UMW FDN327N

N-Channel MOSFET

1.Description

This 20V N-Channel MOSFET uses Fairchild's high voltage PowerTrench process.It has been optimized for power management applications

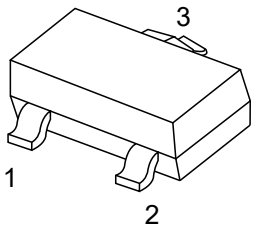
2.Features

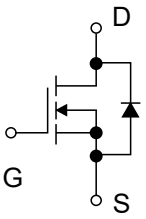
- $V_{DS\ (V)}$=20V
- $R_{DS(ON)}$＜50mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$＜55mΩ(V_{GS}=2.5V)
- $R_{DS(ON)}$＜70mΩ(V_{GS}=1.8V)

3.Pinning information

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

SOT-23





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

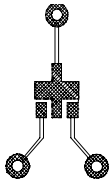
Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	±8	V
Drain Current – Continuous (Note 1a)	I_D	2	A
– Pulsed		8	
Maximum Power Dissipation(Note 1a)	P_D	0.5	W
(Note 1b)		0.46	
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Characteristics			
Thermal Resistance, Junction-to-Ambient (Note 1a)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	75	°C/W

5.Static Electrical Characteristics (T_A= 25°C Unless Otherwise Noted)

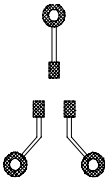
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=-250μA, V_{GS}=0V	20			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		12		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	μA
Gate–Body Leakage, Forward	I_{GSSF}	V_{DS}=0V, V_{GS}=8V			100	nA
Gate–Body Leakage, Reverse	I_{GSSR}	V_{DS}=0V, V_{GS}=-8V			-100	nA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.4	0.7	1.5	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		-3		mV/°C
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=2A		40	50	mΩ
		V_{GS}=2.5V, I_D=1.9A		49	55	
		V_{GS}=1.8V, I_D=1.6A		65	70	
On–State Drain Current	$I_{D(ON)}$	V_{GS}=4.5V, V_{DS}=5V	8			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=2A		11		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V,f =1MHz		423		pF
Output Capacitance	C_{oss}			87		pF
Reverse Transfer Capacitance	C_{rss}			48		pF
SWITCHING PARAMETERS (Note 2)						
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=10V, I_D=1A V_{GS}=4.5V, R_{GEN}=6Ω		6	12	ns
Turn-On Rise Time	t_r			6.5	16	ns
Turn-Off DelayTime	$t_{D(off)}$			14	29	ns
Turn-Off Fall Time	t_f			2	4	ns
Total Gate Charge	Q_g	V_{DS}=10V, I_D=2A V_{GS}=4.5V		4.5	6.3	nC
Gate–Source Charge	Q_{gs}			0.89		nC
Gate–Drain Charge	Q_{gd}			0.95		nC

Drain–Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain–Source Diode Forward Current	I_S				0.42	A
Drain–Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=0.42 (Note 2)		-0.6	1.2	V

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 ofthe drain pins. $R_{\theta JC}$ is guaranteed by design while RθCA is determined by the user's board design.



a) 250°C/W when mounted on a 0.02 in2 pad of 2 oz. copper.



b) 270°C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

6.1Typical Characterisitics

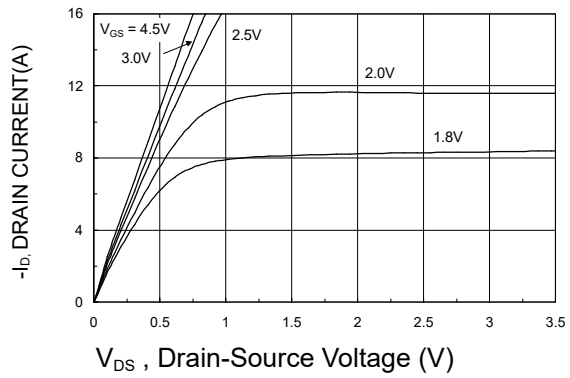


Figure 1: On-Region Characteristics.

