

P-Channel Enhancement Mode MOSFET

TDM3307A

**DESCRIPTION**

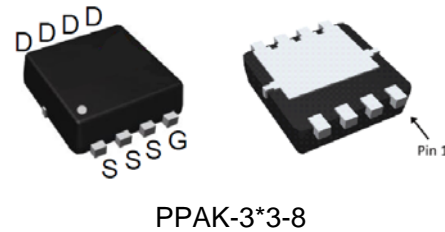
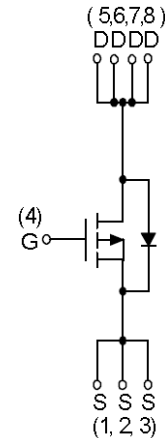
The TDM3307A uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

- -30V/-24A
- RDS(ON) < 18mΩ @ VGS=-4.5V  
RDS(ON) < 10.5mΩ @ VGS=-10V
- Reliable and Rugged
- Lead free product is available
- PPAK\*3-8 Package

**Application**

- PWM applications
- Load switch
- Power management



**ABSOLUTE MAXIMUM RATINGS**(TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	-30	V
Gate-Source Voltage	V <sub>GS</sub>	±25	V
Continuous Drain Current	I <sub>D</sub> (T <sub>C</sub> =25°C)	-24	A
	I <sub>D</sub> (T <sub>C</sub> =100°C)	-18	A
Pulsed Drain Current	I <sub>DM</sub> T <sub>C</sub> =25°C)	-59	A
Maximum Power Dissipation (note1)	P <sub>D</sub> (T <sub>A</sub> =25°C)	2.5	W
Maximum Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Thermal Resistance-Junction to Ambient (note1)	RθJA	50	°C/W
Thermal Resistance-Junction to Case (note2)	RθJC	6	°C/W

**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>ON CHARACTERISTICS</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_{DS}=-9A$	-	14	18	m $\Omega$
		$V_{GS}=-10V, I_{DS}=-13A$	-	9	10.5	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note4)						
Gate Resistance	$R_g$	$V_{GS}=15mV, V_{DS}=0V, F=1MHz$	-	3.0	-	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	3067	-	PF
Output Capacitance	$C_{oss}$		-	453	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	398	-	PF
<b>SWITCHING CHARACTERISTICS</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V, R_G=2.7\Omega, I_{DS}=-1A$	-	20	-	nS
Turn-on Rise Time	$t_r$		-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	nS
Turn-Off Fall Time	$t_f$		-	10	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_{DS}=-13A, V_{GS}=-10V$	-	52	-	nC
Gate-Source Charge	$Q_{gs}$		-	6.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	10	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_{DS}=-20A, di/dt=100A/\mu s$	-	47	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	43	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_{SD}=-1A$	-	-0.7	-1.2	V

**NOTES:**

- Surface Mounted on  $1in^2$  pad area,  $t_s \leq 10sec$ .  $R_{\theta JA}$  steady state  $t = 999s$ .
- The power dissipation  $P_D$  is based on  $T_{J(MAX)} = 150^\circ C$ , and it is useful for reducing junction-to-case thermal resistance ( $R_{\theta JC}$ ) when additional heat sink is used.
- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

