TECH PUBLIC
台舟电子

IRFR540ZTRPBF-TP
N-Channel MOSFET

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Product Summary

- V_{DS} 100 V
- I_{DS} 50A
- $R_{DS\,(ON)}$ (at V_{GS}=10V) ≤18mΩ (TYP)
- Advanced Trench Technology

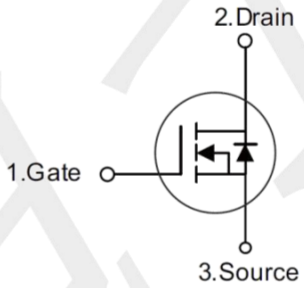
Application

- Reverse Battery protection
- Load switch
- Power management
- PWM Application

Package and Pin Configuration

T0-252

Circuit diagram



Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	50	A
	T_C=100℃		30	
Pulsed Drain Current		I_{DM}	200	A
Total Power Dissipation	T_C=25℃	P_{DTOT}	100	W
Operating Junction Temperature Range		T_J	-55 to +175	℃
Storage Temperature Range		T_{stg}	-55 to +175	℃

Thermal Characteristic

PARAMETER		Symbol	Value	Unit
Thermal Resistance,Junction to Case	PCB Mount (Note)	$R_{\theta JC}$	2	°C/W

Note : When mounted on 1" square PCB (FR4 material).

Electrical Characteristics (T_A=25℃unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	100	--	--	V
Gate-Source Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	$V_{GS(th)}$	2.0	3.0	4.0	V
Gate-Source Leakage	V_{DS}=0V, V_{GS}= ±20V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}= 80V, V_{GS}=0V	I_{DSS}	--	--	1	μA
	V_{DS}= 80V, T_J=125°C		--	--	50	μA
Drain-Source On-State Resistance (Note 1)	V_{GS}= 10V, I_D= 20A	R_{DS}(on)	--	18	22.5	mΩ
	V_{GS}= 4.5V, I_D= 20A		--	22	27.5	
Dynamic (Note 2)						
Total Gate Charge (Note 3)	V_{DS} = 50V, I_D =10A, V_{GS} = 10V	Q_g	--	33.3	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	6.9	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	5.1	--	
Input Capacitance	V_{DS} = 50V, V_{GS} = 0V, F= 1.0MHz	C_{iss}	--	1870	--	pF
Output Capacitance		C_{oss}	--	260	--	
Reverse Transfer Capacitance		C_{rss}	--	6.9	--	
Switching						
Turn-On Delay Time (Note 3)	V_{DD} = 50V, I_D= 10A, V_{GS} = 10V, R_{GEN} = 6Ω	$t_{d(on)}$	--	6.5	--	nS
Rise Time (Note 3)		t_r	--	7	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	19.6	--	
Fall Time (Note 3)		t_f	--	8	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	V_{GS} = 0V, I_S = 20A	V_{SD}	--	0.8	1.3	V
Continuous Source Current	Integral reverse diode in the MOSFET	I_S	--	--	50	A
Pulsed Current (Note 1)		I_{SM}	--	--	200	A

Notes:

1. Pulse test; pulse width ≤ 300 μS, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature

TYPICAL CHARACTERISTICS

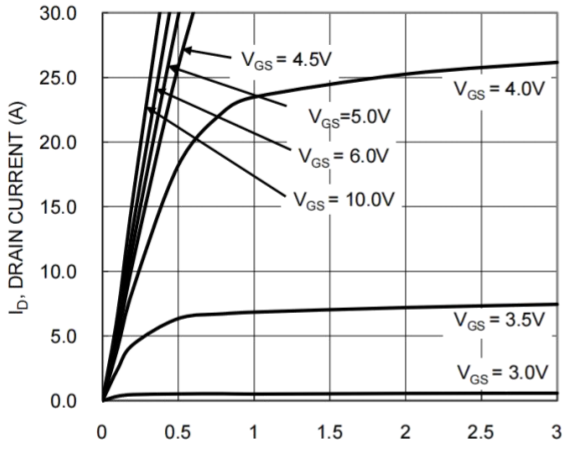


Figure 1. Typical Output Characteristic

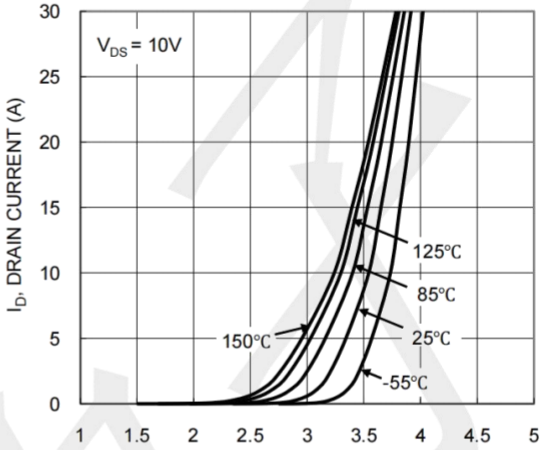


Figure 2. Typical Transfer Characteristic

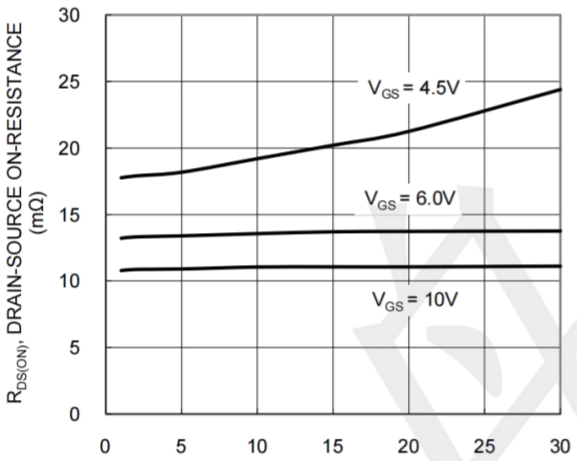


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

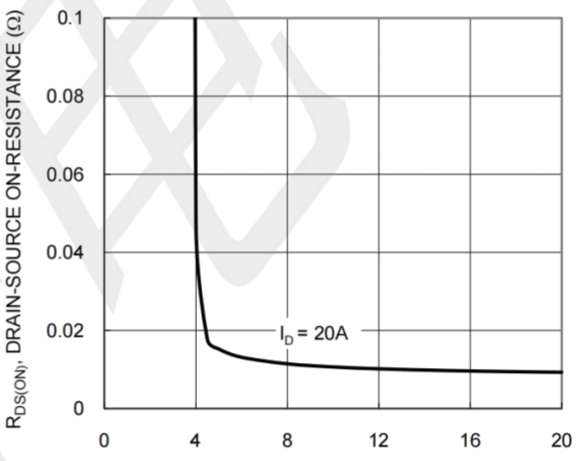


