UMW FDT3612

100V N-Channel MOSFET

1.Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/ DC converters using either synchronous or conventional switching PWM controllers.

2.1Features

- $V_{DS\ (V)}$=100V
- I_D=3.7A(V_{GS}=10V)
- $R_{DS(ON)}$<120mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<130mΩ(V_{GS}=6V)

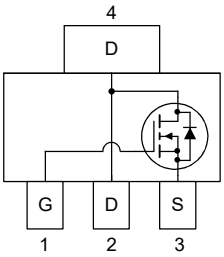
2.2Features

- Fast Switching
- High performance trench technology for extremely low $R_{DS(ON)}$
- Low gate charge (14nC typ)
- High power and current handling capability in a widely used surface mount package

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2,4	D	DRAIN
3	S	SOURCE

SOT-223 top view



4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current - Continuous	(Note 1a)	I_D	3.7	A
-Pulsed			20	A
Power Dissipation for Single Operation	(Note 1a)	P_D	3	W
	(Note 1b)		1.3	W
	(Note 1c)		1.1	W
Operating and Storage Junction Temperature Range		T_J, T_{STG}	-55 to 150	°C

5.Thermal Characteristics

Parameter		Symbol	Rating	Units
Thermal Resistance, Junction-to-Ambient	(Note 1a)	$R_{\theta JA}$	42	°C/W
Thermal Resistance, Junction-to-Case	(Note 1)	$R_{\theta JC}$	12	°C/W

6.Electrical Characteristic (T_A=25°C unless otherwise noted)

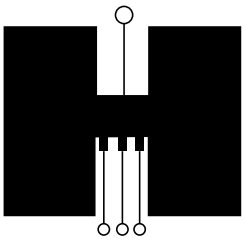
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Avalanche Energy	W_{DSS}	Single Pulse,V_{DD}=50V, I_D=3.7A			90	mJ
Drain-Source Avalanche Current	I_{AR}				3.7	A
Drain–Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	100			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		106		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V, V_{GS}=0V			10	μA
Gate–Body Leakage, Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V			100	nA
Gate–Body Leakage, Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	2.5	4	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		-6		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.7A		88	120	mΩ
		V_{GS}=6V, I_D=3.5A		94	130	mΩ
On–State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=10V	10			A
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=3.7A		11		S
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, f=1MHz		632		pF
Output Capacitance	C_{oss}			40		pF
Reverse Transfer Capacitance	C_{rss}			20		pF
Gate Resistance	$t_{D(on)}$	V_{DD}=50V, I_D=1A V_{GS}=10V, R_{GEN}=6Ω		8.5	17	ns
Turn–On Delay Time	t_r			2	4	ns
Turn–On Rise Time	$t_{D(off)}$			23	37	ns
Turn–Off Delay Time	t_f			4.5	9	ns
Turn–Off Fall Time	Q_g	V_{DS}=50V, I_D=3.7A, V_{GS}=10V		14	20	nC
Gate–Source Charge	Q_{gs}			2.4		nC
Gate–Drain Charge	Q_{gd}			3.8		nC

Maximum Continuous Drain–Source Diode Forward Current	I_S				2.5	A
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2.5A (Note 2)		0.75	1.2	V

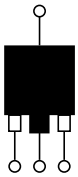
Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.

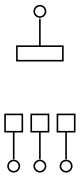
$R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 42°C/W when mounted on a 1in ^{2} pad of 2 oz copper

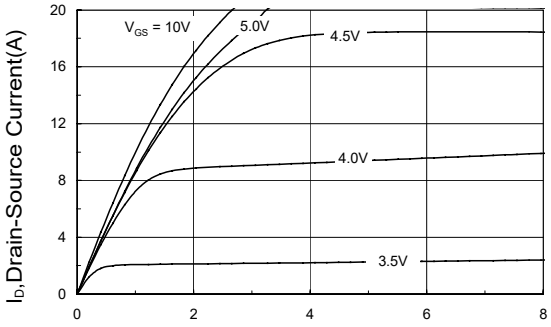


b) 95°C/W when mounted on a.0066 in^2 pad of 2 oz copper



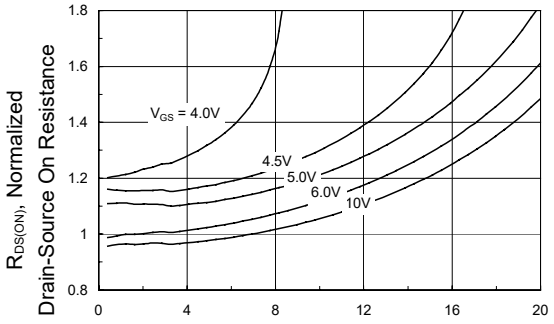
c) 110°C/W when mounted on a minimum pad

