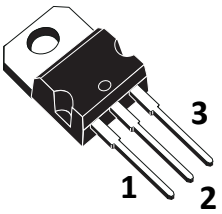
General Description

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

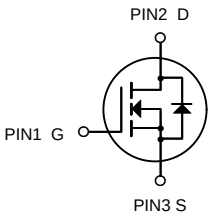


TO-220S

General Features

V_{DS} =150V I_D =120A

$R_{DS(ON)}$ < 11.5mΩ @ V_{GS}=10V



N-Channel MOSFET

Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

Package Marking and Qrdering Information

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

Absolute Maximum Ratings at Tj=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	150	V
Gate source voltage	VGS	±20	V
Continuous drain current[1)]	ID	120	A
Pulsed drain current[2)]	ID, 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，Tj	-55 to 150	℃
Thermal resistance, junction-case	RθJC	0.7	°C/W
Thermal resistance, junction-ambient[4)]	RθJA	52	°C/W

Electrical Characteristics（T_J = 25°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
Zero Gate Voltage Drain Current 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°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 ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

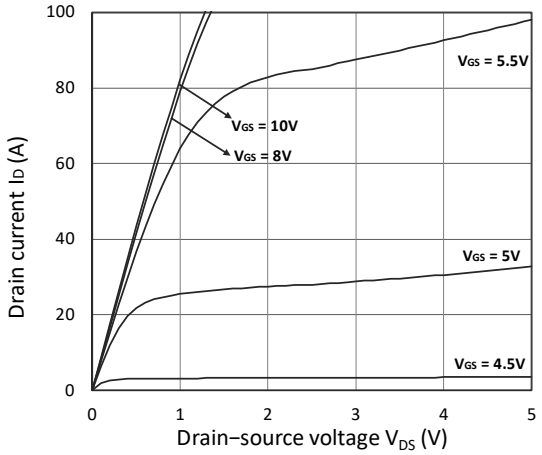


Figure 1. Output Characteristics

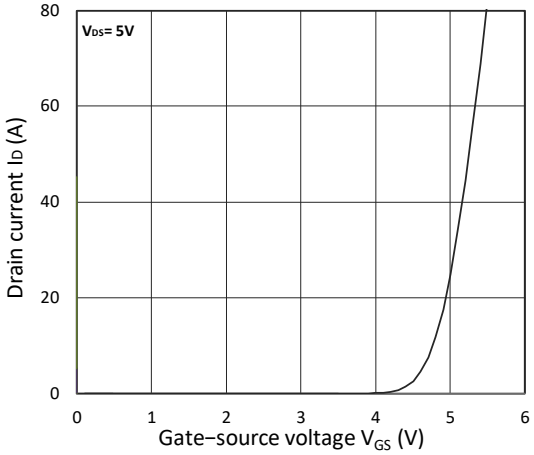


Figure 2. Transfer Characteristics

