



General Description

The IRFB4115PBF use advanced SGT MOSFET technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness

General Features

$V_{DS} = 150V$ $I_D = 120A$

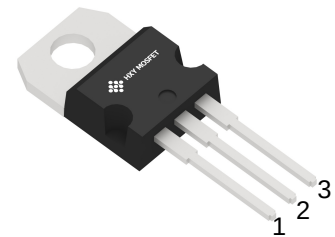
$R_{DS(ON)} < 11.5m\Omega @ V_{GS}=10V$

Applications

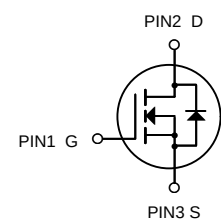
Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications



TO-220S



N-Channel MOSFET

Package Marking and Qrdering Information

Product ID	Pack	Marking	Qty(PCS)
IRFB4115PBF	TO-220S	120N15 XXX YYYY	50

Absolute Maximum Ratings at $T_j=25^{\circ}C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	150	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾	I_D	120	A
Pulsed drain current ²⁾	I_D , pulse	352	A
Power dissipation ³⁾	P_D	178.6	W
Single pulsed avalanche energy ⁵⁾	EAS	204.8	mJ
Operation and storage temperature	Tstg, T_j	-55 to 150	$^{\circ}C$
Thermal resistance, junction-case	$R_{\theta JC}$	0.7	$^{\circ}C/W$
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	52	$^{\circ}C/W$



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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	150	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 150V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	9.5	11.5	mΩ
Forward Transconductance ⁴		g _{fs}	V _{DS} = 10V, I _D = 20A	-	69	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 75V, V _{GS} =0V, f =1MHz	-	3310	-	pF
Output Capacitance		C _{oss}		-	268	-	
Reverse Transfer Capacitance		C _{rss}		-	9.4	-	
Gate Resistance		R _g	f = 1MHz	-	3.2	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 75V, I _D = 20A	-	45	-	nC
Gate-Source Charge		Q _{gs}		-	15	-	
Gate-Drain Charge		Q _{gd}		-	8.5	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} = 75V, R _G = 3Ω, I _D = 20A	-	16	-	ns
Rise Time		t _r		-	12	-	
Turn-Off Delay Time		t _{d(off)}		-	30	-	
Fall Time		t _f		-	18	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F =20A, dI/dt=100A/μs	-	76	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	182	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current T _C =25°C		I _S	-	-	-	120	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$
2. The EAS data shows Max. rating . The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 32A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.



