

1.Description

The Power MOSFET is fabricated using the advanced planar VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalanche energy.

2.2Features

- Power factor correction
- Switched mode power supplies

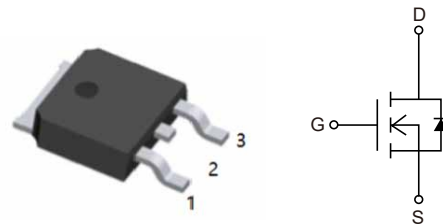
2.1Features

- $V_{DSS}=500V$
- $I_D=5A$
- $R_{DS(ON)}=2.4m\Omega$

3.Pinning information

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

TO-252(DPAK)
top view



4.Absolute Maximum Ratings $T_A=25^{\circ}C$

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	500	V
Continuous drain current ¹⁾	$T_C=25^{\circ}C$	I_D	5	A
	$T_C=100^{\circ}C$		2.5	
Pulsed drain current ²⁾		I_{DM}	15	
Gate-Source voltage		V_{GSS}	± 30	V
Avalanche energy, single pulse ³⁾		E_{AS}	106	mJ
Power Dissipation		P_D	76	W
Operating Junction Temperature Range		T_{STG}, T_J	-55 to 150	$^{\circ}C$
Continuous diode forward current		I_S	5	A
Diode pulse current		$I_{S,pulse}$	15	A



5. Thermal resistance rating

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.65	°C/W
Thermal Resistance, Junction-to-Ambient, minimal footprint 4)	$R_{\theta JA}$	62	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sld}	260	°C



6.SPECIFICATIONS (T_J= 25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=0.25mA$	500			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.25mA$	2		4	V
Drain cut-off current	I_{DSS}	$V_{GS}=500V, V_{GS}=0V, T_J=25^{\circ}C$			1	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=30V, V_{DS}=0V$			100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2A$		2.05	2.4	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=250kHz$		391		pF
Output Capacitance	C_{oss}			38.3		pF
Reverse Transfer Capacitance	C_{rss}			2.5		pF
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=250V, I_D=4A$ $R_G=10V\Omega, V_{GS}=10V$		2.9		ns
Rise Time	t_r			29.9		ns
Turn-Off Delay Time	$t_{D(off)}$			15.7		ns
Fall Time	t_f			7.6		ns
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=400V, I_D=2A, V_{GS}=0 \text{ to } 0V$		1.9		nC
Gate to drain charge	Q_{gd}			4.3		nC
Gate charge total	Q_g			9.5		nC
Gate plateau voltage	$V_{plateau}$			4.9		V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=7A$			1.3	V
Reverse recovery time	t_{rr}	$V_R=400V, I_F=5A$ $dI_F/dt=100A/\mu s$		248		ns
Reverse recovery charge	Q_{rr}			1263.5		μC
Peak reverse recovery current	I_{rrm}			7.3		A



Notes:

1. Drain current limited by maximum junction temperature and duty cycle.
2. Repetitive Rating: Pulse width limited by maximum junction temperature, maximum duty cycle is 0.7.
3. $I_{AS}=4.6A$, $L=10mH$, $V_{DD}=60V$, Starting $T_J=25^{\circ}C$.
4. The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot..



7.1 Typical Characteristics

Figure 1: Typ. Output Characteristics	Figure 2: Transfer Characteristics
Figure 3: On-resistance vs. Drain Current	Figure 4: On-Resistance vs. Temperature
Figure 5: Breakdown Voltage vs. Temperature	Figure 6: Threshold Voltage vs. Temperature



7.2Typical Characteristics

Figure 5: $R_{DS(ON)}$ vs. Gate Voltage	Figure 6: Body-Diode Characteristics
Figure 7: Capacitance Characteristics	Figure 8: Gate Charge Characteristics
Figure 7: Drain Current Derating	Figure 8: Power Dissipation vs. Temperature