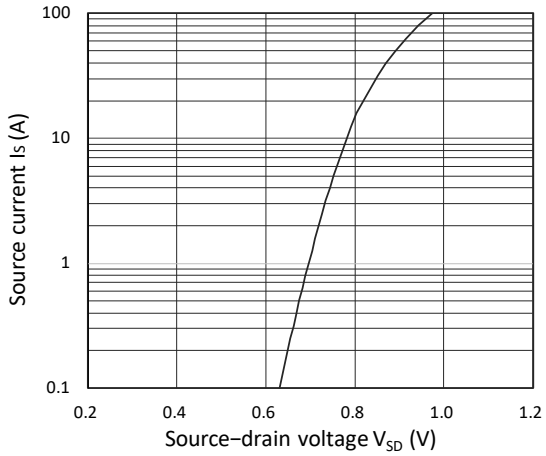


Figure 3. Forward Characteristics of Reverse

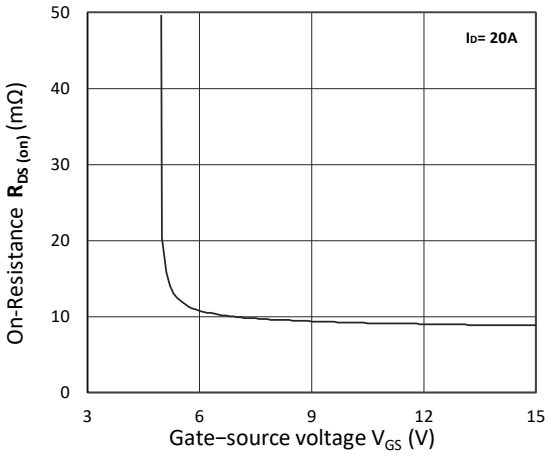


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

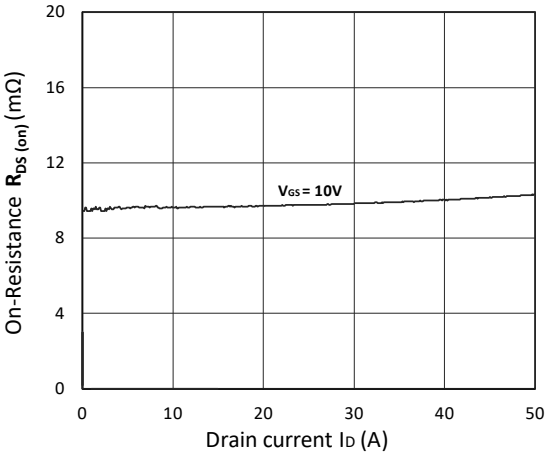


Figure 5. $R_{DS(ON)}$ vs. I_D

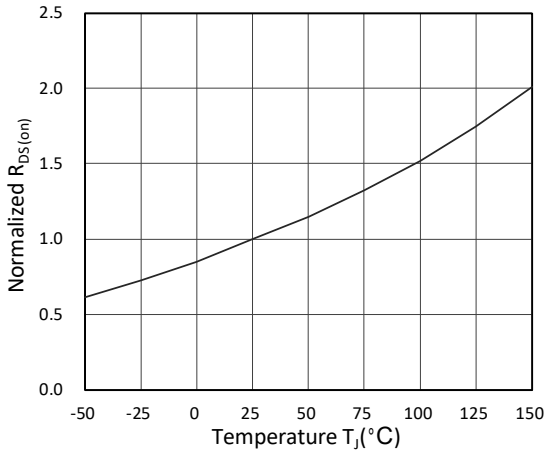


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

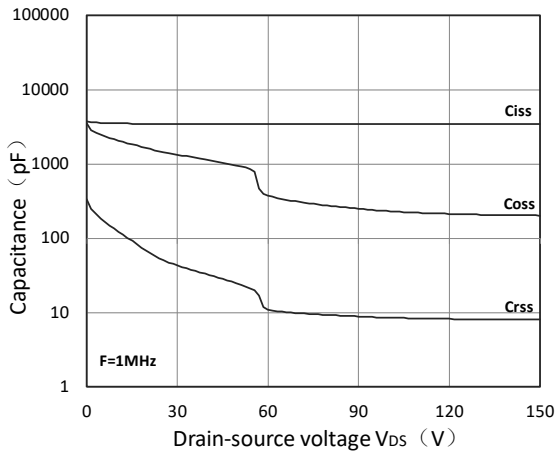


Figure 7. Capacitance Characteristics

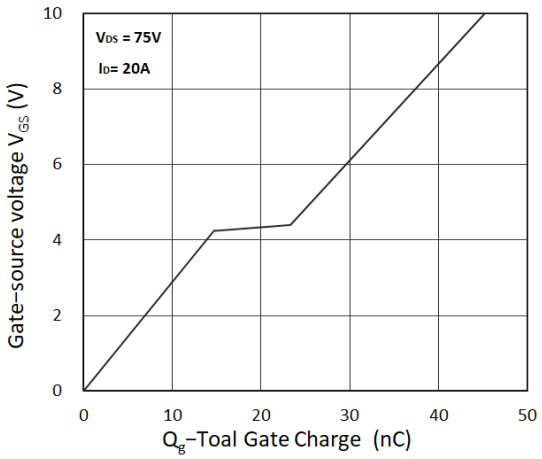


Figure 8. Gate Charge Characteristics

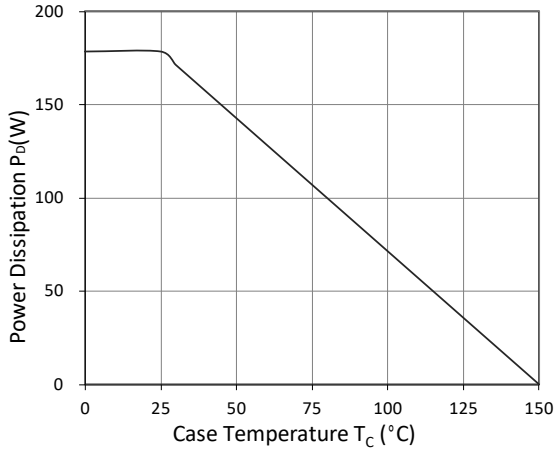


Figure 9. Power Dissipation

