

1.Description

This device employs a new advanced trench technology and features low gate charge while maintaining low on-resistance. Optimized for switching applications, this device improves the overall efficiency of DC/DC converters and allows operation to higher switching frequencies.

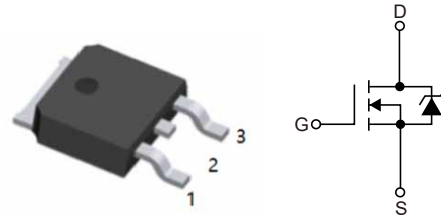
2.Features

- $V_{DS(V)}=30V$
- $I_D=50A(V_{GS}=10V)$
- $R_{DS(ON)}<5.2m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<8.5m\Omega(V_{GS}=4.5V)$
- $Q_g(Typ)=30nC, V_{GS}=5V$
- $Q_{gd}(Typ)=11nC$
- $C_{iss}(Typ)=3400pF$

3.Pinning information

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

TO-252(DPAK)
top view



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

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current Continuous ($T_C=25^{\circ}C, V_{GS}=10V$)	I_D	50	A
Continuous ($T_C=25^{\circ}C, V_{GS}=4.5V$)		50	A
Continuous ($T_C=25^{\circ}C, V_{GS}=V, R_{\theta JC}=52^{\circ}C/W$)		16	A
Pulsed		Figure 4	A
Power Dissipation	P_D	125	W
Derate above $25^{\circ}C$		0.83	W/ $^{\circ}C$
Operating and Storage Temperature	T_J, T_{STG}	-55 to 175	$^{\circ}C$



5. Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Case TO-252	$R_{\theta JC}$	1.2	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient TO-252	$R_{\theta JA}$	100	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient TO-252, 1in ² copper pad area	$R_{\theta JA}$	52	$^{\circ}\text{C/W}$



6. Electrical Characteristic ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Drain to Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V		30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =25V				1	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} =±20V				±100	nA
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA		1		3	V
Drain to Source On Resistance	R _{DS(ON)}	I _D =50A, V _{GS} =10V			5.2	6	mΩ
		I _D =50A, V _{GS} =4.5V			8.5	9.5	mΩ
Input Capacitance	C _{iss}	I _D =15A, V _{GS} =0V, f=1MHz			3400		pF
Output Capacitance	C _{oss}				650		pF
Reverse Transfer Capacitance	C _{rss}				300		pF
Total Gate Charge at 10V	Q _{g(TOT)}	V _{GS} =0 to 10V	V _{DD} =15V		60	90	nC
Total Gate Charge at 5V	Q _{g(5)}	V _{GS} =0 to 5V	I _D =50A		30	45	nC
Threshold Gate Charge	Q _{g(TH)}	V _{GS} =0 to 1V	I _g =1mA		3	4.5	nC
Gate to Source Gate Charge	Q _{gs}				10		nC
Gate to Drain “Miller” Charge	Q _{gd}				11		nC
Turn-On Time	t _(on)	V _{DD} =15V, I _D =16A V _{GS} =4.5V, R _{GS} =4.3Ω				131	ns
Turn-On Delay Time	t _{D(on)}				16		ns
Rise Time	t _r				70		ns
Turn-Off DelayTime	t _{D(off)}				34		ns
Fall Time	t _f				30		ns
Turn-Off Time	t _{off}					97	ns
Turn-On Time	t _(on)	V _{DD} =15V, I _D =16A V _{GS} =10V, R _{GS} =4.3Ω				80	ns
Turn-On Delay Time	t _{D(on)}				10		ns
Rise Time	t _r				43		ns
Turn-Off DelayTime	t _{D(off)}				62		ns
Fall Time	t _f				29		ns
Turn-Off Time	t _{off}					137	ns



Avalanche Time	t_{av}	$I_D=30A, L=200\mu H$	428			μs
Source to Drain Diode Forward Voltage	V_{SD}	$I_{SD}=50A$			1.25	V
		$I_{SD}=25A$			1	V
Reverse Recovery Time	t_{rr}	$I_{SD}=50A, dI_{SD}/dt=100A/\mu s$			35	ns
Reverse Recovery Charge	Q_{rr}	$I_{SD}=50A, dI_{SD}/dt=100A/\mu s$			30	nC



