



General Description

The IRFR120ZTRPBF 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.

General Features

$V_{DS} = 100V$ $I_D = 12A$

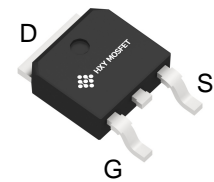
$R_{DS(ON)} < 120m\Omega$ @ $V_{GS}=10V$

Applications

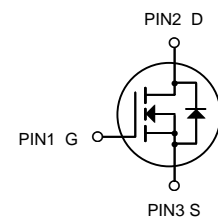
Consumer electronic power supply

Motor control

Synchronous-rectification



TO-252-2L
(DPAK)



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRFR120ZTRPBF	TO-252-2L(DPAK)	12N10 XXXXX	2500

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	100	V
V_{GS}	Gate source voltage	± 20	V
I_D	Continuous drain current ¹⁾	12	A
I_D , pulse	Pulsed drain current ²⁾	24	A
P_D	Power dissipation ³⁾	17	W
EAS	Single pulsed avalanche energy ⁴⁾	1.2	mJ
Tstg, T_j	Operation and storage temperature	-55 to 150	$^{\circ}C$
$R_{\theta JC}$	Thermal resistance, junction-case	6.6	$^{\circ}C/W$
$R_{\theta JA}$	Thermal resistance, junction-ambient ⁵⁾	62	$^{\circ}C/W$



Electrical Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	100	110	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics ^{note3}						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.8	3.0	V
R _{DS(on)}	Static Drain-Source On-Resistance ^{note2}	V _{GS} = 10V, I _D = 3A	-	95	120	mΩ
Dynamic Characteristics ^{note4}						
C _{iss}	Input Capacitance	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz	-	196	-	pF
C _{oss}	Output Capacitance		-	25.9	-	pF
C _{rss}	Reverse Transfer Capacitance		-	21.4	-	pF
Q _g	Total Gate Charge	V _{DS} = 50V, I _D = 3A, V _{GS} = 10V	-	4.3	-	nC
Q _{gs}	Gate-Source Charge		-	3.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	3.1	-	nC
Switching Characteristics ^{note4}						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 50V, I _{DS} =3A R _G = 2Ω, V _{GEN} = 10V	-	14.7	-	ns
t _r	Turn-On Rise Time		-	3.5	-	ns
t _{d(off)}	Turn-Off Delay Time		-	20.9	-	ns
t _f	Turn-Off Fall Time		-	2.7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current ^{note2}		-	-	4.5	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V _{SD}	Drain to Source Diode Forward Voltage ^{note3}	V _{GS} = 0V, I _S =3A	-	-	1.3	V
t _{rr}	Body Diode Reverse Recovery Time	V _{GS} = 0V, I _F = 3A, di/dt =100A/μs	-	32.1	-	ns
Q _{rr}	Body Diode Reverse Recovery Time Charge		-	39.4	-	nC
I _{rrm}	Peak Reverse Recovery Current		-	2.1	-	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. $V_{DD}=50$ V, $R_G=50$ Ω , $L=0.3$ mH, starting $T_J=25^{\circ}\text{C}$



