

P-Channel Enhancement Mode MOSFET

TDM3307C

**DESCRIPTION**

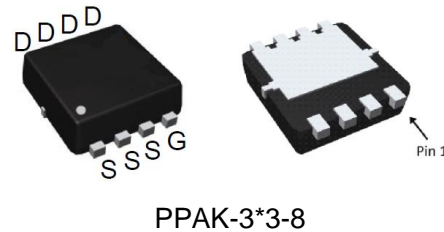
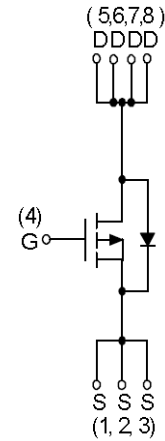
The TDM3307C uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

- -30V/-24A
- RDS(ON) < 15mΩ @ 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>	±20	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
Operating Junction Temperature Range	T <sub>J</sub>	-55 to 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	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_{DS}=-9A$	-	12	15	m $\Omega$
		$V_{GS}=-10V, I_{DS}=-13A$	-	9	10.5	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note4)						
Input Capacitance	$C_{iss}$	$V_{DS}=-25V, V_{GS}=0V, F=1.0MHz$	-	2590	-	PF
Output Capacitance	$C_{oss}$		-	590	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	360	-	PF
<b>SWITCHING CHARACTERISTICS</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-30V, V_{GS}=-4.5V, R_G=6.8\Omega, I_{DS}=-1A$	-	21	-	nS
Turn-on Rise Time	$t_r$		-	79	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	185	-	nS
Turn-Off Fall Time	$t_f$		-	145	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-10V, I_{DS}=-12A, V_{GS}=-15V$	-	65	-	nC
Gate-Source Charge	$Q_{gs}$		-	10	-	nC
Gate-Drain Charge	$Q_{gd}$		-	16	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_{DS}=-2.5A, di/dt=100A/\mu s$	-	38	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	24	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_{SD}=-1A$	-	-0.9	-1.5	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

