UMW NTR4171PT1G

-30V P-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=-30V
- $R_{DS(ON)}$<75mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<110mΩ(V_{GS}=-4.5V)

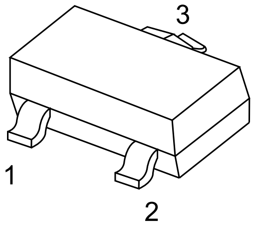
2.Applications

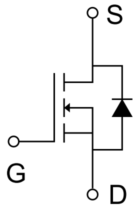
- Load Switch
- Optimized for Battery and Load Management Applications in Portable Equipment like Cell Phones, PDA's, Media Players, etc

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2	S	SOURCE
3	D	DRAIN

SOT-23





4.Maximum ratings (T_A=25°C unless otherwise noted)

Parameter			Symbol	Value	Units
Drain − to − Source Voltage			V_{DSS}	-30	V
Drain − to − Source Voltage			V_{GS}	±12	
Continuous Drain Current (Note 1)	Steady State	T_A=25°C	I_D	-2.2	A
		T_A=85°C		-1.5	
	t ≤ 5 s	T_A=25°C		-3.5	
Power Dissipation (Note 1)	Steady State	T_A=25°C	P_D	0.48	W
	t ≤ 5 s			1.25	
Pulsed Drain Current	t_p=10μs		I_{DM}	-15	A
Operating Junction and Storage Temperature			T_J,T_{STG}	-55 to 150	°C
Source Current (Body Diode)			I_S	-1	A
Lead Temperature for Soldering Purposes (1/8” from case for 10 sec)			T_L	260	°C

5.Thermal resist ance rating

Parameter	Symbol	Typ	Max	Units
Junction−to−Ambient − Steady State (Note 1)	$R_{\theta JA}$		260	°C/W
Junction−to−Ambient − t≤10s (Note 1)	$R_{\theta JA}$		100	°C/W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface−mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces)

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-30			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D=-250μA Referenced to 25°C		24		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V,V_{DS}=-24V,T_J=25°C			-1	μA
		V_{GS}=0V,V_{DS}=-24V,T_J=85°C			-5	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V			±0.1	μA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.7	-1.15	-1.4	V
Negative Threshold Temperature Coefficient	$V_{GS(th)}/T_J$			3.5		mV/°C
Drain−to−Source On−Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.2A		50	75	mΩ
		V_{GS}=-4.5V, I_D=-1.8A		60	110	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-2.2A		7		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{iss}	V_{GS}=0V f=1MHz V_{DS}=15V		720		pF
Output Capacitance	C_{oss}			95		pF
Reverse Transfer Capacitance	C_{rss}			65		pF
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=-10V, V_{DS}=-15V I_D=-3.5A		15.6		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.7		nC
Gate−to−Source Charge	Q_{gs}			1.6		nC
Gate−to−Drain Charge	Q_{gd}			2.6		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=-4.5V, V_{DS}=-15V I_D=-3.5A		7.4		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.7		nC
Gate−to−Source Charge	Q_{gs}			1.6		nC
Gate−to−Drain Charge	Q_{gd}			2.6		nC
Gate Resistance	R_g			6.1		Ω

SWITCHING CHARACTERISTICS, V_{GS}=4.5 V (Note 4)						
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DS}=-15V I_D=-3.5A,Rg=6Ω		8		ns
Rise Time	t_r			11		ns
Turn-Off Delay Time	$t_{D(off)}$			32		ns
Fall Time	t_f			14		ns
Turn−On Delay Time	$t_{D(on)}$	V_{GS}=-4.5V, V_{DS}=-15V I_D=-3.5A,Rg=6Ω		9		ns
Rise Time	t_r			16		ns
Turn−Off Delay Time	$t_{D(off)}$			25		ns
Fall Time	t_f			22		ns
DRAIN−SOURCE DIODE CHARACTERISTICS						
Forward Diode Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25°C		-0.8	-1.2	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_S=-1A d_{ISD}/d_t=100 A/µs		14		ns
Charge Time	t_a			10		ns
Discharge Time	t_b			4		ns
Reverse Recovery Charge	Q_{rr}			8		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Surface−mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