Typical Performance Characteristics

Figure1: Output Characteristics

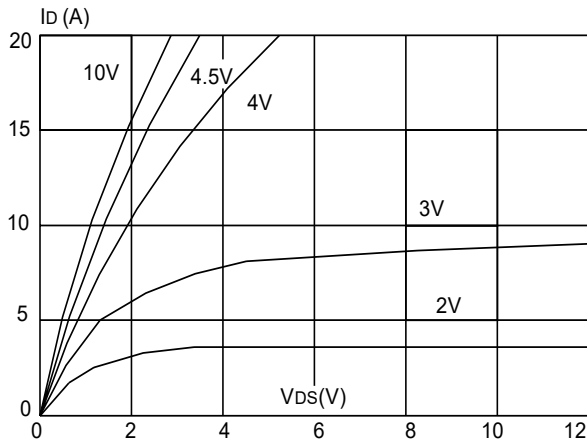


Figure 2: Typical Transfer Characteristics

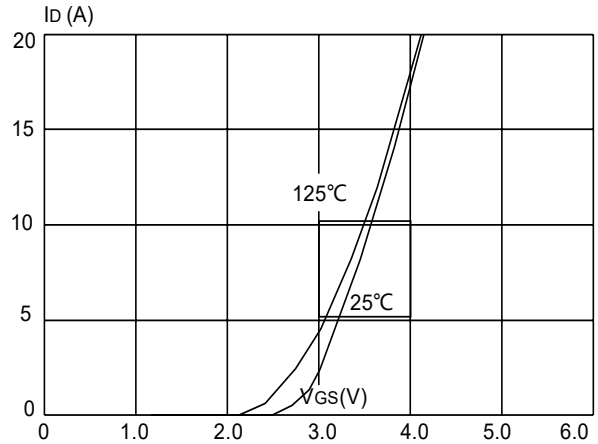


Figure 3: On-resistance vs. Drain Current

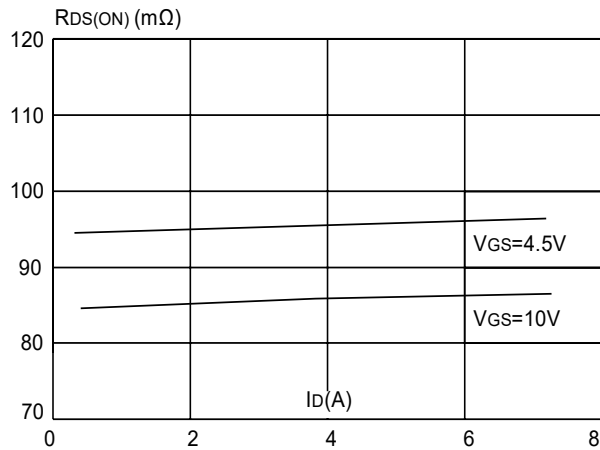


Figure 4 : Body Diode Characteristics

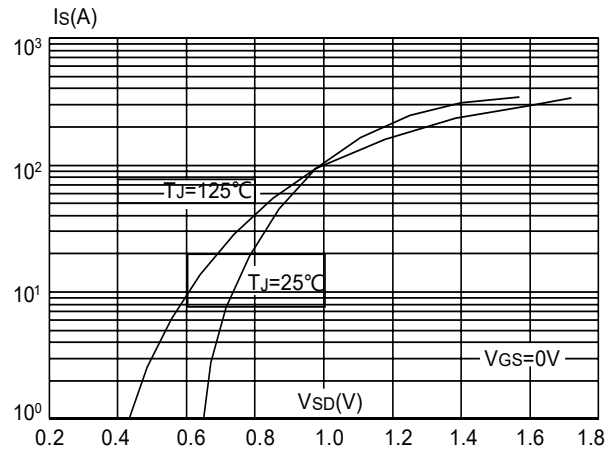


Figure 5: Gate Charge Characteristics

