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IRF9640S-TP
P-Channel Power MOSFET

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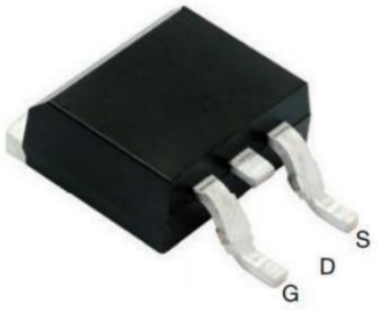
Product Summary

- V_{DS} -200 V
- I_{DS} -15A
- $R_{DS(ON)}$ (at V_{GS}= -10V) <290mΩ (Typ)

Application

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

Package and Pin Configuration



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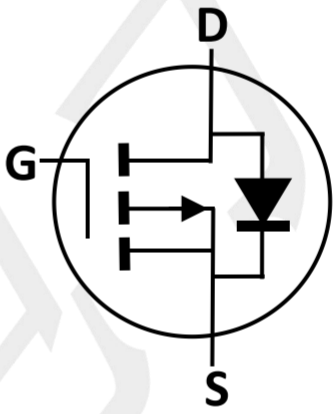
Circuit diagram



Equivalent Circuit

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	-200	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	-15	A
Pulsed Drain Current (note1)	I_{DM}	-36	A
Maximum Power Dissipation T_C=25℃	P_D	100	W
Operating Junction Temperature Range	T_J	-55 to +150	℃
Storage Temperature Range	T_{stg}	-55 to +150	℃

Thermal Characteristic

PARAMETER		Symbol	Value	Unit
Thermal Resistance from Junction to Case(t≤10s)	PCB Mount (note2)	$R_{\theta JC}$	1.25	°C/W

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

2 . 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}	-200	--	--	V
Gate-Source Threshold Voltage	V_{DS}=V_{GS} , I_D= -250μA	$V_{GS(th)}$	-2.0	-2.8	-4.0	V
Gate-Source Leakage	V_{DS}=0V, V_{GS}= ±20V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}= -200V, V_{GS}=0V	I_{DSS}	--	-0.1	-1	μA
	V_{DS}= -200V, T_J=125°C		--	-10	-50	μA
Drain-Source On-State Resistance (Note 1)	V_{GS}= -10V, I_D= -6A	R_{DS}(on)	--	290	330	mΩ
Forward Transconductance (Note 2)	V_{DS}= -10V, I_D= -6A	g_{fs}	--	22	--	S
Dynamic (Note 2)						
Total Gate Charge (Note 3)	V_{DS} = -100V, I_D = -6A, V_{GS} = -10V	Q_g	--	56	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	11	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	8.5	--	
Input Capacitance	V_{DS} = -75V, V_{GS} = 0V, F= 1.0MHz	C_{iss}	--	3600	--	pF
Output Capacitance		C_{oss}	--	455	--	
Reverse Transfer Capacitance		C_{rss}	--	186	--	
Switching						
Turn-On Delay Time (Note 3)	V_{DD} = -100V, I_D= -6A, V_{GS} = -10V, R_{GEN} = 6Ω	$t_{d(on)}$	--	33	--	nS
Rise Time (Note 3)		t_r	--	19	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	149	--	
Fall Time (Note 3)		t_f	--	50	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	V_{GS} = 0V, I_{SD} = -1A	V_{SD}	--	-0.76	-1.1	V
Continuous Source Current	Integral reverse diode in the MOSFET	I_S	--	--	-15	A
Pulsed Current (Note 1)		I_{SM}	--	--	-36	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 (25 °C, unless otherwise noted)