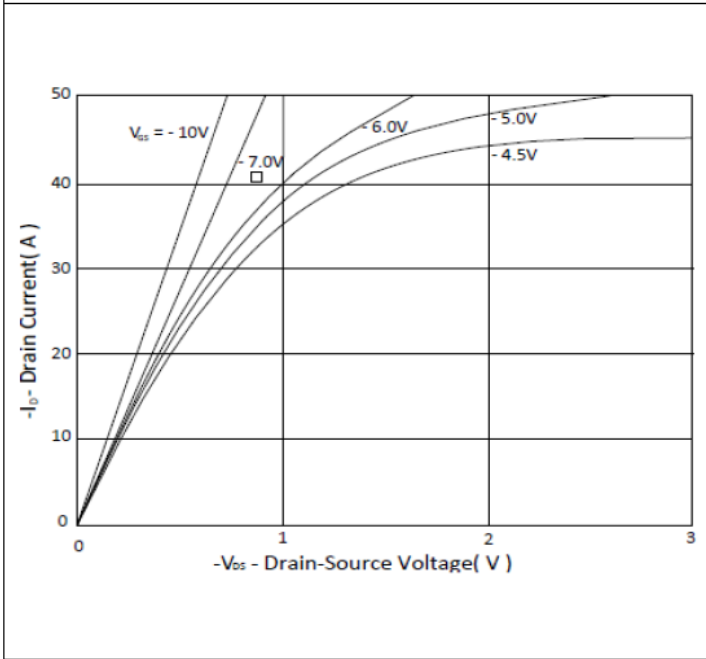


Figure 2. On-Resistance vs. Gate-Source Voltage

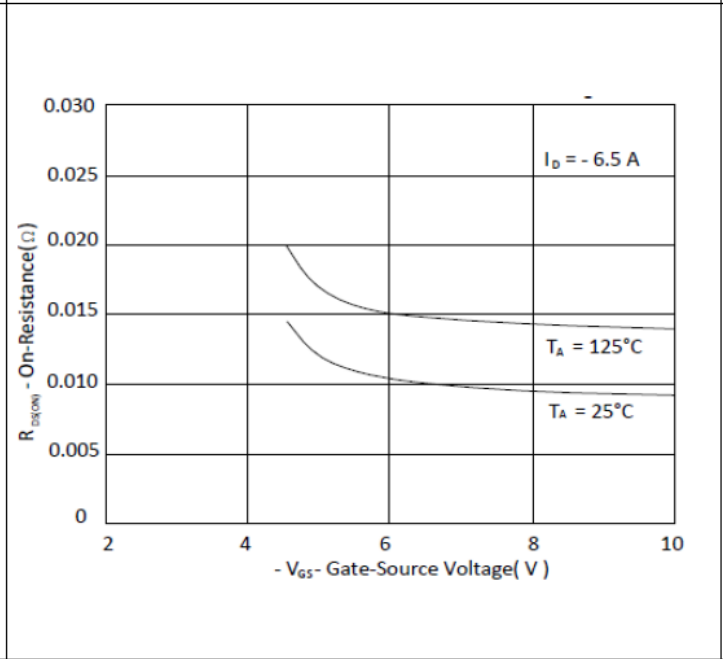


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

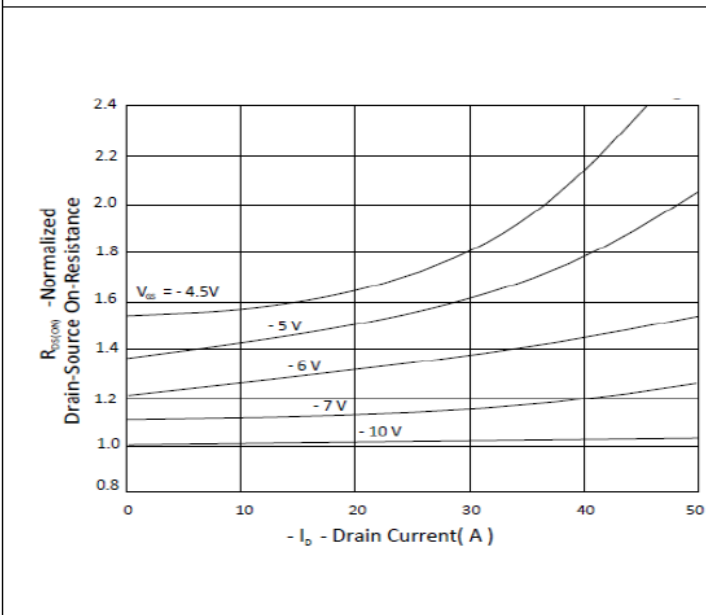
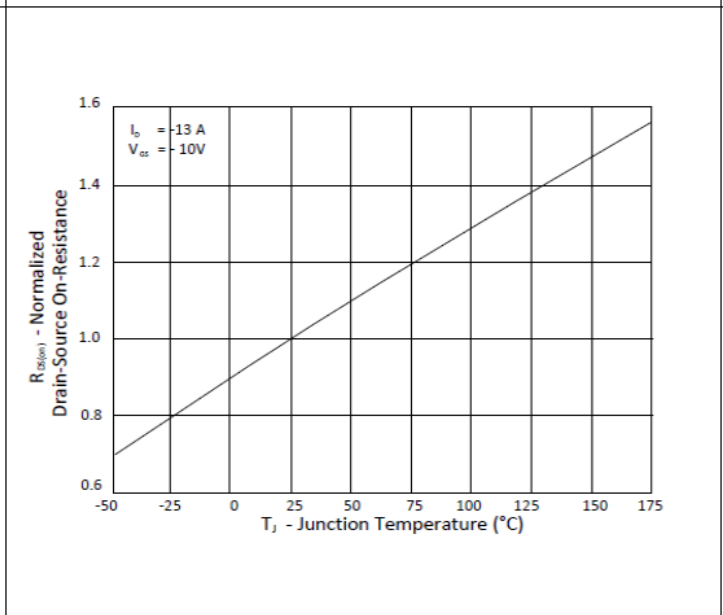


