

TPSIR870DP-T1-GE3

N-Channel Enhancement MOSFET

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Product Summary

- V_{DS} 100 V
- I_{DS} (at $V_{GS}=10V$) 60A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $\leq 6.5m\Omega$ (TYP)

Application

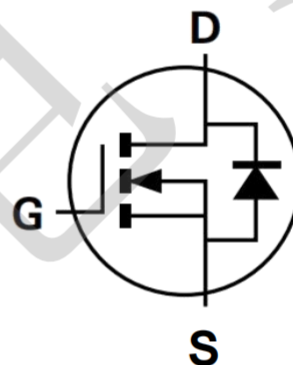
- Load switch
- High Frequency Switching and Synchronous Rectification
- Active Clamp in Intermediate
- DC/DC Power Supplies

Package and Pin Configuration



PDFN5X6-8

Circuit diagram



Absolute Maximum Ratings

($T_A=25^{\circ}C$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}C$	I_D	60	A
	$T_C=100^{\circ}C$		52	
Pulsed Drain Current		I_{DM}	105	A
Single Pulse Avalanche Energy		EAS	56	mJ
Total Power Dissipation	$T_C=25^{\circ}C$	P_{DTOT}	57	W
Operating Junction Temperature Range		T_J	-55 to +150	$^{\circ}C$
Storage Temperature Range		T_{stg}	-55 to +150	$^{\circ}C$

Thermal Characteristic

PARAMETER		Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	PCB Mount (Note)	$R_{\theta JA}$	62	$^{\circ}C/W$
Thermal Resistance Junction-Case		$R_{\theta JC}$	2.2	$^{\circ}C/W$

Note : The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

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}	100	--	--	V
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.2	--	3.0	V
Gate-Source Leakage	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	I_{DSS}	--	0.1	1.0	μA
	$V_{DS}=80V, T_J=55^{\circ}C$		--	1.0	5.0	μA
Drain-Source On-State Resistance (Note 1)	$V_{GS}=10V, I_D=15A$	$R_{DS(on)}$	--	6.5	9.0	m Ω
	$V_{GS}=4.5V, I_D=8A$		--	9.0	12	
Forward Transconductance (Note 2)	$V_{DS}=5V, I_D=20A$	g_{fs}	--	75	--	S
Dynamic (Note 2)						
Total Gate Charge (Note 3)	$V_{DS}=50V, I_D=20A, V_{GS}=10V$	Q_g	--	40	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	7.2	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	6.5	--	
Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1.0MHz$	C_{iss}	--	2860	--	pF
Output Capacitance		C_{oss}	--	410	--	
Reverse Transfer Capacitance		C_{rss}	--	38	--	
Switching						
Turn-On Delay Time (Note 3)	$V_{DD}=30V, I_D=1A, V_{GS}=10V, R_G=3.3\Omega$	$t_{d(on)}$	--	8.3	--	nS
Rise Time (Note 3)		t_r	--	4.2	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	36	--	
Fall Time (Note 3)		t_f	--	6.9	--	
Source-Drain Diode Ratings and Characteristics (Note 2)						
Forward Voltage	$V_{GS}=0V, I_F=10A$	V_{SD}	--	0.7	1.2	V
Continuous Source Current	Integral reverse diode in the MOSFET	I_S	--	--	60	A
Pulsed Current (Note 1)		I_{SM}	--	--	105	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 Electrical and Thermal Characteristics