7.1Typical Characterisitics

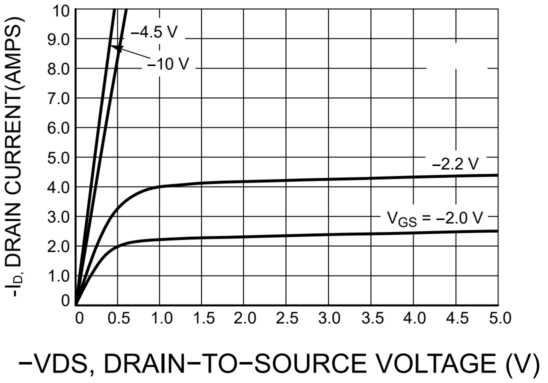


Fig 1: On-Region Characteristics

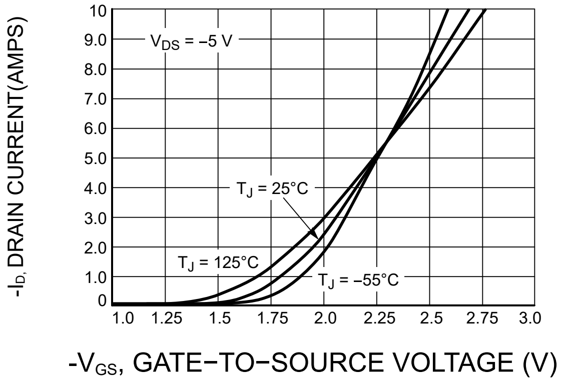


Figure 2: Transfer Characteristics

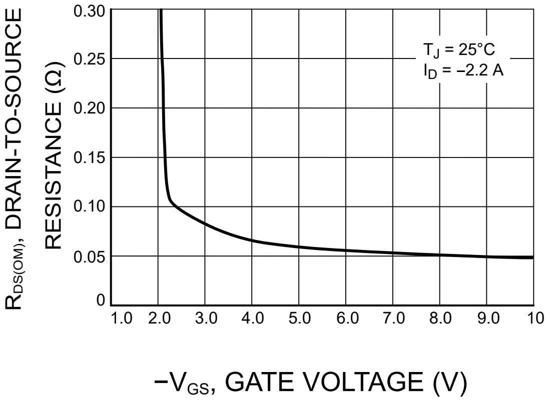


Figure 3: On-Resistance vs.
Gate−to−SourceVoltage

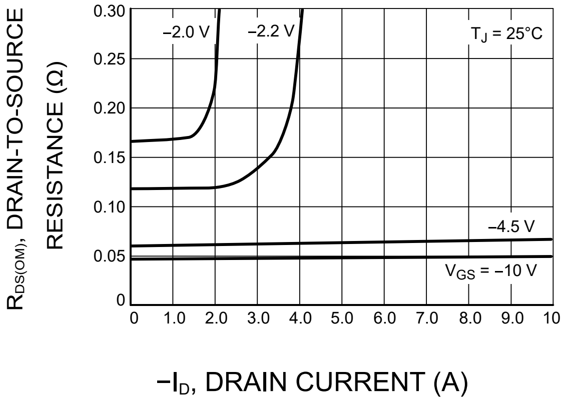


Figure 4: On−Resistance vs. Drain Current and
Gate Voltage

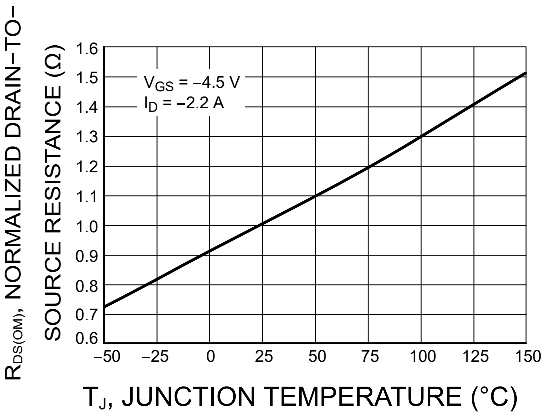


Figure 5: On-Resistance e Variation with
Temperature

