

# TN50N60DN

## N-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS} = 60V, I_D = 50A$
- $R_{DS(on)} < 17m\Omega @ V_{GS} = 10V$
- $R_{DS(on)} < 21m\Omega @ V_{GS} = 4.5V$

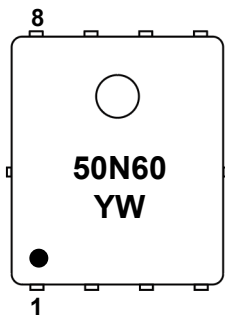
### Features

- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

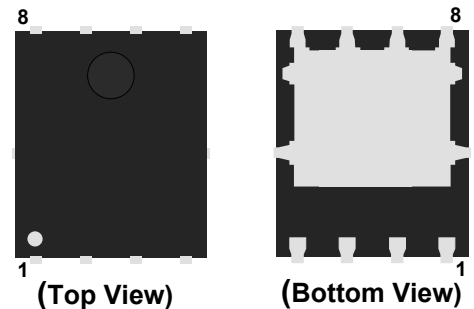
### Application

- Load Switch
- PWM Application
- Power Management

### Marking Code

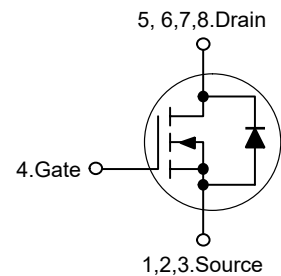


### PDFN5x6-8L



Pin	Description
1,2,3	Source
4	Gate
5,6,7,8	Drain

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	50	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	120	A
Maximum Power Dissipation	$P_D$	104	W
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Case <sup>Note2</sup>	$R_{\theta JC}$	1.2	°C/W
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## Electrical Characteristics

(T<sub>J</sub>=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V,I <sub>D</sub> =250μA	60	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V,V <sub>GS</sub> =0V	--	--	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V,V <sub>DS</sub> =0V	--	--	±100	nA
Gate Threshold Voltage <sup>Note3</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	1	--	2.5	V
Drain-Source On-Resistance <sup>Note3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V,I <sub>D</sub> =10A	--	16	17	mΩ
		V <sub>GS</sub> =4.5V,I <sub>D</sub> =10A	--	20	21	mΩ
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V,V <sub>GS</sub> =0V,f=1MHz	--	2876	--	pF
Output Capacitance	C <sub>oss</sub>		--	201	--	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		--	180	--	pF
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V,I <sub>D</sub> =30A, V <sub>GS</sub> =10V	--	77	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	14	--	nC
Gate-Drain Charge	Q <sub>gd</sub>		--	15	--	nC
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V, R <sub>GEN</sub> =1.8Ω	--	13	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	77	--	nS
Turn-off Delay Time	t <sub>d(off)</sub>		--	50	--	nS
Turn-off Fall Time	t <sub>f</sub>		--	106	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V,I <sub>S</sub> =30A	--	--	1.2	V
Diode Forward Current	I <sub>S</sub>		--	--	60	A

Note :

1.Pulse width limited by maximum junction temperature.

2.Surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper

3.The data tested by pulsed , pulse width≤ 300us , duty cycle ≤ 2%

Typical Electrical and Thermal Characteristics (Curves)