Figure 4. Typical Transfer Characteristic

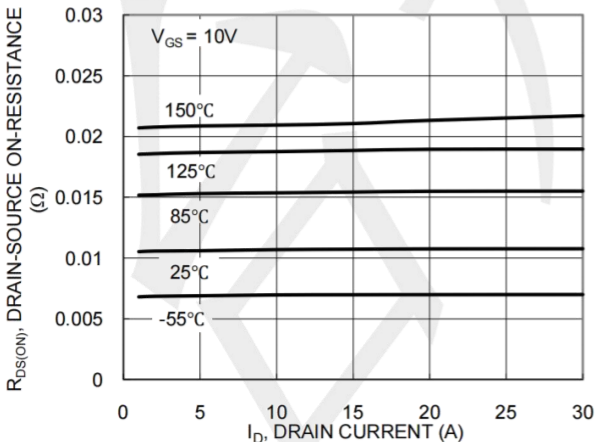


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

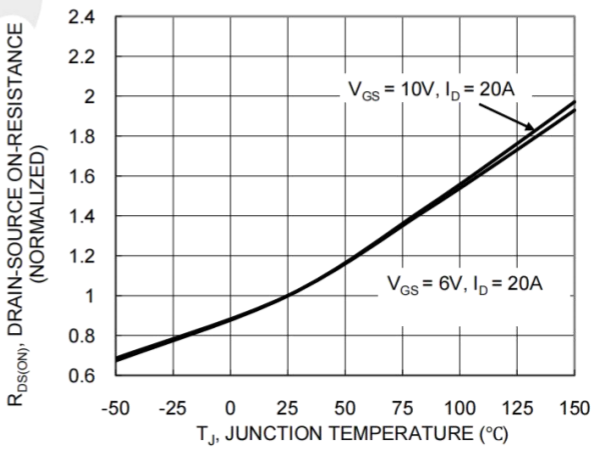


Figure 6. On-Resistance Variation with Junction Temperature

TYPICAL CHARACTERISTICS

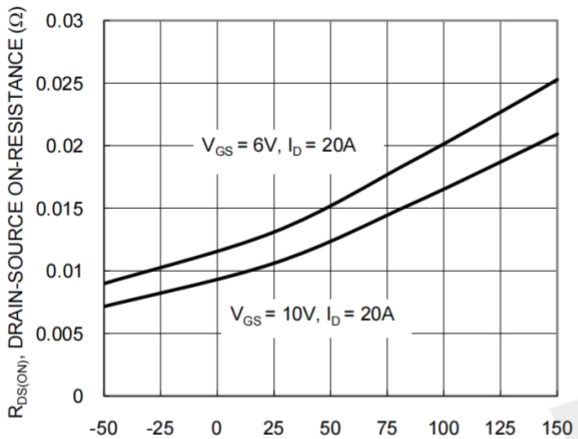


Figure 7. On-Resistance Variation with Junction Temperature

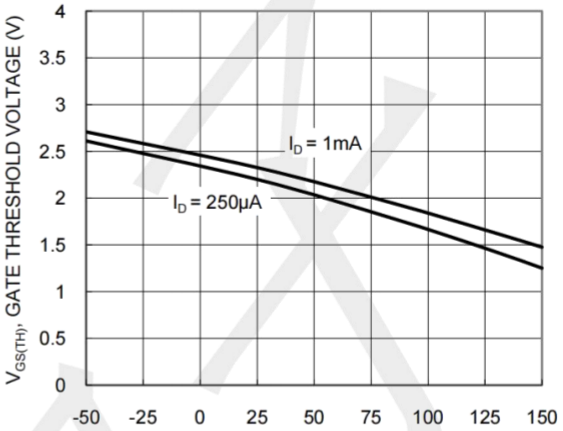


Figure 8. Gate Threshold Variation vs. Junction Temperature

