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FDN361BN

30V N-Channel, Logic Level, PowerTrench® MOSFET

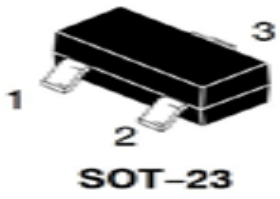
General Description

These N-Channel Logic Level MOSFETs are produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

These devices are particularly suited for low voltage applications in notebook computers, portable phones, PCMCIA cards, and other battery powered circuits where fast switching, and low in-line power loss are needed in a very small outline surface mount package.

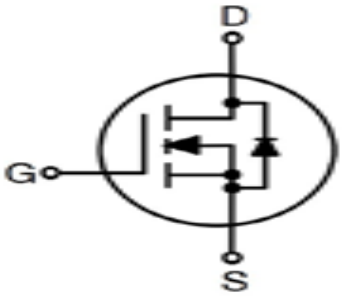
Features

- 1.4 A, 30 V. $R_{DS(ON)}$ = 110 mΩ @ V_{GS} = 10 V
  $R_{DS(ON)}$ = 160 mΩ @ V_{GS} = 4.5 V
- Low gate charge
- Industry standard outline SOT-23 surface mount package using proprietary SuperSOT™-3 design for superior thermal and electrical capabilities
- High performance trench technology for extremely low $R_{DS(ON)}$



SOT–23

1 – Gate
2 – Source
3 – Drain



Absolute Maximum Ratings

T_A=25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Drain Current – Continuous	(Note 1a)	1.4	A
	– Pulsed		10	
P_D	Power Dissipation for Single Operation	(Note 1a)	0.5	W
		(Note 1b)	0.46	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		–55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	250	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	75	

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Electrical Characteristics

T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA,Referenced to 25°C		26		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V			1	μA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55°C			10	μA
I_{GSS}	Gate–Body Leakage	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1	2.1	3	V
$R_{DS(on)}$	Static Drain–Source On–Resistance	V_{GS} = 10 V, I_D = 1.4 A		92	110	mΩ
		V_{GS} = 4.5 V, I_D = 1.2 A		120	160	
		V_{GS} = 10 V, I_D = 1.4 A, T_J = 125°C		114	150	
$I_{D(on)}$	On–State Drain Current	V_{GS} = 4.5 V, V_{DS} = 5 V	3.5			A
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 1.4 A		4		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0 MHz		145	193	pF
C_{oss}	Output Capacitance			35	47	pF
C_{rss}	Reverse Transfer Capacitance			15	23	pF
R_G	Gate Resistance	V_{GS} = 15 mV, f = 1.0 MHz		1.6		Ω
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	V_{DD} = 15 V, I_D = 1 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		3	6	ns
t_r	Turn–On Rise Time			8	16	ns
$t_{d(off)}$	Turn–Off Delay Time			16	29	ns
t_f	Turn–Off Fall Time			2	4	ns
Q_g	Total Gate Charge	V_{DS} = 15 V, I_D = 1.4 A, V_{GS} = 4.5 V		1.3	1.8	nC
Q_{gs}	Gate–Source Charge			0.5		nC
Q_{gd}	Gate–Drain Charge			0.5		nC
Drain–Source Diode Characteristics						
V_{SD}	Drain–Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 0.42 A (Note 2)		0.8	1.2	V
t_{rr}	Diode Reverse Recovery Time	I_F = 1.4 A, d_{iF}/d_t = 100 A/μs		11	22	nS
Q_{rr}	Diode Reverse Recovery Charge			4		nC

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Typical Characteristics

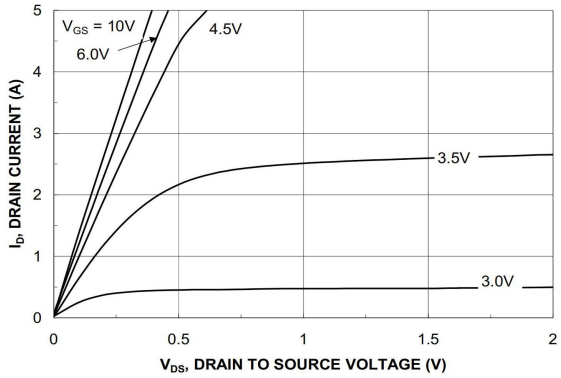


Figure 1. On-Region Characteristics.

