

IRF9333TRPBF-TP

P-Channel Enhancement Mode Power MOSFET

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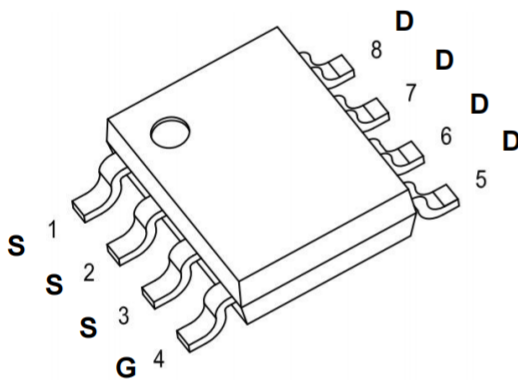
Product Summary

- V_{DS} -30 V
- I_{DS} (@ $V_{GS} = -10V$) -13A
- $R_{DS(ON)}$ (@ $V_{GS} = -10V$) 11mΩ(Typ)

Application

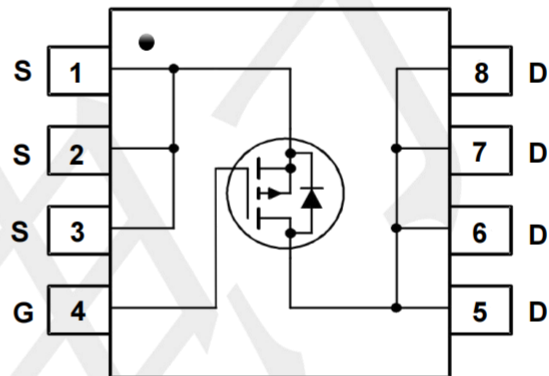
- Reverse Battery protection
- Load switch
- Power management
- PWM Application

Package and Pin Configuration



SOP8

Circuit diagram



Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	-13	A
Pulsed Drain Current (note1)	I_{DM}	-72	A
Maximum Power Dissipation	P_D	3.8	W
Operating Junction Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C

Thermal Characteristic

PARAMETER		Symbol	Value	Unit
Thermal Resistance from Junction to Ambient (t ≤ 10s)	PCB Mount (note2)	$R_{\theta JA}$	33	°C/W

notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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

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Electrical Characteristics (T_A=25 °C unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	BV _{DSS}	-30	--	--	V
Gate-Source Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	V _{GS(th)}	-1.0	-1.8	-3.0	V
Gate-Source Leakage	V _{DS} =0V, V _{GS} = ±20V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = -24V, V _{GS} =0V	I _{DSS}	--	-0.1	-1	μA
	V _{DS} = -24V, T _J =55°C		--	--	-25	μA
Drain-Source On-State Resistance (Note 1)	V _{GS} = -10V, I _D = -13A	R _{DS(on)}	--	11	15	mΩ
	V _{GS} = -4.5V, I _D = -7A		--	15	20	
Forward Transconductance (Note 2)	V _{DS} = -5V, I _D = -8A	g _{fs}	--	7	--	S
Dynamic (Note 2)						
Total Gate Charge (Note 3)	V _{DS} = -15V, I _D = -13A, V _{GS} = -10V	Q _g	--	24	--	nC
Gate-Source Charge (Note 3)		Q _{gs}	--	7.7	--	
Gate-Drain Charge (Note 3)		Q _{gd}	--	6.5	--	
Input Capacitance	V _{DS} = -15V, V _{GS} = 0V, F= 1.0MHz	C _{iss}	--	2106	--	pF
Output Capacitance		C _{oss}	--	353	--	
Reverse Transfer Capacitance		C _{rss}	--	267	--	
Switching						
Turn-On Delay Time (Note 3)	V _{DD} = -15V, I _D = -5.0A, V _{GS} = -10V, R _{GEN} = 6Ω	t _{d(on)}	--	18	--	nS
Rise Time (Note 3)		t _r	--	24	--	
Turn-Off Delay Time (Note 3)		t _{d(off)}	--	114	--	
Fall Time (Note 3)		t _f	--	47	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	V _{GS} = 0V, I _{SD} = -1A	V _{SD}	--	-0.78	-1.2	V
Continuous Source Current	Integral reverse diode in the MOSFET	I _S	--	--	-13	A
Pulsed Current (Note 1)		I _{SM}	--	--	-72	A

Notes:

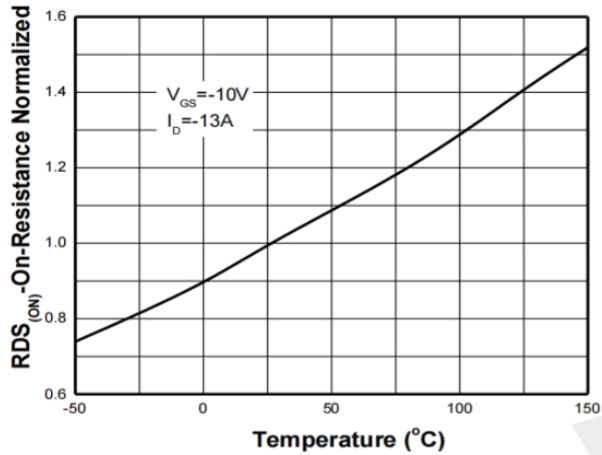
1. Pulse test; pulse width ≤ 300 μS, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature

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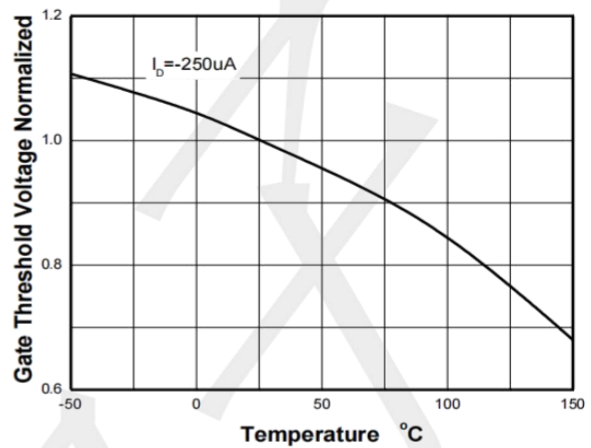
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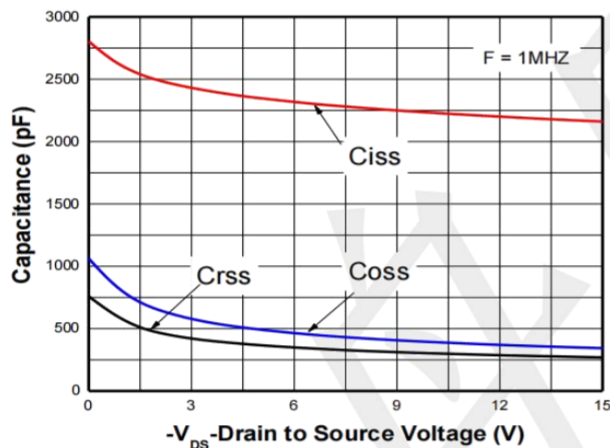
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



