

TPM50N15HD56-1

N-Channel Enhancement MOSFET

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Product Summary

- V_{DS} 150 V
- I_{DS} (at $V_{GS}=10V$) 50A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $\leq 13m\Omega$ (TYP)

Application

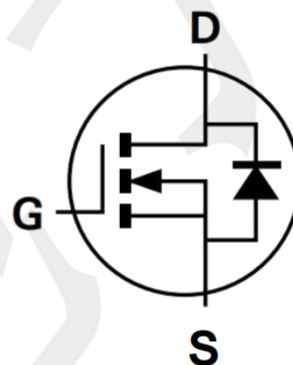
- Load switch
- High Frequency Switching and Synchronous Rectification
- Active Clamp in Intermediate
- DC/DC Power Supplies

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}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^{\circ}C$	A
		$T_C=100^{\circ}C$	
Pulsed Drain Current	I_{DM}	200	A
Single Pulse Avalanche Energy	EAS	306	mJ
Total Power Dissipation	P_{TOT}	120	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	$R_{\theta JA}$	50	$^{\circ}C/W$
Thermal Resistance Junction-Case	$R_{\theta JC}$	1.04	$^{\circ}C/W$

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

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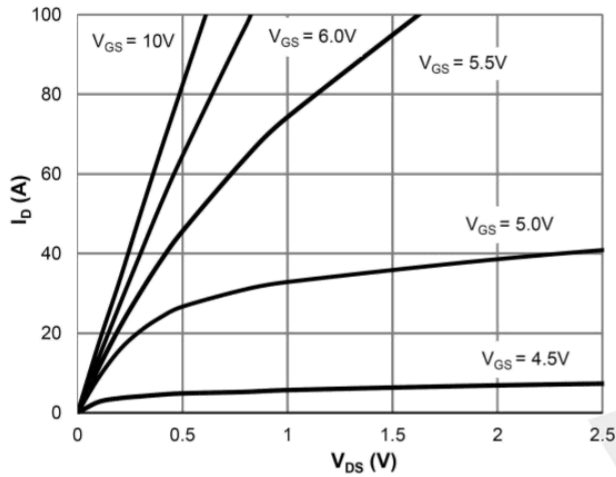
Electrical Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	145	150	--	V
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	2.0	--	4.0	V
Gate-Source Leakage	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS}=90V, V_{GS}=0V$	I_{DSS}	--	0.1	1.0	μA
	$V_{DS}=90V, T_J=55^{\circ}C$		--	1.0	5.0	μA
Drain-Source On-State Resistance (Note 1)	$V_{GS}=10V, I_D=20A$	$R_{DS(on)}$	--	13	16	m Ω
Dynamic (Note 2)						
Total Gate Charge (Note 3)	$V_{DS}=75V, I_D=20A, V_{GS}=10V$	Q_g	--	30	--	nC
Gate-Source Charge (Note 3)		Q_{gs}	--	5.8	--	
Gate-Drain Charge (Note 3)		Q_{gd}	--	7.0	--	
Input Capacitance	$V_{DS}=75V, V_{GS}=0V, F=1.0MHz$	C_{iss}	--	2230	--	pF
Output Capacitance		C_{oss}	--	293	--	
Reverse Transfer Capacitance		C_{rss}	--	22	--	
Switching						
Turn-On Delay Time (Note 3)	$V_{DD}=50V, I_D=20A, V_{GS}=10V, R_G=6\Omega$	$t_{d(on)}$	--	13	--	nS
Rise Time (Note 3)		t_r	--	25	--	
Turn-Off Delay Time (Note 3)		$t_{d(off)}$	--	31	--	
Fall Time (Note 3)		t_f	--	26	--	
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	--	--	50	A
Pulsed Current (Note 1)		I_{SM}	--	--	200	A

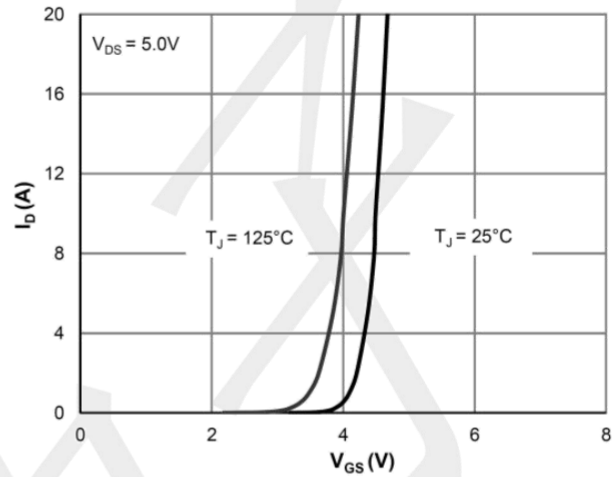
Notes:

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

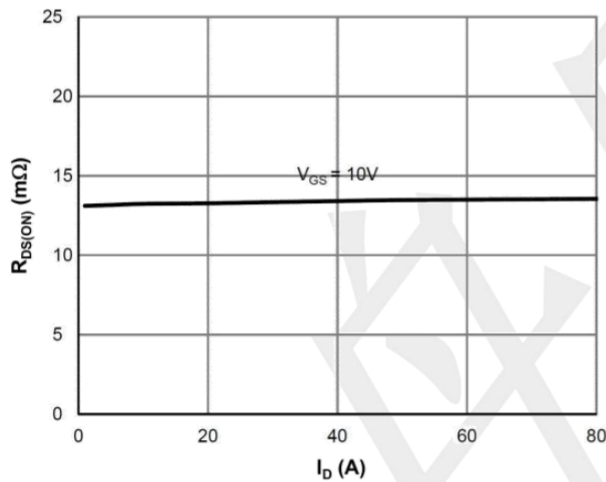
Typical Electrical and Thermal Characteristics



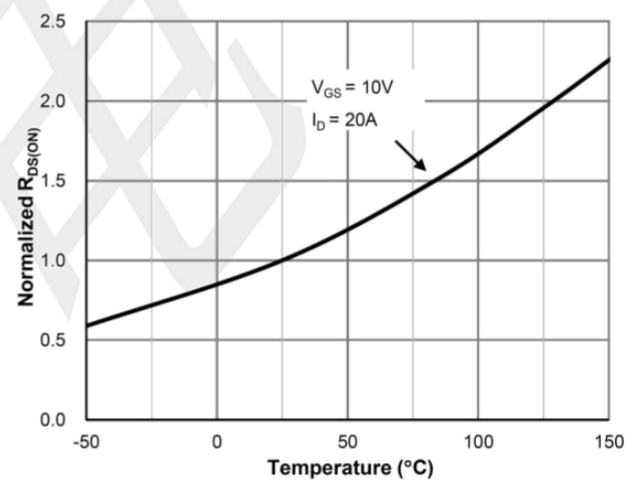
Saturation Characteristics



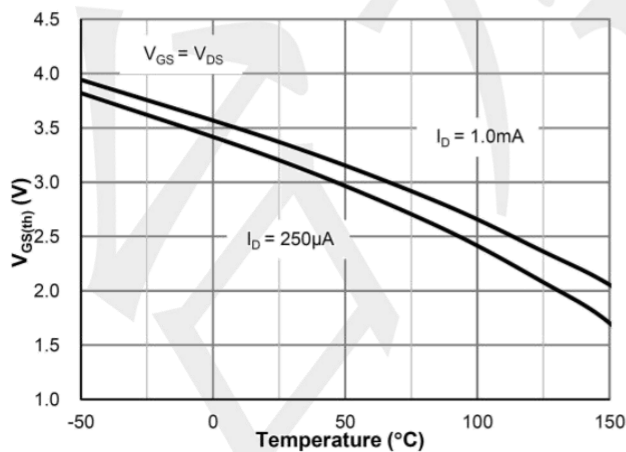
Transfer Characteristics



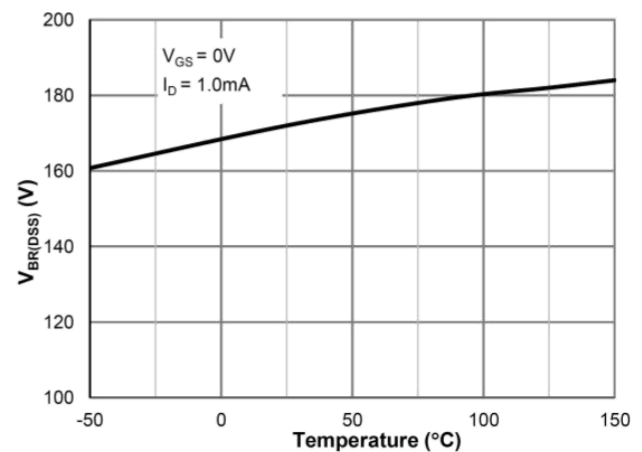
$R_{DS(ON)}$ vs. Drain Current



