

Description

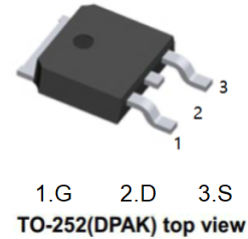
The Power MOSFET is fabricated using the advanced planar VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalanche energy.

Features

- Low $R_{DS(on)}$
- Low gate charge (typ. $Q_g = 9.5nC$)
- 100% UIS tested
- RoHS compliant

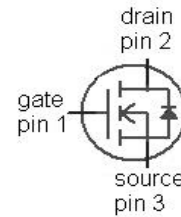
Product Summary

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



Applications

- Power factor correction.
- Switched mode power supplies.
- LED driver.



Absolute Maximum Ratings

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

Thermal Characteristics

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

Electrical Characteristics T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
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	2.0	-	4.0	V
Drain cut-off current	I _{DSS}	V _{DS} =500V, V _{GS} =0 V, T _j = 25°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} =10 V, I _D =2A	-	2.05	2.4	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0 V, f = 250kHz	-	391	-	pF
Output capacitance	C _{oss}		-	38.3	-	
Reverse transfer capacitance	C _{rss}		-	2.5	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 250V, I _D = 4A R _G = 10Ω, V _{GS} =10V	-	9.9	-	ns
Rise time	t _r		-	29.9	-	
Turn-off delay time	t _{d(off)}		-	15.7	-	
Fall time	t _f		-	7.6	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =400V, I _D =2A V _{GS} =0 to 10V	-	1.9	-	nC
Gate to drain charge	Q _{gd}		-	4.3	-	
Gate charge total	Q _g		-	9.5	-	
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=100 A/μs	-	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°C.
4. The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

