



General Description

The IRFS4310ZTRL PBF 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 and suitable to use in

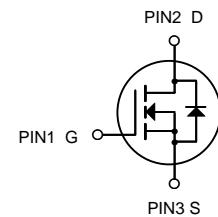


TO-263

General Features

$V_{DS} = 100V$ $I_D = 260A$

$R_{DS(ON)} < 2.8m\Omega @ V_{GS} = 10V$



N-Channel MOSFET

Applications

Consumer electronic power supply Motor control
Synchronous-rectification Isolated DC
Synchronous-rectification applications

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRFS4310ZTRL PBF	TO-263	FS4310Z XXXX	800

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	260	A
	$T_C = 100^\circ C$		163	
Pulsed Drain Current ¹		I_{DM}	1028	A
Single Pulse Avalanche Energy ²		EAS	583	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	379	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Resistance from Junction-to-Ambient ³		R_{θJA}	59	$^\circ C/W$
Thermal Resistance from Junction-to-Case		R_{θJC}	0.33	$^\circ C/W$



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	100	-	-	V
Gate-body Leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	V _{DS} =100V, 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	-	2.4	2.8	mΩ
Forward Transconductance ⁴	g _{fs}	V _{DS} =10V, I _D =20A	-	76	-	S
Dynamic Characteristics⁵						
Input Capacitance	C _{iss}	V _{DS} = 50V, V _{GS} = 0V, f = 1MHz	-	9030	-	pF
Output Capacitance	C _{oss}		-	1505	-	
Reverse Transfer Capacitance	C _{rss}		-	40	-	
Gate Resistance	R _g	f = 1MHz	-	2.3	-	Ω
Switching Characteristics⁵						
Total Gate Charge	Q _g	V _{GS} = 10V, V _{DS} = 50V, I _D =20A	-	150	-	nC
Gate-Source Charge	Q _{gs}		-	32.5	-	
Gate-Drain Charge	Q _{gd}		-	49	-	
Turn-on Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DD} = 50V, R _G = 3Ω, I _D = 20A	-	27	-	ns
Rise Time	t _r		-	78.5	-	
Turn-off Delay Time	t _{d(off)}		-	110	-	
Fall Time	t _f		-	86	-	
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI/dt=100A/μs	-	88	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	220	-	nC
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ⁴	V _{SD}	I _D = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	I _S	T _C =25°C	-	-	260	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}=54A.
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