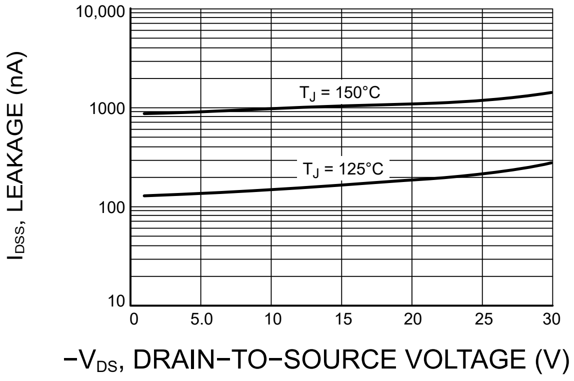


Figure 6: Drain−to−Source Leakage Current
vs. Voltage

7.2Typical Characterisitics

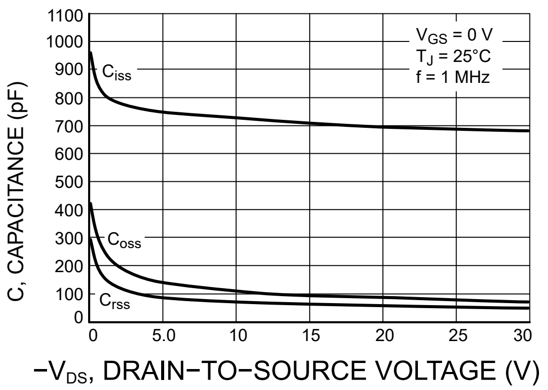


Fig 7: Capacitance Variation

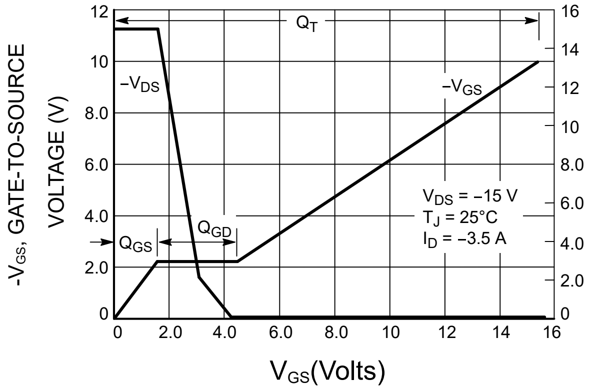


Figure 8: Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

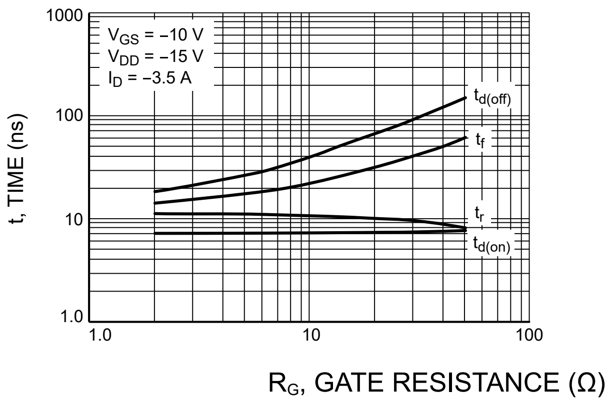


Figure 9: Resistive Switching Time Variation vs. Gate Resistance

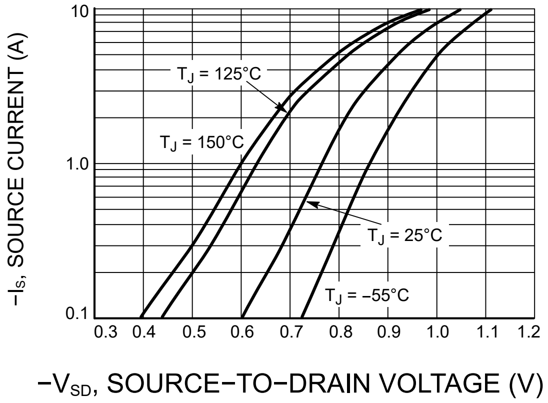


Figure 10: Diode Forward Voltage vs. Current