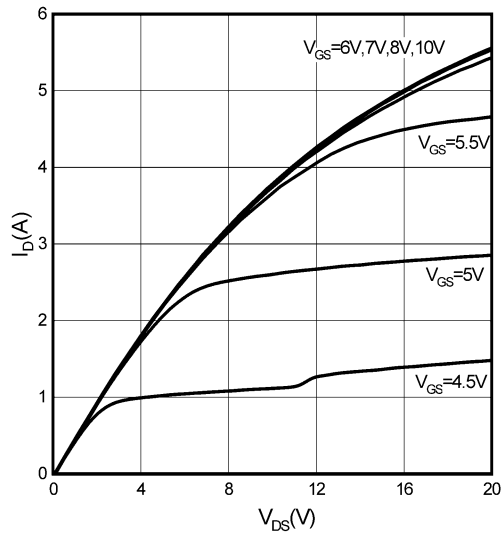


Figure 2. Transfer Characteristics

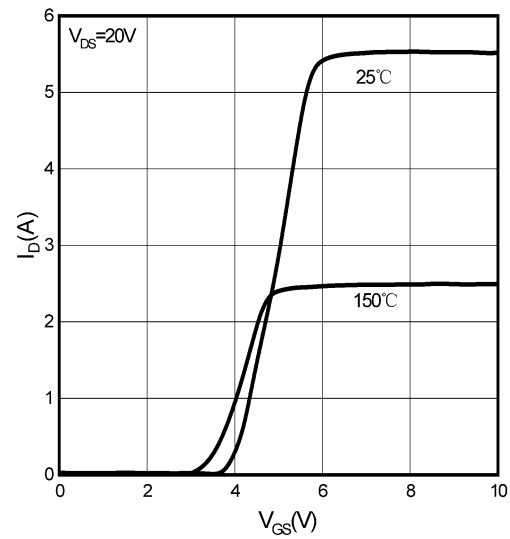


Figure 3. On-Resistance vs. Drain Current

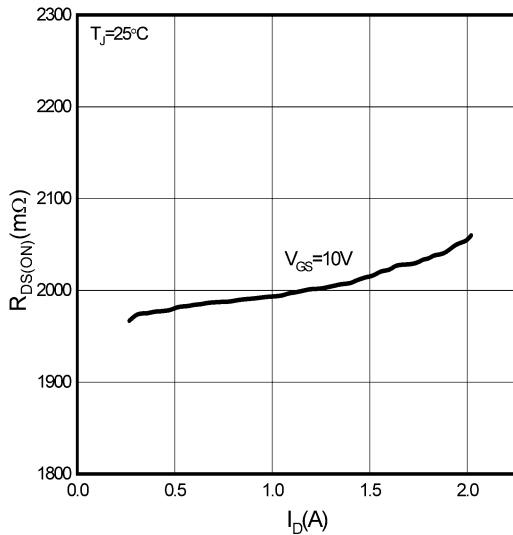


Figure 4. On-Resistance vs. Temperature

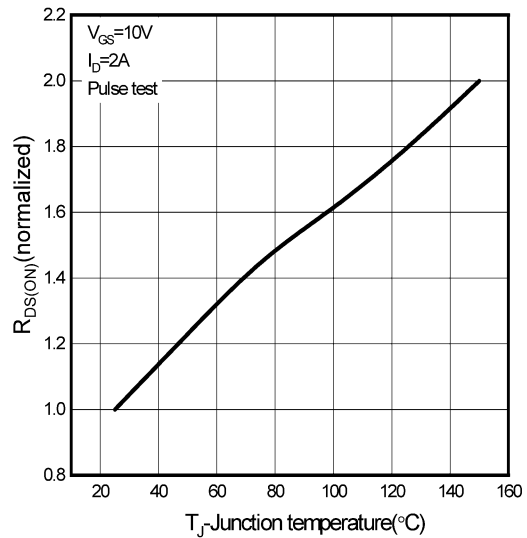


Figure 5. Breakdown Voltage vs. Temperature

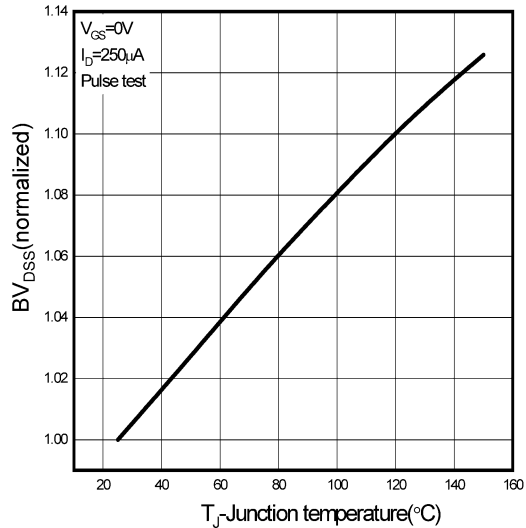


Figure 6. Threshold Voltage vs. Temperature

