

P-Channel Enhancement Mode MOSFET

TDM3307A

DESCRIPTION

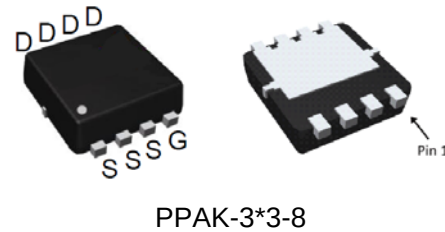
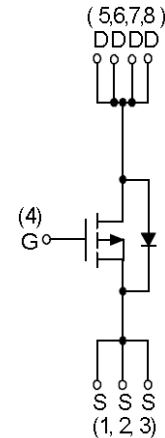
The TDM3307A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- -30V/-24A
- $R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)} < 10.5m\Omega$ @ $V_{GS} = -10V$
- 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_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current	$I_D (T_C = 25^\circ C)$	-24	A
	$I_D (T_C = 100^\circ C)$	-18	A
Pulsed Drain Current	$I_{DM} (T_C = 25^\circ C)$	-59	A
Maximum Power Dissipation (note1)	$P_D (T_A = 25^\circ C)$	2.5	W
Maximum Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to 150	°C
Thermal Resistance-Junction to Ambient (note1)	$R_{\theta JA}$	50	°C/W
Thermal Resistance-Junction to Case (note2)	$R_{\theta JC}$	6	°C/W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24, V _{GS} =0V	-	-	-1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-1.0	-1.5	-3.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V,I _{DS} =-9A	-	14	18	mΩ
		V _{GS} =-10V, I _{DS} =-13A	-	9	10.5	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Gate Resistance	R _g	V _{GS} =15mV, V _{DS} =0V,F=1MHz	-	3.0	-	Ω
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
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V,, V _{GS} =-10V, R _G =2.7Ω 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/μs	-	47	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	43	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
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, $t \leq 10sec$. $R_{\theta JA}$ 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