$R_{DS(ON)}$ vs. Junction Temperature

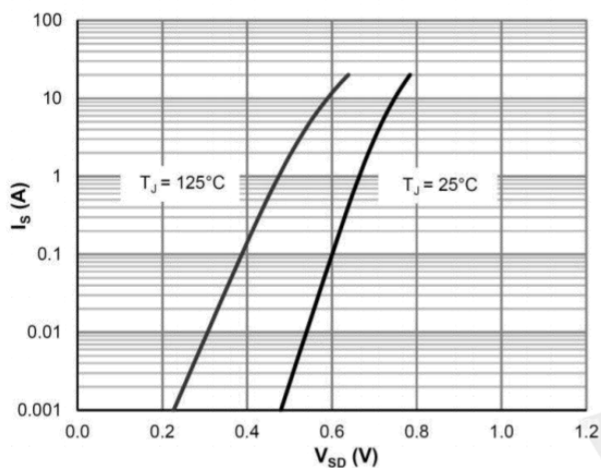


$V_{GS(th)}$ vs. Junction Temperature

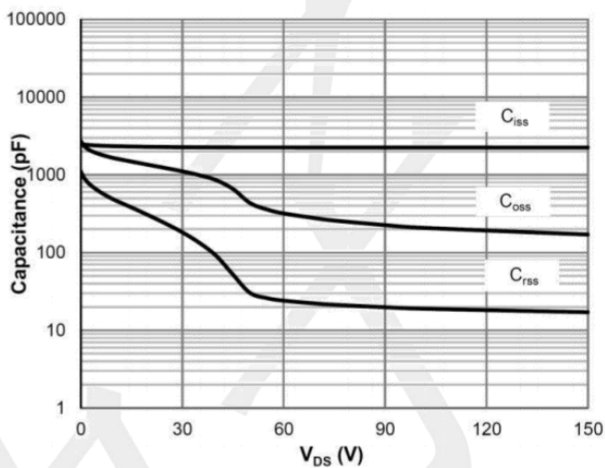


$V_{BR(DSS)}$ vs. Junction Temperature

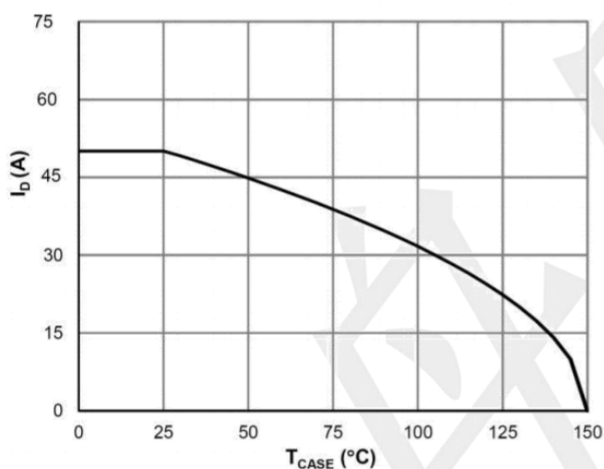
Typical Performance Characteristics



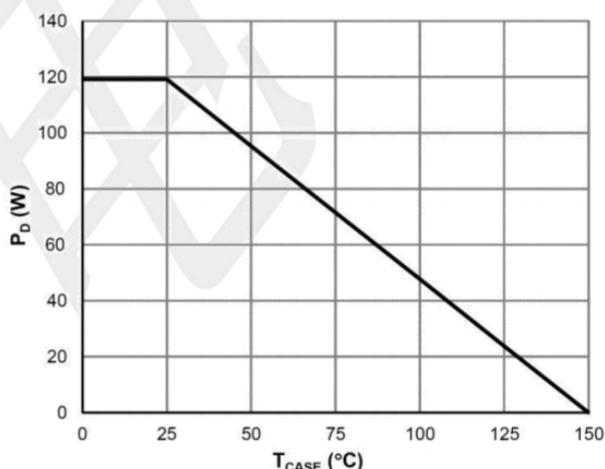
Body-Diode Characteristics