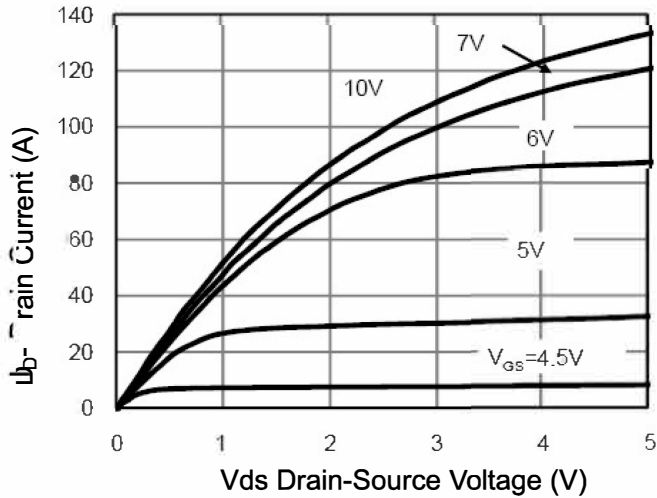


Figure 1 Output Characteristics

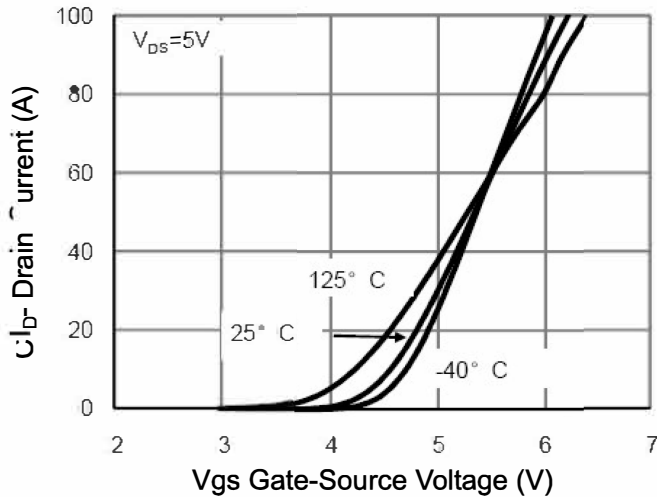


Figure 2 Transfer Characteristics

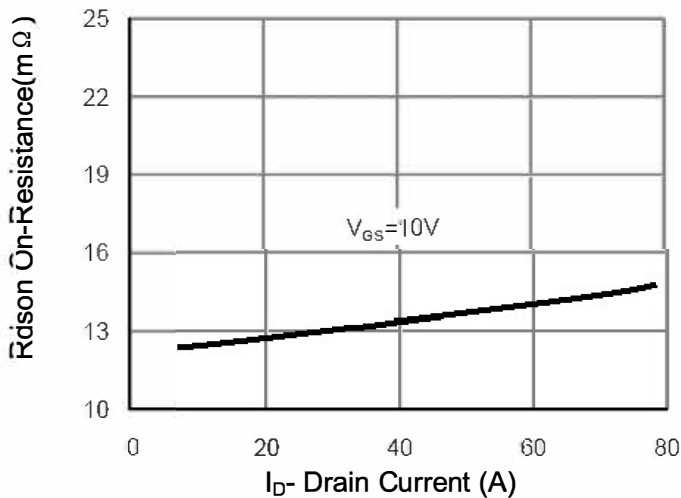


Figure 3 Rdson- Drain Current