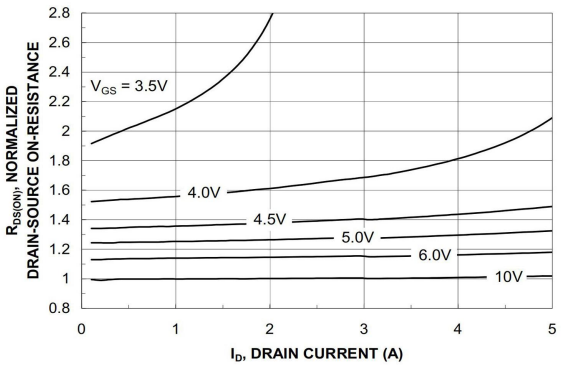


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

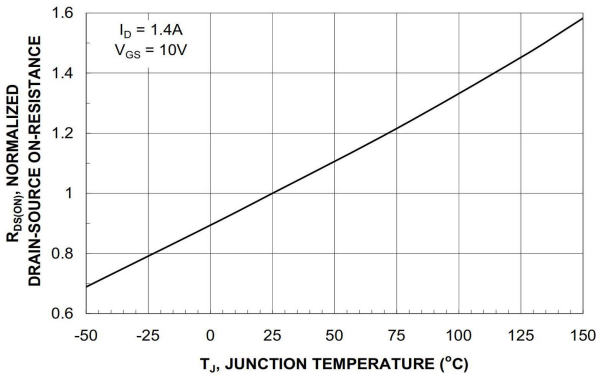


Figure 3. On-Resistance Variation with Temperature.

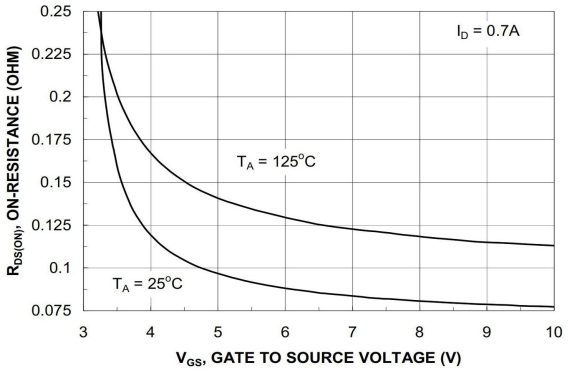


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

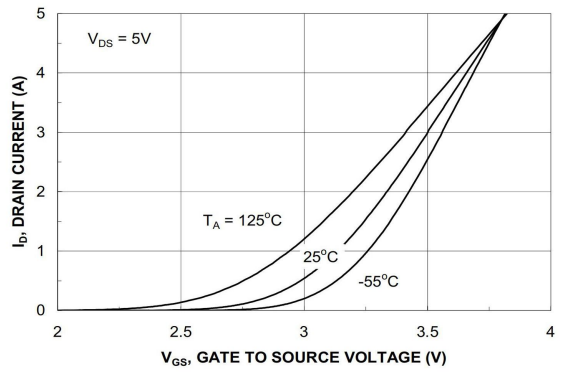


Figure 5. Transfer Characteristics.

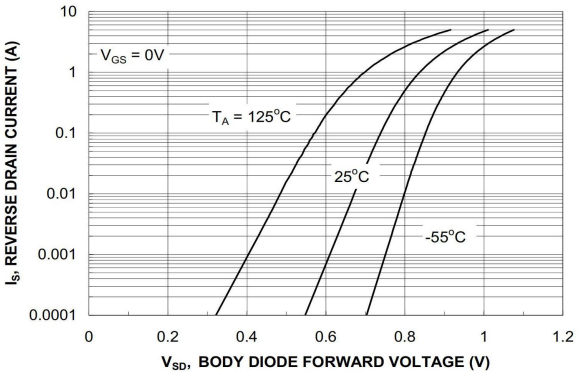


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

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Typical Characteristics

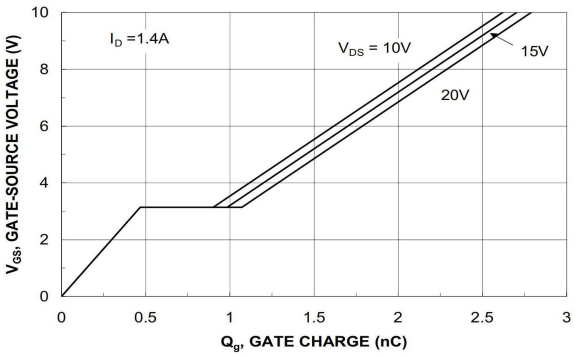


Figure 7. Gate Charge Characteristics.

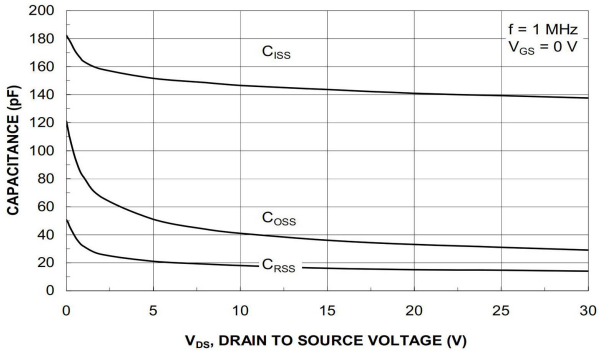


Figure 8. Capacitance Characteristics.