7.1Typical characteristic



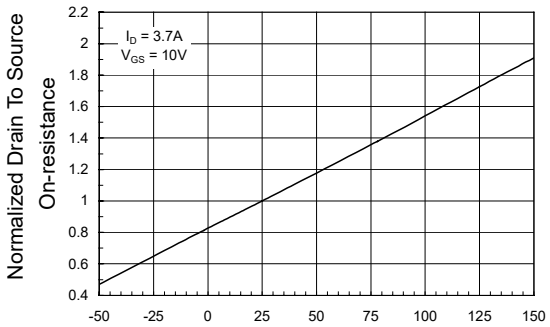
$V_{DS,}$ Drain To Source Voltage (V)

Figure 1: On-Region Characteristics



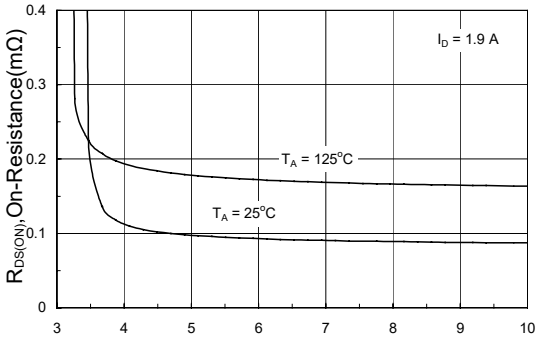
I_D, Drain Current (A)

Figure 2: On-Resistance Variation with Drain Current and Gate Voltage



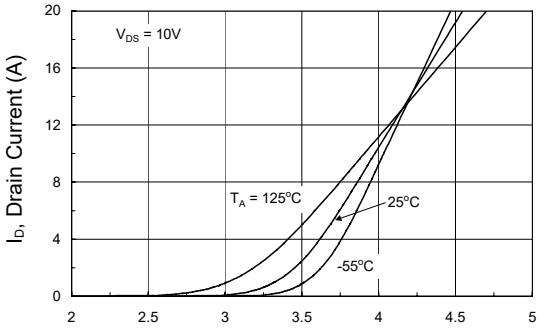
T_J, Junction Temperature (°C)

Figure 3: On-Resistance Variation with Temperature



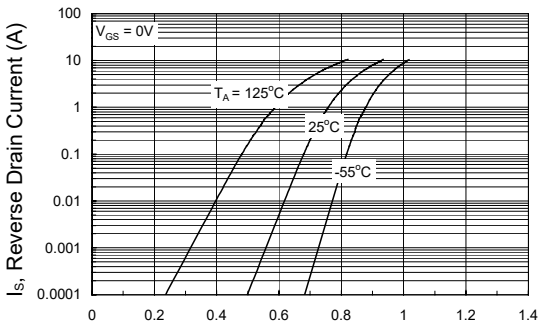
V_{GS}, Gate To Source Voltage (V)

Figure 4: On-Resistance Variation with Gate-to-Source Voltage



V_{GS}, Gate To Source Voltage (V)

Figure 5: Transfer Characteristics



V_{SD}, Body Diode Forward Voltage (V)

Figure 6: . Body Diode Forward Voltage Variation with Source Currentand Temperature