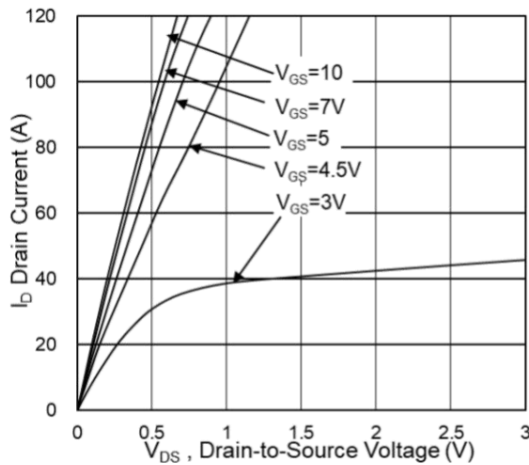


Fig.1 Typical Output Characteristics

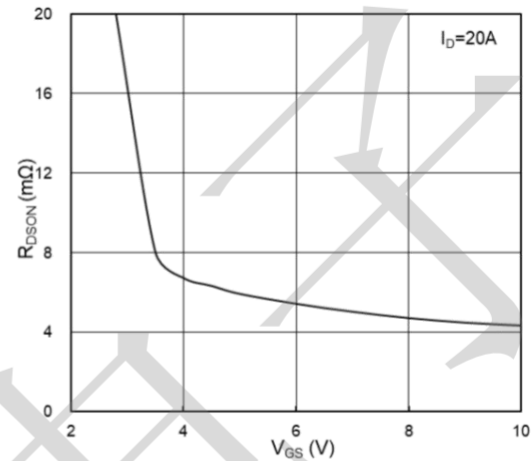


Fig.2 On-Resistance vs G-S Voltage

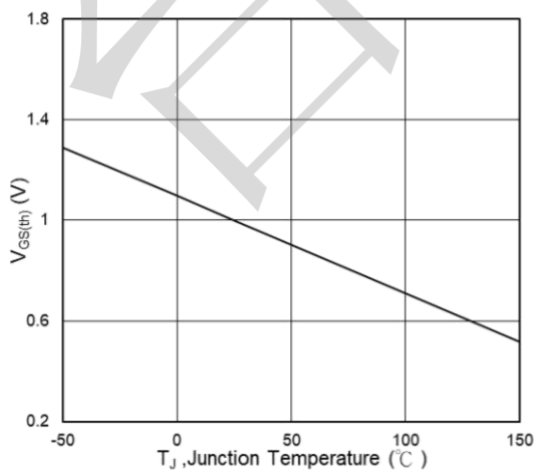
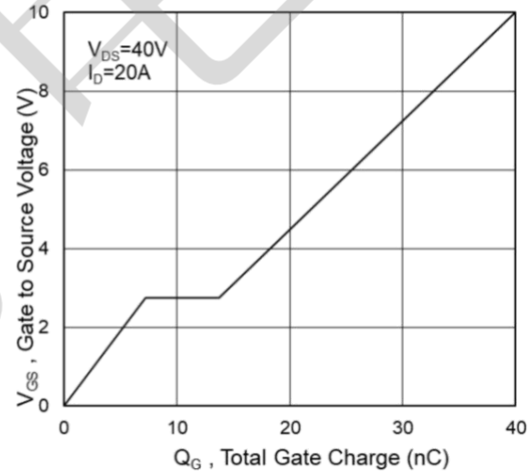
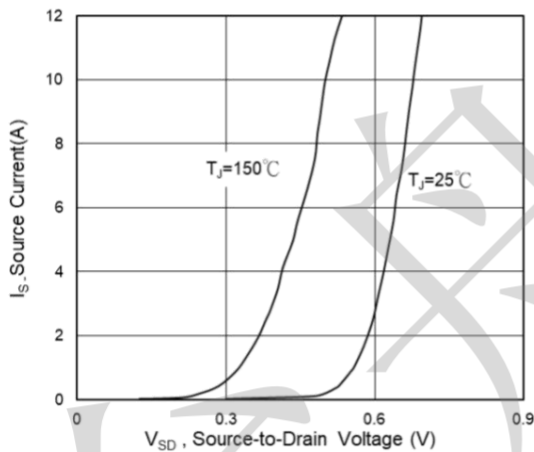


