UMW NTD25P03LG

-30V P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-30V
- $R_{DS(ON)}$<43mΩ(V_{GS}=-4.5V)
- $R_{DS(ON)}$<52mΩ(V_{GS}=-2.5V)
- Halogen-free

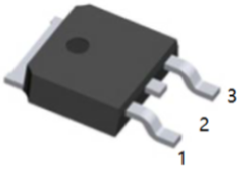
2.Applications

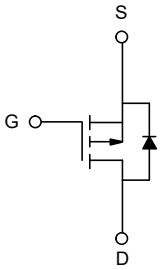
- Load Switch
- Notebook Adaptor Switch

3.Pinning information

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

TO-252(DPAK)
top view





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

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous DrainCurrent (T_J = 150 °C)	T_C=25°C	I_D	-26	A
	T_C=70°C		-21	
	T_A=25°C		-12.9[a,b]	
	T_A=70°C		-9.6[a,b]	
Pulsed Drain Current		I_{DM}	-112	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-4.1	
	T_A=25°C		-2.2[a,b]	
Avalanche Current Pulse	L = 0.1 mH	I_{AS}	-20	
Single Pulse Avalanche Energy		E_{AS}	20	mJ

Maximum Power Dissipation	T_C=25°C	P_D	125	W
	T_C=70°C		20	
	T_A=25°C		2.7[a,b]	
	T_A=70°C		1.7[a,b]	
Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

4.Thermal resistance rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [a,c]	t ≤ 10 s	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.

5.T_J=25°C unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS}=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		-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}=-4.5V, I_D=-10A		33	43	mΩ
		V_{GS}=-2.5V, I_D=-8A		46	52	
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		1350		pF
Output Capacitanc	C_{oss}			255		
Reverse Transfer Capacitance	C_{rss}			190		
Total Gate Charge	Q_g	V_{DS}=-15V,V_{GS}=-10V		27	43	nC
		I_D=-10A		19	25	
Gate Source Charge	Q_{gs}	V_{DS}=-15V, V_{GS}=-4.5V		6		
Gate Drain Charge	Q_{gd}	I_D=-10A		12		
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		13	25	ns
Rise Time	t_r	I_D≅-10A, V_{GEN}=-10V		12	24	
Turn-Off DelayTime	$t_{D(off)}$	R_g=1Ω		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	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.