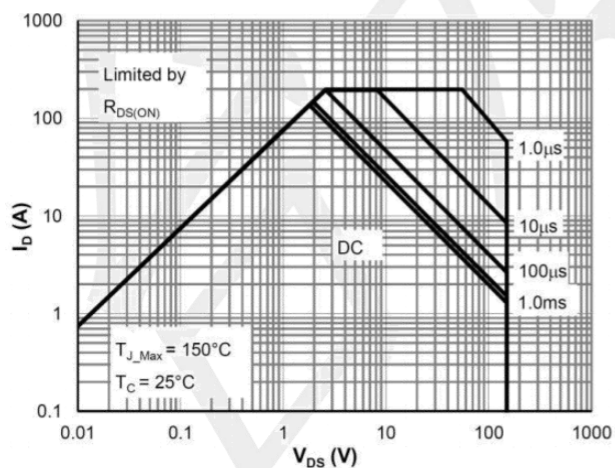
Capacitance Characteristics



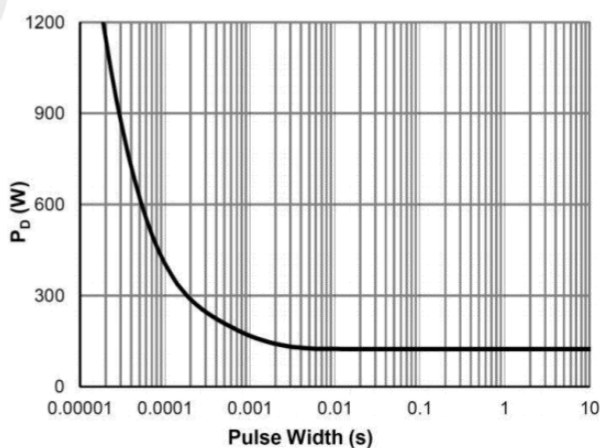
Current De-rating



Power De-rating



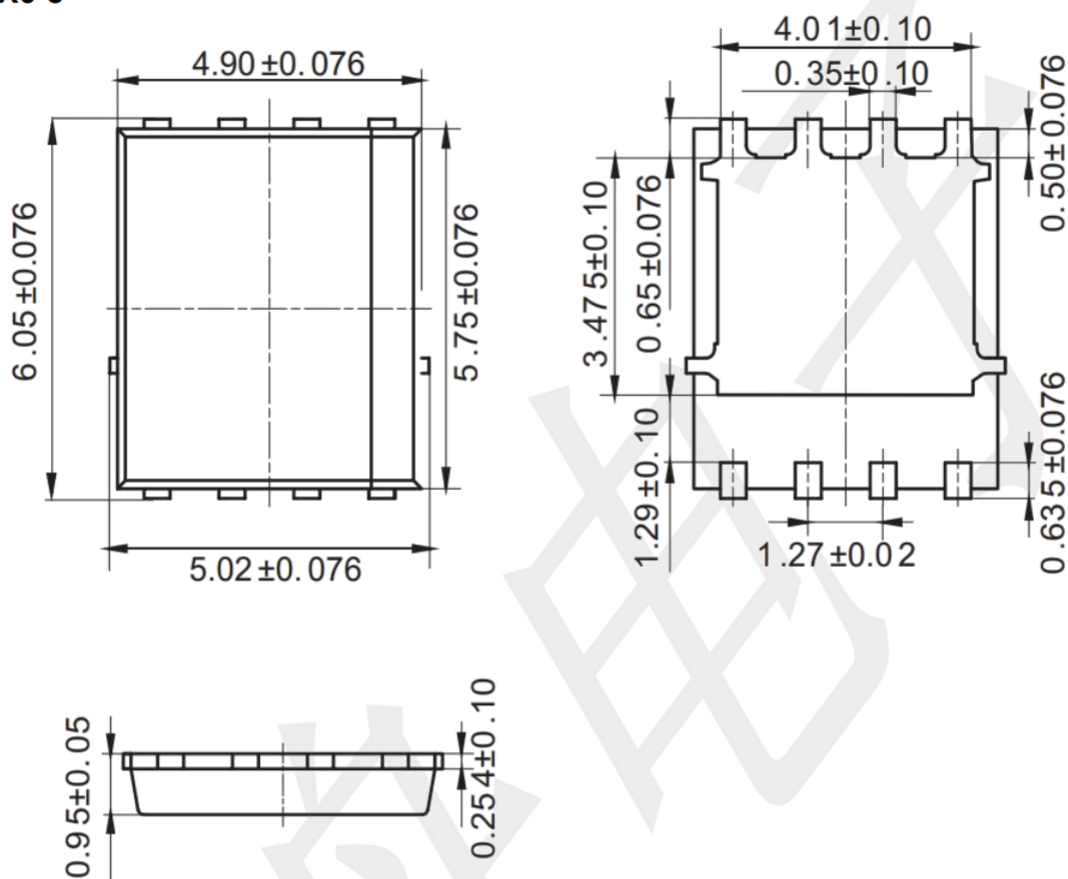
Maximum Safe Operating Area



Single Pulse Power Rating, Junction-to-Case

Package Information

PDFN5X6-8



Mounting Pad Layout (unit: mm)