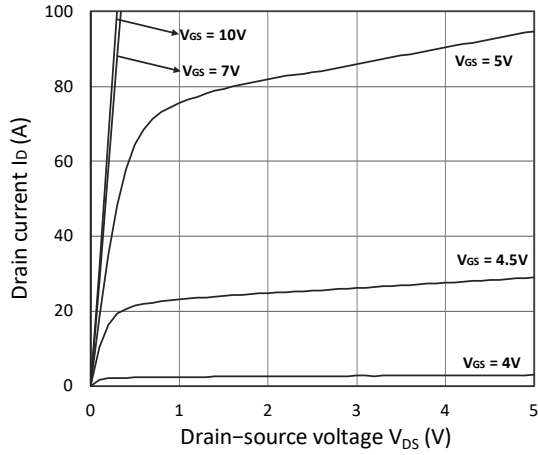


Figure 1. Output Characteristics

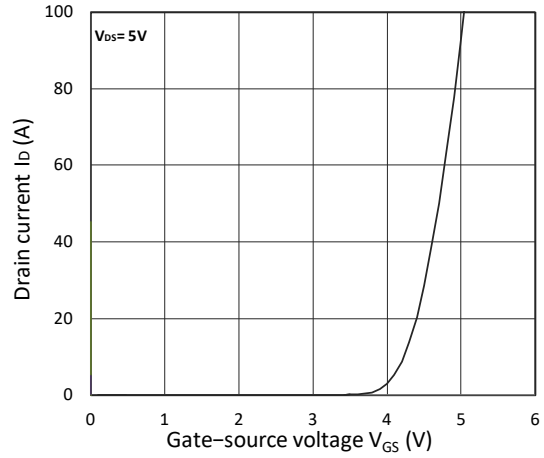


Figure 2. Transfer Characteristics

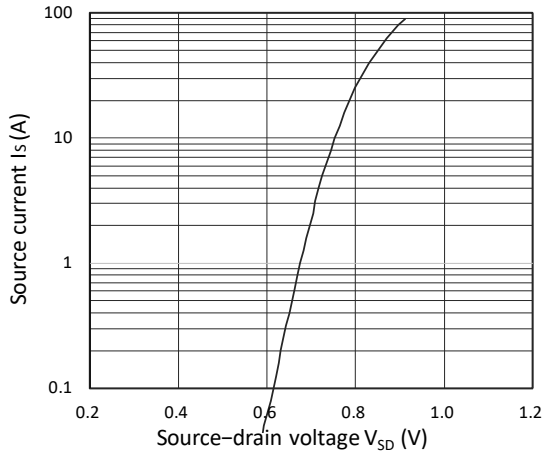


Figure 3. Forward Characteristics of Reverse

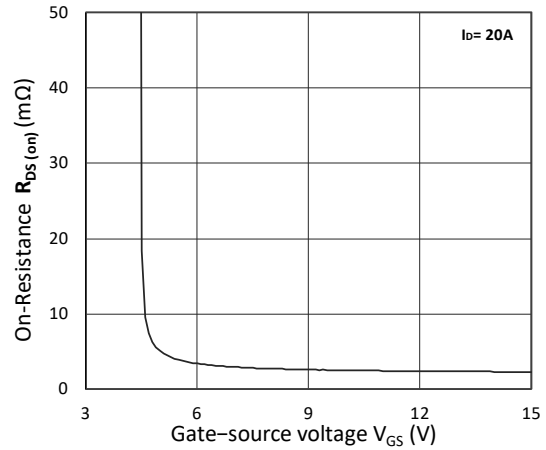


Figure 4. $R_{DS(on)}$ vs. V_{GS}