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

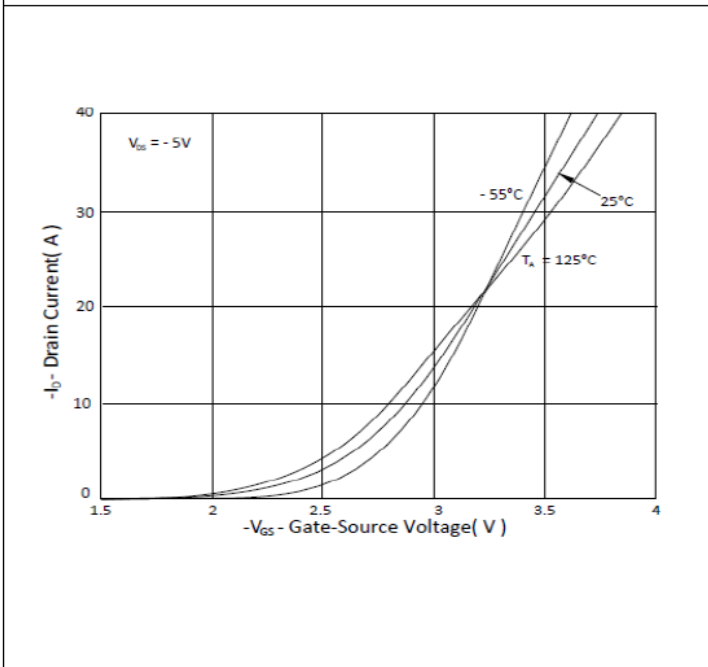


Figure 6. Typical Source-Drain Diode Forward Voltage