Typical Characteristics

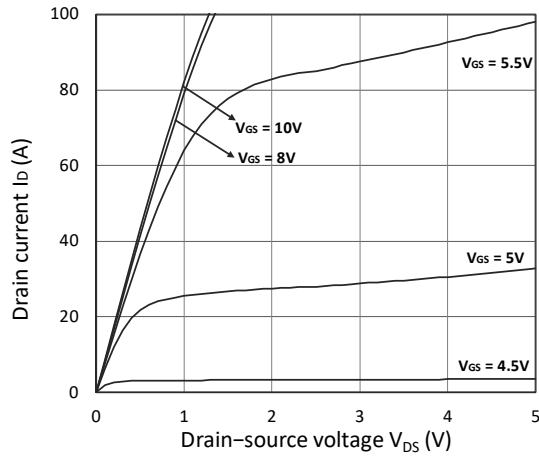


Figure 1. Output Characteristics

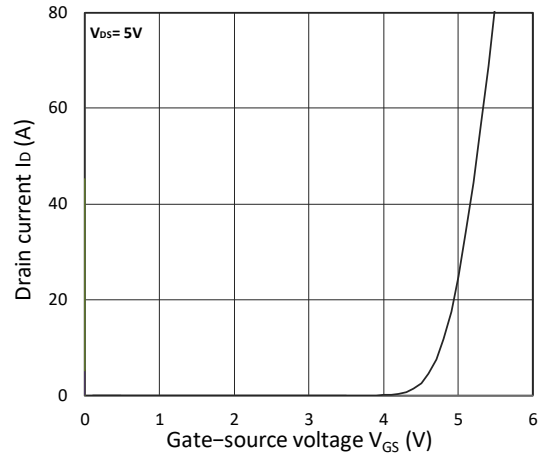


Figure 2. Transfer Characteristics

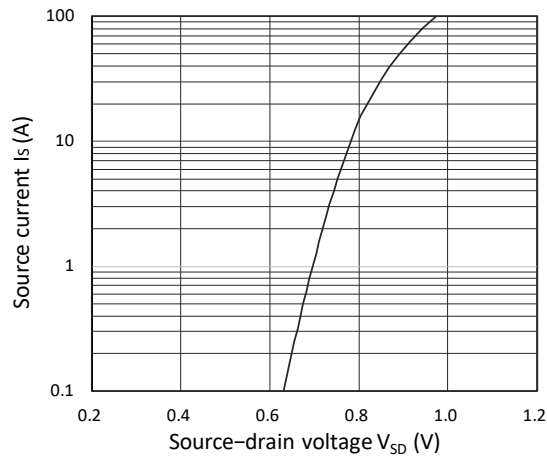


Figure 3. Forward Characteristics of Reverse

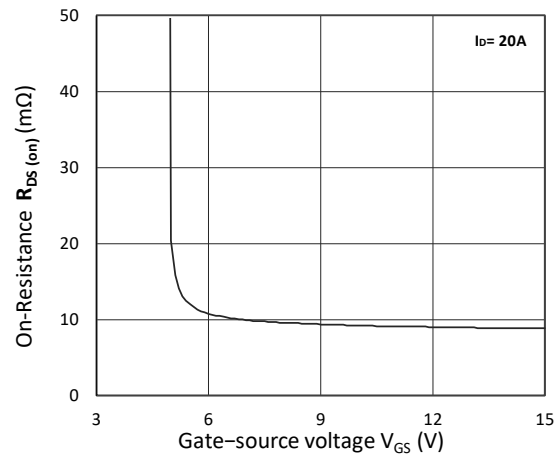


Figure 4. $R_{DS(on)}$ vs. V_{GS}

