UMW TPC8107

-30V P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-30V, Q_g=29.5nC
- $R_{DS(ON)}$<11mΩ(V_{GS}=-10V), I_D=-10A
- $R_{DS(ON)}$<15mΩ(V_{GS}=-4.5V), I_D=-8A

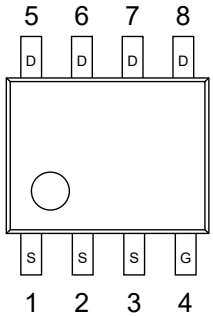
2.Applications

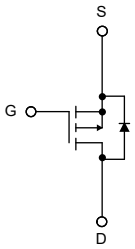
- Load Switch
- Notebook Adaptor Switch

3.Pinning information

Pin	Symbol	Description
1,2,3	S	SOURCE
4	G	GATE
5,6,7,8	D	DRAIN

SOP-8





4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150 °C)	T_C=25°C	I_D	-13.5	A
	T_C=70°C		-11.9	
	T_A=25°C		-10.9 [a,b]	
	T_A=70°C		-8.6 [a,b]	
Pulsed Drain Current		I_{DM}	-50	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-4.1	
	T_A=25°C		-2.2	
Avalanche current	L = 0.1 mH	I_{AS}	-20	
Single-pulse avalanche energy		E_{AS}	20	mJ
Maximum Power Dissipation	T_C=25°C	P_D	5	W
	T_C=70°C		3.2	W
	T_A=25°C		2.7 [a,b]	W
	T_A=70°C		1.7 [a,b]	W
Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal Resistance Rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [a,c]	t ≤10s	R_{thJA}	38	46	°C/W
Maximum Junction-to-Foot	Steady-State	R_{thJF}	20	25	°C/W

Notes:

a. Surface mounted on 1" x 1" FR4 board.

b. t =10s.

c. Maximum under Steady State conditions is 85 °C/W.

d. Based on T_C=25 °C.

6.T_J=25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS}=0V, I_D=-250μA	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=-250μA		-34		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.3		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.4		-2.5	V
Gate-Source Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±25V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
		V_{DS}=-30V, V_{GS}=0V, T_J=55°C			-5	
On-State Drain Current[a]	$I_{D(ON)}$	V_{DS}≥-10V, V_{GS}=-10V	-30			A
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A		11		mΩ
		V_{GS}=-4.5V, I_D=-8A		15		
Forward Transconductance[a]	g_{FS}	V_{DS}=-10V, I_D=-10A		28		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		2550		pF
Output Capacitance	C_{oss}			455		
Reverse Transfer Capacitance	C_{rss}			390		
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=-10V, I_D=-10A		57	86	nC
		V_{DS}=-15V, V_{GS}=-4.5V, I_D=-10A		29.5	45	
Gate Source Charge	Q_{gs}			8		
Gate Drain Charge	Q_{gd}			22		
Gate Resistance	R_g	f=1MHz	0.5	2.2	4.4	Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=1.5Ω, I_D≅-10A, V_{GEN}=-10V, R_g=1Ω		13	25	ns
Rise Time	t_r			12	24	
Turn-Off DelayTime	$t_{D(off)}$			40	70	
Fall Time	t_f			9	18	

Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=1.5Ω I_D≌-10A, V_{GEN}=-4.5V R_g=1Ω		48	80	ns
Rise Time	t_r			92	160	ns
Turn-Off DelayTime	$t_{D(off)}$			34	60	ns
Fall Time	t_f			19	35	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C=25°C			-4.1	A
Pulse Diode Forward Current [a]	I_{SM}				-60	A
Body Diode Voltage	V_{SD}	I_S=-3A, V_{GS}=0V		-0.75	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=-10A, dI/dt=100A/μs T_J=25°C		27	45	ns
Body Diode Reverse Recovery Charge	Q_{rr}			16	27	nC
Reverse Recovery Fall Time	t_a			12		ns
Reverse Recovery Rise Time	t_b			15		ns

Notes:

a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

b. Guaranteed by design, not subject to production testing.

