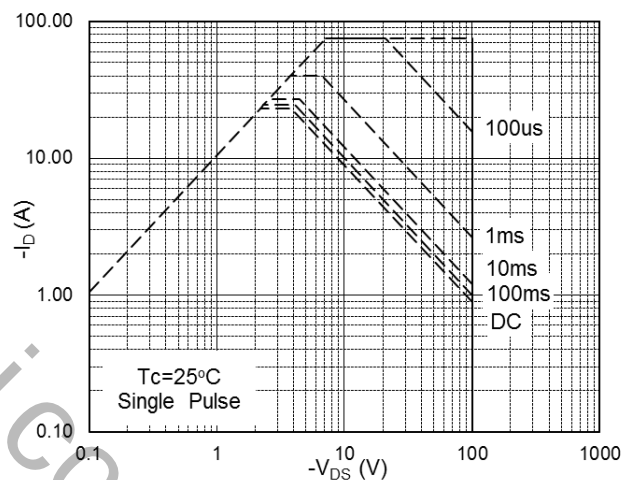


Fig.8 Safe Operating Area

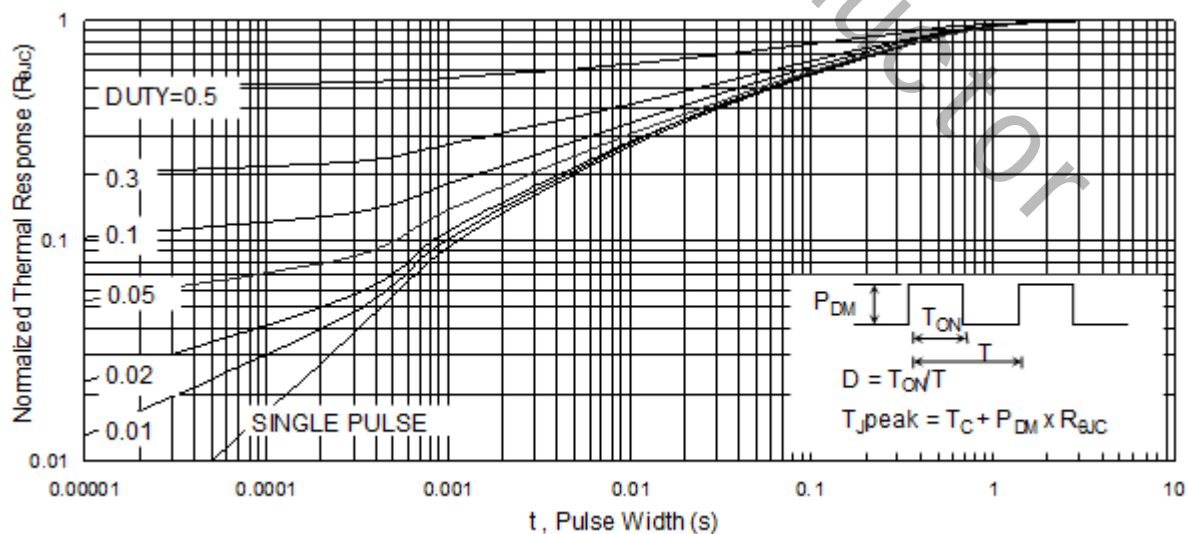


Fig.9 Normalized Maximum Transient Thermal Impedance

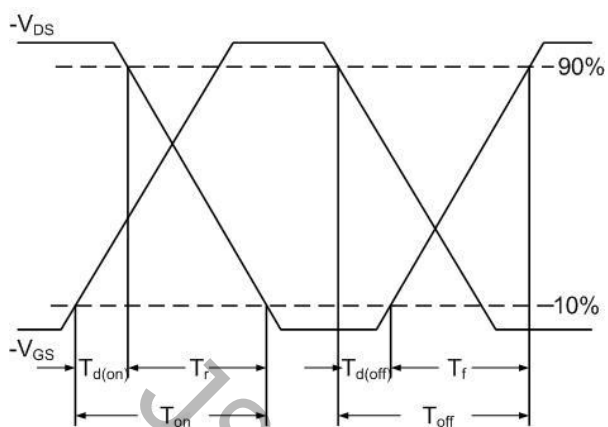


Fig.10 Switching Time Waveform

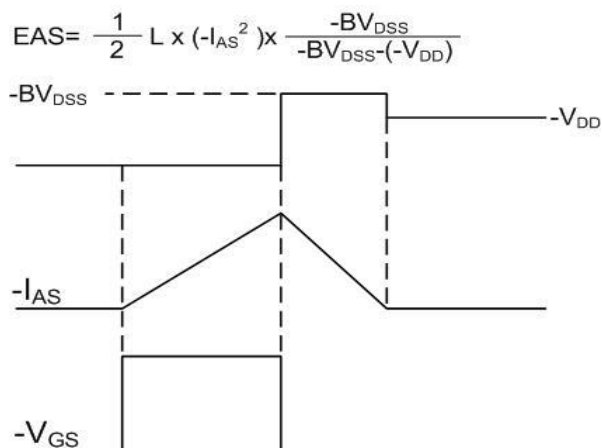


Fig.11 Unclamped Inductive Waveform