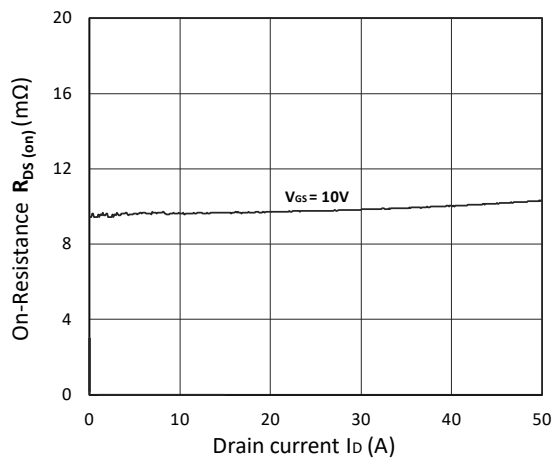


Figure 5. $R_{DS(on)}$ vs. I_D

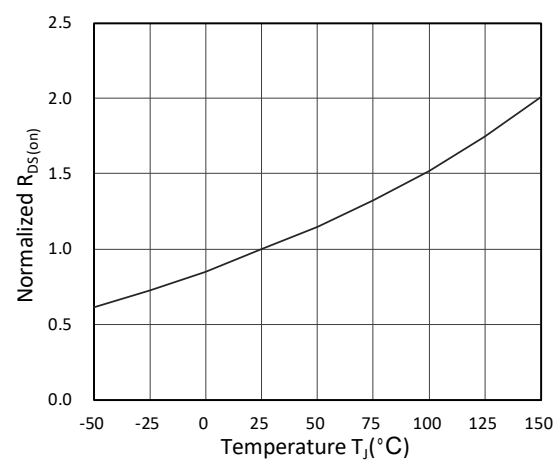


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

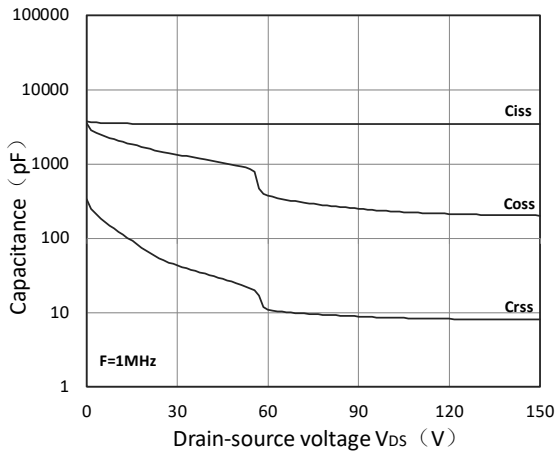


Figure 7. Capacitance Characteristics

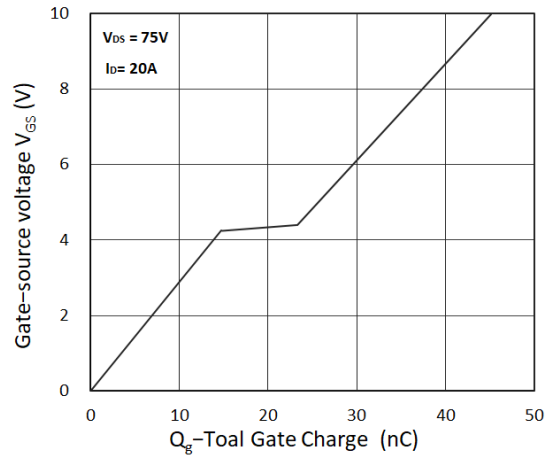


Figure 8. Gate Charge Characteristics

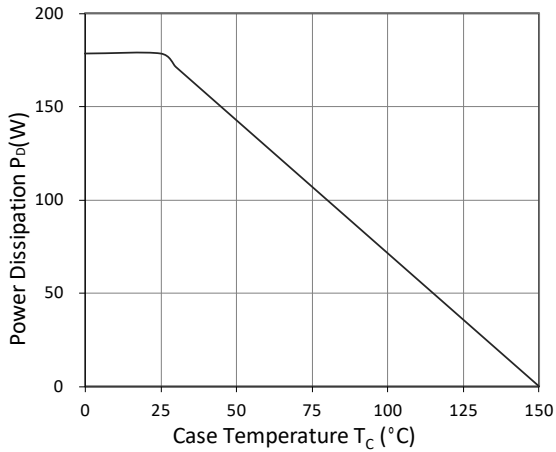