6.1Typical Characterisitics

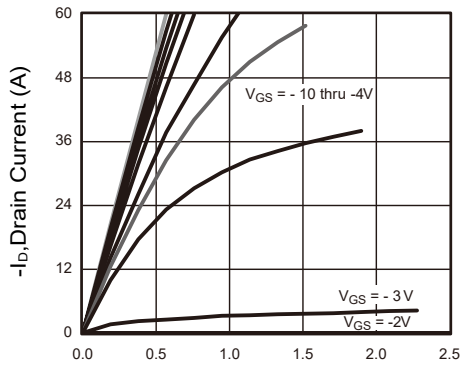


Figure 1: Output Characteristics

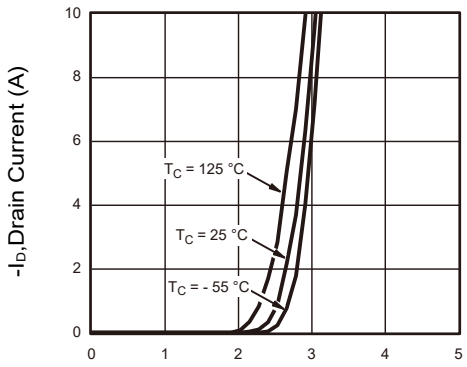


Figure 2: Transfer Characteristics

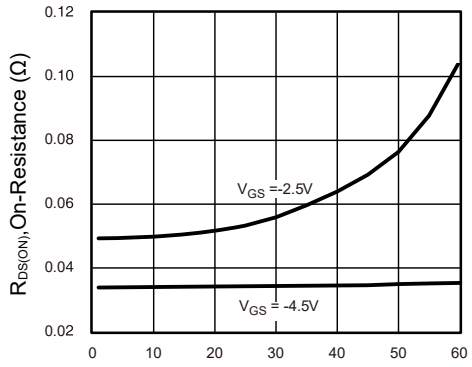


Figure 3: On-Resistance vs. Drain Current

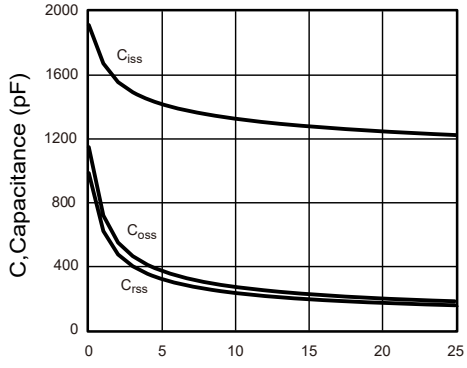


Figure 4: Capacitance

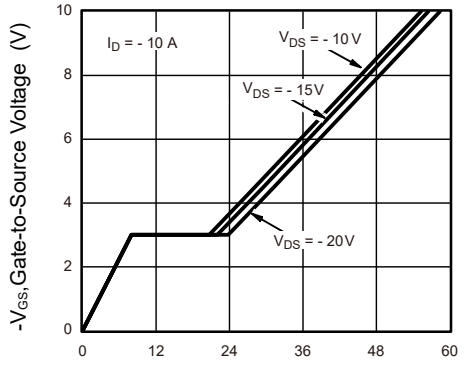


Figure 5: Gate Charge

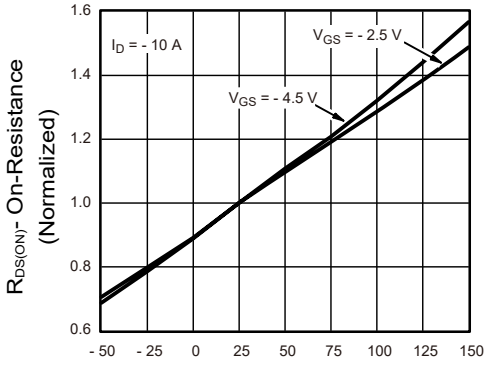


Figure 6: On-Resistance vs. Junction Temperature

6.2Typical Characterisitics

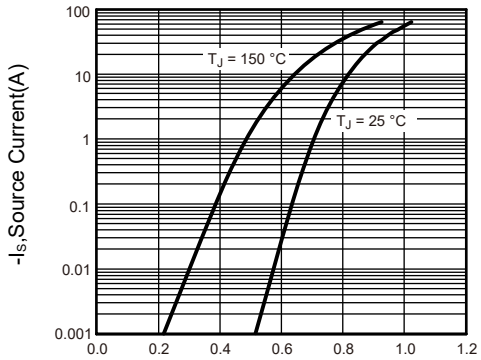


Figure 7: Source-Drain Diode Forward Voltage

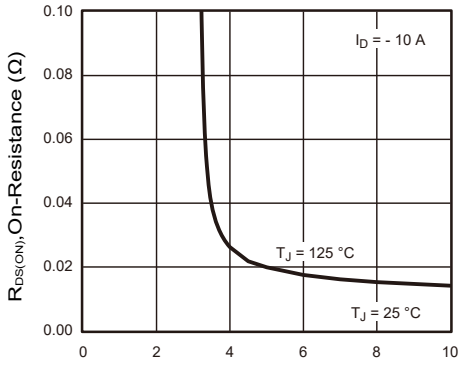