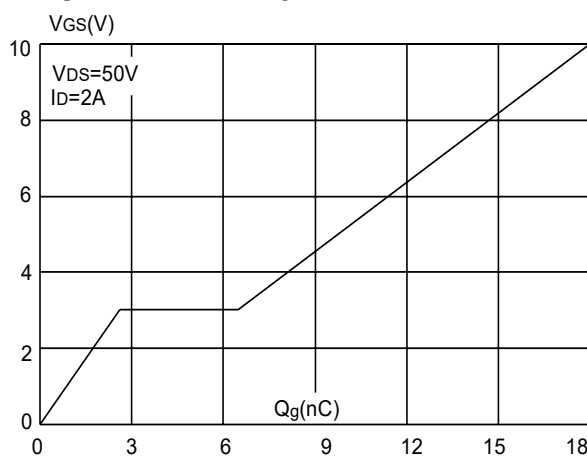


Figure 6: Capacitance Characteristics

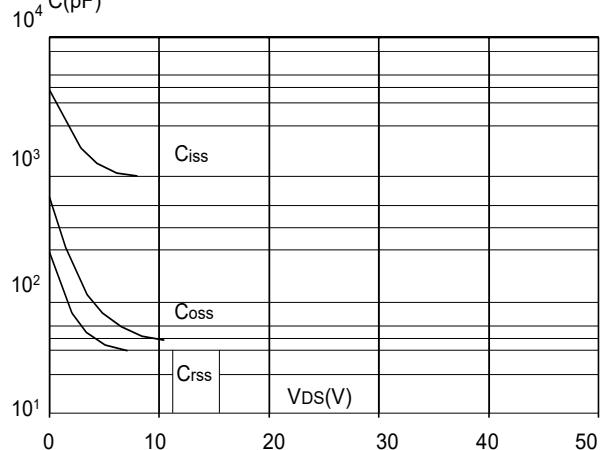




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

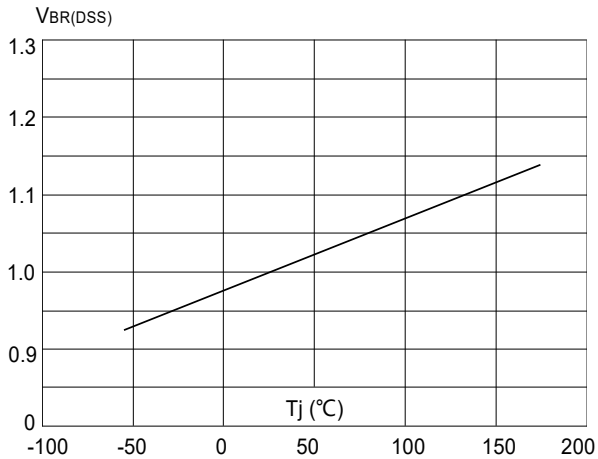


Figure 8: Normalized on Resistance vs. Junction Temperature

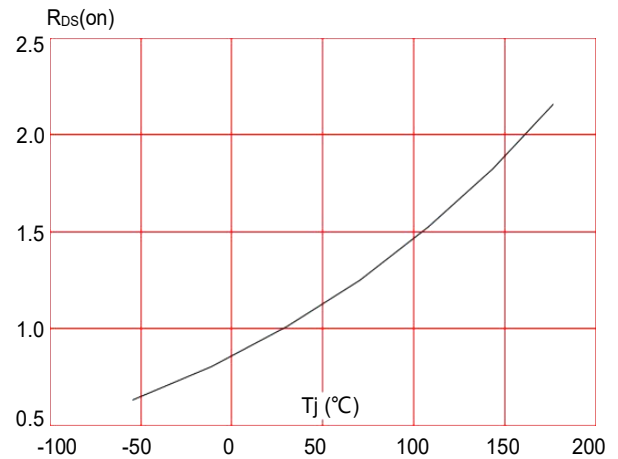


Figure 9: Maximum Safe Operating Area

