

TPM25015PHW3

P-Channel Enhancement Power MOSFET

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Product Summary

- V_{DS} -250 V
- I_{DS} -15A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) $< 520m\Omega$ (Typ)

Application

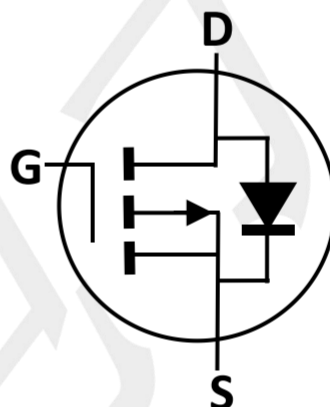
- Reverse Battery protection
- Load switch
- Power management
- PWM Application

Package and Pin Configuration



TO-263

Circuit diagram



Equivalent Circuit

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	-250	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current	T _C =25℃	I _D	-15	A
	T _C =100℃		-12	A
Pulsed Drain Current (note1)		I _{DM}	-60	A
Maximum Power Dissipation T _C =25℃		P _D	106	W
Operating Junction Temperature Range		T _J	-55 to +150	℃
Storage Temperature Range		T _{stg}	-55 to +150	℃

Thermal Characteristic

PARAMETER	Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	62	$^\circ C/W$
Thermal Resistance Junction-Case	$R_{\theta JC}$	1.21	

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

2 . When mounted on 2" 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	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-250	--	--	V
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(th)}$	-2.0	-3.0	-4.0	V
Gate-Source Leakage	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS}=-200V, V_{GS}=0V$	I_{DSS}	--	-0.1	-1	μA
	$V_{DS}=-200V, T_J=125^{\circ}C$		--	-10	-50	μA
Drain-Source On-State Resistance (Note 1)	$V_{GS}=-10V, I_D=-3A$	$R_{DS(on)}$	--	520	580	m Ω
	$V_{GS}=-6.5V, I_D=-2A$		--	550	620	
Forward Transconductance (Note 2)	$V_{DS}=-10V, I_D=-2A$	g_{fs}	--	9	--	S
Dynamic (Note 2)						
Total Gate Charge (Note 3)	$V_{DS}=-100V,$ $I_D=-2A,$ $V_{GS}=-10V$	Q_g	--	60	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	12	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	9	--	
Input Capacitance	$V_{DS}=-100V,$ $V_{GS}=0V,$ $F=1.0MHz$	C_{iss}	--	3600	--	pF
Output Capacitance		C_{oss}	--	470	--	
Reverse Transfer Capacitance		C_{rss}	--	180	--	
Switching						
Turn-On Delay Time (Note 3)	$V_{DD}=-100V,$ $I_D=-2A,$ $V_{GS}=-10V,$ $R_{GEN}=6\Omega$	$t_{d(on)}$	--	38	--	nS
Rise Time (Note 3)		t_r	--	20	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	126	--	
Fall Time (Note 3)		t_f	--	56	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	$V_{GS}=0V, I_{SD}=-10A$	V_{SD}	--	-0.8	-1.2	V
Continuous Source Current	Integral reverse diode in the MOSFET	I_S	--	--	-15	A
Pulsed Current (Note 1)		I_{SM}	--	--	-60	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)