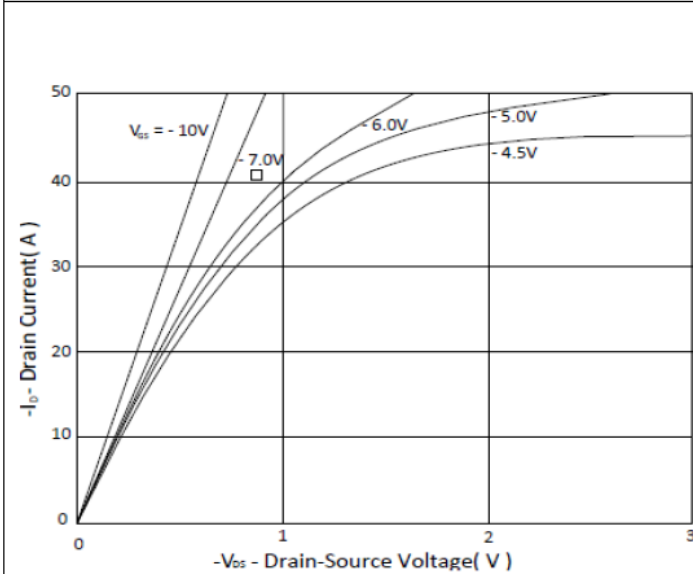


Figure 2. On-Resistance vs. Gate-Source Voltage

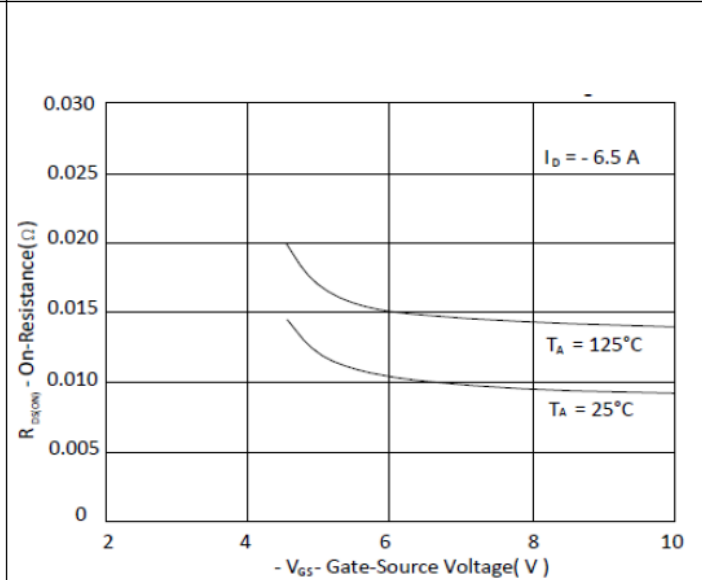


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

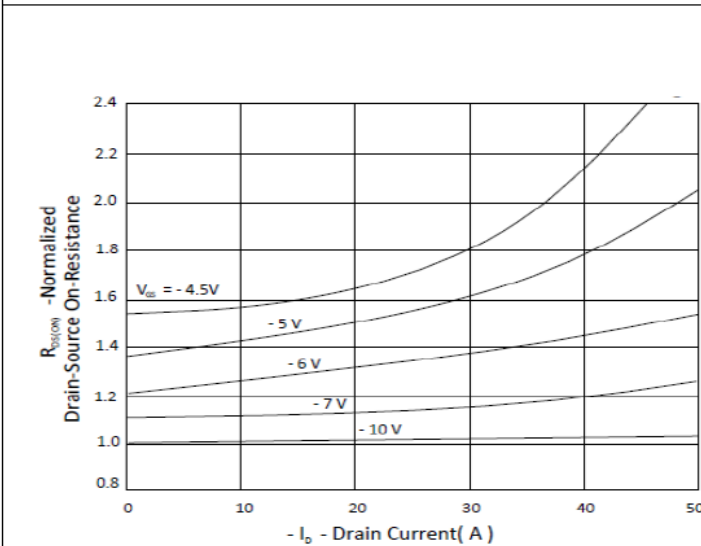
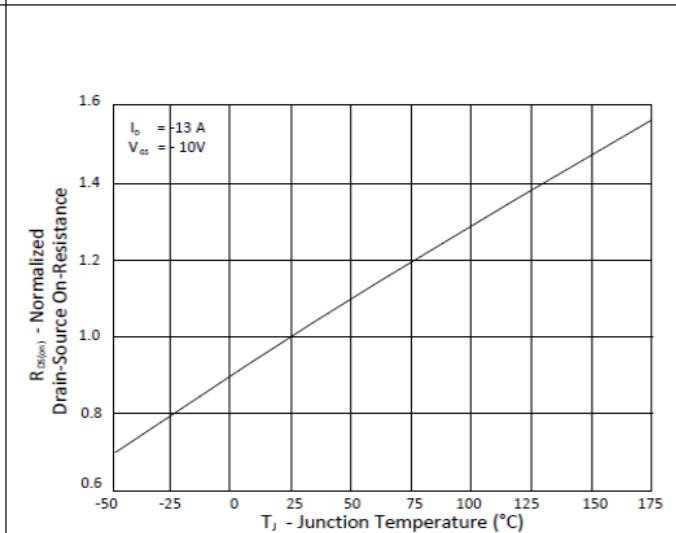