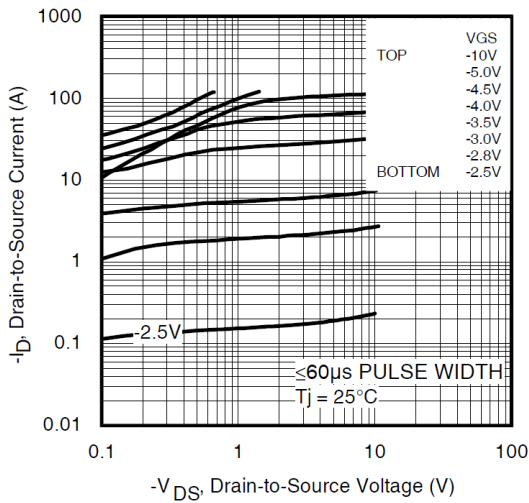


Fig 1. Typical Output Characteristics

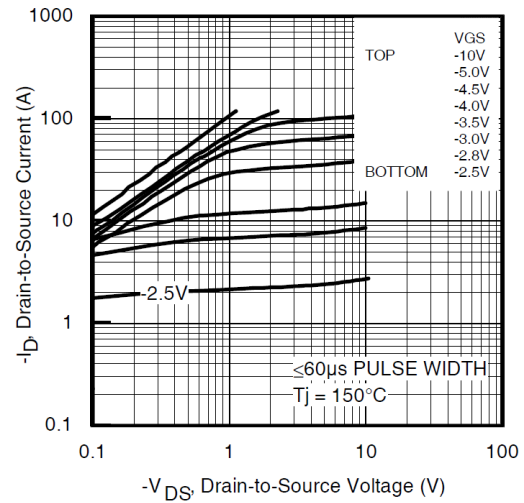


Fig 2. Typical Output Characteristics

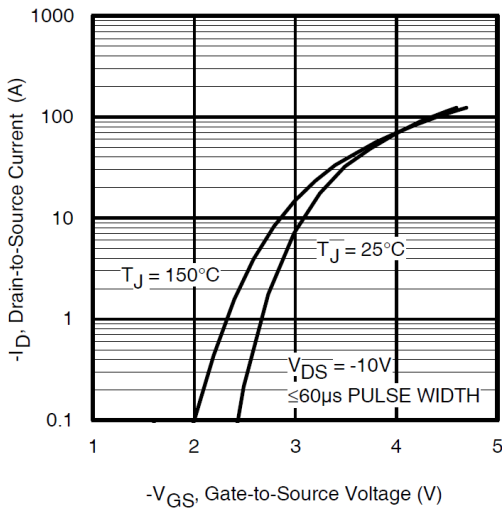


Fig 3. Typical Transfer Characteristics

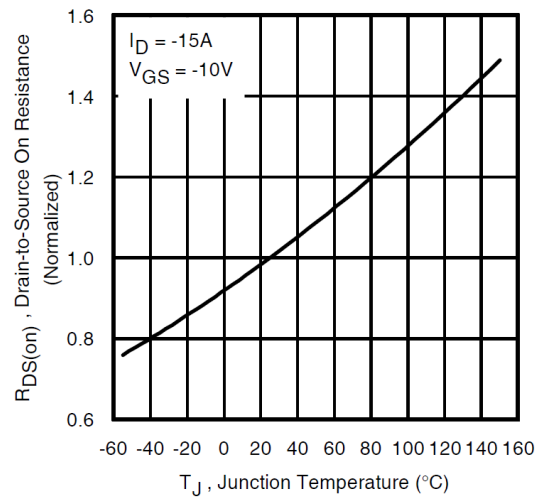


Fig 4. Normalized On-Resistance vs. Temperature

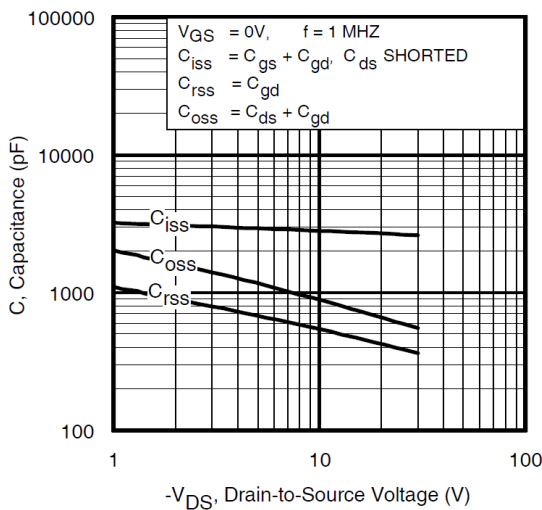


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

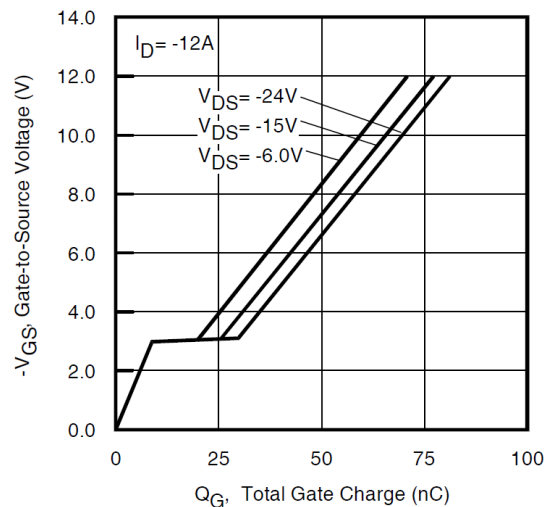


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

Typical Operating Characteristics (Cont.)