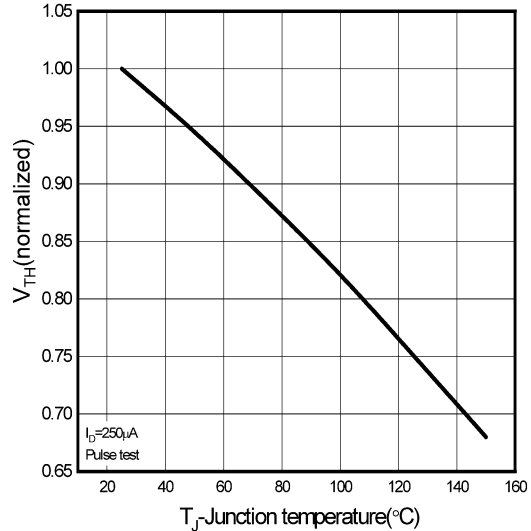


Figure 7. R_{DS(on)} vs. Gate Voltage

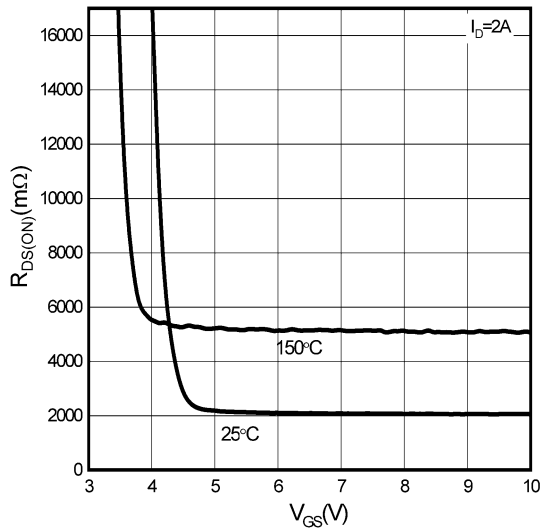


Figure 8. Body-Diode Characteristics

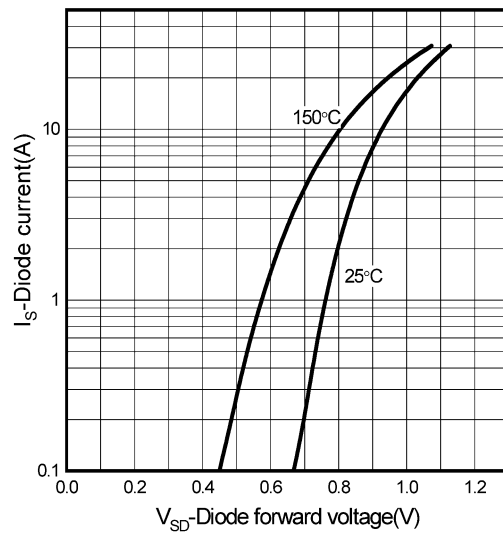


Figure 9. Capacitance Characteristics

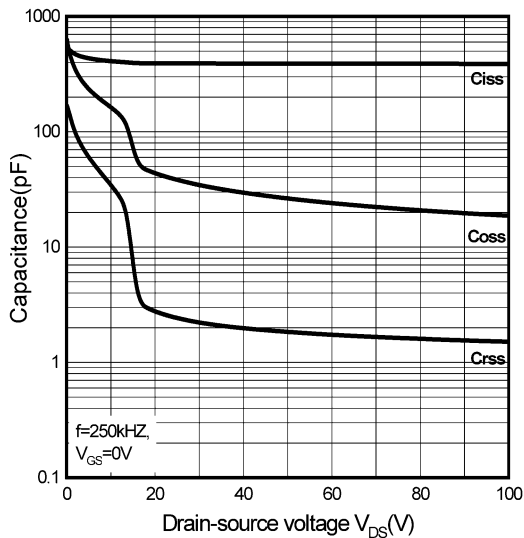


Figure 10. Gate Charge Characteristics

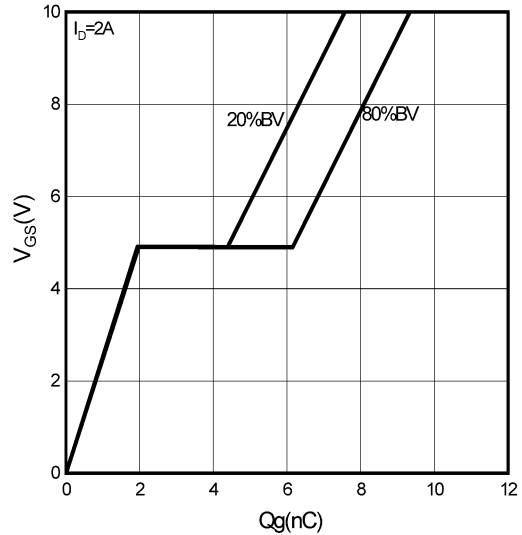


Figure 11. Drain Current Derating

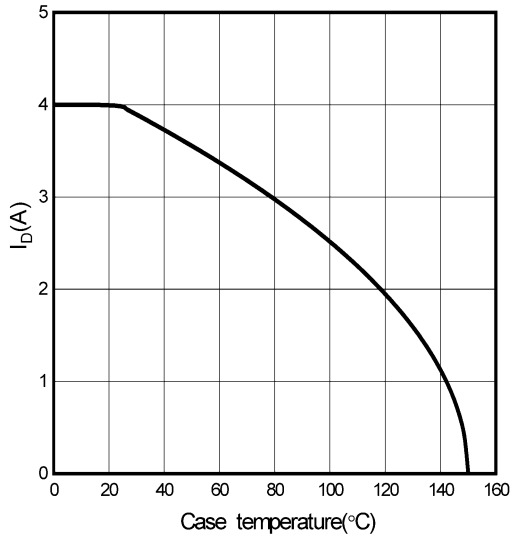