7.1 Typical characteristic

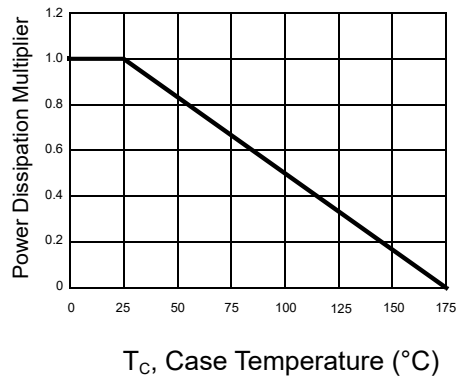


Figure 1: Normalized Power Dissipation vs Case Temperature

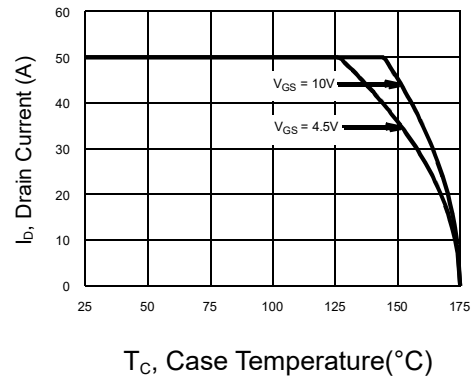


Figure 2: Maximum Continuous Drain Current vs Case Temperature

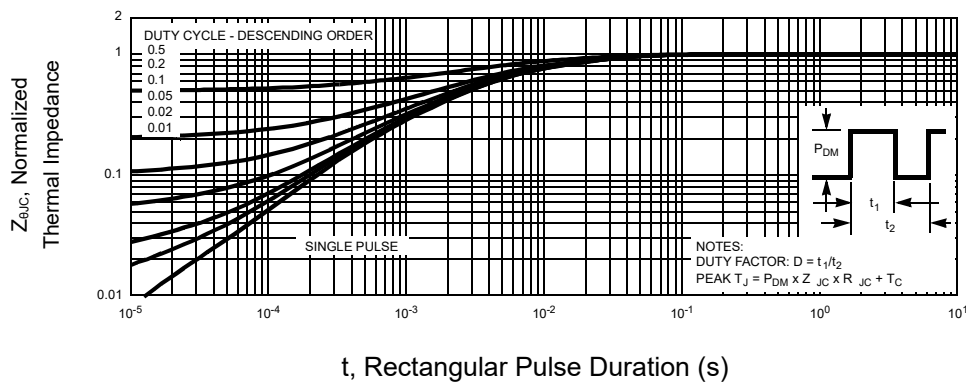


Figure 3: Normalized Maximum Transient Thermal Impedance