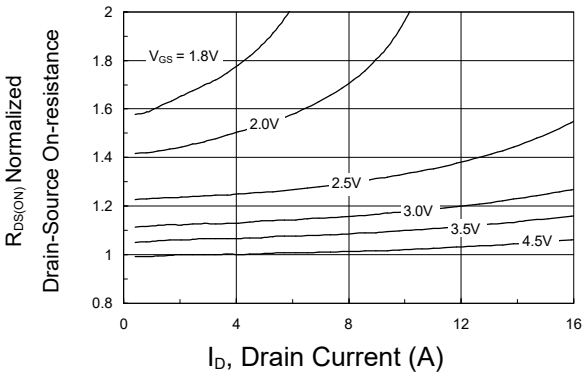


Figure 2: On-Resistance Variation with Drain Current and Gate Voltage.

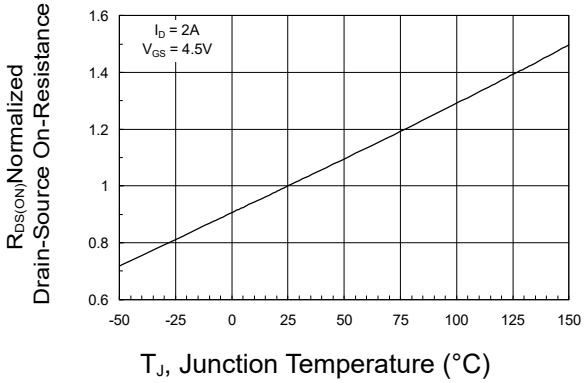


Figure 3: On-Resistance Variation with Temperature.

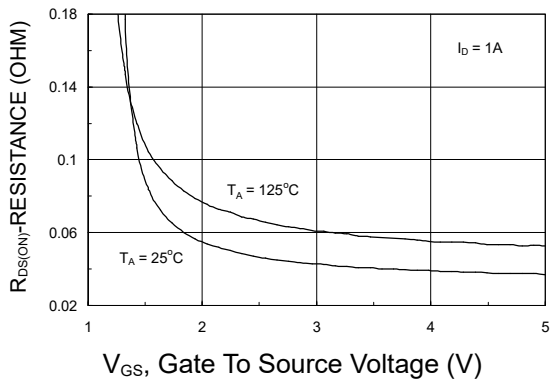


Figure 4: On-Resistance Variation with Gate-to-Source Voltage.

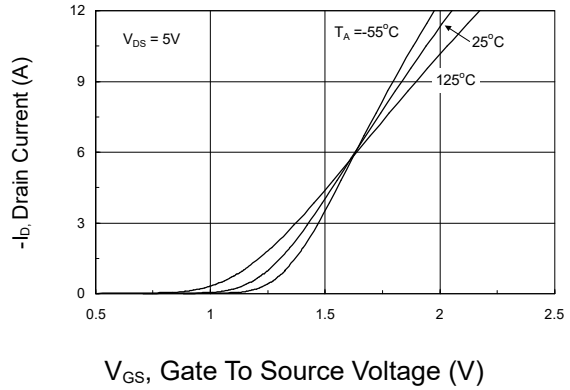


Figure 5: Transfer Characteristics.

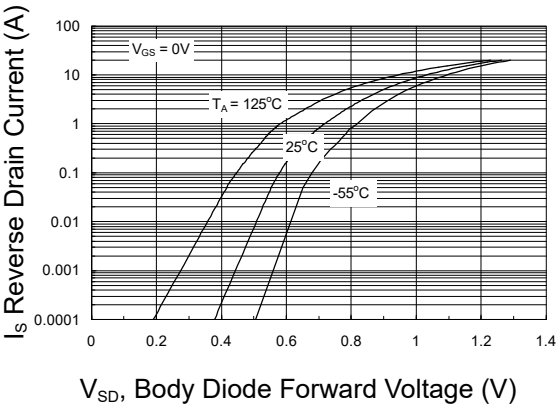


Figure 6: . Body Diode Forward Voltage Variation with Source Current and Temperature.