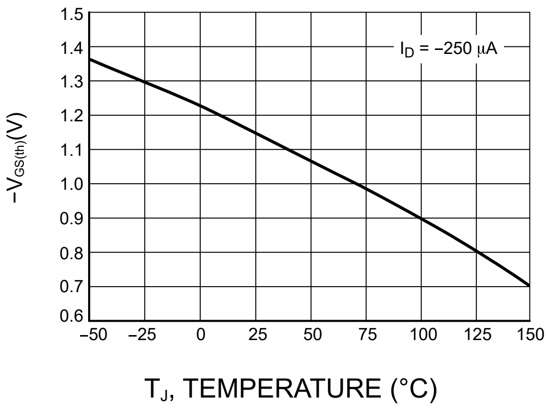


Figure 11: Threshold Voltage

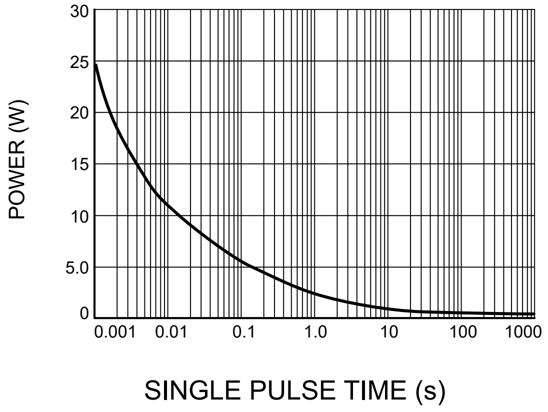


Figure 12: Single Pulse Maximum Power Dissipation

7.3Typical Characterisitics

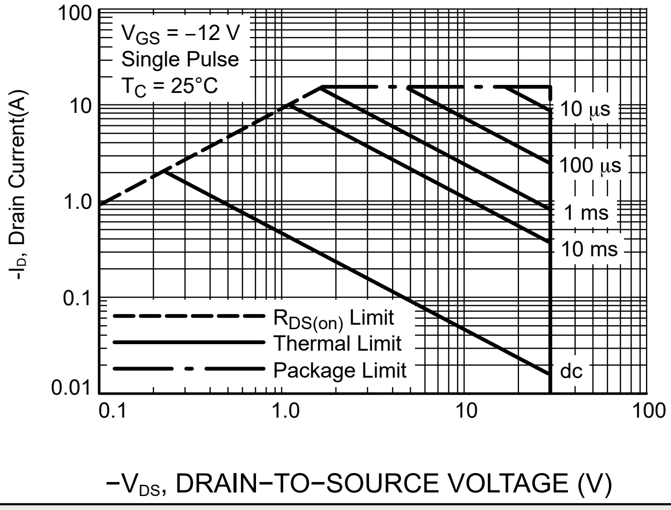


Figure 13. Maximum Rated Forward Biased Safe Operating Area

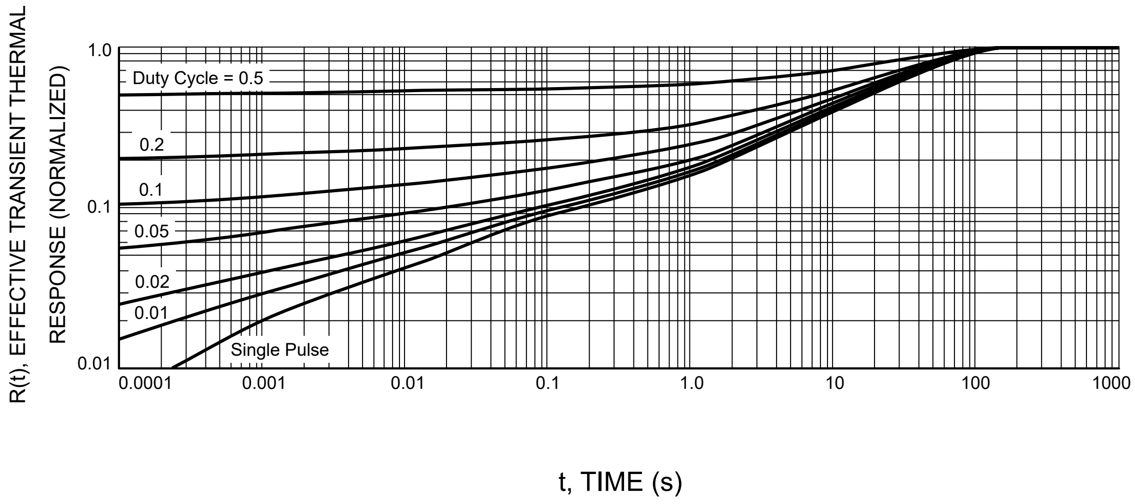
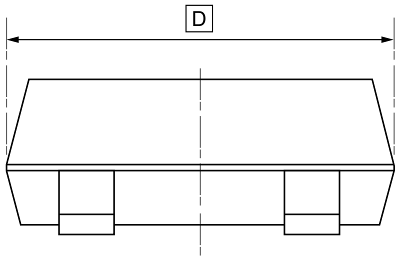
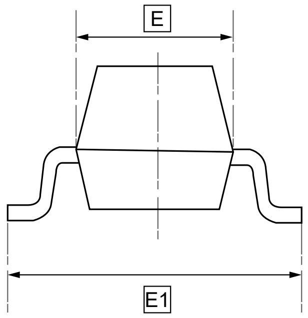
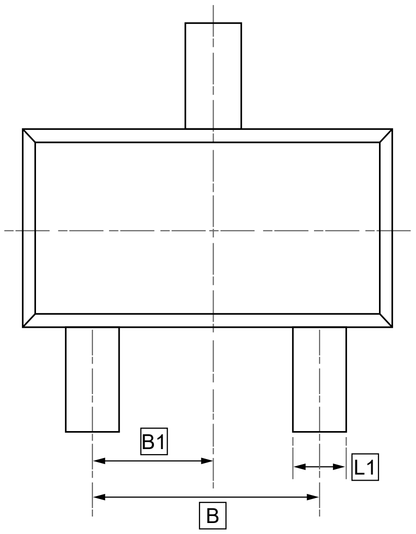


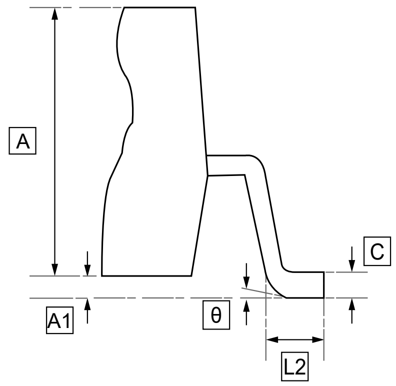
Figure 14. FET Thermal Response

8.SOT-23 Package Outline Dimensions





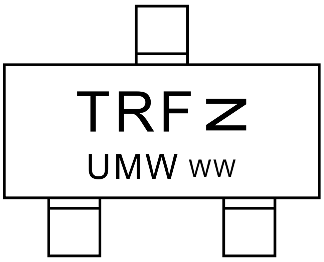




DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	1.050	0.000	0.300	0.350	0.100	2.820	1.500	2.700	1.800	0.950	0°
Max	1.150	0.100	0.500	0.550	0.200	3.020	1.700	2.900	2.000	TYP	8°

9.Ordering information



WW: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTR4171PT1G	SOT-23	3000	Tape and reel

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