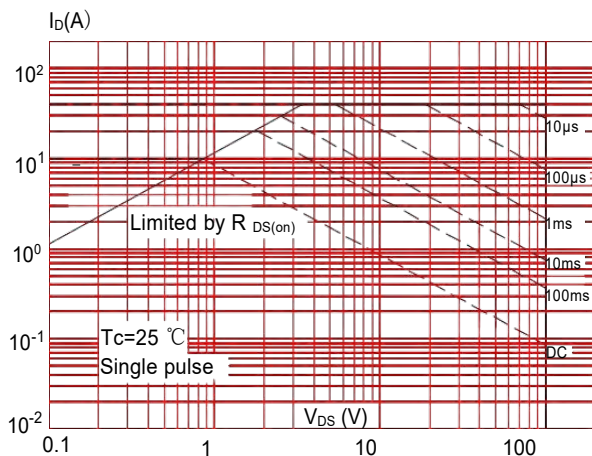


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

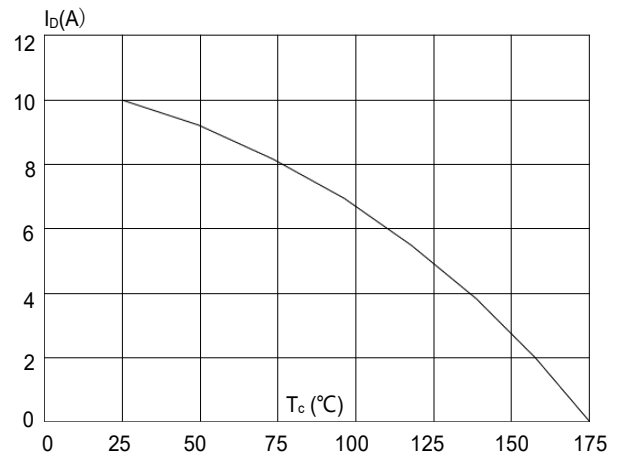
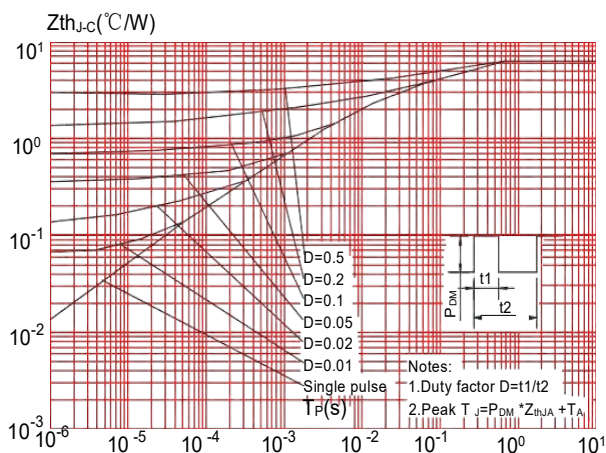
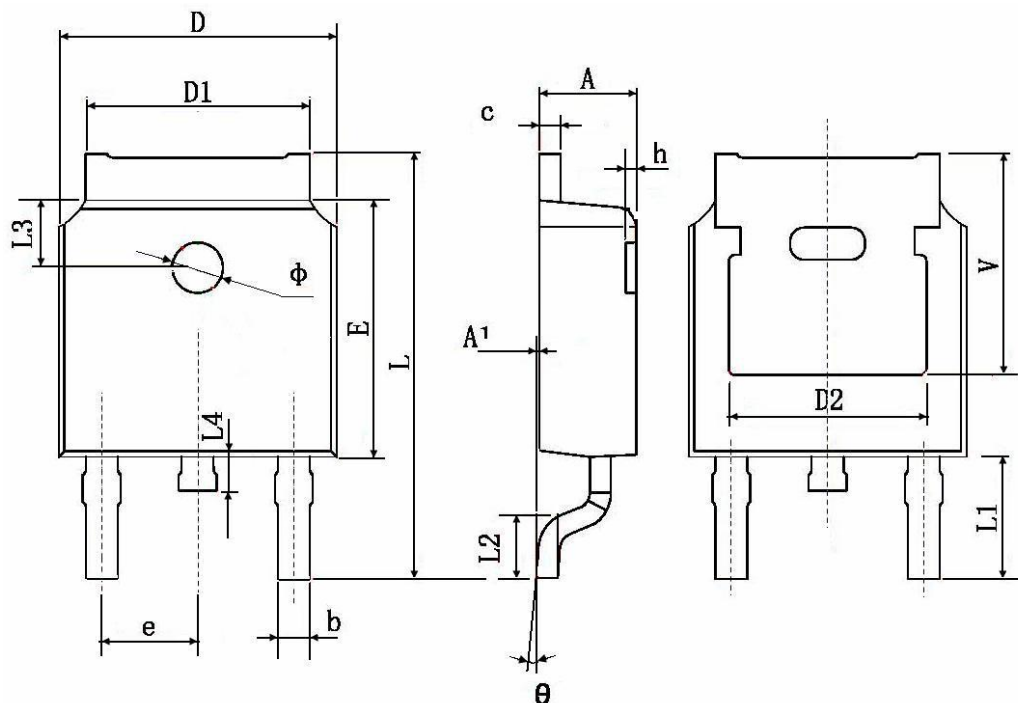


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





TO-252-2L(DPAK) Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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