

# AP2317QD

## P-Channel Power MOSFET

### Description

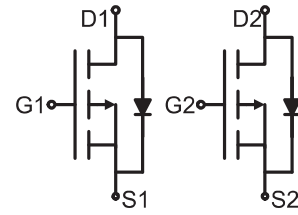
The AP2317QD uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

### General Features

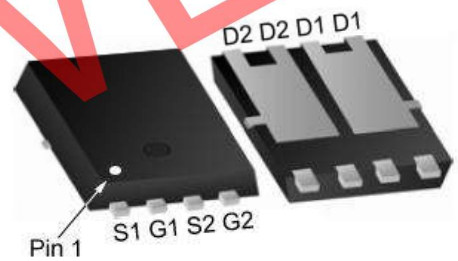
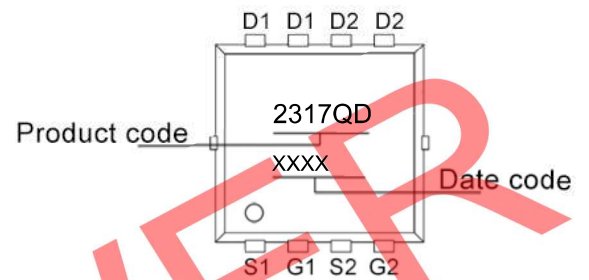
- $V_{DS} = -20V, I_D = -12A$   
 $R_{DS(ON)} < 28m\Omega(max) @ V_{GS} = -2.5V$   
 $R_{DS(ON)} < 20m\Omega(max) @ V_{GS} = -4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

### Application

- PWM applications
- Load switch
- Power management
- Halogen-free



Schematic diagram



PDFN3.3x3.3-8L

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±12	V
Drain Current -Continuous	$I_D$	-12	A
Drain Current -Pulsed <sup>(Note 1)</sup>	$I_{DM}$	-50	A
Maximum Power Dissipation	$P_D$	15	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	4.5	°C /W
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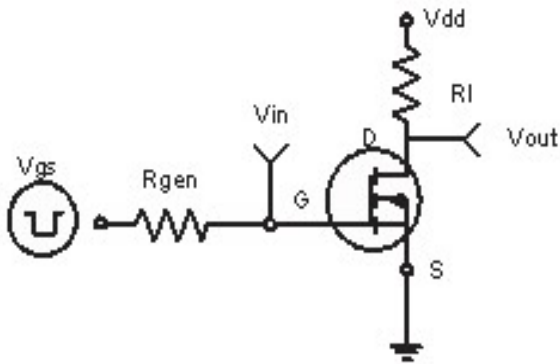
**AP2317QD**
**P-Channel Power MOSFET**
**Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-12V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-6A$	-	17	20	m $\Omega$
		$V_{GS}=-2.5V, I_D=-5A$	-	21	28	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-6A$		20	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-6V, V_{GS}=0V,$ $F=1.0MHz$	-	1730	-	PF
Output Capacitance	$C_{oss}$		-	320	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	210	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-6V, I_D=-1A,$ $R_L=6\Omega, V_{GEN}=-4.5V, R_g=6\Omega$	-	20	-	nS
Turn-on Rise Time	$t_r$		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	90	-	nS
Turn-Off Fall Time	$t_f$		-	70	-	nS
Total Gate Charge	$Q_g$		-	19.5	-	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS}=-6V, I_D=-6A, V_{GS}=-4.5V$	-	4.1	-	nC
Gate-Drain Charge	$Q_{gd}$		-	5.2	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-1.0A$	-	-	-1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-12	A