7.1Typical Characterisitics

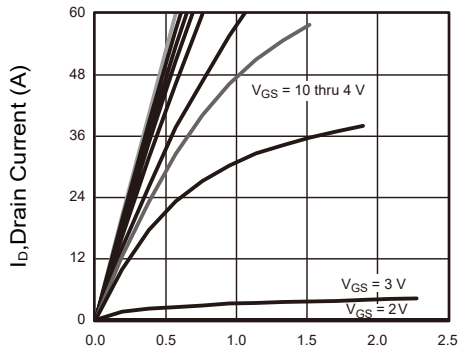


Figure 1: Output Characteristics

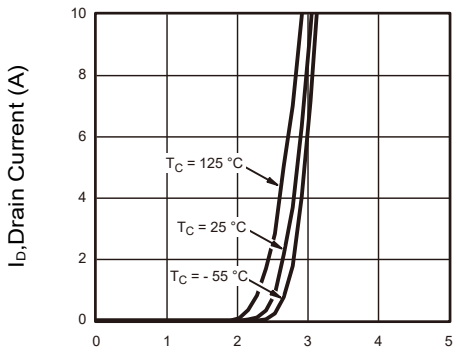


Figure 2: Transfer Characteristics

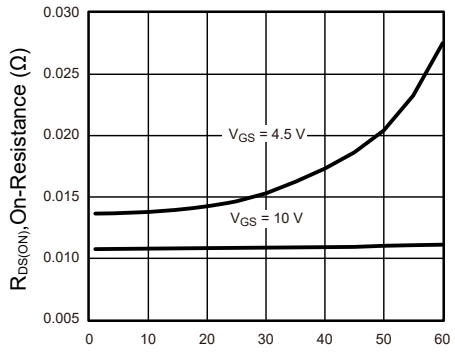


Figure 3: On-Resistance vs. Drain Current

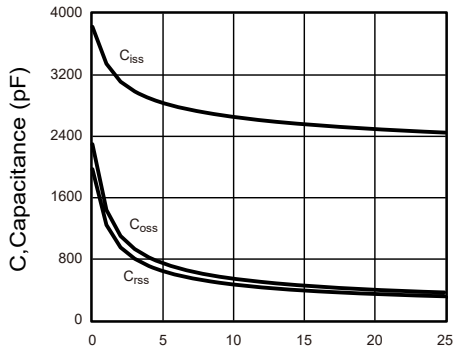


Figure 4: Capacitance

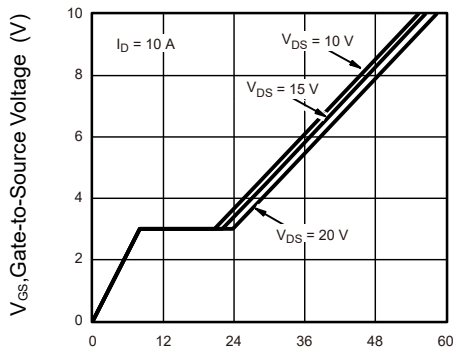


Figure 5: Gate Charge

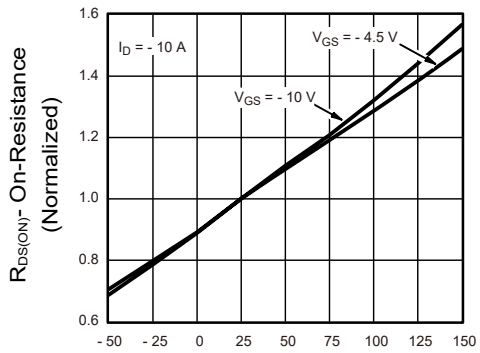


Figure 6: On-Resistance vs. Junction Temperature

7.2Typical Characterisitics

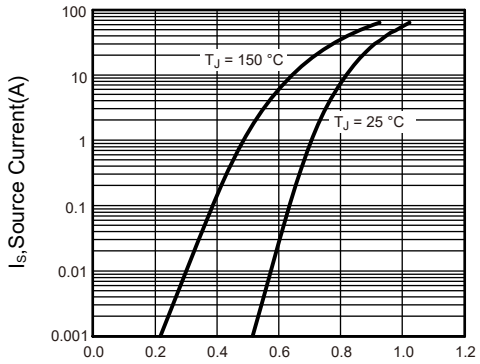


Figure 7: Source-Drain Diode Forward Voltage