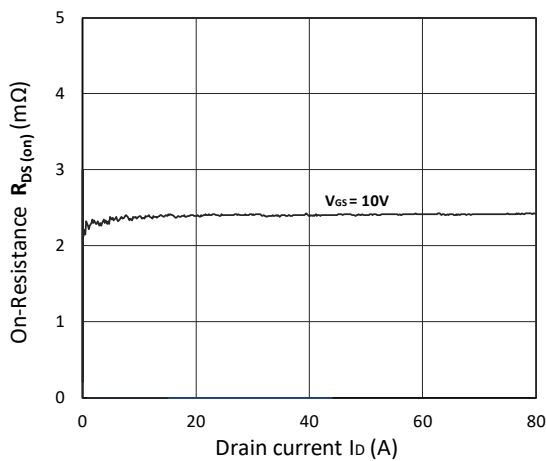


Figure 5. $R_{DS(on)}$ vs. I_D

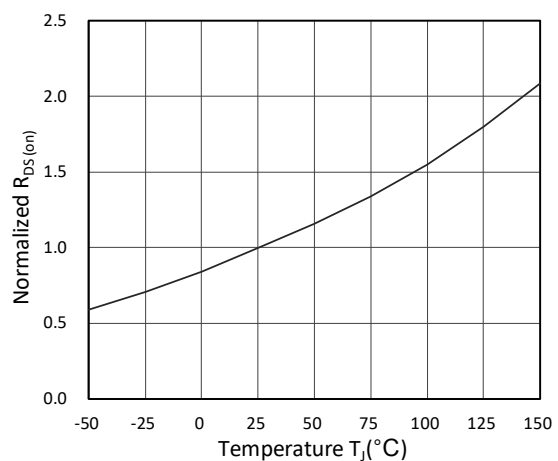


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

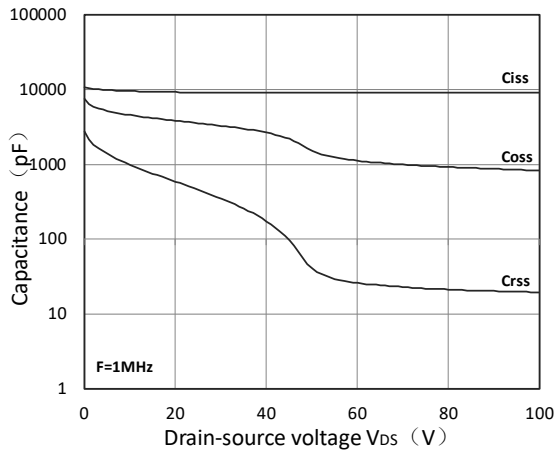


Figure 7. Capacitance Characteristics

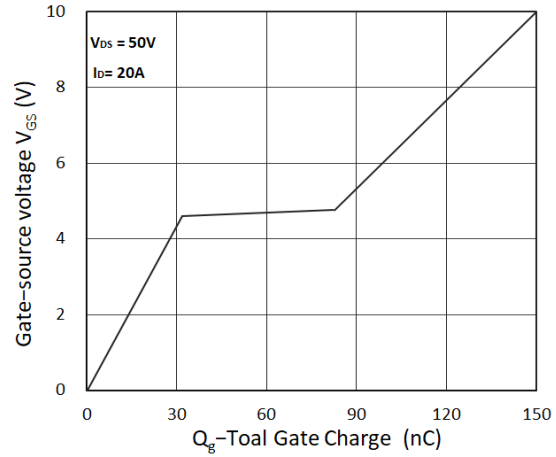


Figure 8. Gate Charge Characteristics

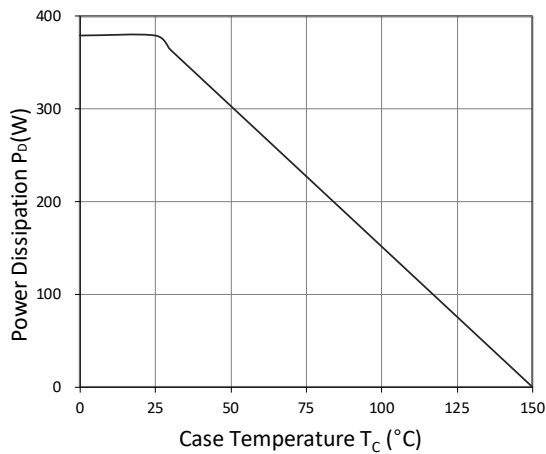