Figure 8: On-Resistance vs. Gate-to-Source Voltage

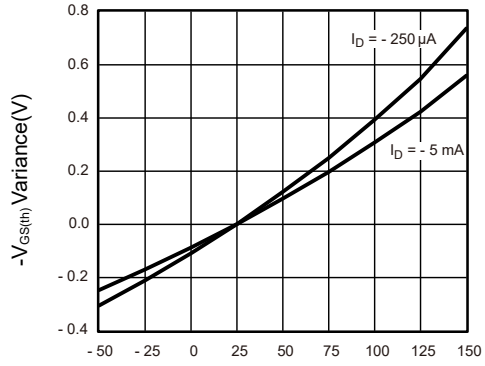


Figure 9: Threshold Voltage

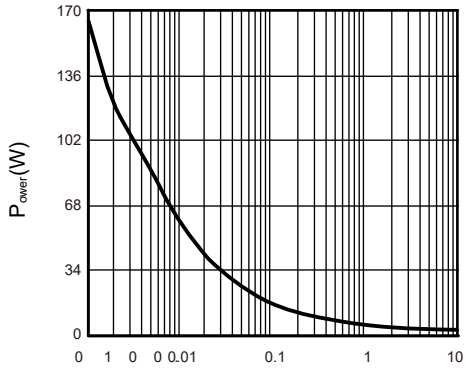


Figure 10: Single Pulse Power, Junction-to-Ambient

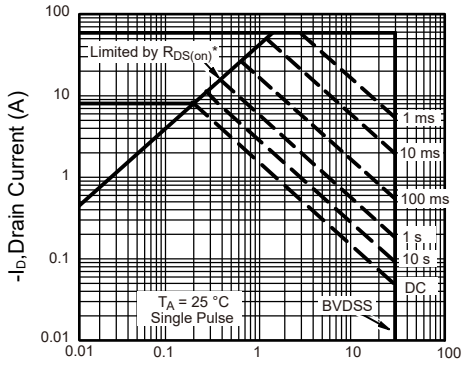


Figure 11: Safe Operating Area

6.3Typical Characterisitics

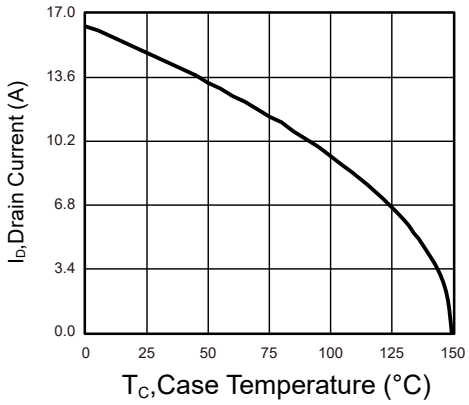


Figure 12: Current Derating*

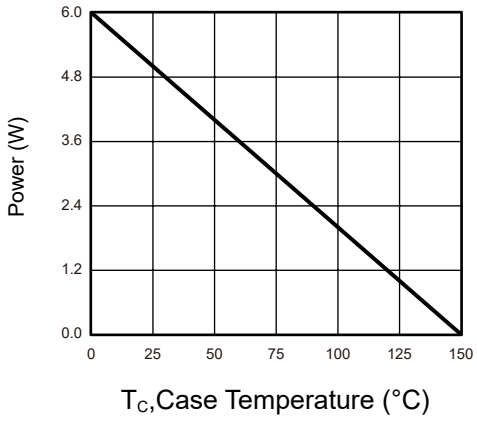


Figure 13: Power, Junction-to-Foot

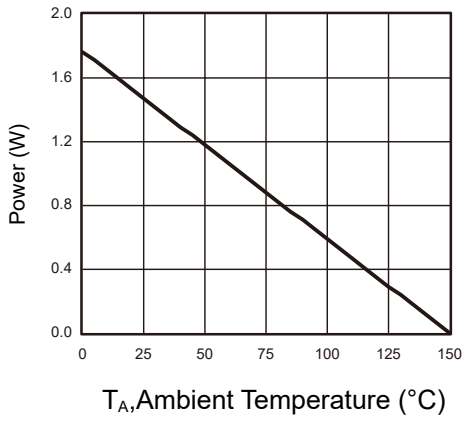


Figure 14: Power, Junction-to-Ambient

* 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.