Figure 1. Output Characteristics

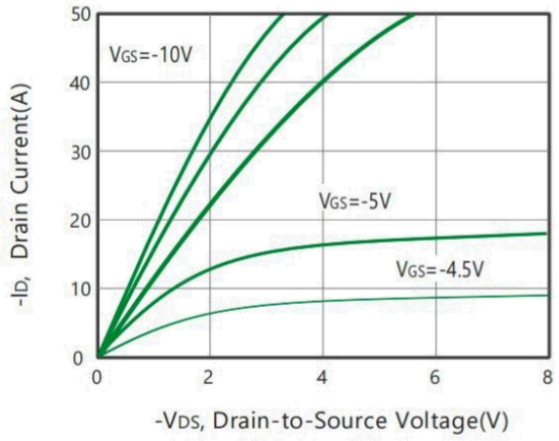


Figure 2. Body Diode Forward Voltage Variation with Source Current

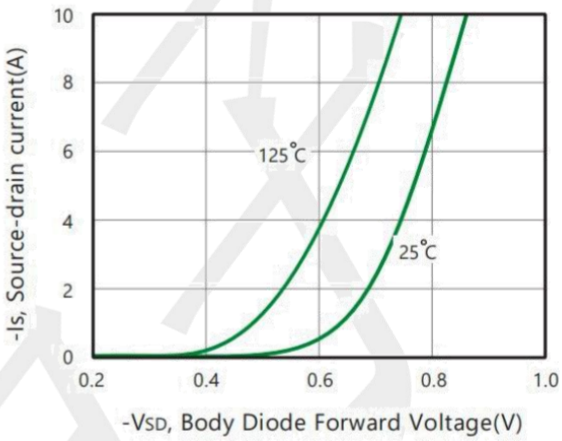


Figure 3. On-Resistance vs. Gate-Source Voltage

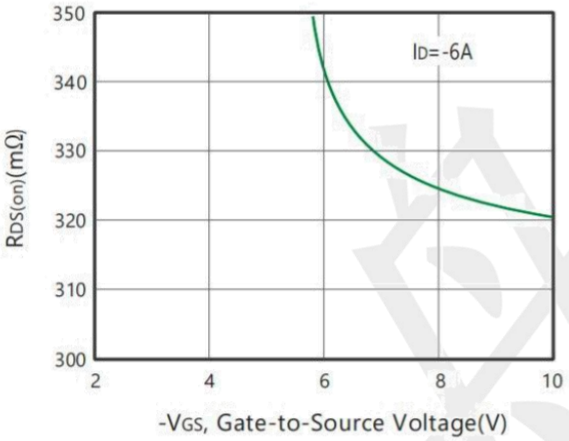


Figure 4. On-Resistance Variation with Drain Current and Temperature