7.2Typical characteristic

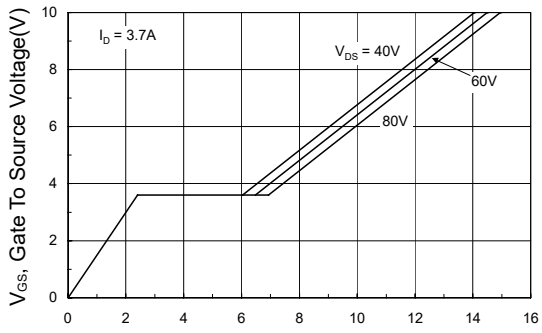


Figure 7: Gate Charge Characteristics

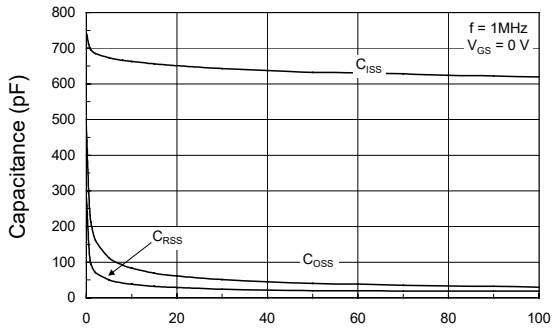


Figure 8: Capacitance Characteristics

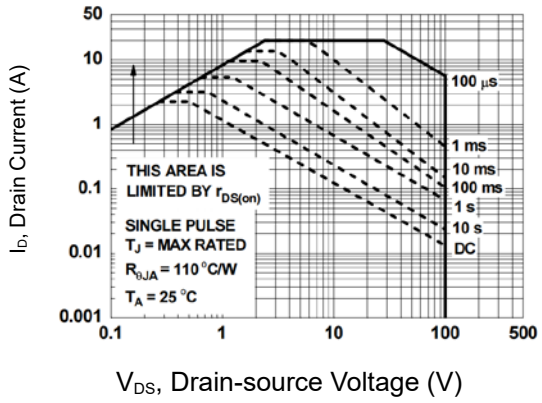


Figure 9: Maximum Safe Operating Area

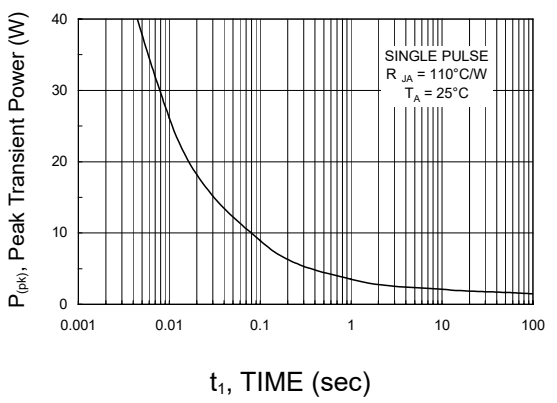


Figure 10: Single Pulse Maximum Power Dissipation

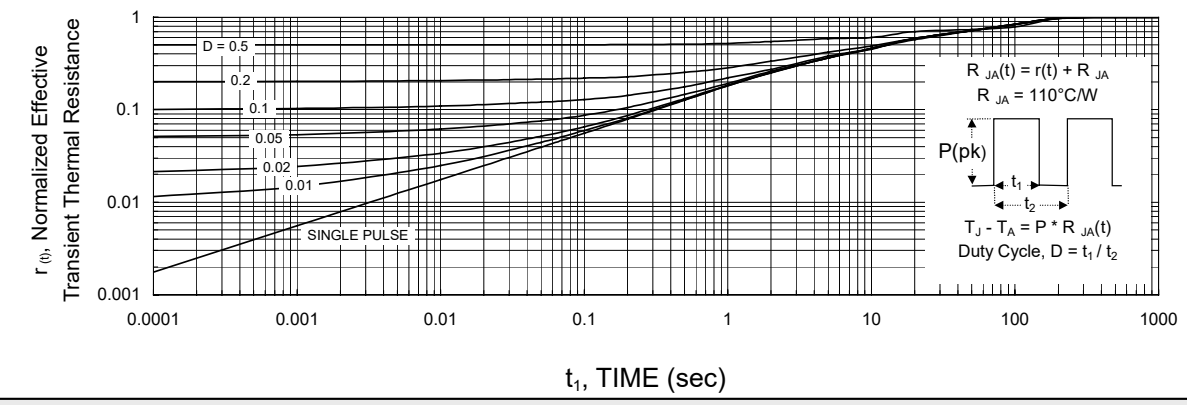
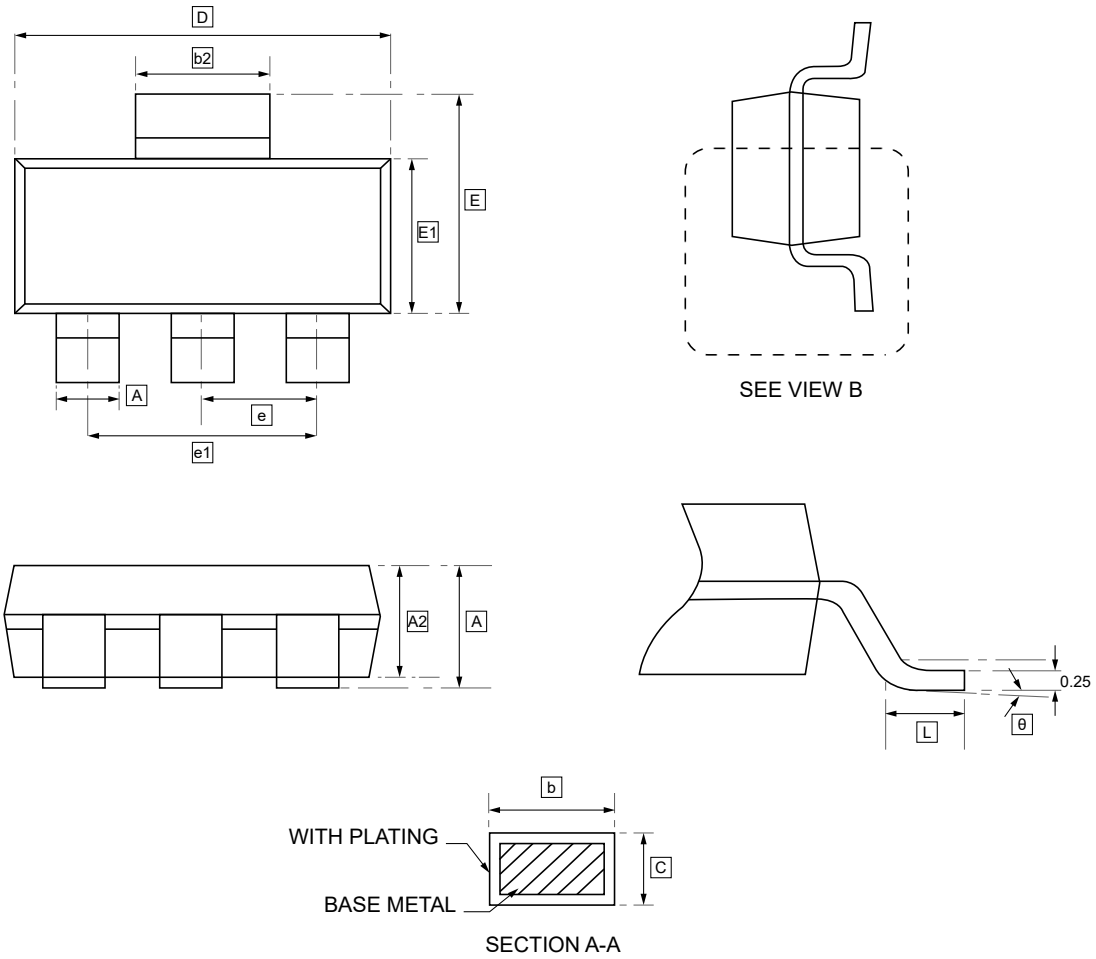


Figure 11: Transient Thermal Response Curve

8.SOT-223 Package Outlie Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b2	c	D	E	E1	e	e1	L	θ
Min		0.02	1.55	0.66	2.90	0.23	6.30	6.70	3.30	2.30	4.60	0.90	0°
Max	1.80	0.10	1.65	0.84	3.10	0.33	6.70	7.30	3.70	BSC	BSC		8°

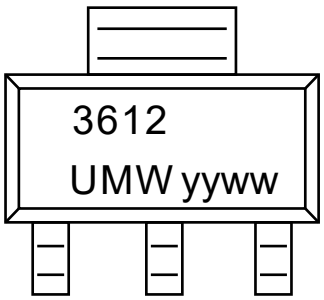
Note.

1.Refer to JEDEC TO-261AA.

2.Dimension D and E1 are determined at the outermost extremesof the plastic body exclusive of mold flash, tie bar burrs, gateburrs, and interlead flash, but including any mismatch betweenthe top and bottom of the plastic body.

3.Controlling dimension is millimeter, converted inch dimensionsare not necessarily exact.

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDT3612	SOT-223	2500	Tape and reel

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