6.2Typical Characterisitics

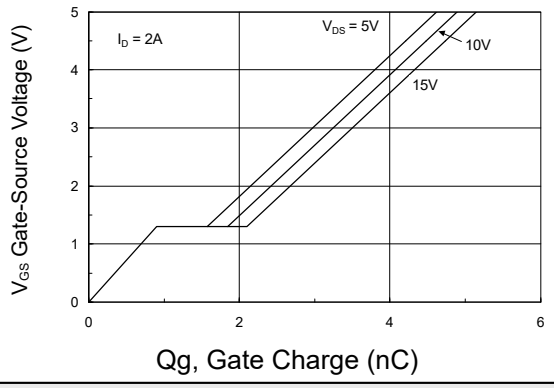


Figure 7: Gate-Charge Characteristics

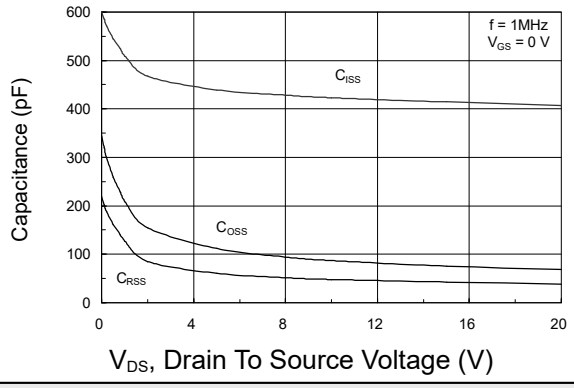


Figure 8: Capacitance Characteristics

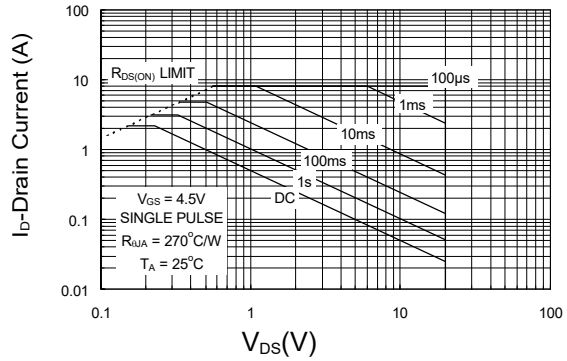


Figure 9: Maximum Safe Operating Area.

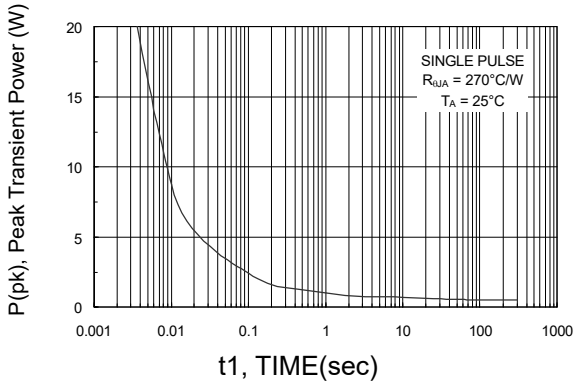


Figure 10: Single Pulse Maximum Power Dissipation.