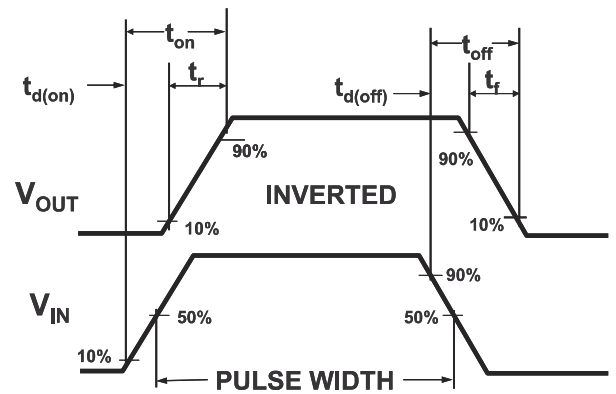
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

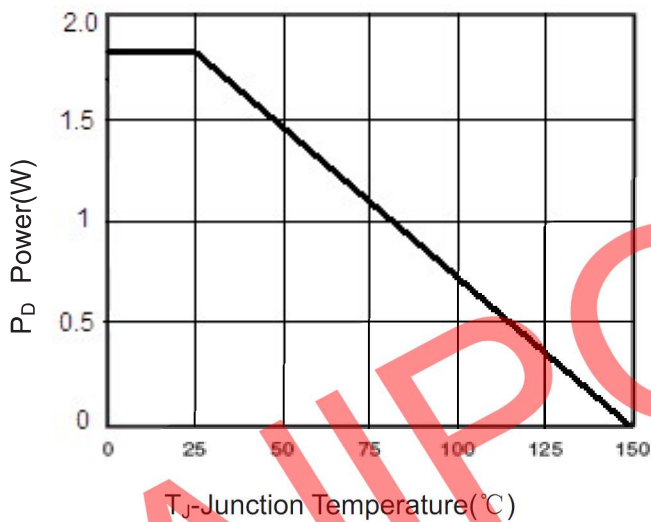
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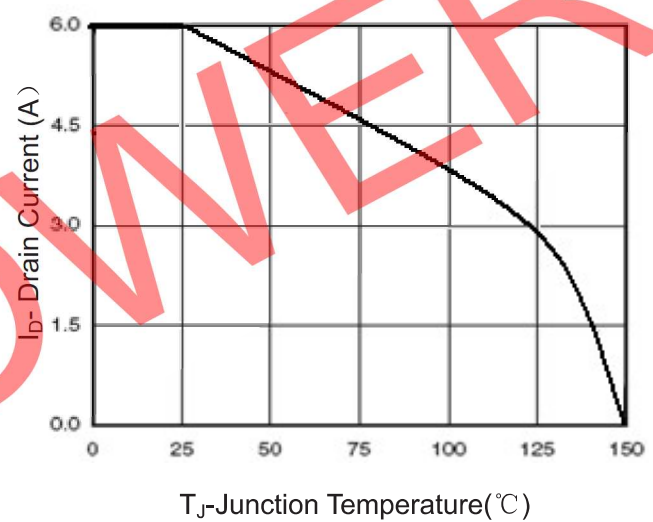
**Figure 1: Switching Test Circuit**