7.3Typical Characterisitics

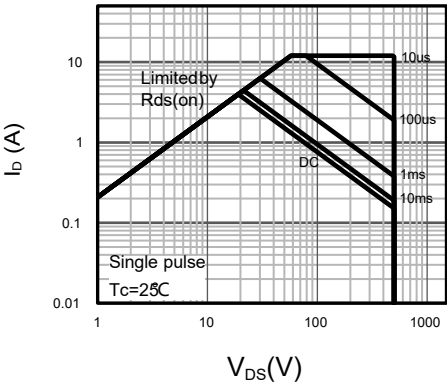


Figure 9: Safe Operating Area

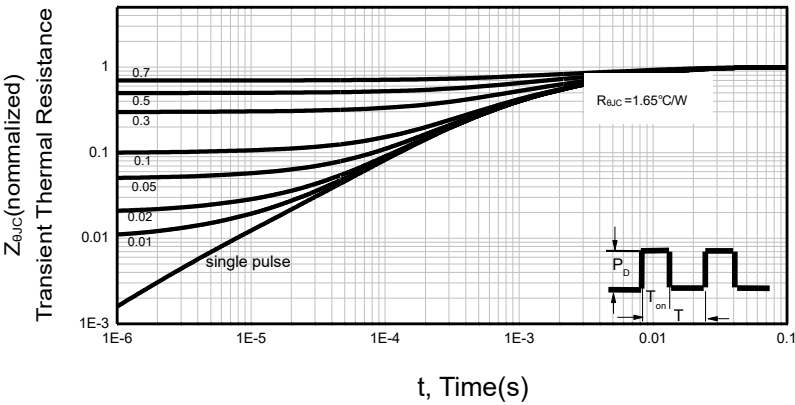
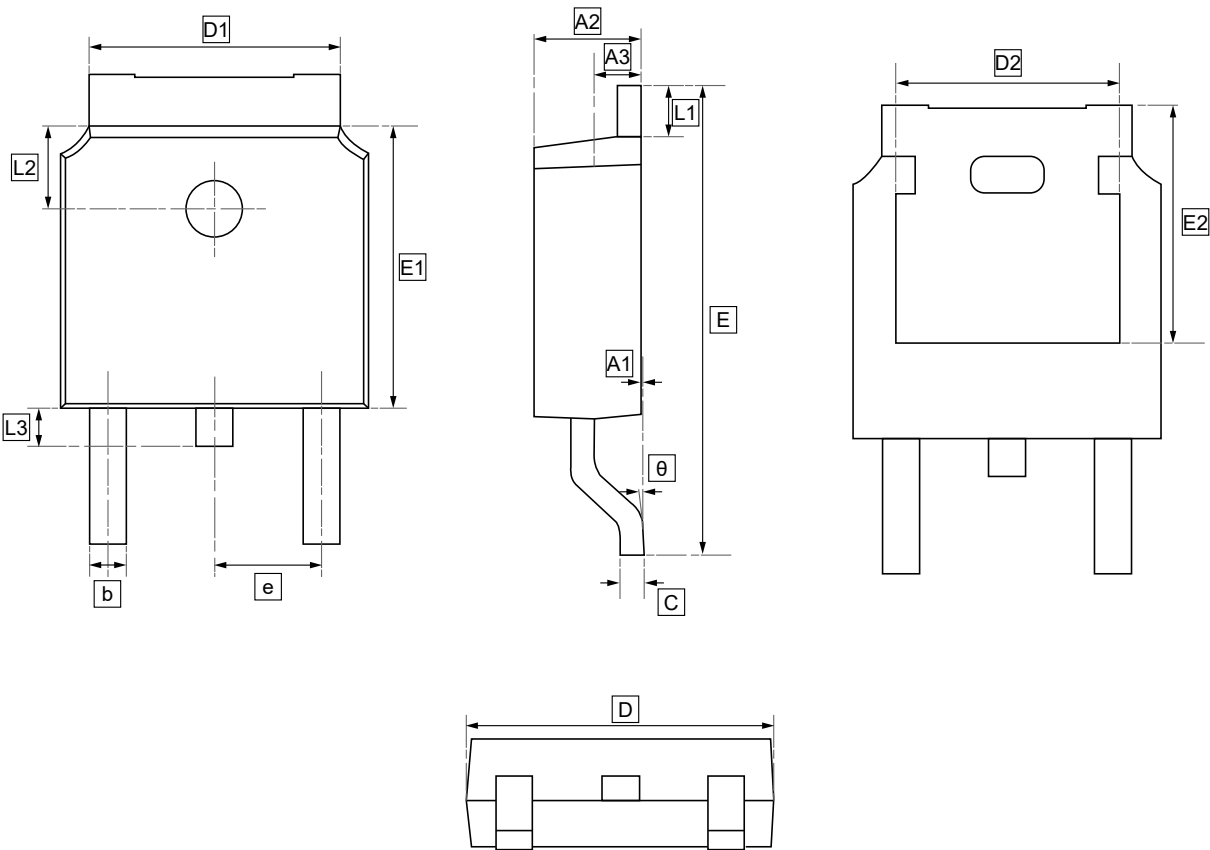


Figure 10: Normalized Maximum Transient Thermal impedance (R_{thJC})



8.TO-252 Package Outline Dimensions

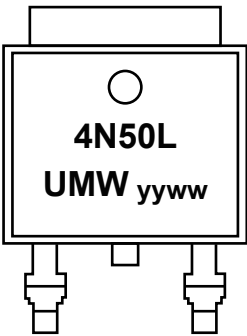


DIMENSIONS (mm are the original dimensions)

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		1.27	1.90	1.00	8.00



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW 4N50L	TO-252	2500	Tape and reel



10.Disclaimer

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