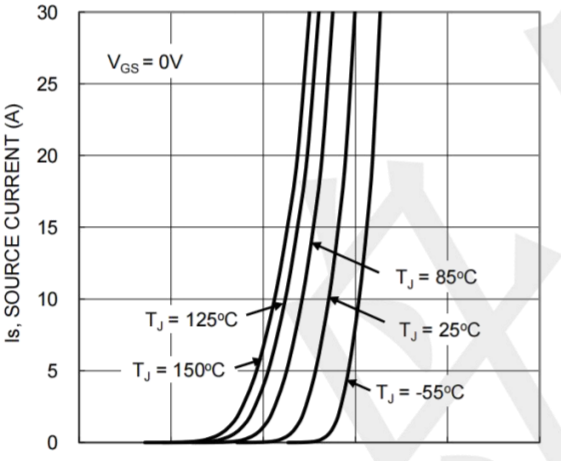


Figure 9. Diode Forward Voltage vs. Current

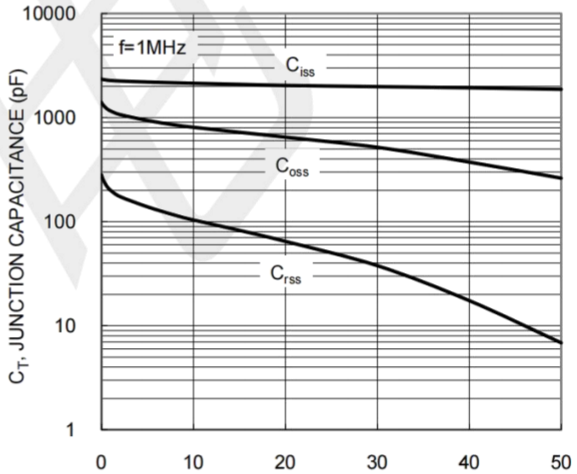


Figure 10. Typical Junction Capacitance

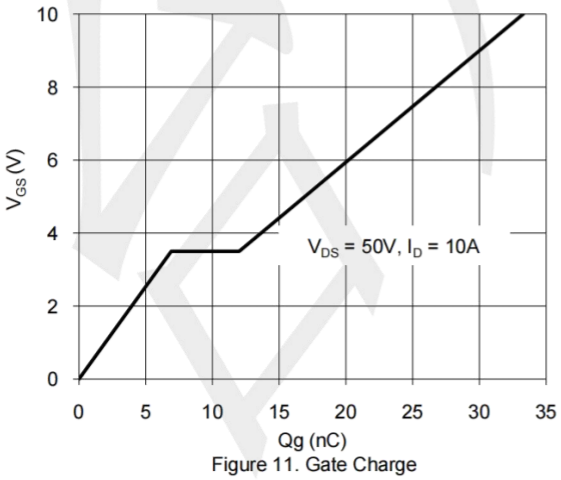


Figure 11. Gate Charge

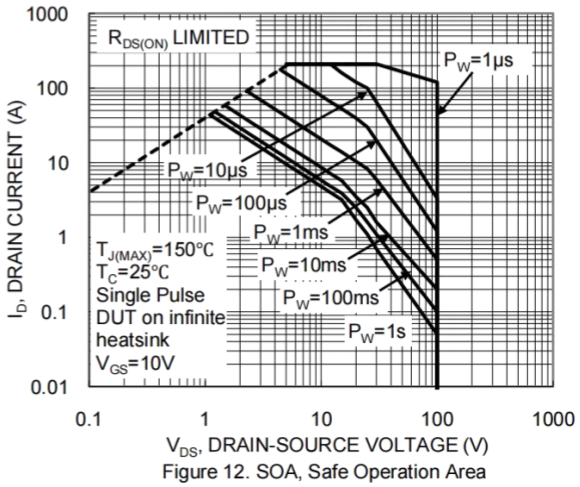
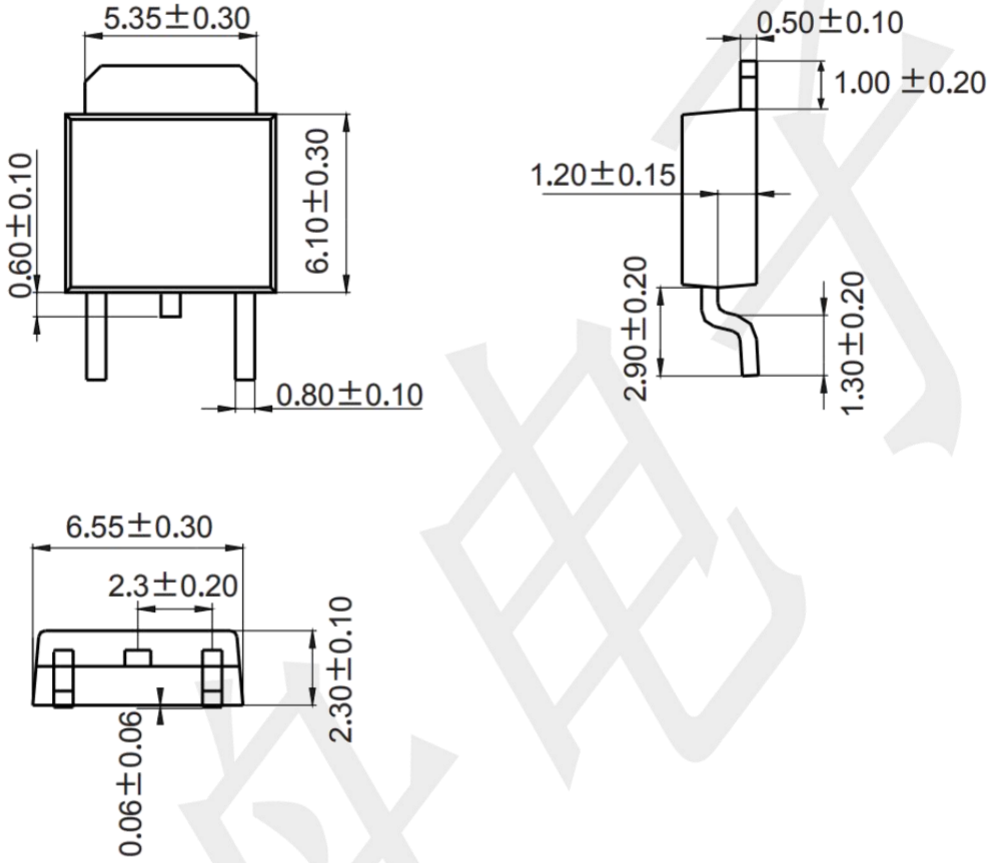


Figure 12. SOA, Safe Operation Area

Package Outline Dimensions (unit: mm)

TO-252



Mounting Pad Layout (unit: mm)