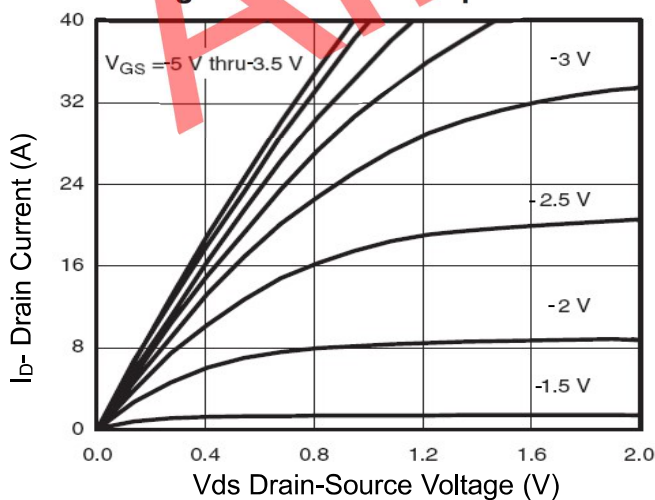
**Figure 2: Switching Waveforms**



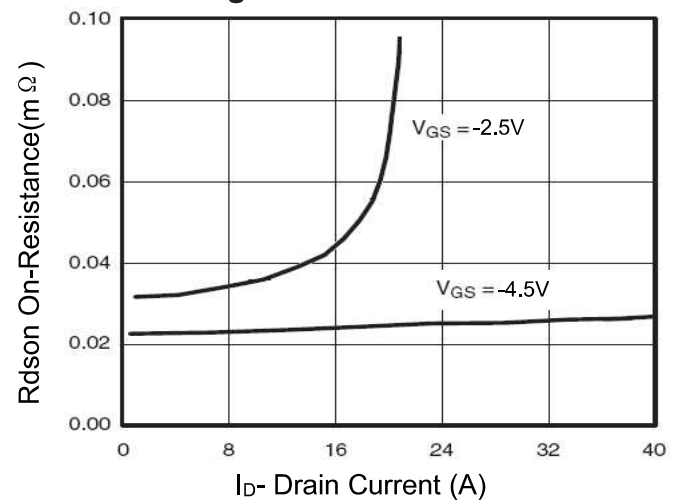
**Figure 3 Power Dissipation**



**Figure 4 Drain Current**



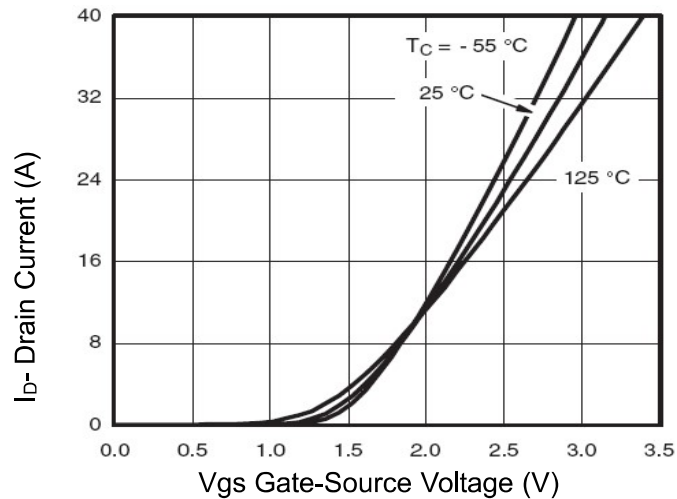
**Figure 5 Output Characteristics**



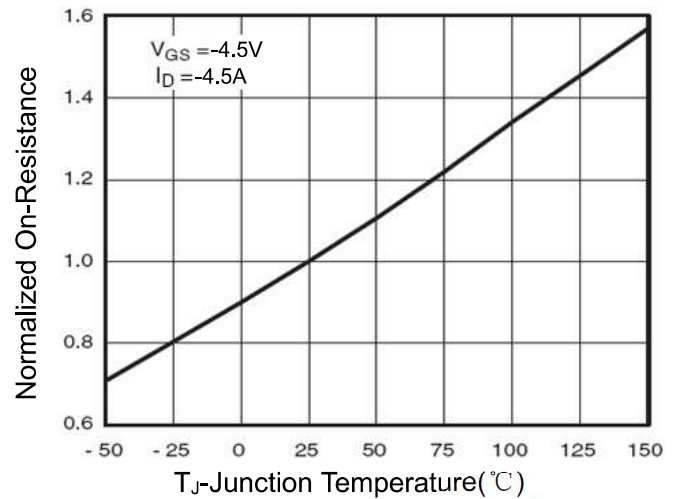