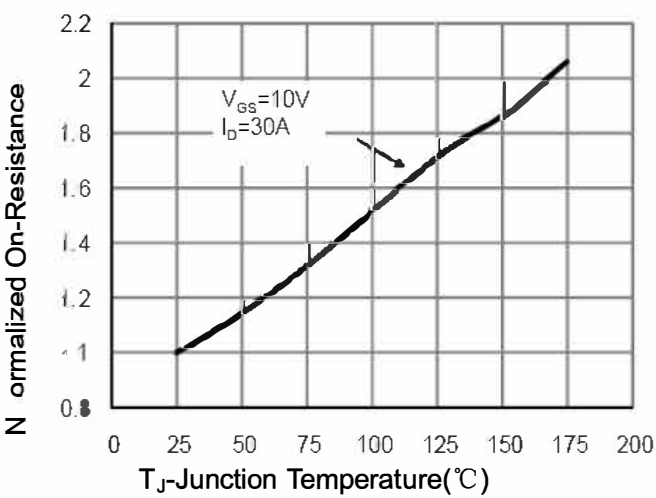


Figure 4 Rdson-JunctionTemperature

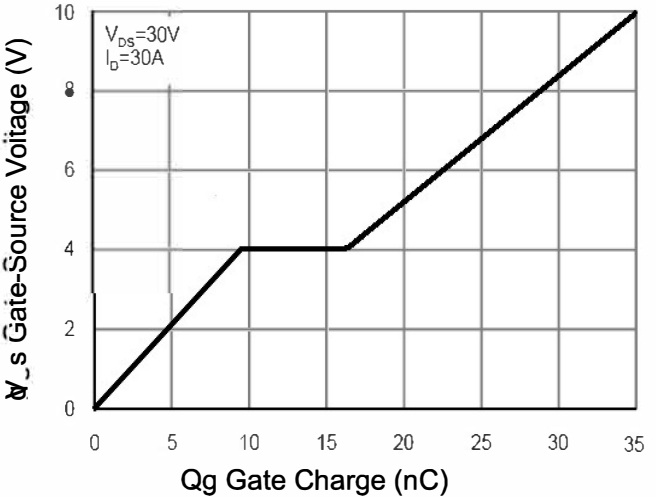


Figure 5 Gate Charge

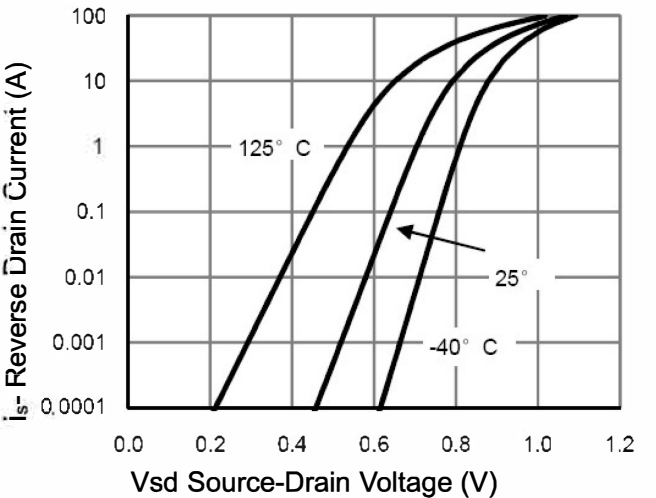


Figure 6 Source- Drain Diode Forward

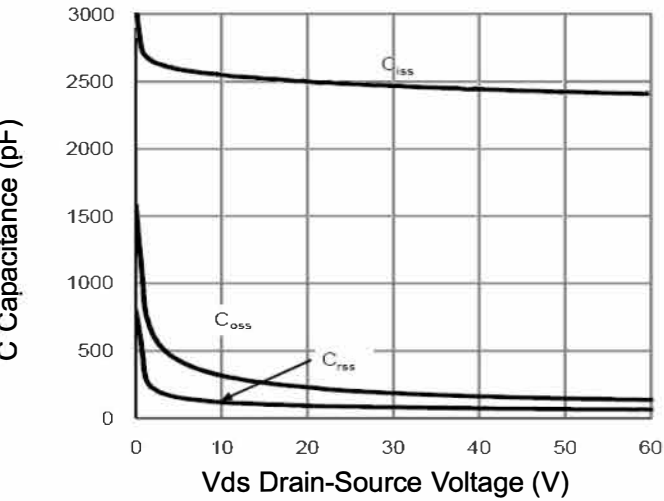