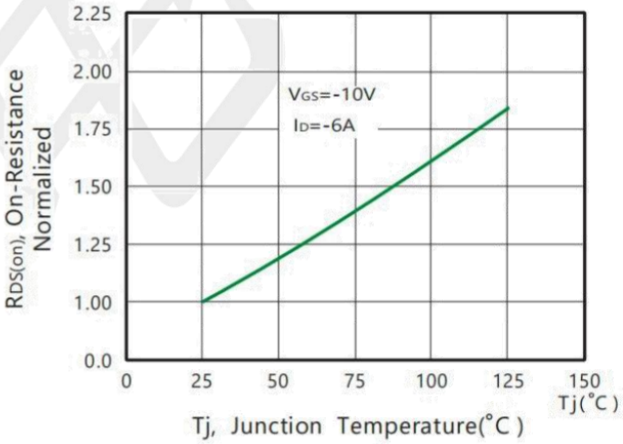


Figure 5. Gate Threshold Variation with Temperature

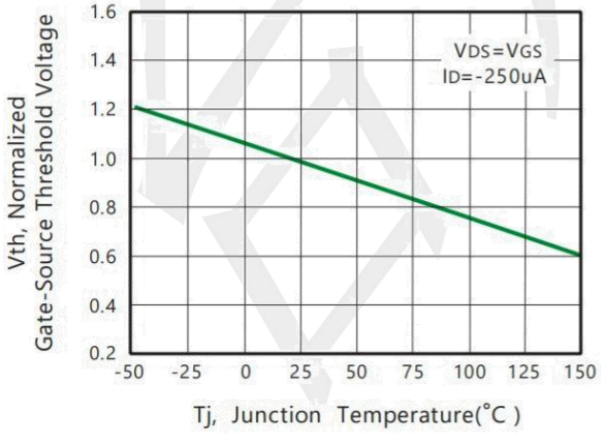
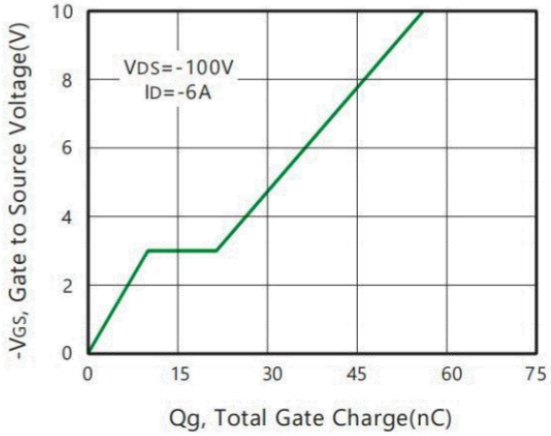


Figure 6. Gate Charge



Package Outline Dimensions (unit: mm)

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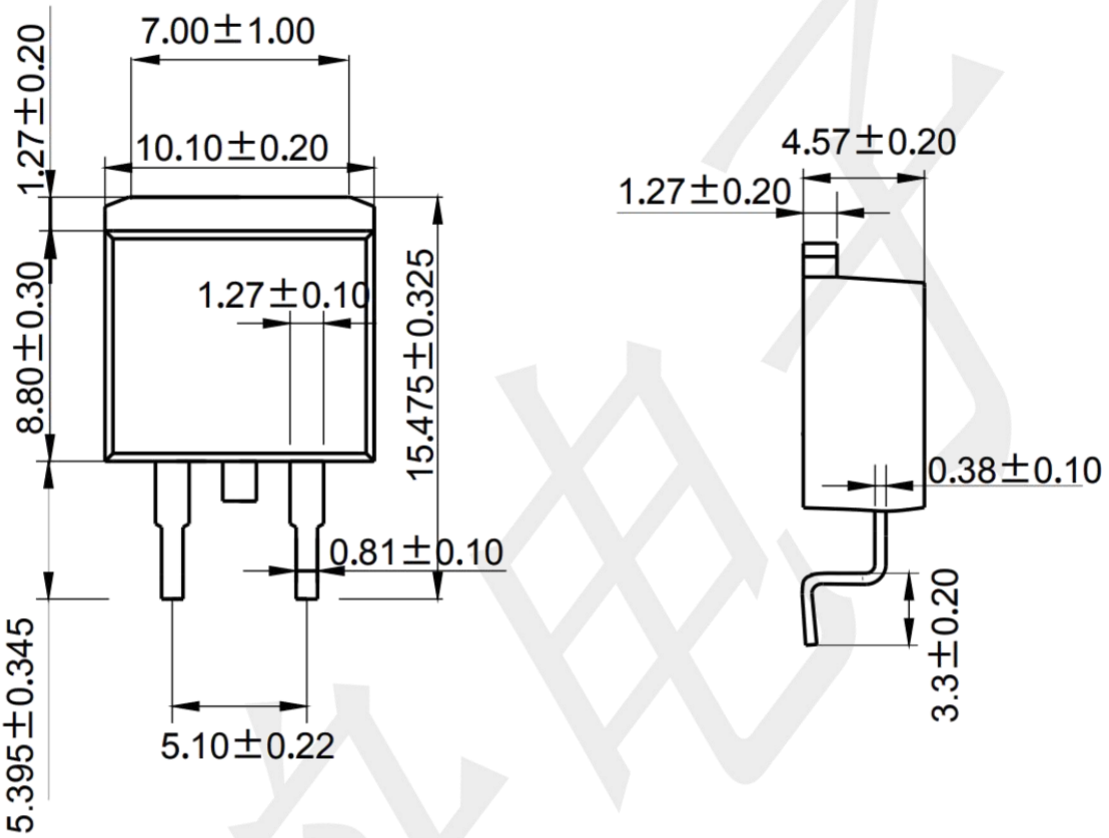

Mounting Pad Layout (unit: mm)