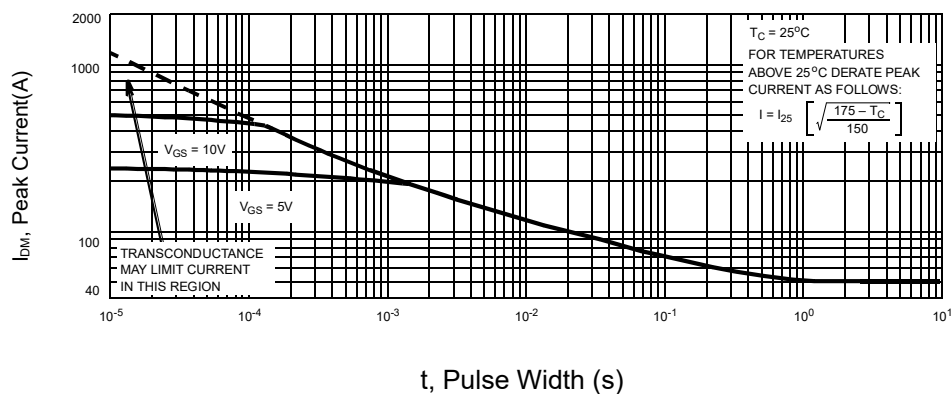


Figure 4: Peak Current Capability



7.2 Typical characteristic

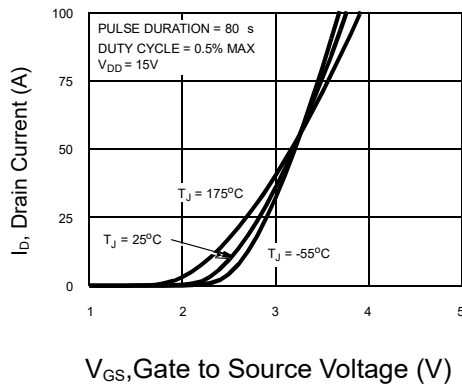


Figure 5: Transfer Characteristics

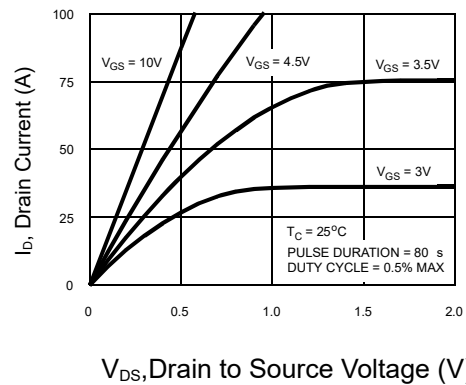


Figure 6: Saturation Characteristics

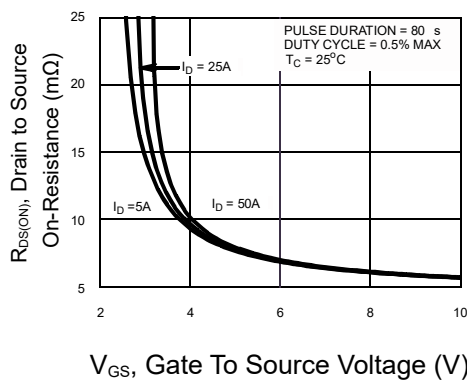


Figure 7: Drain to Source On Resistance vs Gate Voltage and Drain Current