Figure 9. Power Dissipation

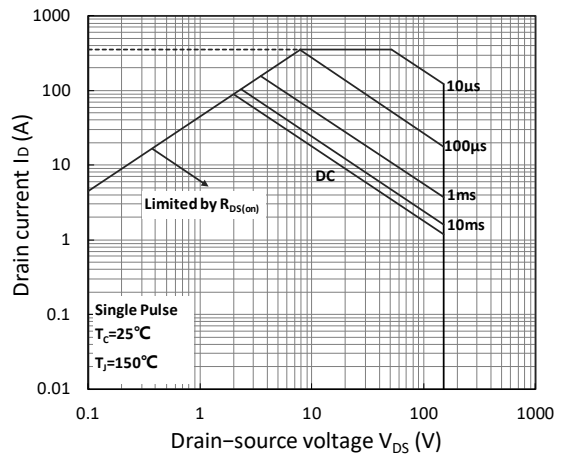


Figure 10. Safe Operating Area

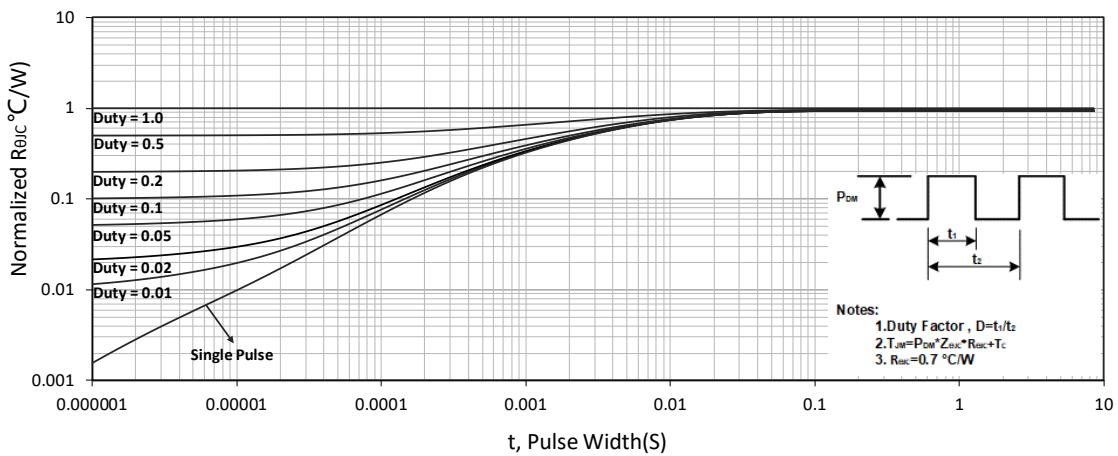


Figure 11. Normalized Maximum Transient Thermal Impedance



Test Circuit

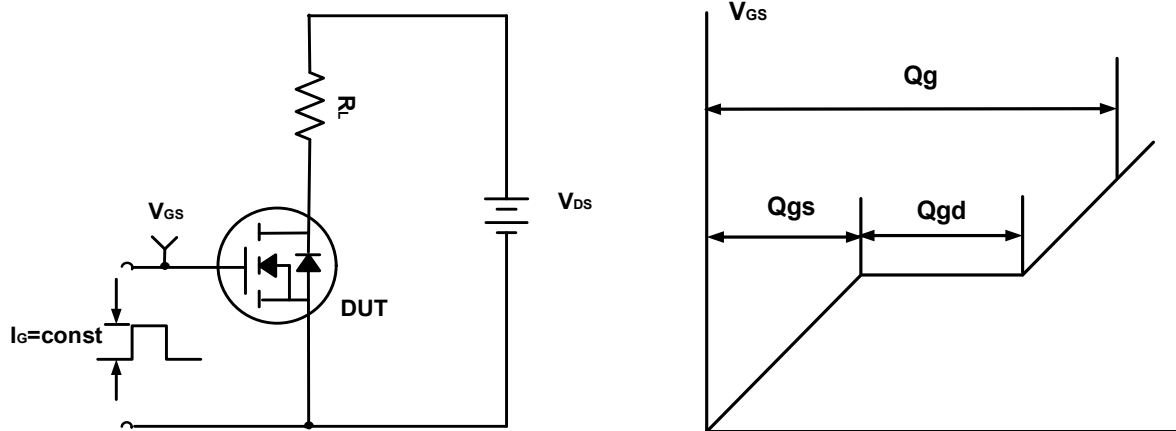


Figure A. Gate Charge Test Circuit & Waveforms

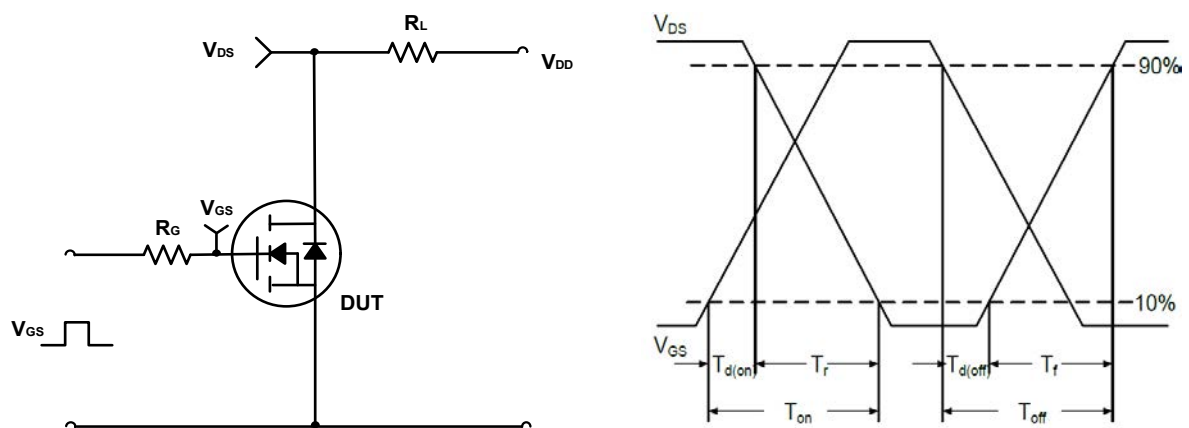