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

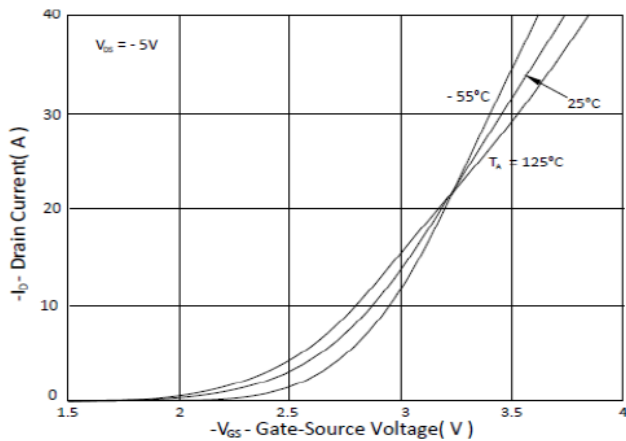


Figure 6. Typical Source-Drain Diode Forward Voltage

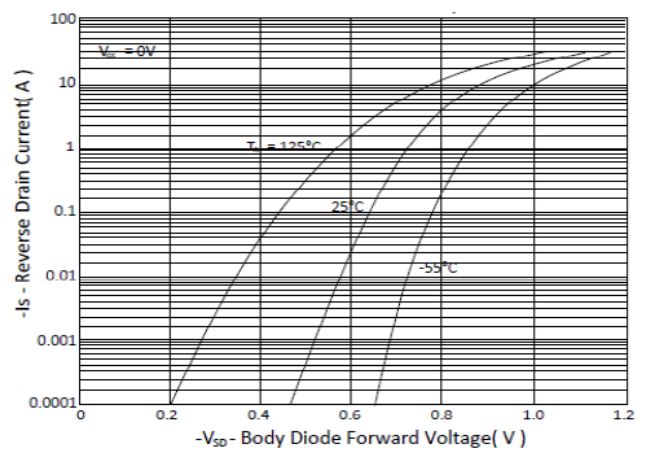


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

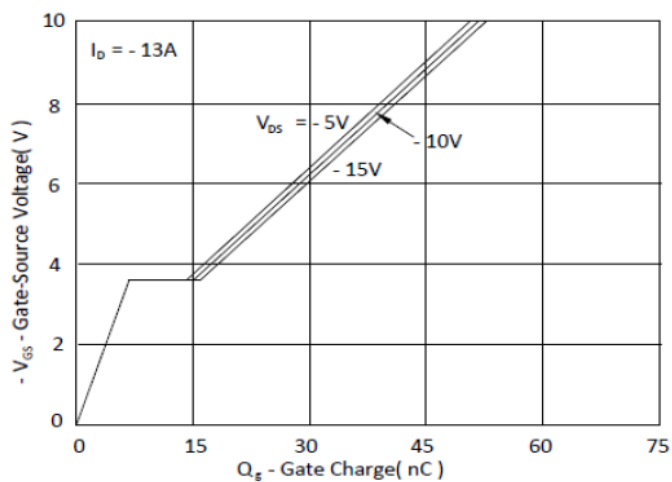
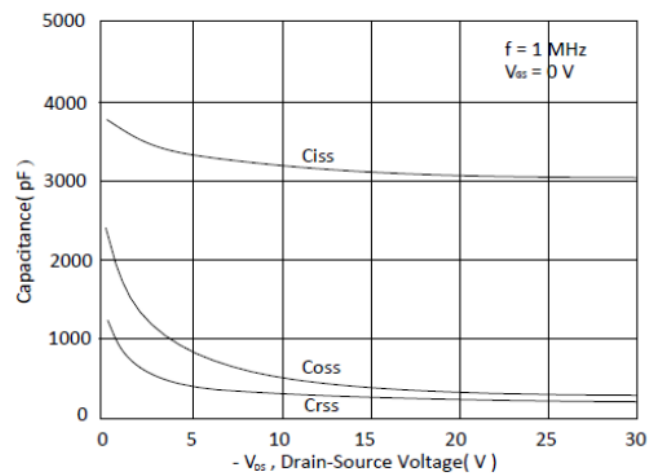