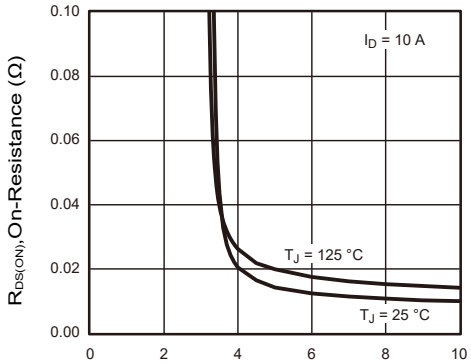


Figure 8: On-Resistance vs. Gate-to-Source Voltage

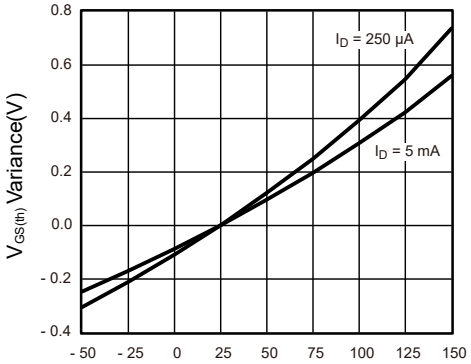


Figure 9: Threshold Voltage

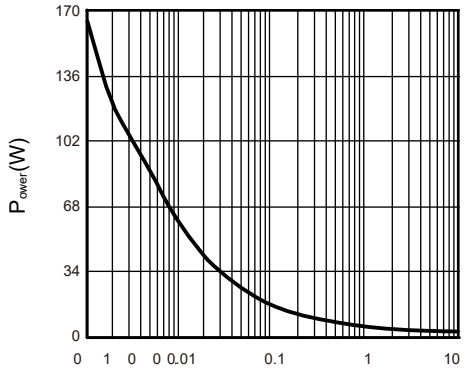


Figure 10: Single Pulse Power, Junction-to-Ambient

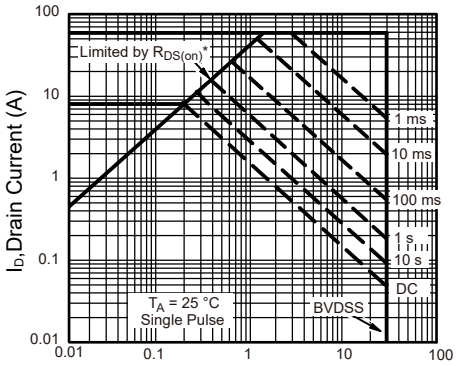


Figure 11: Safe Operating Area, Junction-to-Ambient

7.3Typical Characterisitics

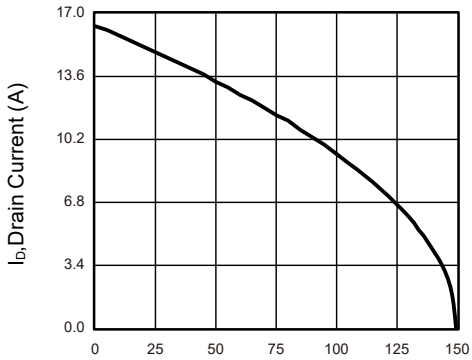


Figure 12: Current Derating*

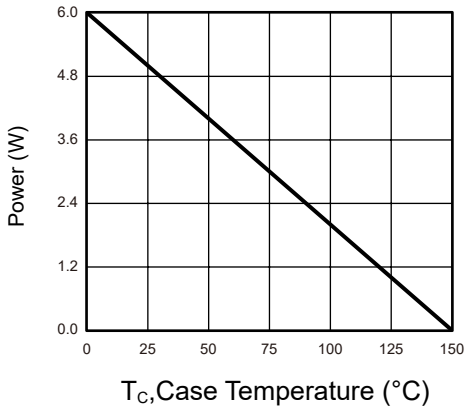


Figure 13: Power, Junction-to-Foot

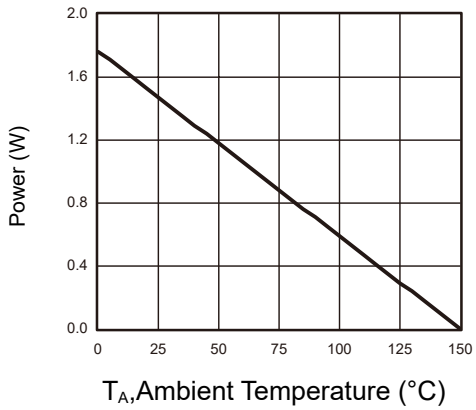


Figure 14: Power, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