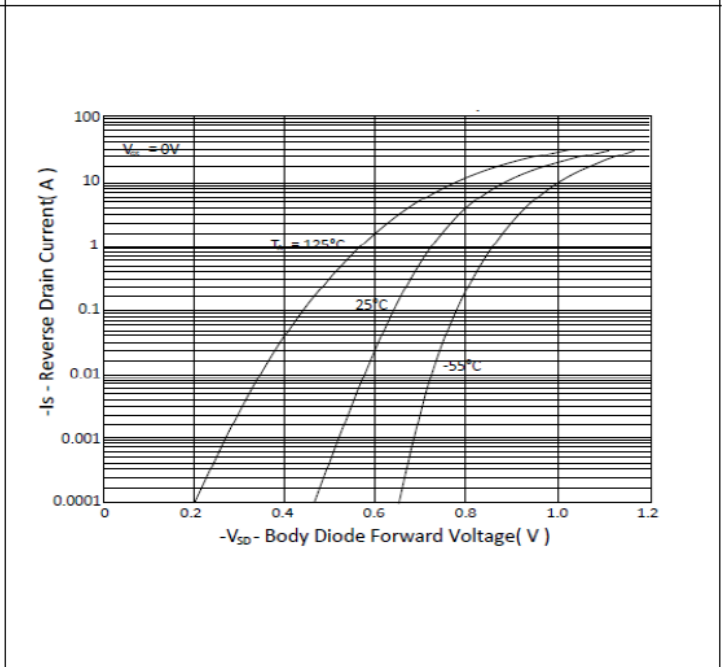


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

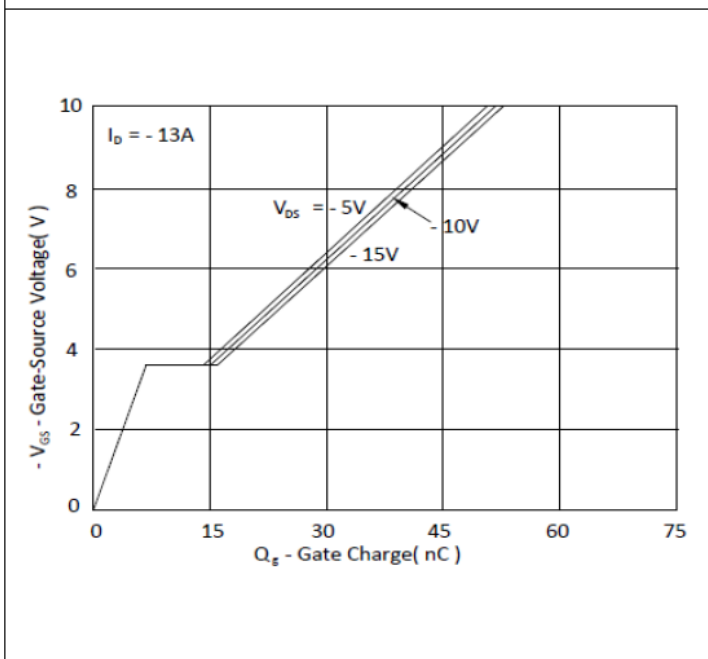
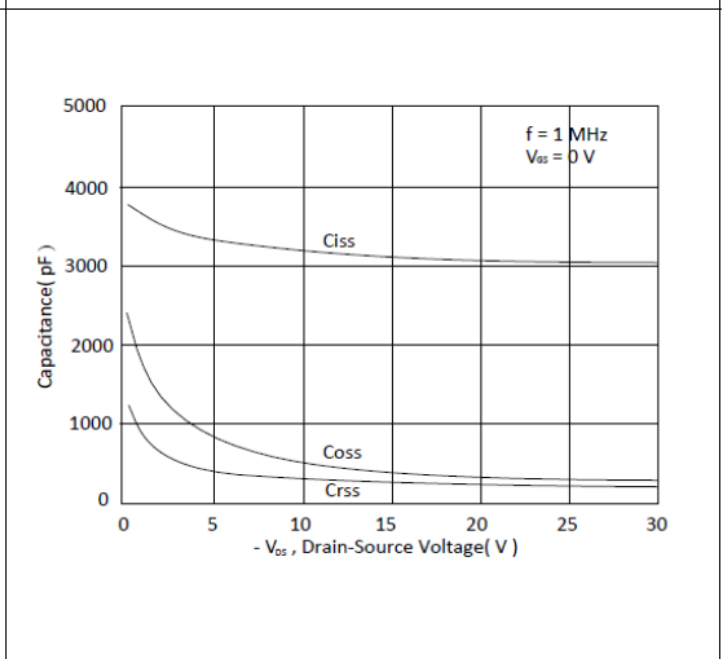