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

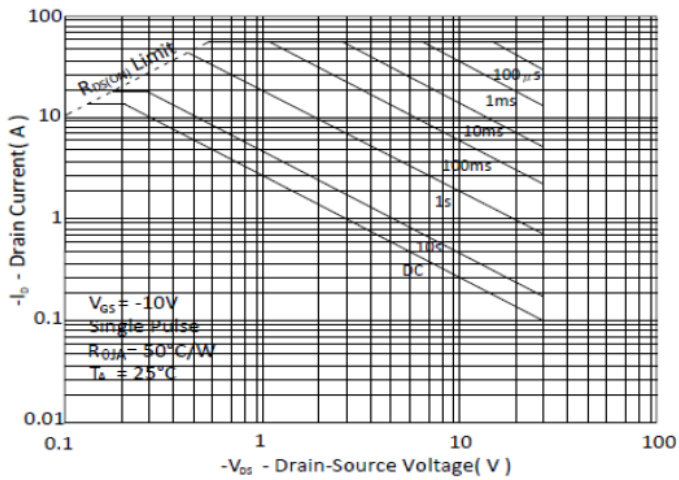


Figure 10. Single Pulse Maximum Power Dissipation

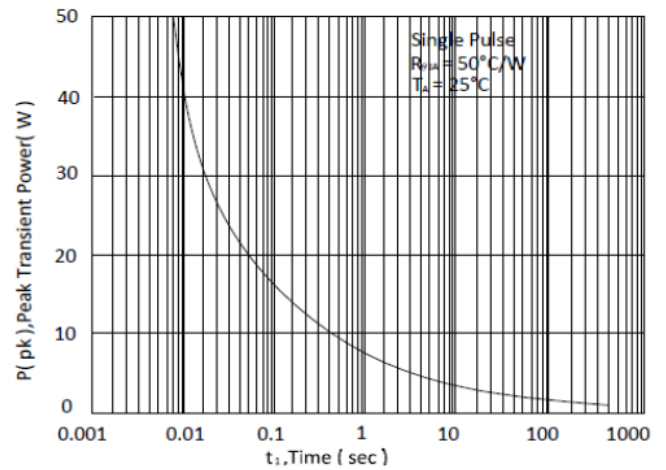
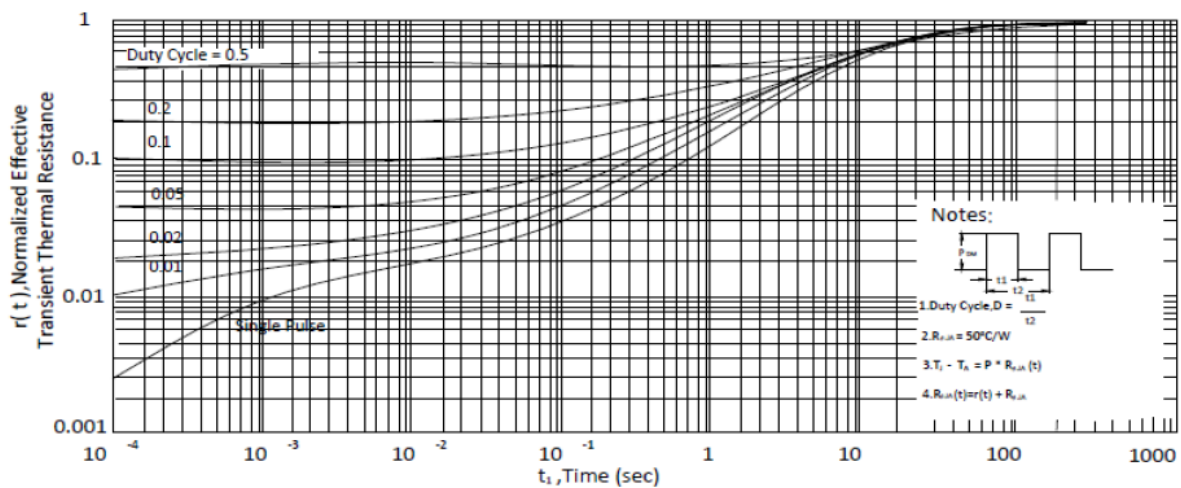
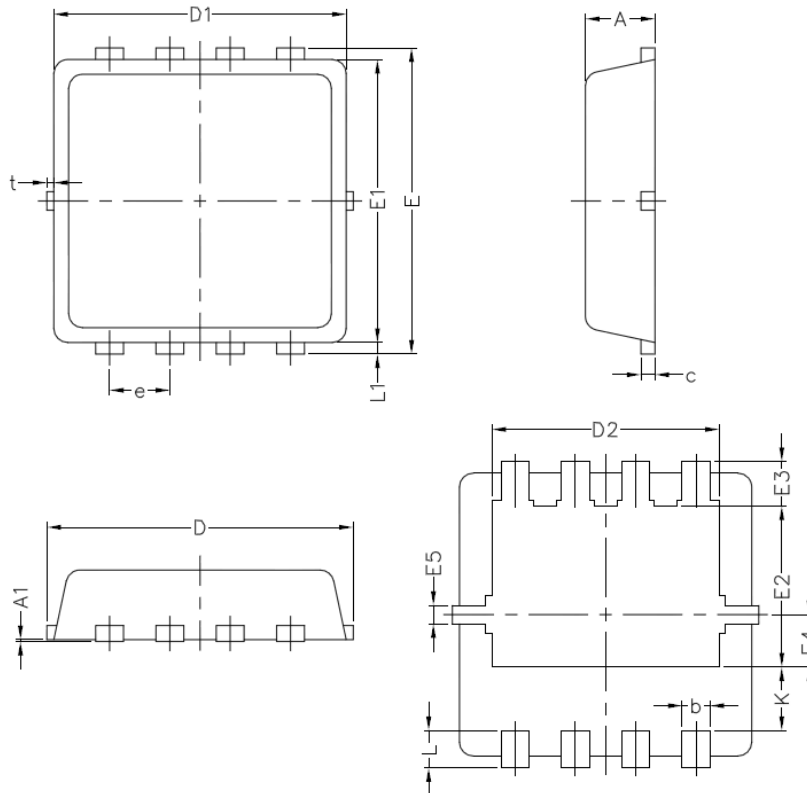


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



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