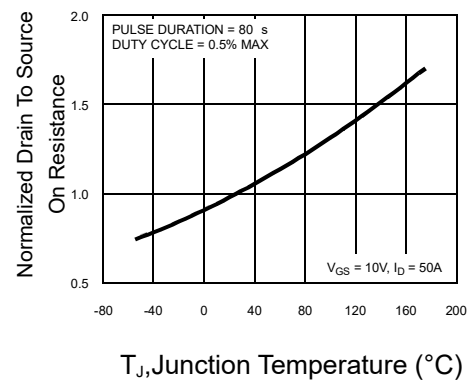


Figure 8: Normalized Drain to Source On Resistance vs Junction Temperature

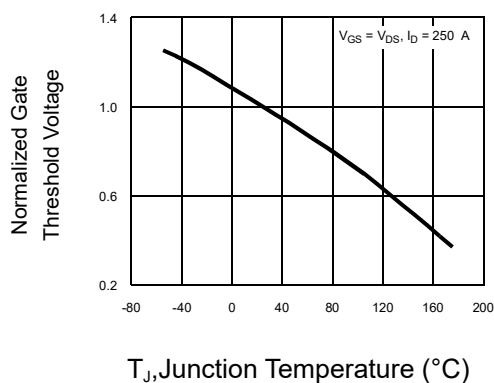


Figure 9: Normalized Gate Threshold Voltage vs Junction Temperature

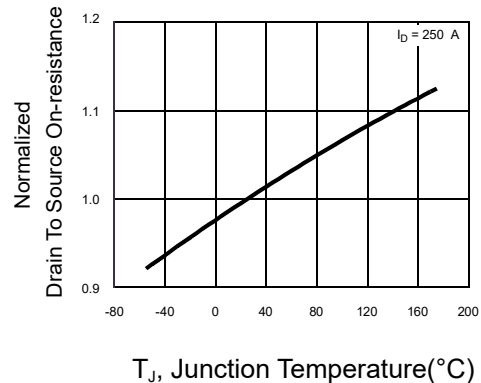
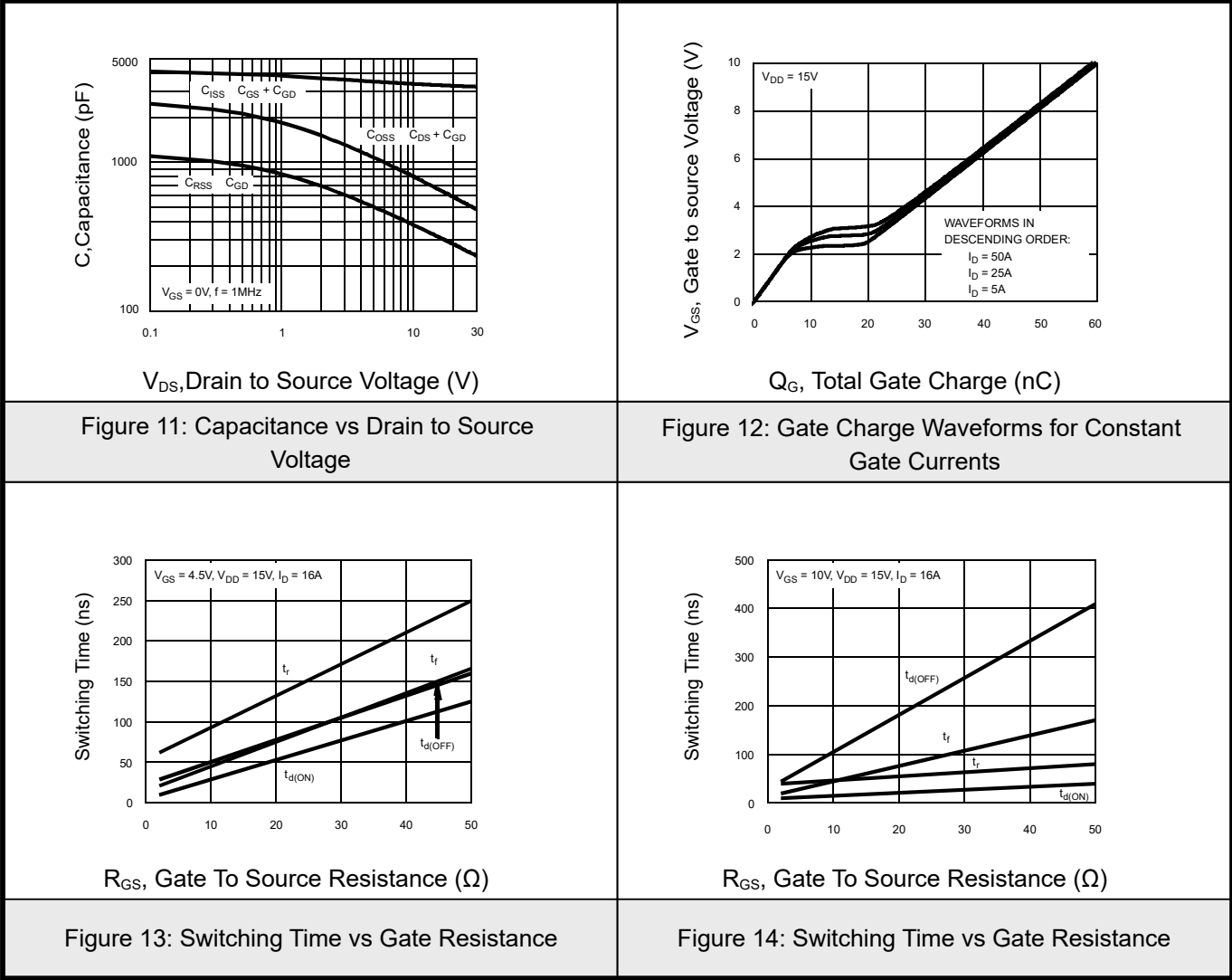