**Figure 6 Drain-Source On-Resistance**

**AP2317QD**

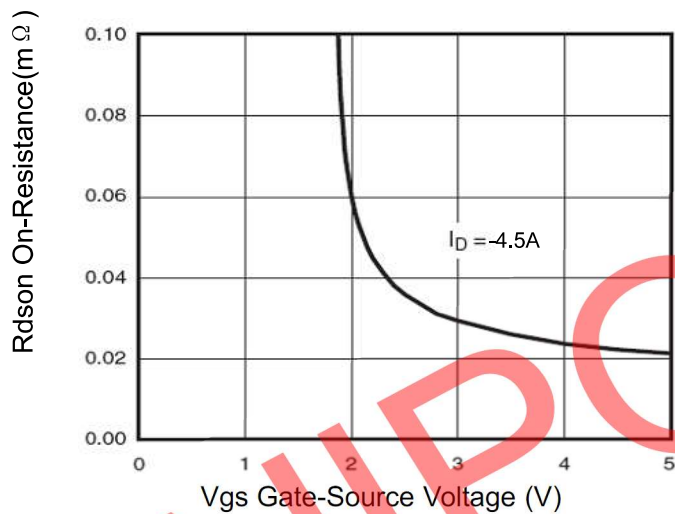
**P-Channel Power MOSFET**



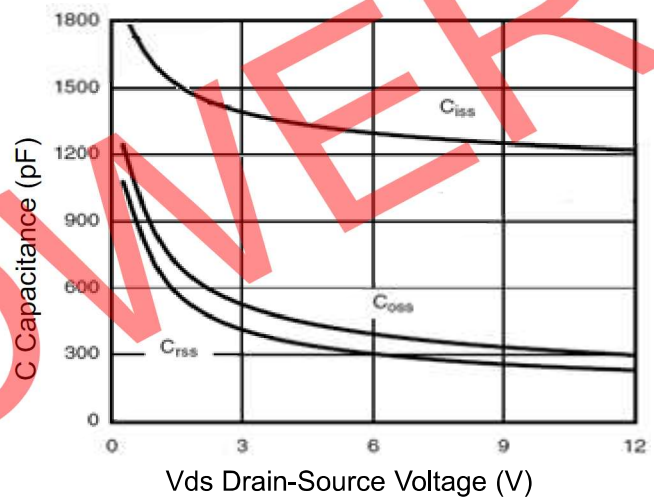
**Figure 7 Transfer Characteristics**



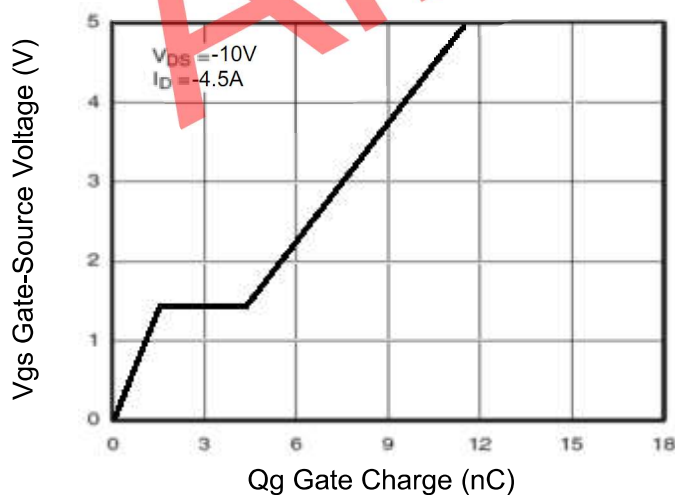