6.4Typical Characterisitics

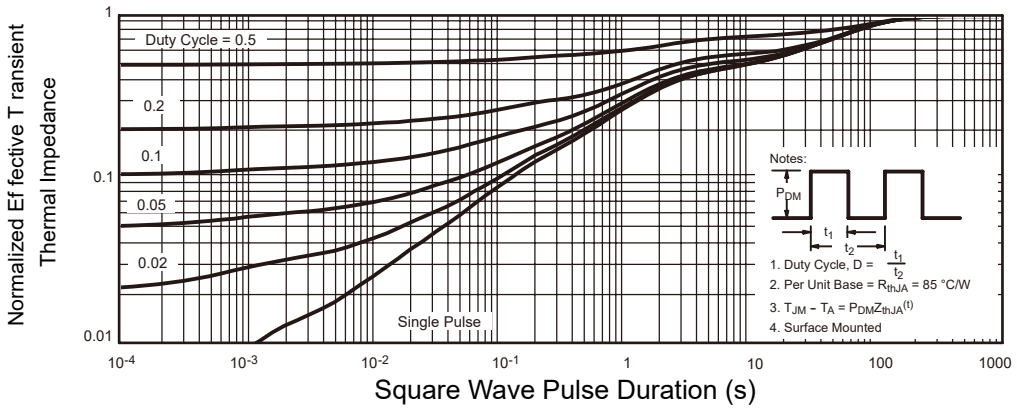


Figure 15: Normalized Thermal Transient Impedance, Junction-to-Ambient

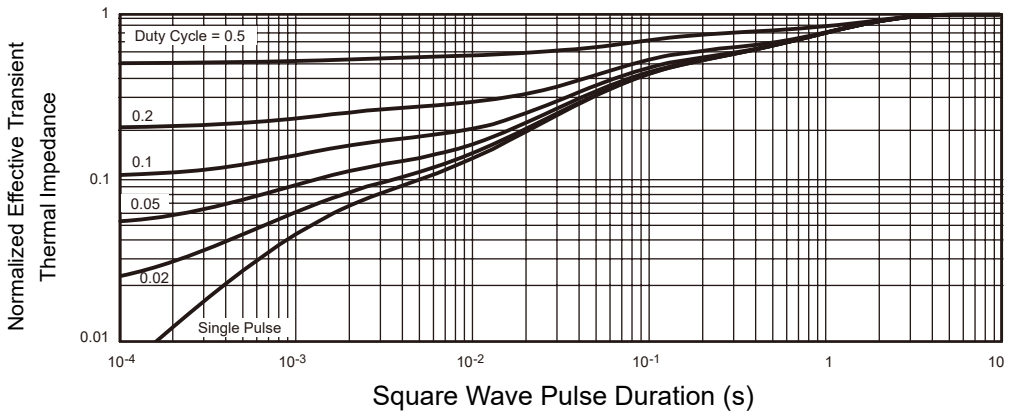
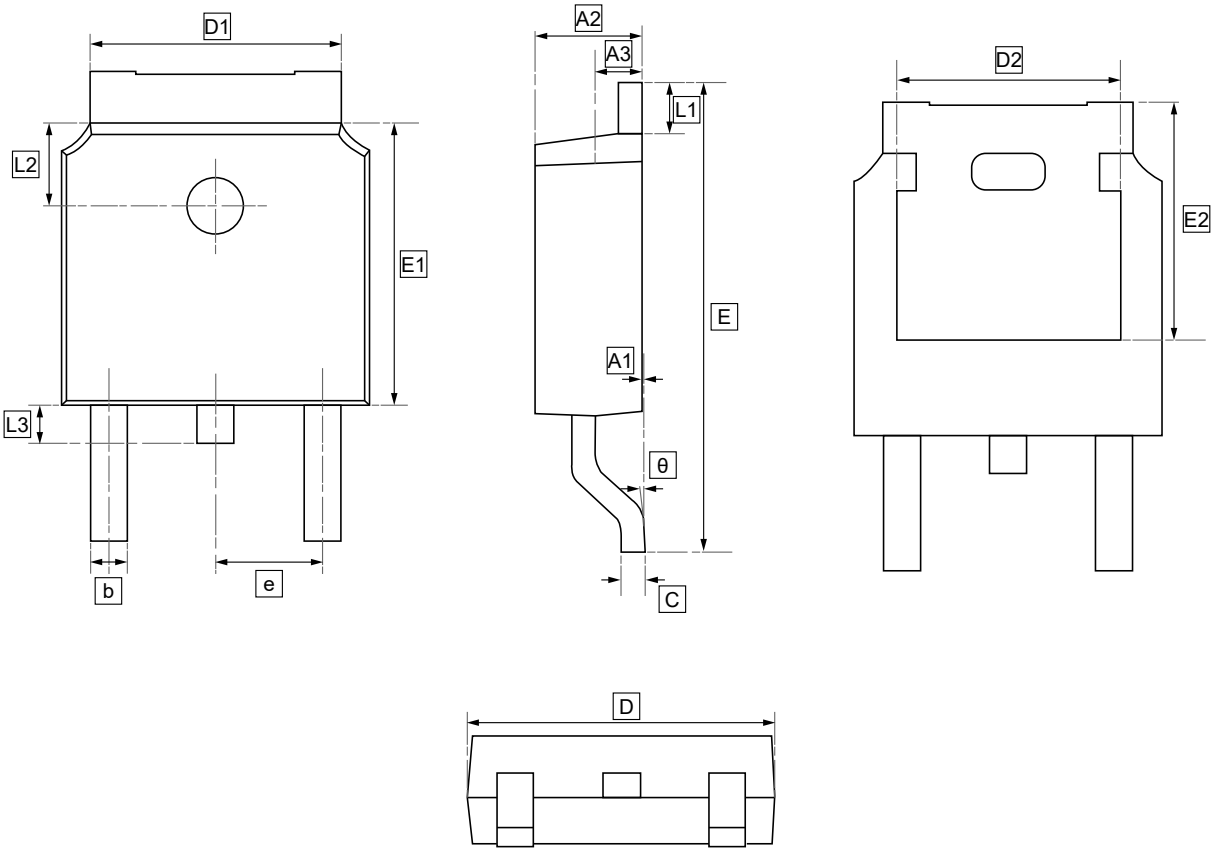


Figure 16: Normalized Thermal Transient Impedance, Junction-to-Foot

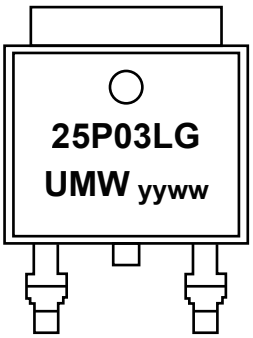
7.TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTD25P03LG	TO-252	2500	Tape and reel

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