Figure B. Switching Test Circuit & Waveforms

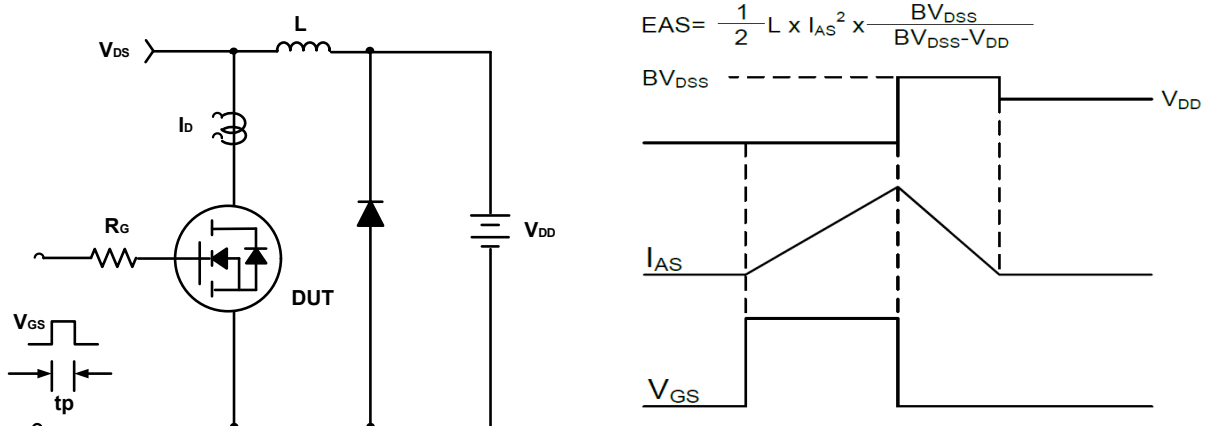
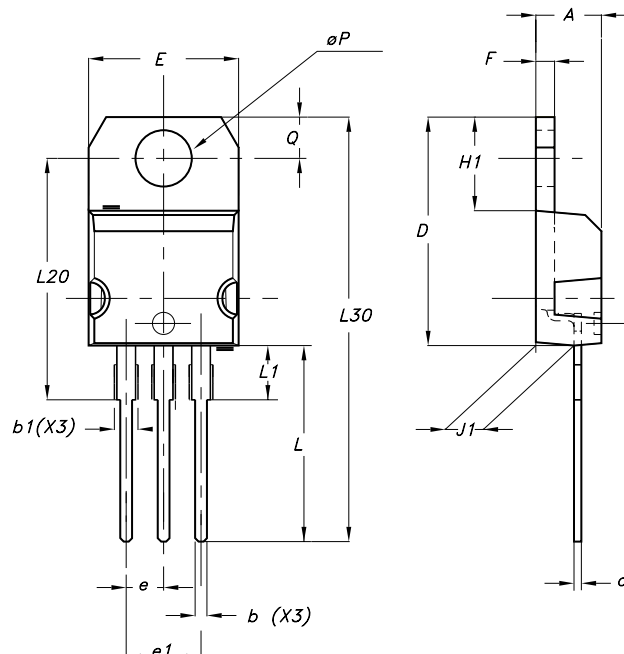


Figure C. Unclamped Inductive Switching Circuit & Waveforms



Package Information TO-220S



DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



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