Figure 12. Power Dissipation vs. Temperature

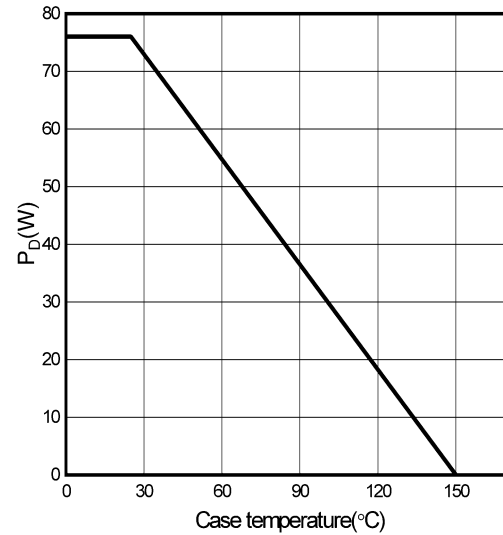


Figure 13. Safe Operating Area

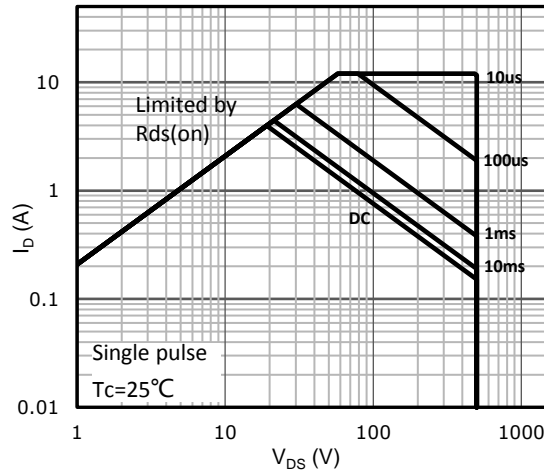
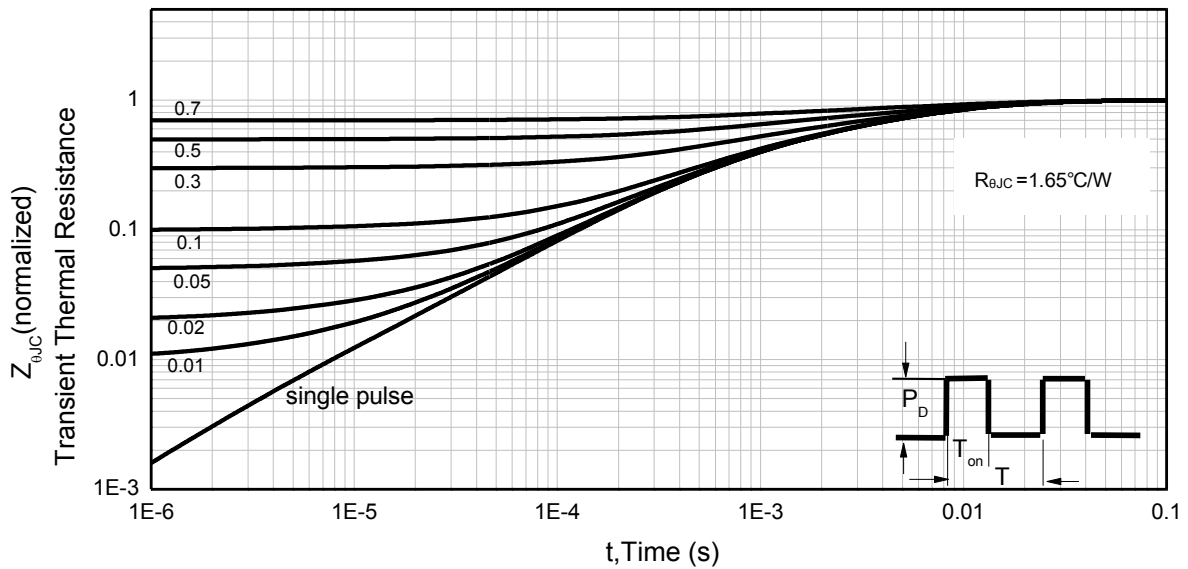
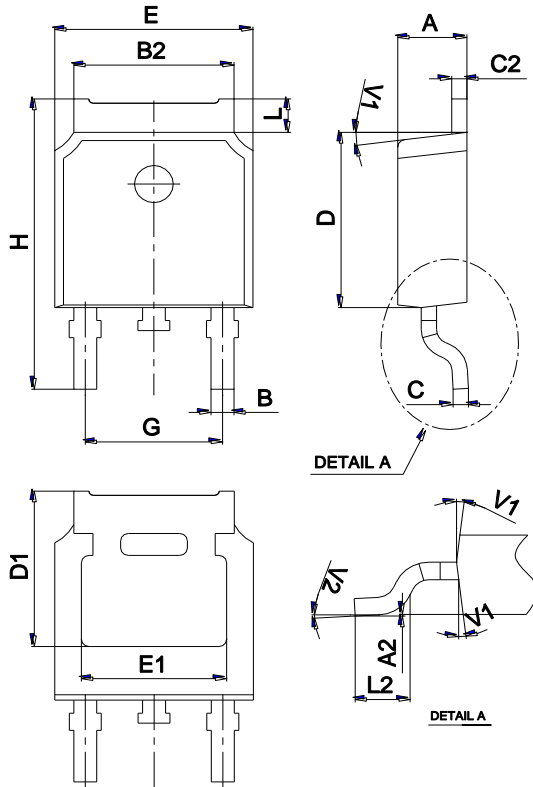


Figure 14. Normalized Maximum Transient Thermal Impedance (R_{thJC})

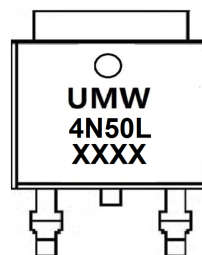


Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW 4N50L	TO-252	2500	Tape and reel