Figure 9. Power Dissipation

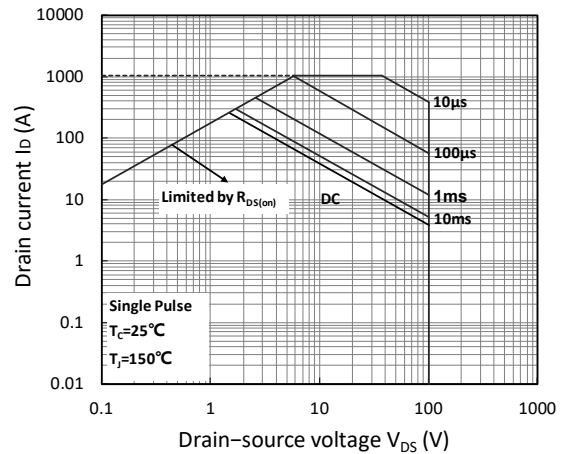


Figure 10. Safe Operating Area

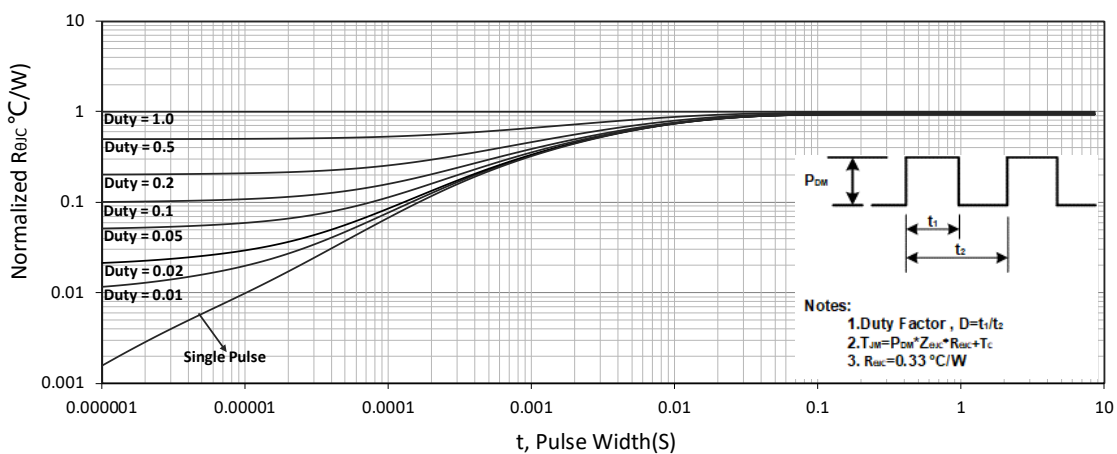


Figure 11. Normalized Maximum Transient Thermal Impedance



Test Circuit

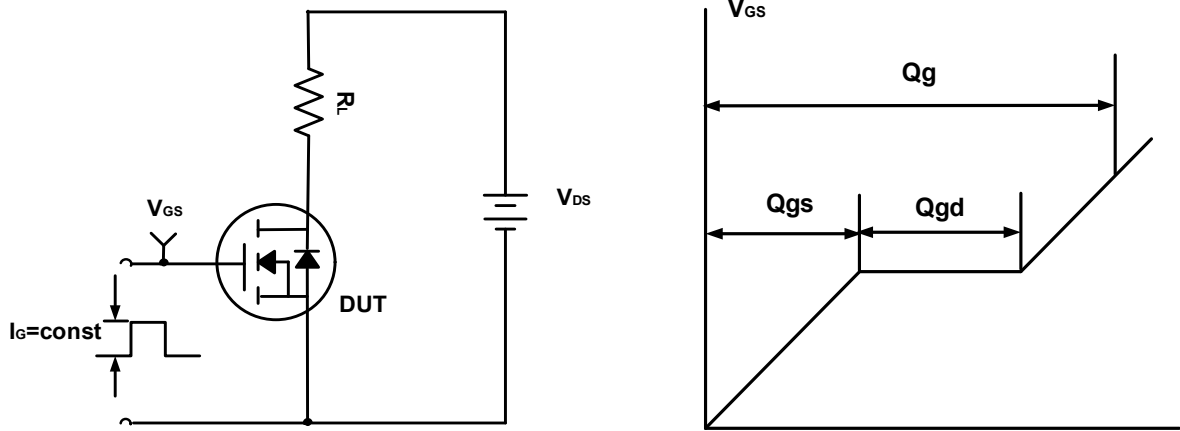


Figure A. Gate Charge Test Circuit & Waveforms