**Figure 8 Drain-Source On-Resistance**



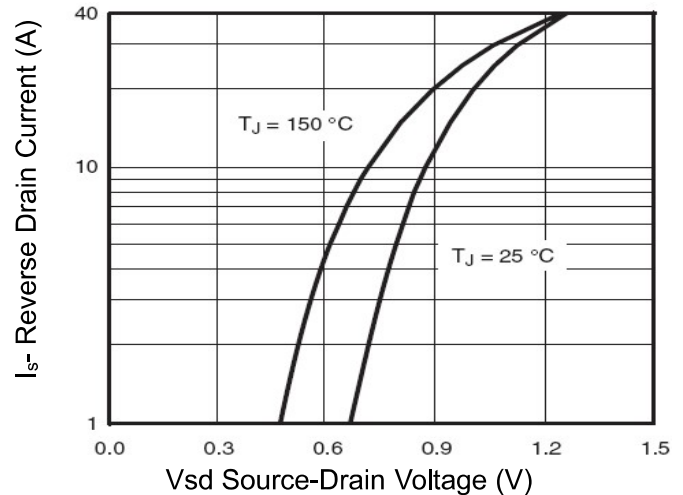
**Figure 9 Rdson vs Vgs**



**Figure 10 Capacitance vs Vds**



**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**

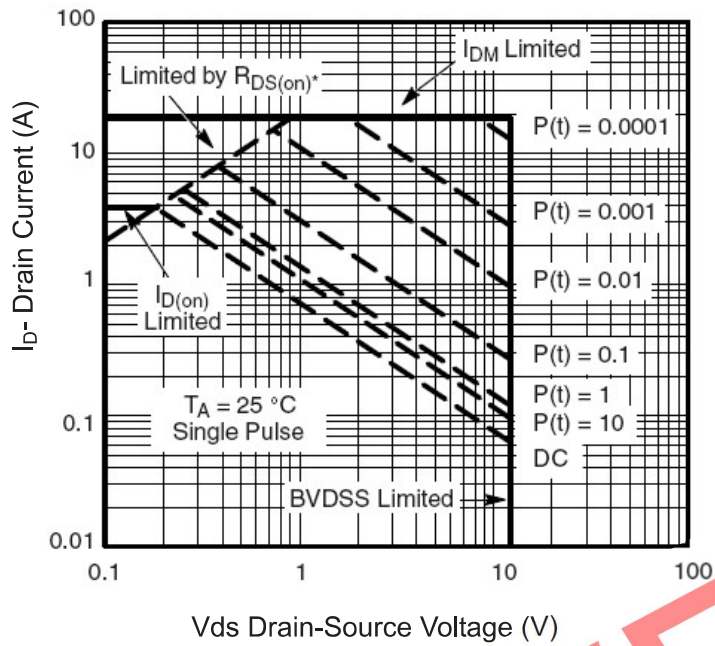


Figure 13 Safe Operation Area