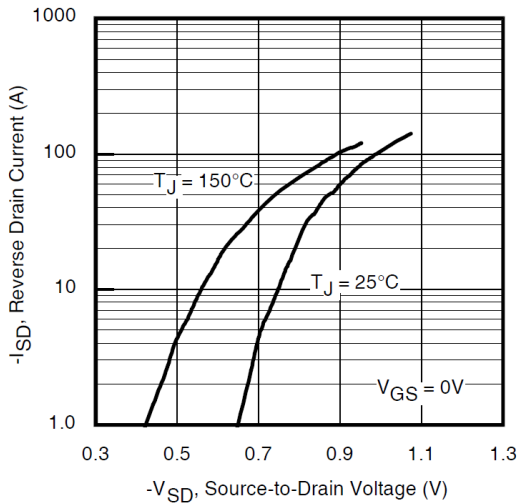


Fig 7. Typical Source-Drain Diode Forward Voltage

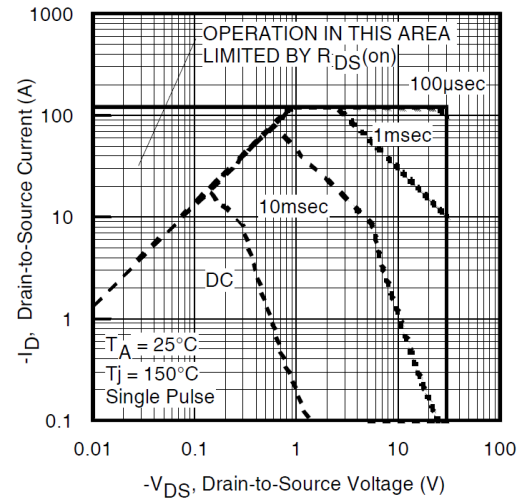


Fig 8. Maximum Safe Operating Area

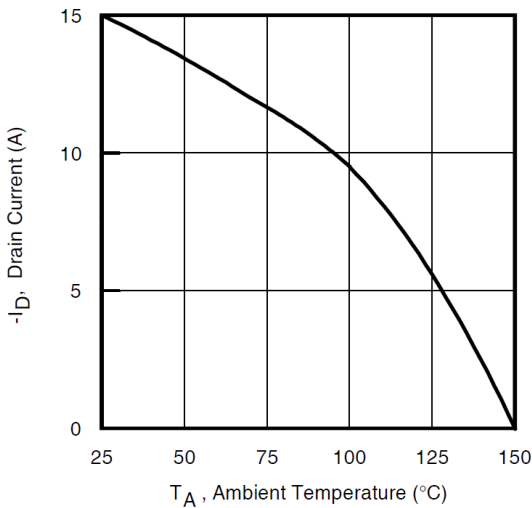


Fig 9. Maximum Drain Current vs. Ambient Temperature

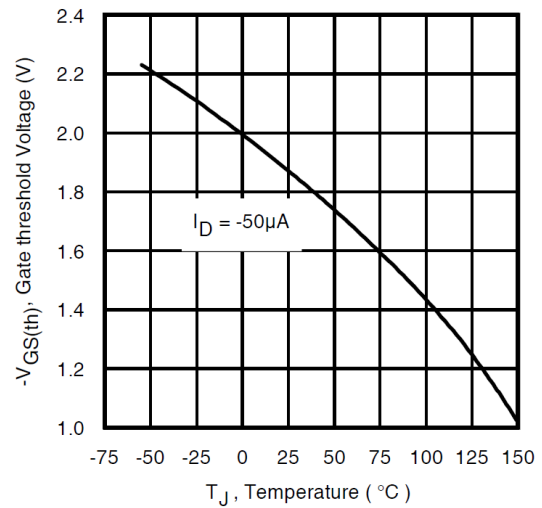


Fig 10. Threshold Voltage vs. Temperature

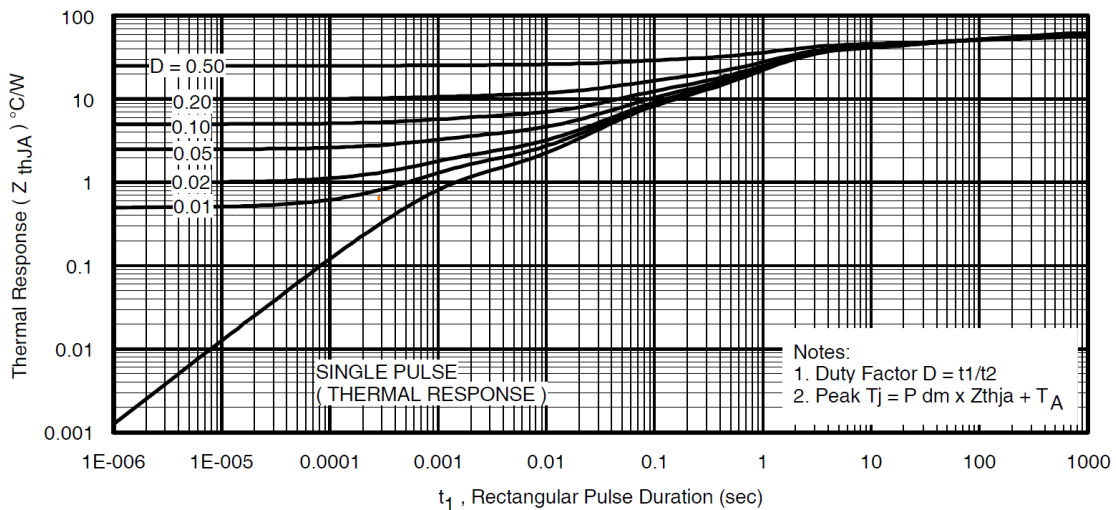


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Typical Operating Characteristics (Cont.)