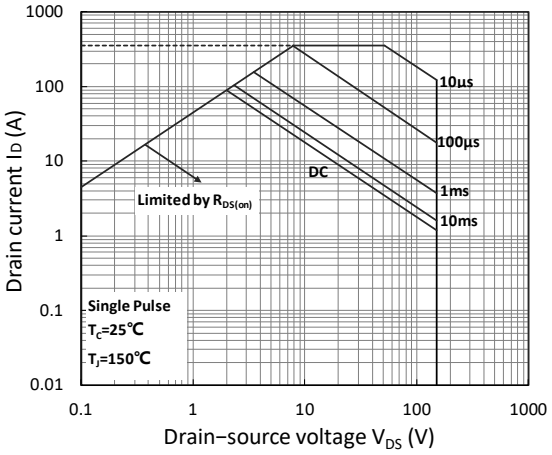


Figure10. Safe Operating Area

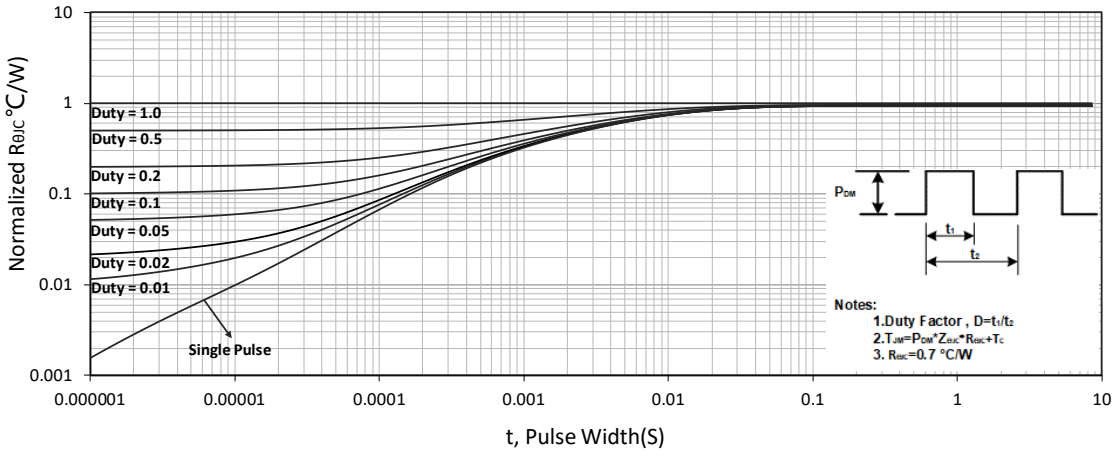


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

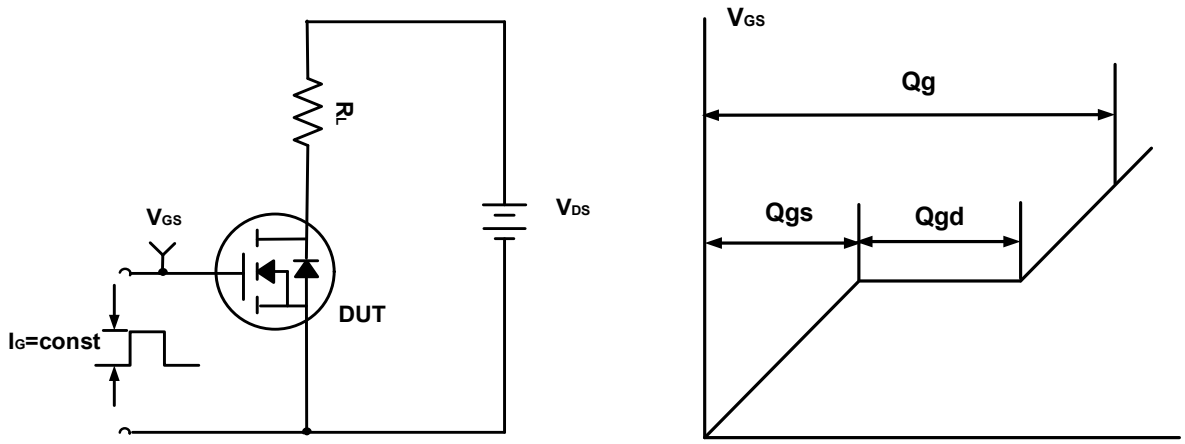


Figure A. Gate Charge Test Circuit & Waveforms

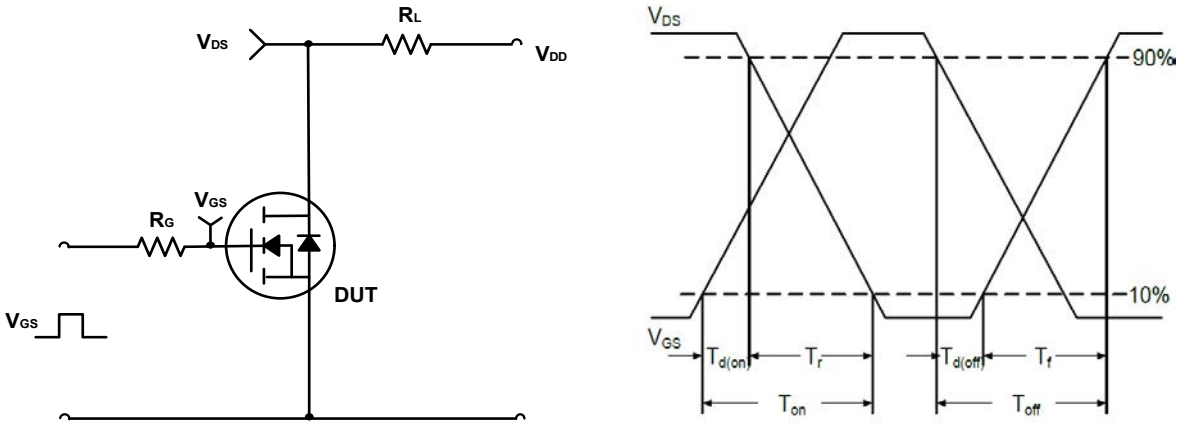


Figure B. Switching Test Circuit & Waveforms

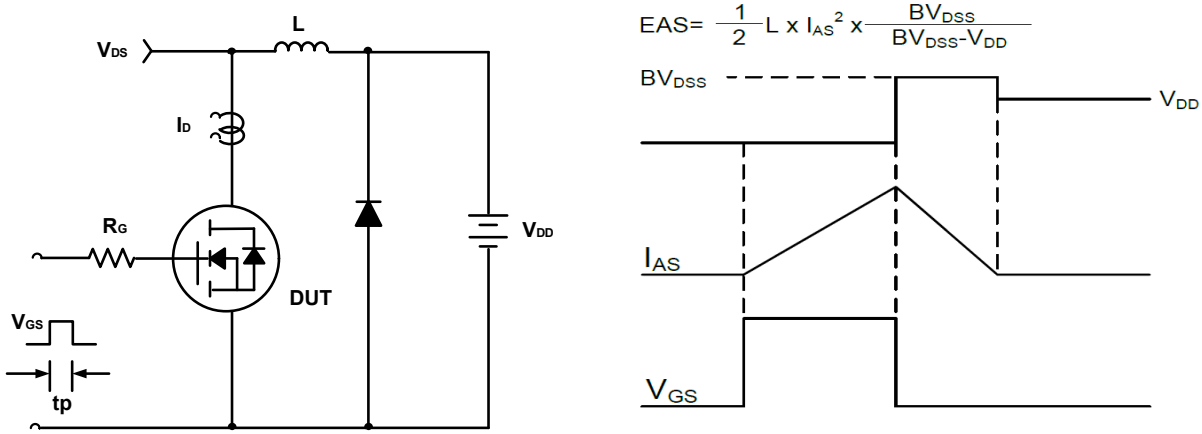
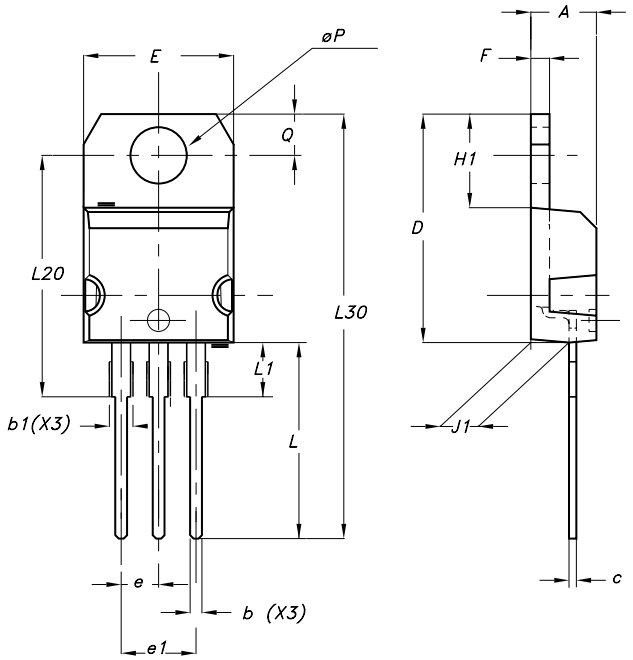


Figure C. Unclamped Inductive Switching Circuit & Waveforms

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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