Figure 7 Capacitance vs Vds

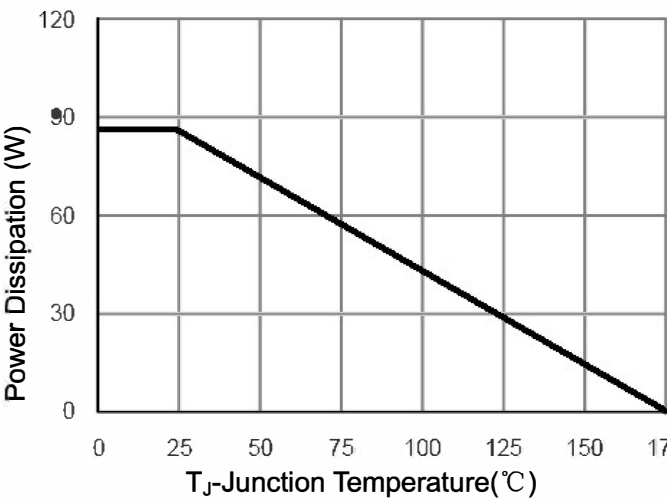


Figure 9 Power De-rating

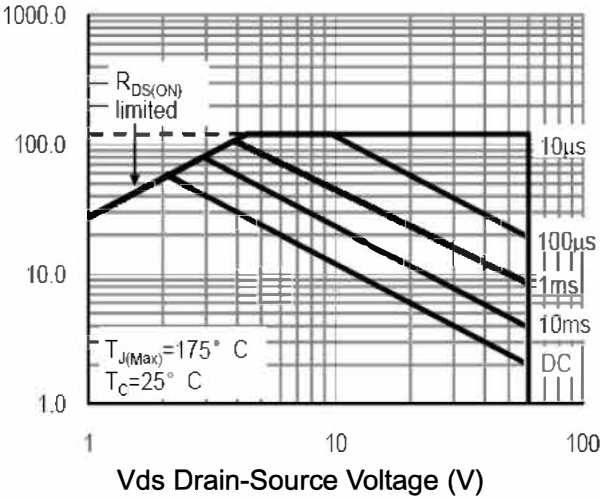


Figure 8 Safe Operation Area

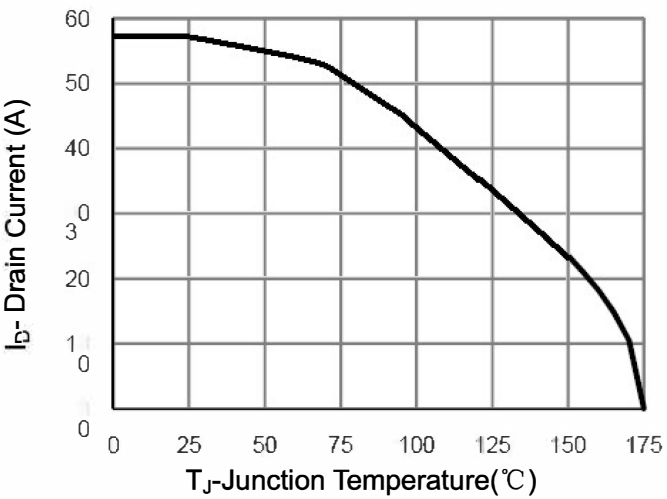