Fig.1 Continuous Drain Current vs. TC

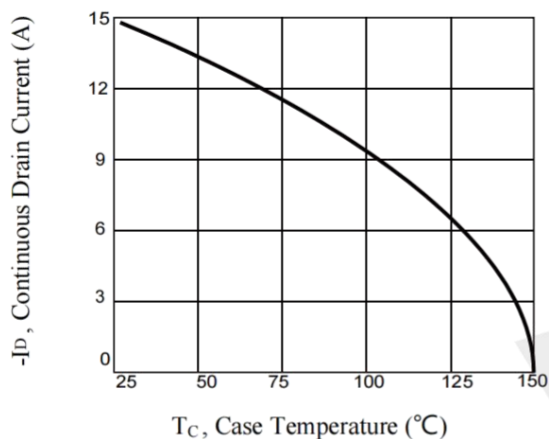


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

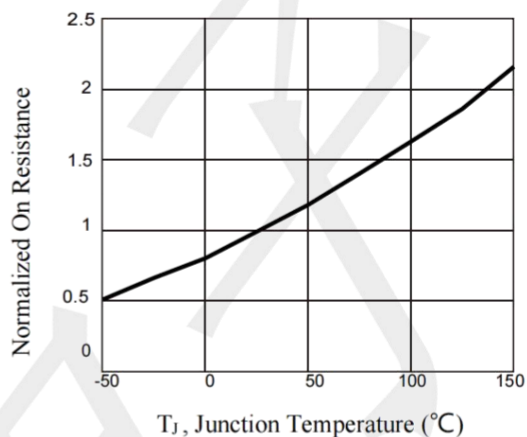


Fig.3 Normalized V_{th} vs. T_J

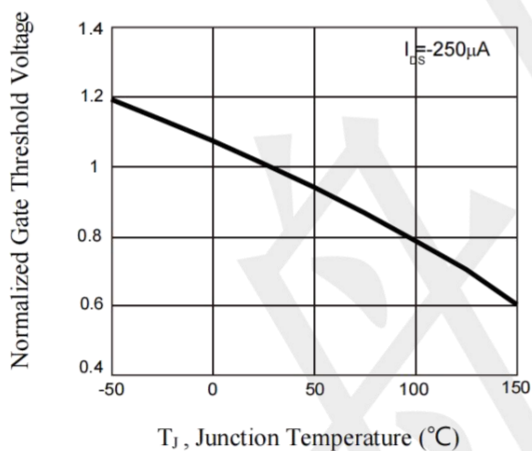


Fig.4 Gate Charge Waveform

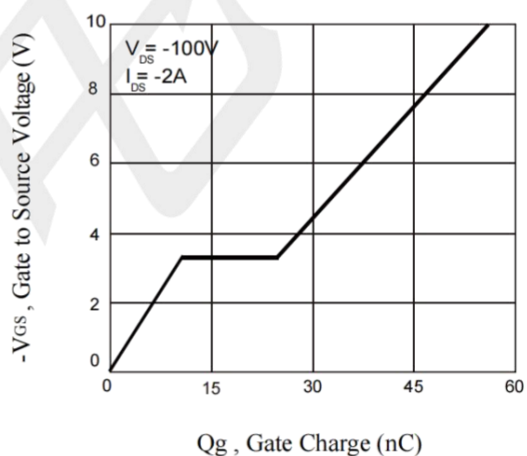


Fig.5 Typical Output Characteristics

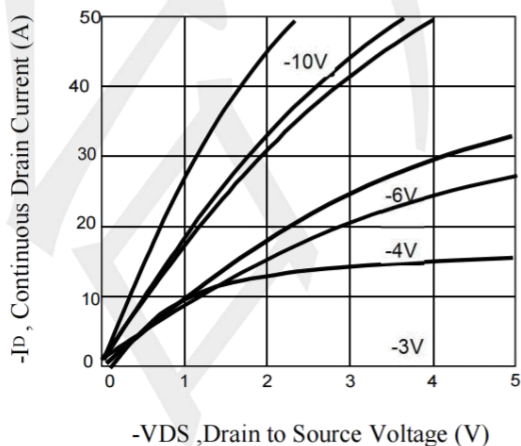
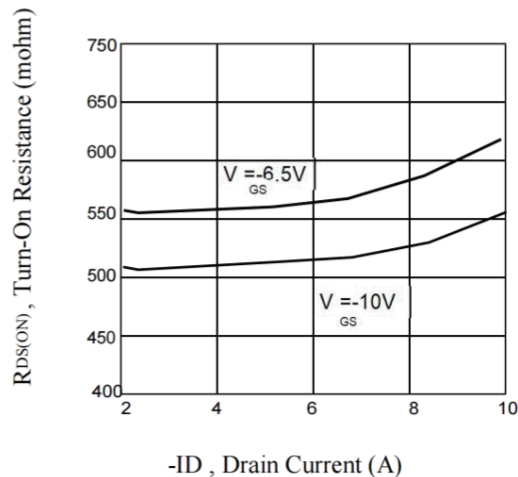
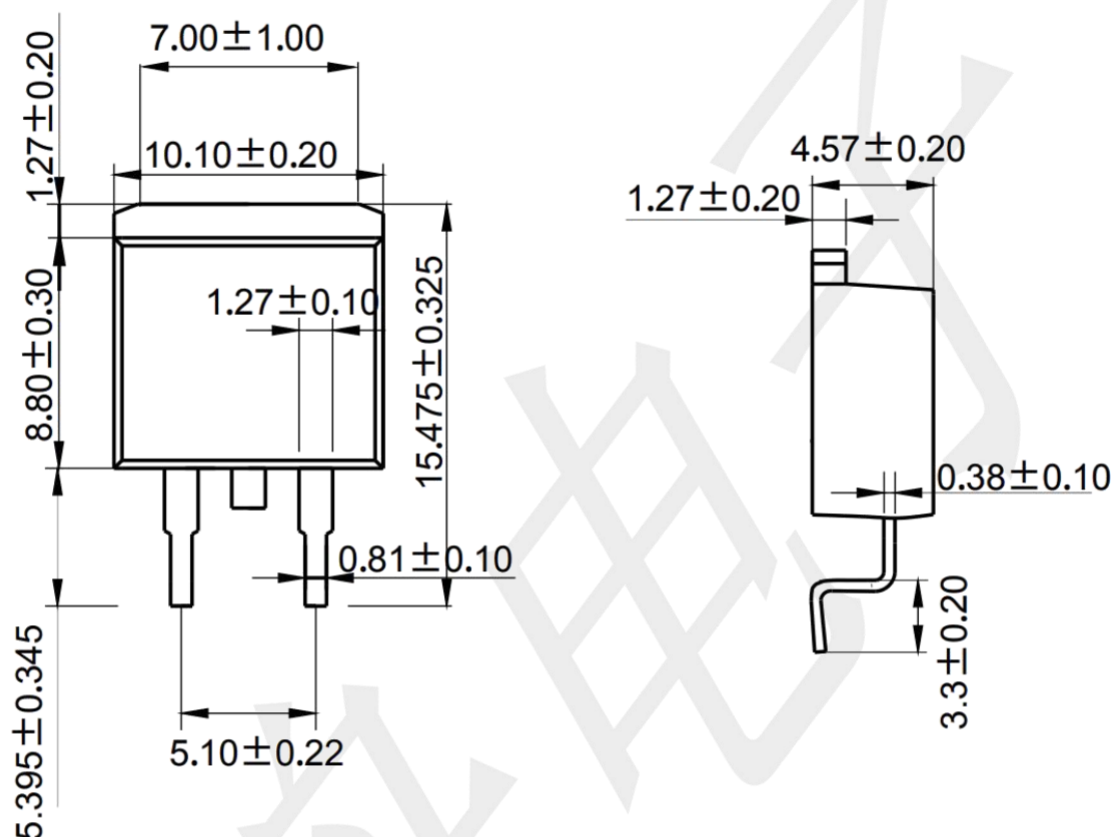


Fig.6 Turn-On Resistance vs. I_D



Package Outline Dimensions (unit: mm)

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Mounting Pad Layout (unit: mm)