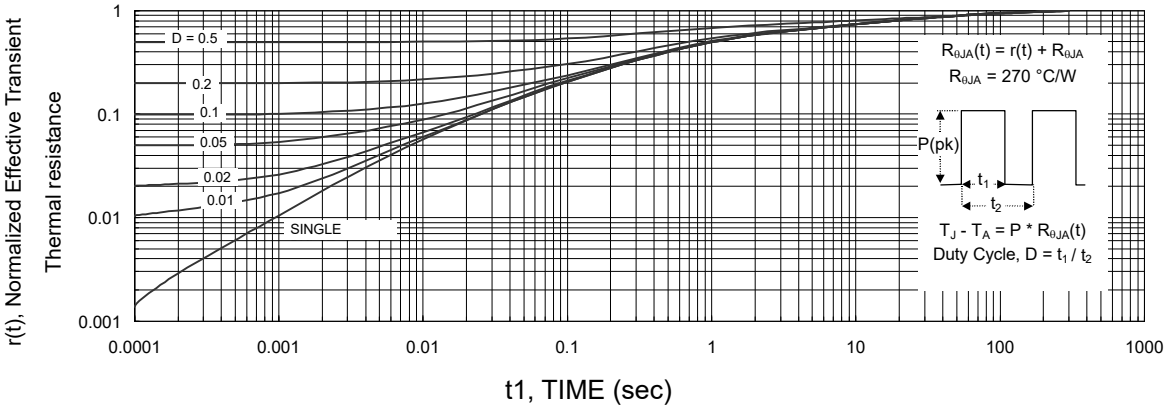
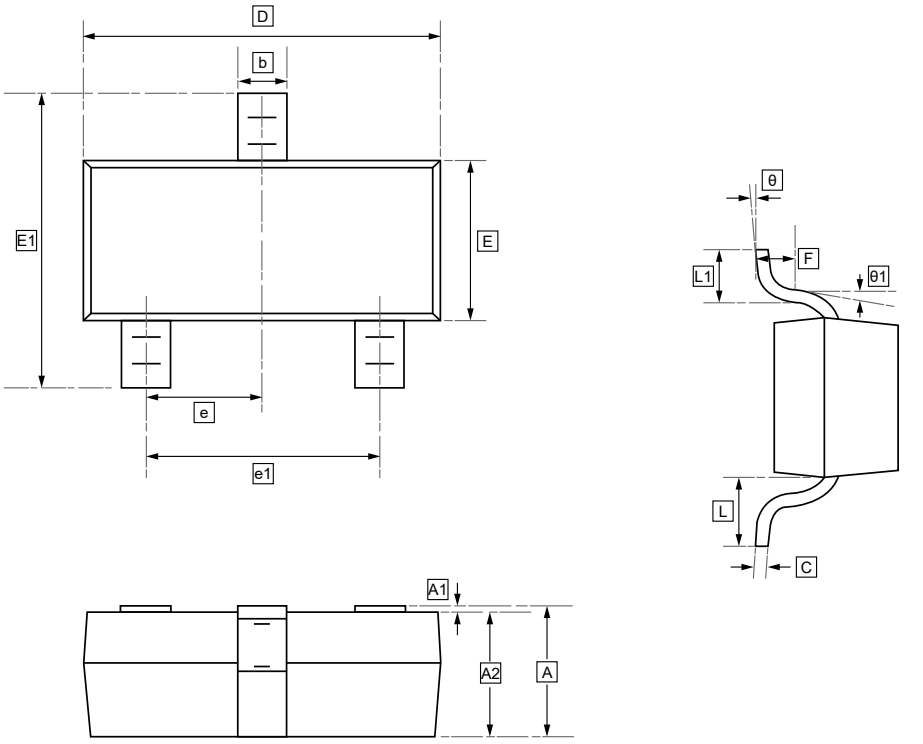


Figure 11. Transient Thermal Response Curve.

7.SOT-23 Package Outline Dimensions

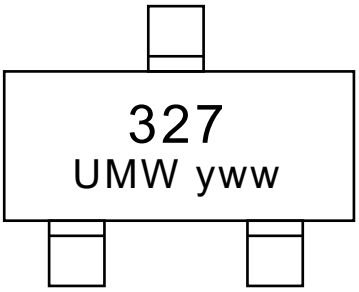


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	C	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.30	0.08	2.80	1.20	2.25	0.95	1.80	0.55	0.30
Max	1.15	0.10	1.05	0.50	0.15	3.00	1.40	2.55	TYP.	2.00	REF	0.50

Symbol	F	θ	θ1
Min	0.25	0°	2°
Max		8°	12°

8.Ordering Information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDN327N	SOT-23	3000	Tape and reel

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