Figure 10 ID Current- Junction Temperature

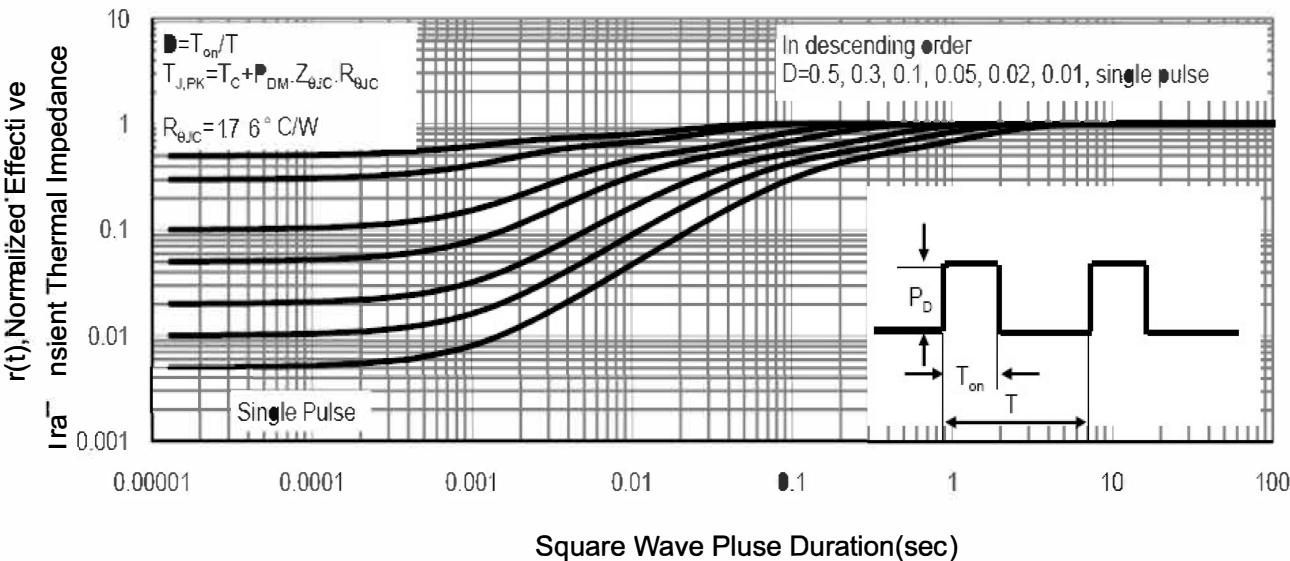
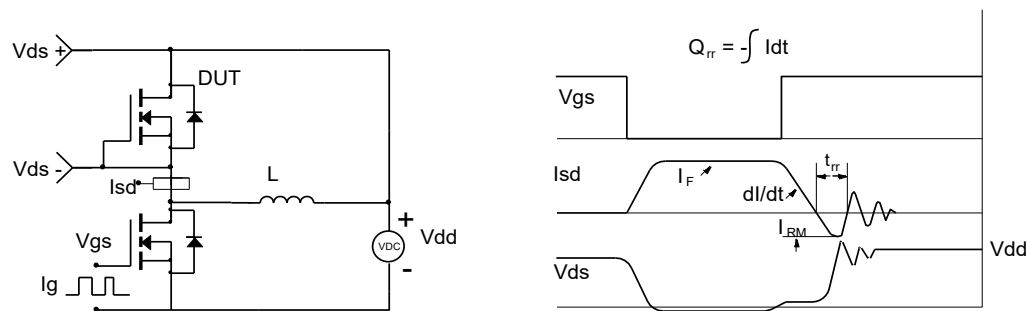
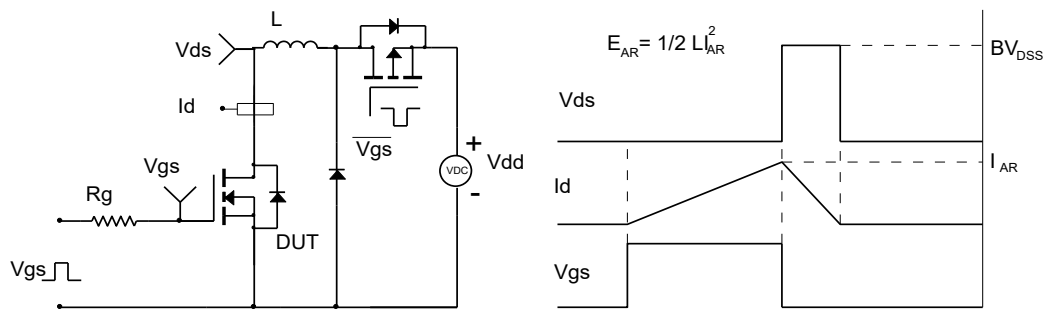
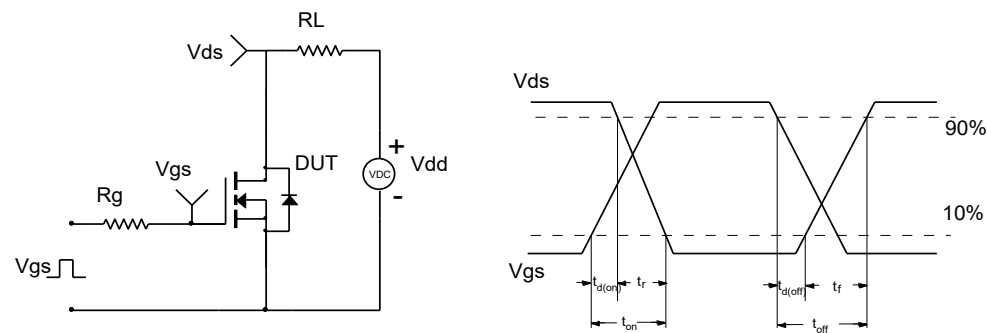
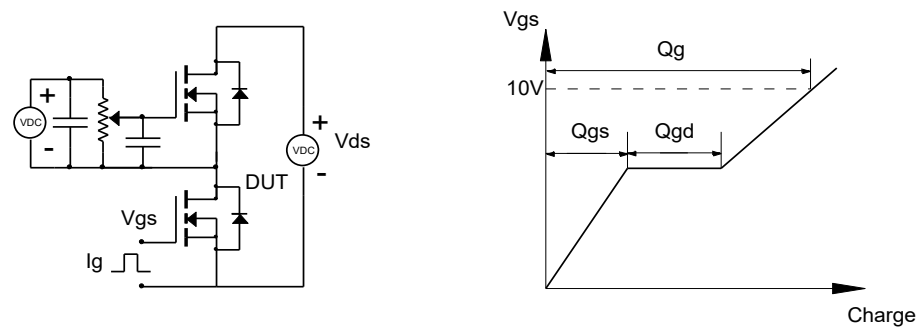