7.4Typical Characterisitics

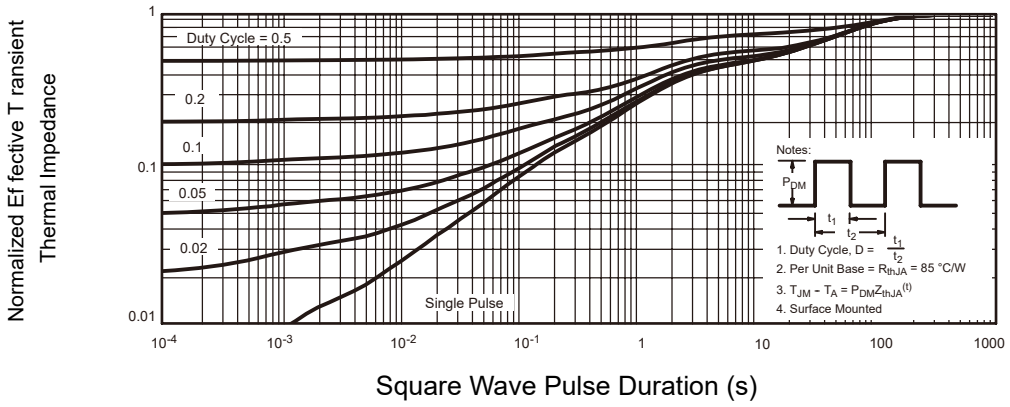


Figure 15: Normalized Thermal Transient Impedance, Junction-to-Ambient

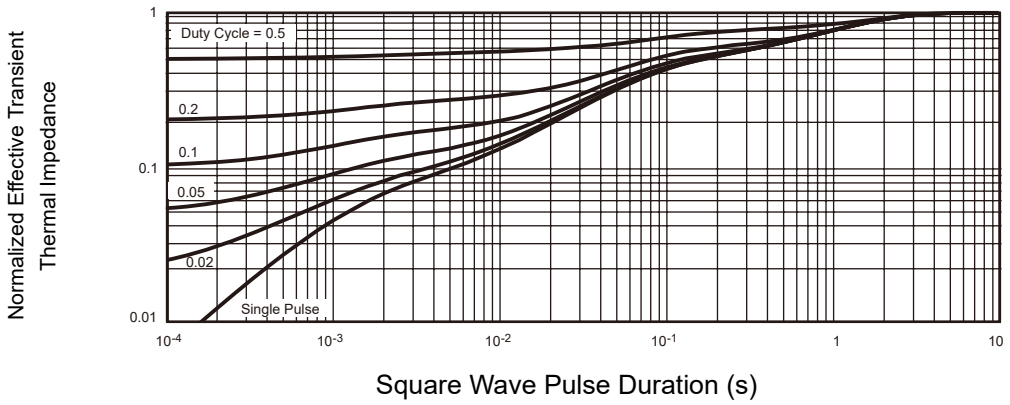
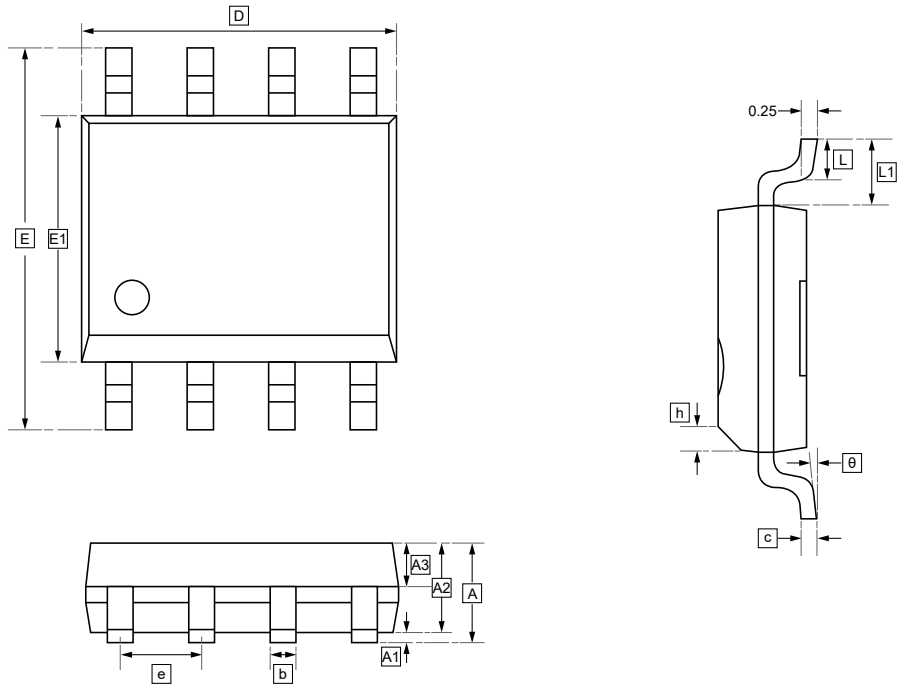


Figure 16: Normalized Thermal Transient Impedance, Junction-to-Case

8.SOP-8 Package Outline Dimensions

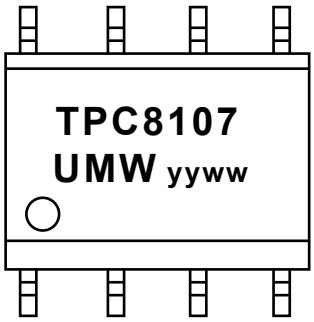


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.10	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW TPC8107	SOP-8	3000	Tape and reel

10.Disclaimer

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