Figure 10: Normalized Drain to Source On Resistance vs Junction Temperature

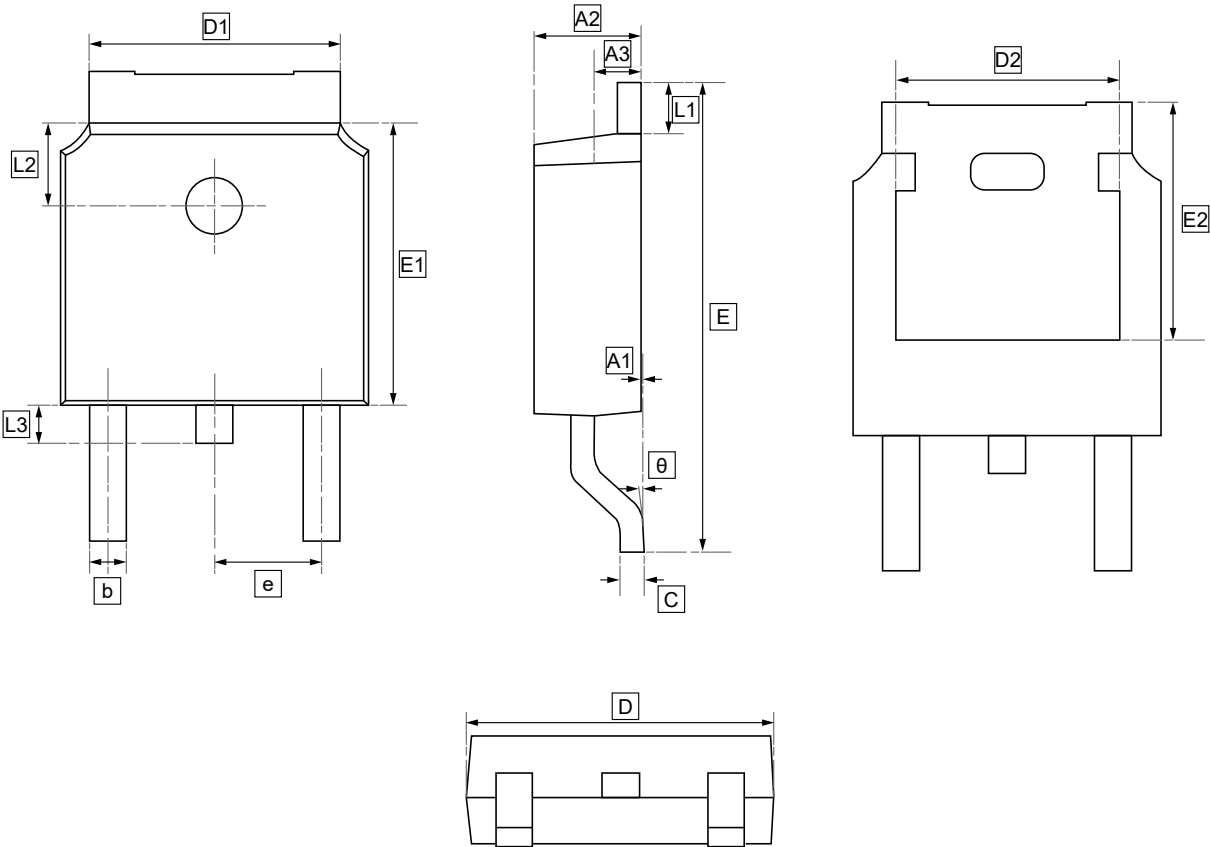


7.3Typical characteristic





8.TO-252 Package Outline Dimensions

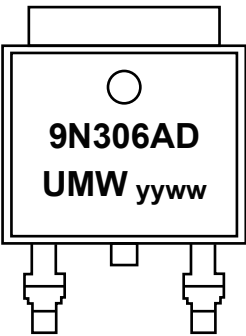


DIMENSIONS (mm are the original dimensions)

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 BSC	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 ISL9N306AD3ST	TO-252	2500	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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