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

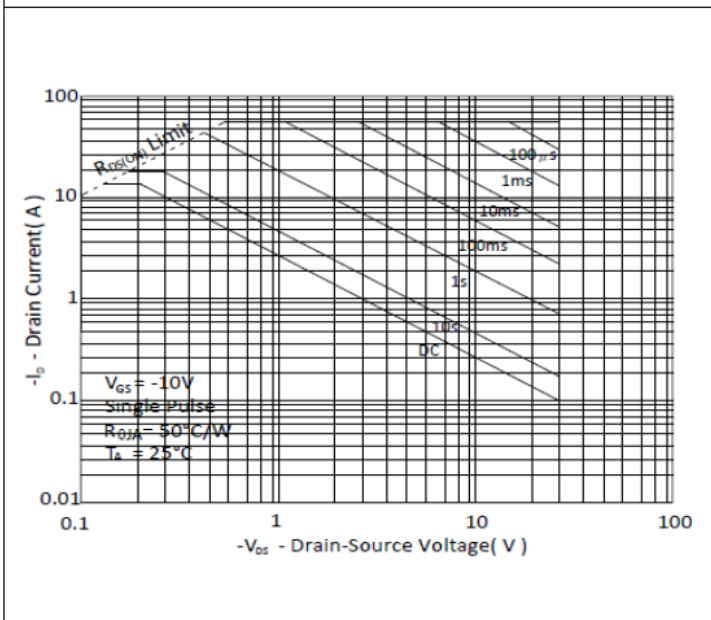


Figure 10. Single Pulse Maximum Power Dissipation

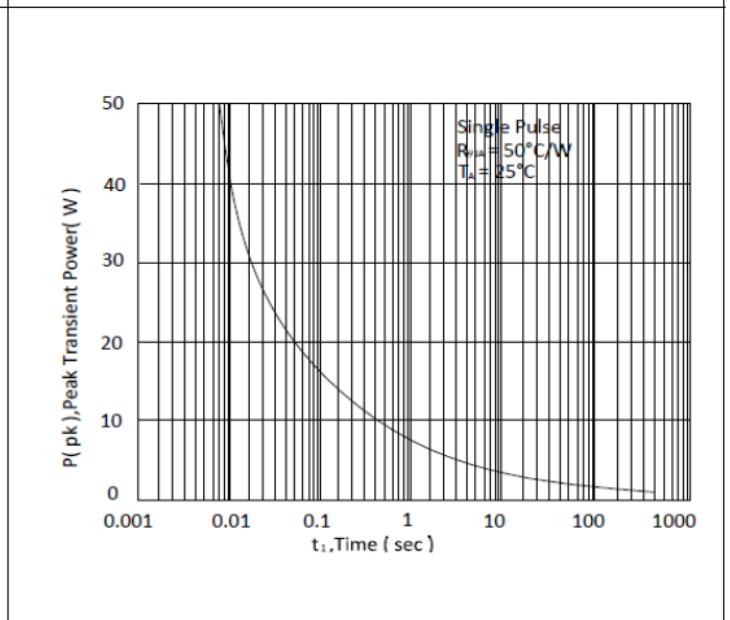
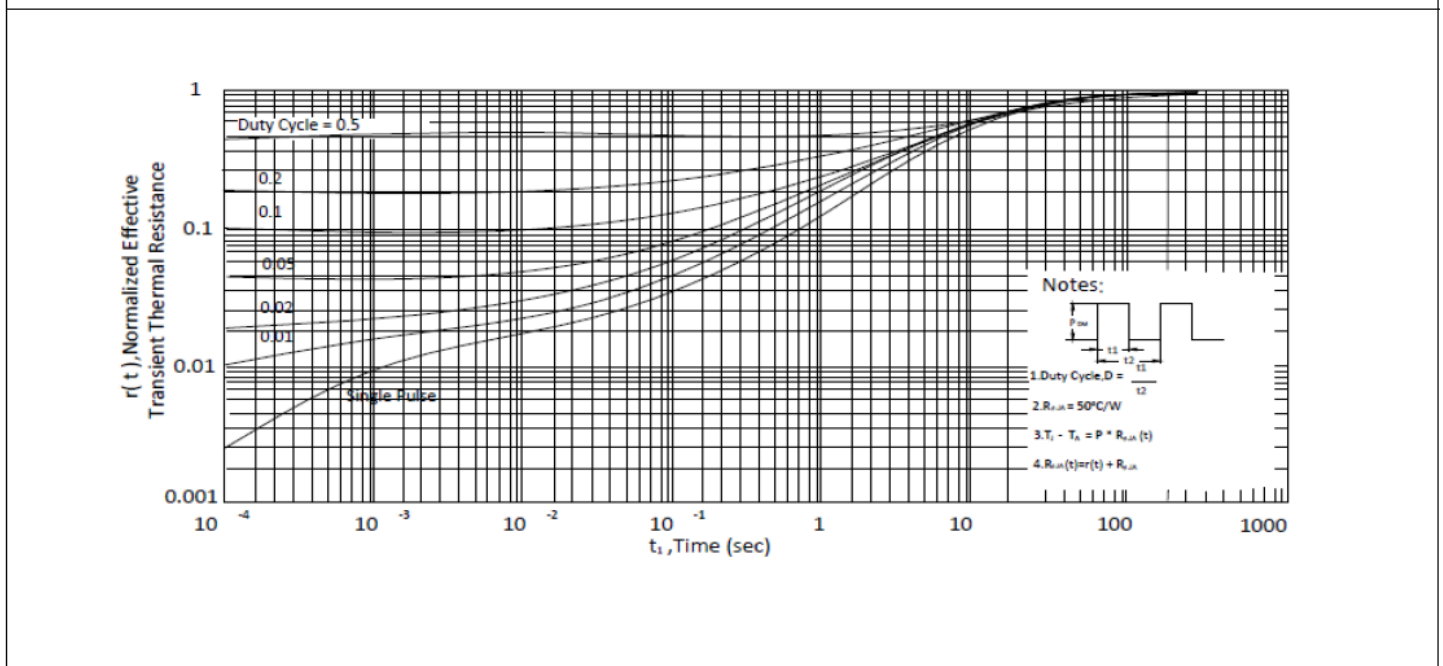
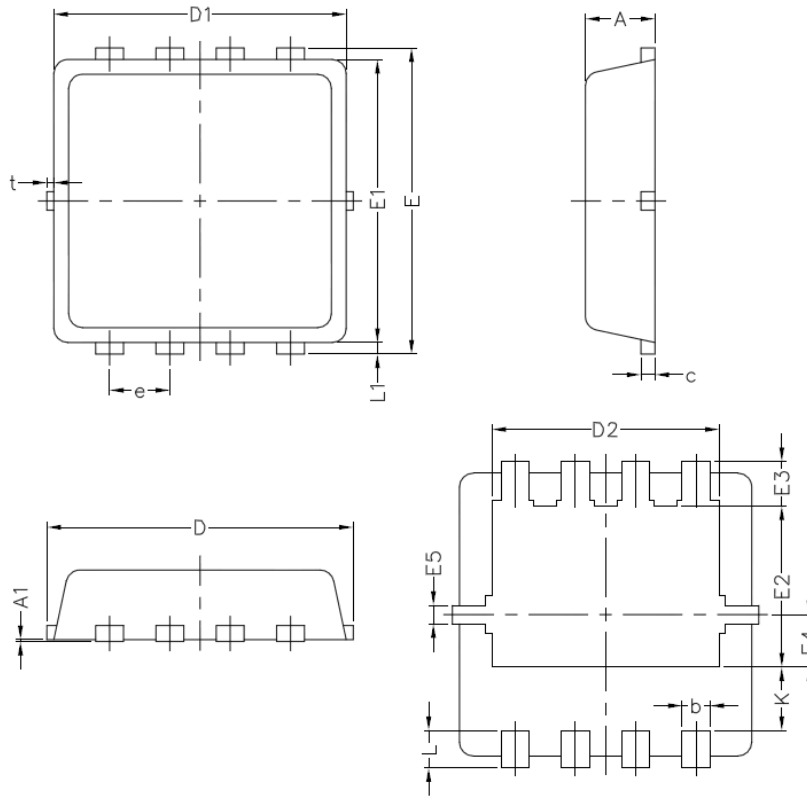


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



Package Information

PPAK-3\*3-8 Package



Symbol	PPAK-3*3-8(mm)		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.3	3.45
D1	3.00	3.15	3.30
D2	2.25	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.68
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.49	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	/	/	0.13

Design Notes