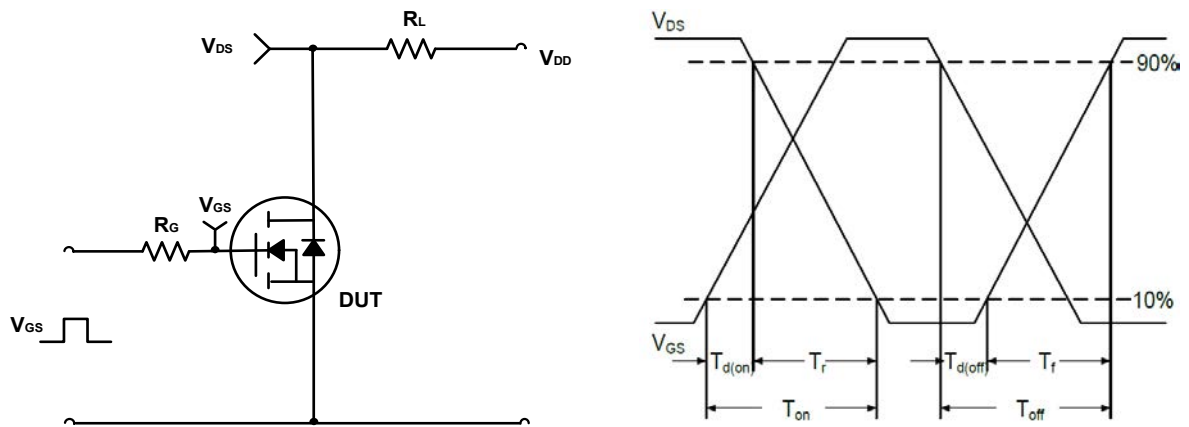


Figure B. Switching Test Circuit & Waveforms

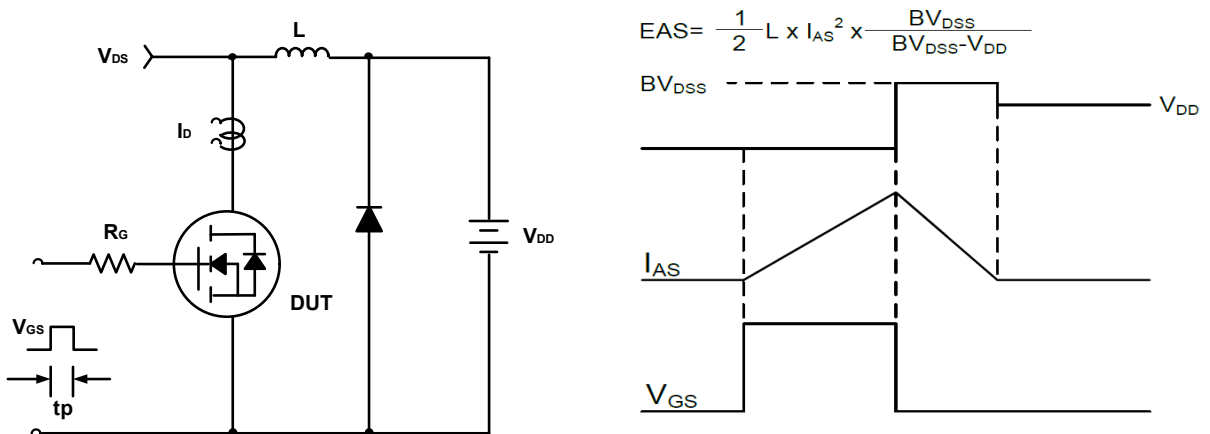
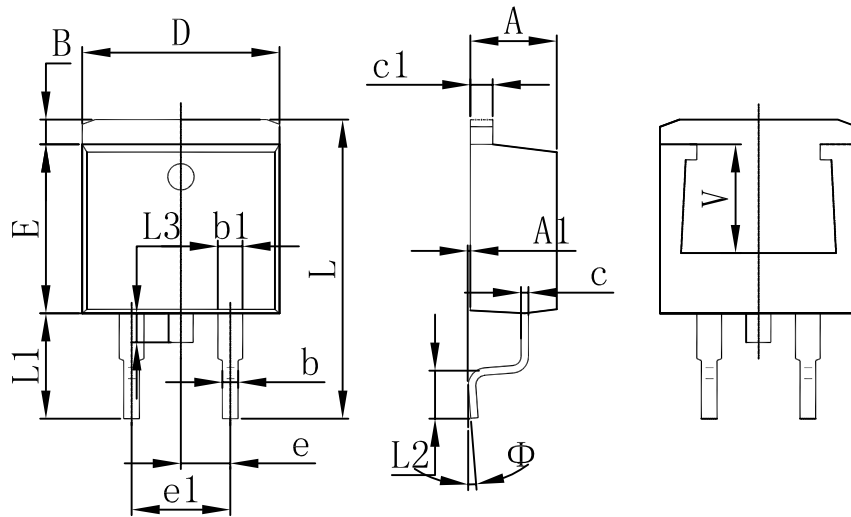


Figure C. Unclamped Inductive Switching Circuit & Waveforms



TO-263 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220REF.	



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