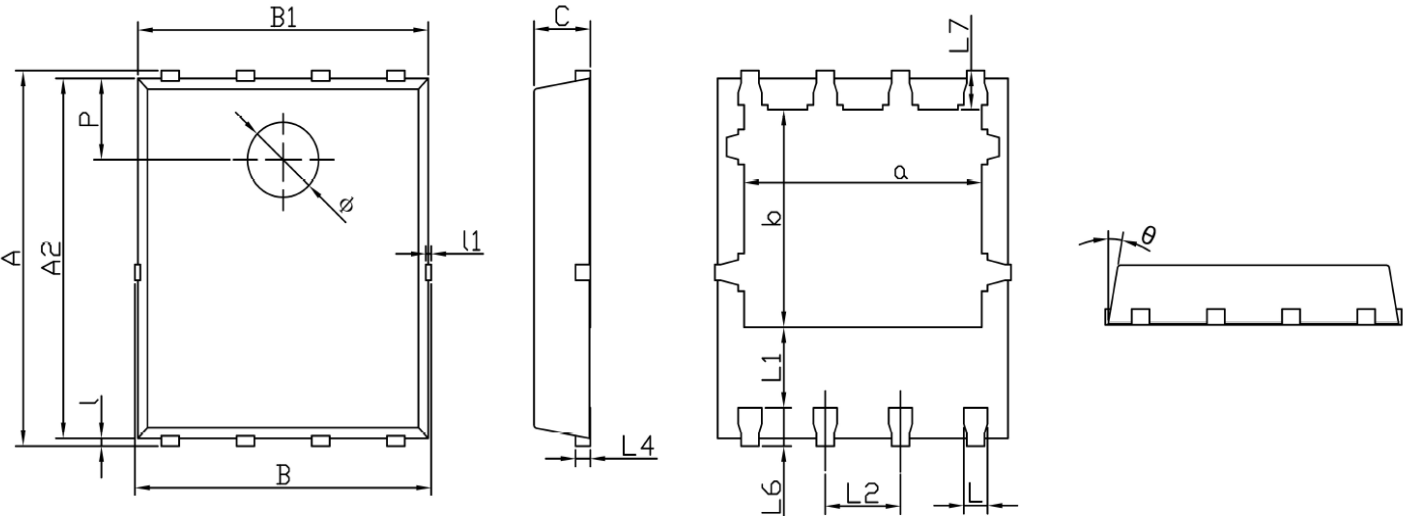
Figure 11 Normalized Maximum Transient Thermal Impedance

Typical Characteristic Curves



Package Outline

PDFN5x6-8L Dimensions in mm

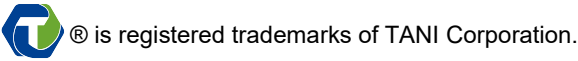


Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	5.90	6.10	L1	1.10	-
a	3.91	4.11	L1	-	0.10
A2	5.70	5.80	L2	1.17	1.37
B	4.90	5.10	L4	0.21	0.34
b	3.375	3.575	L6	0.51	0.71
B1	4.80	5.00	L7	0.51	0.71
C	0.90	1.00	P	1.15	1.45
L	0.30	0.50	θ	8°	12°
l	0.06	0.20	Φ	1.10	1.30

Contact Information

TANI website: <http://www.tanisemi.com> Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.



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