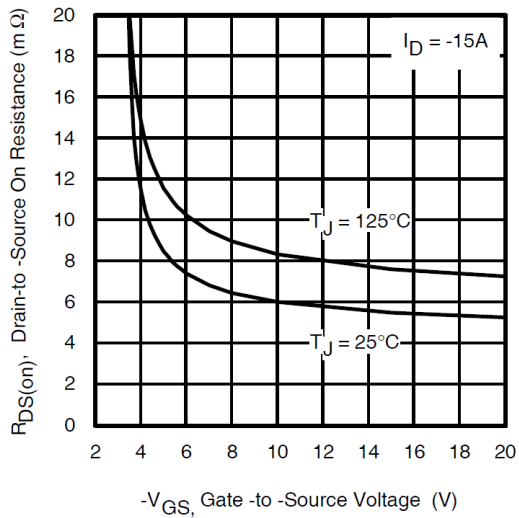


Fig 12. On-Resistance vs. Gate Voltage

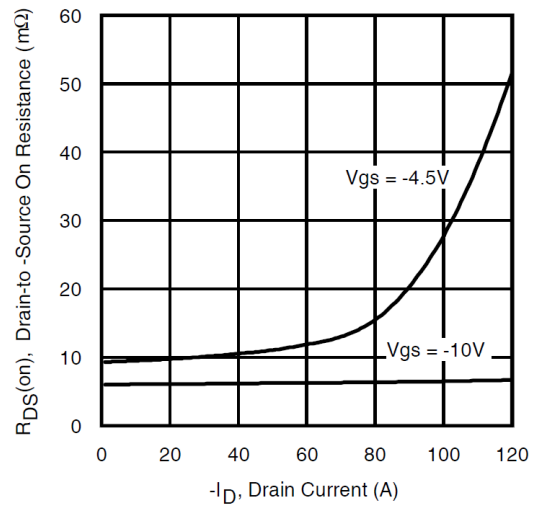


Fig 13. Typical On-Resistance vs. Drain Current

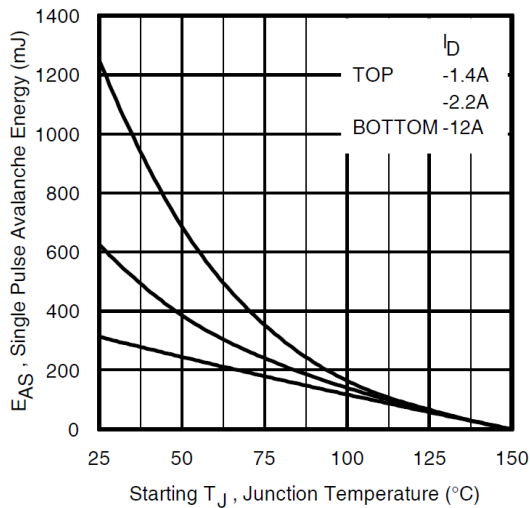