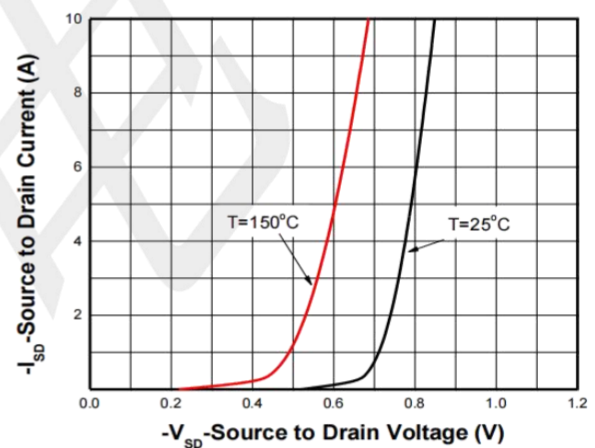
On-Resistance vs. Junction temperature



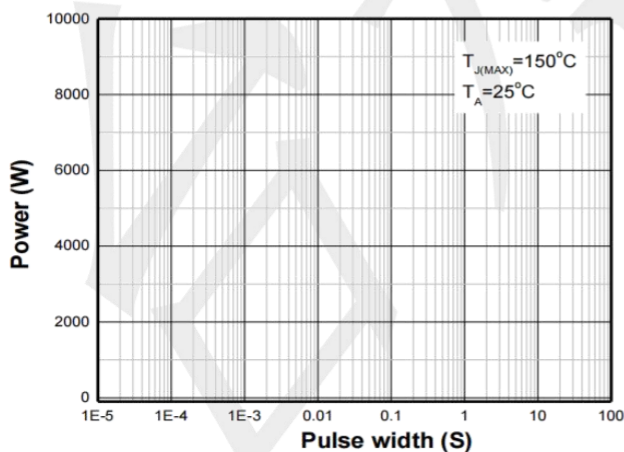
Threshold voltage vs. Temperature



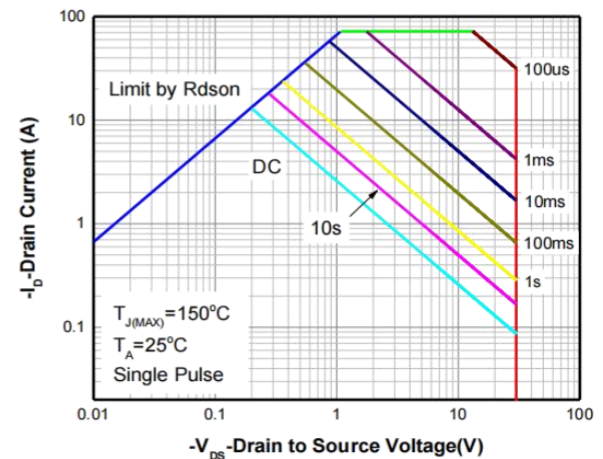
Capacitance



Body diode forward voltage



Single pulse power



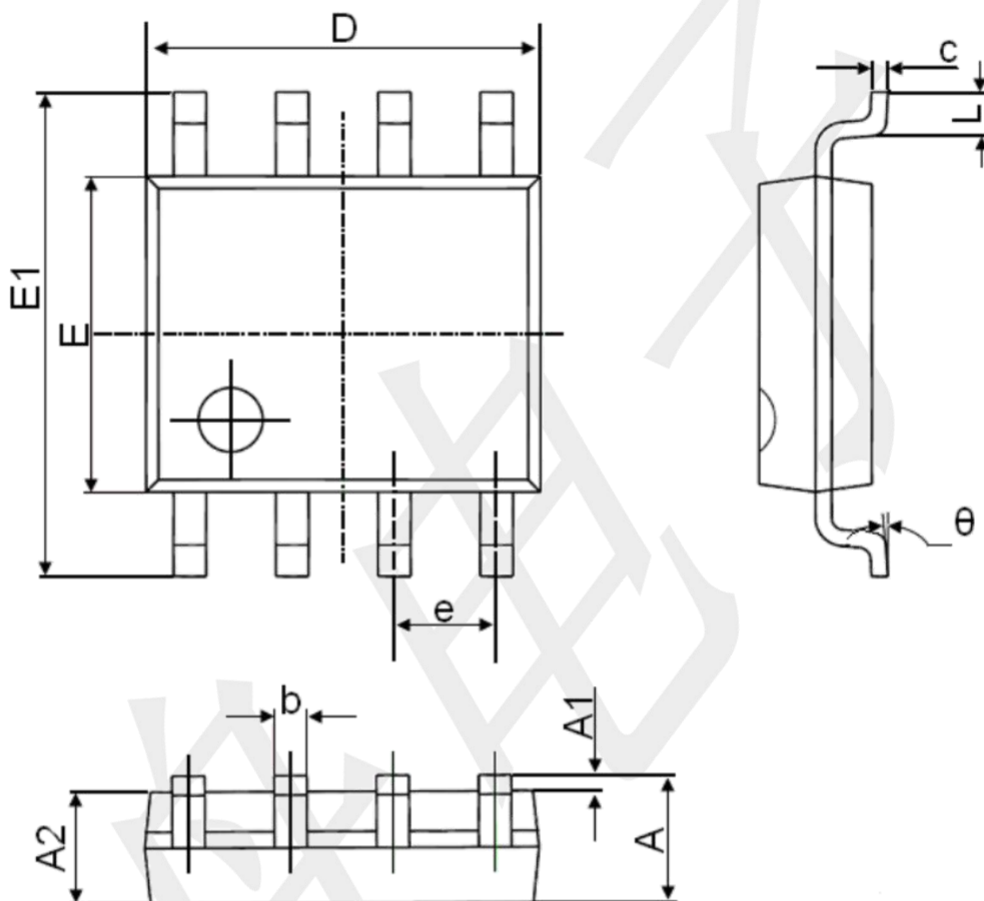
Safe operating power

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Package Information SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°