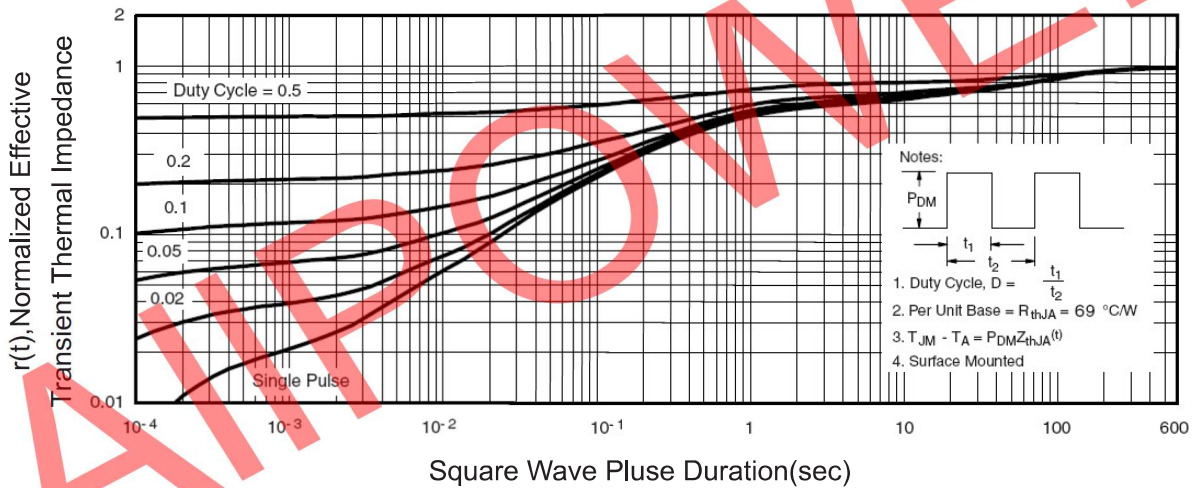
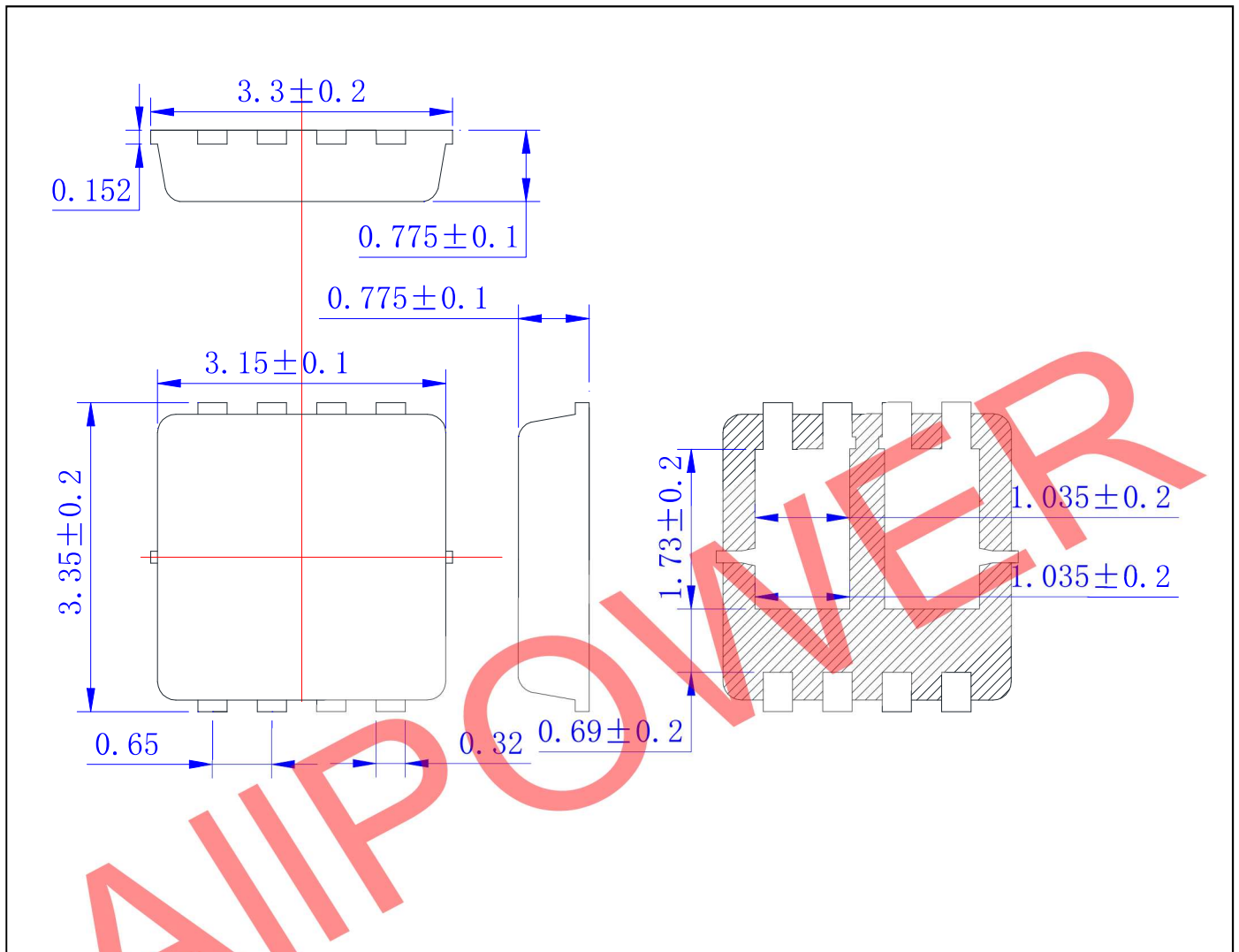


Figure 14 Normalized Maximum Transient Thermal Impedance

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**PACKAGE OUTLINE DIMENSIONS**



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