Fig 14. Maximum Avalanche Energy vs. Drain Current

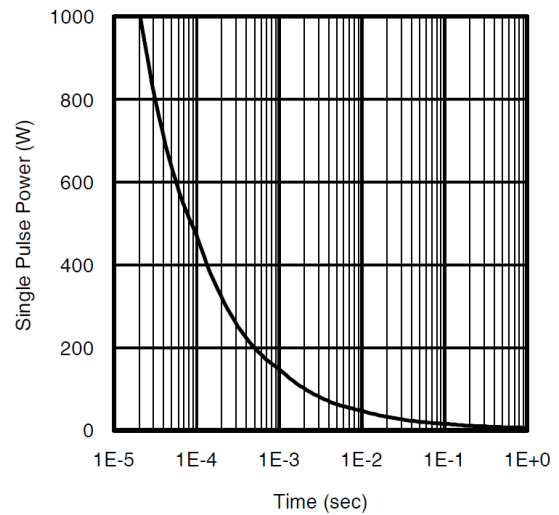
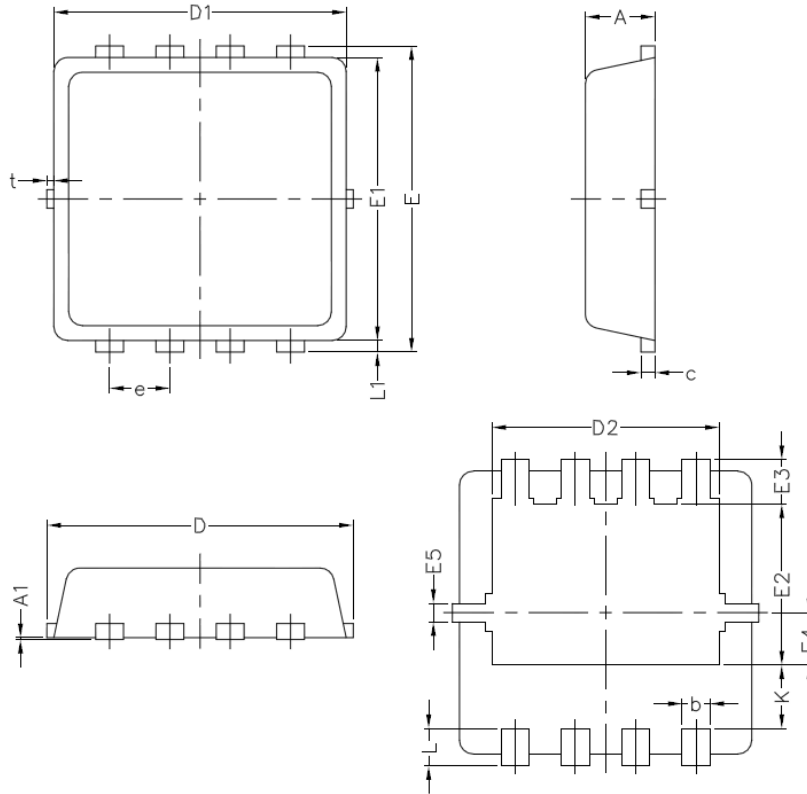


Fig 15. Typical Power vs. Time

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