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

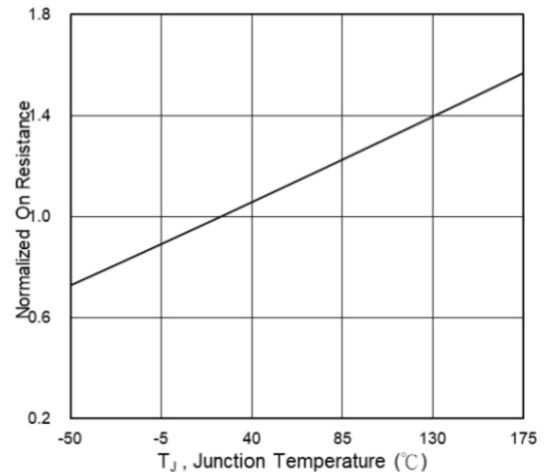
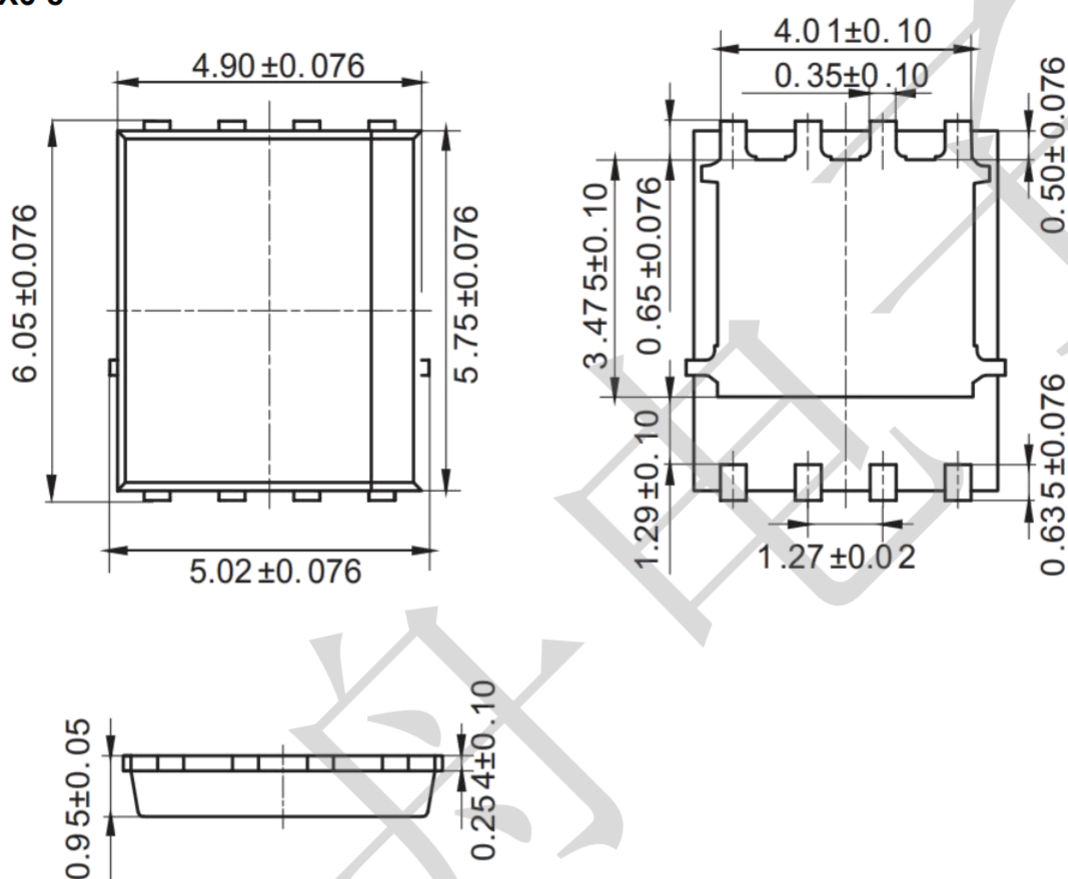


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Package Information

PDFN5X6-8



Mounting Pad Layout (unit: mm)