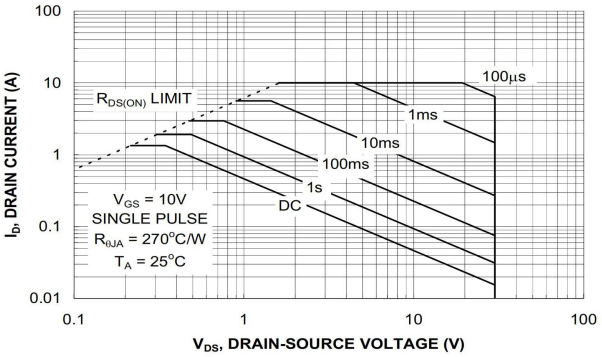


Figure 9. Maximum Safe Operating Area.

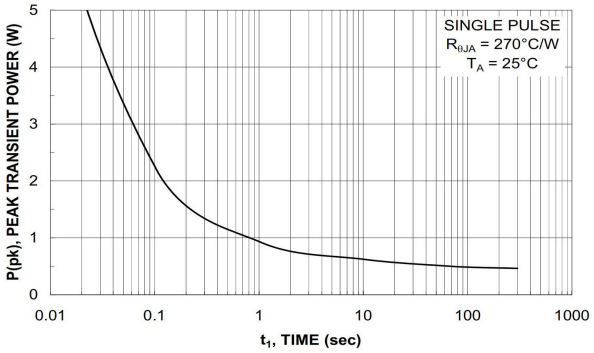


Figure 10. Single Pulse Maximum Power Dissipation.

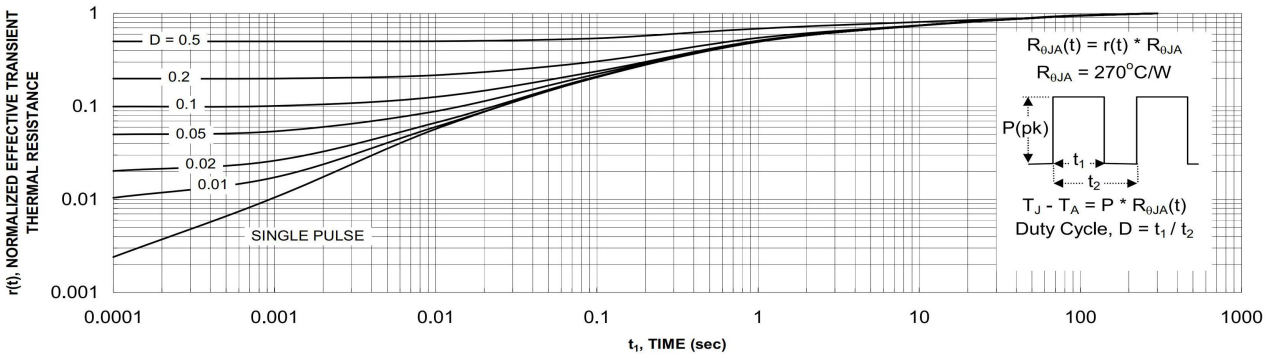


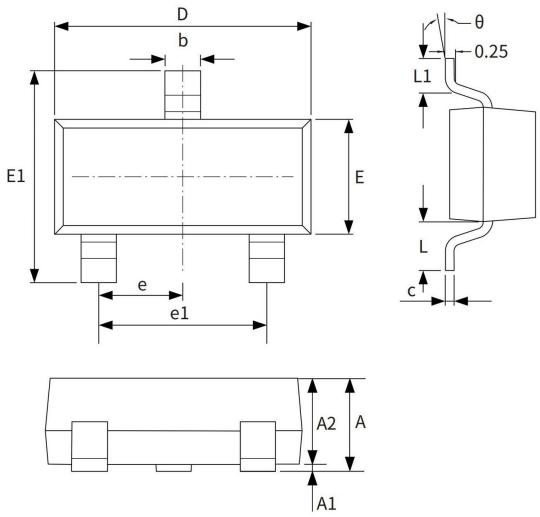
Figure 11. Transient Thermal Response Curve.

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Ordering Information

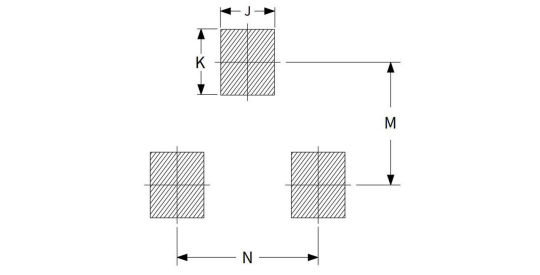
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

Package Outline Dimensions (SOT-23)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	-	0.10	-	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.80	2.00	0.071	0.079
L	0.550REF		0.022REF	
L1	0.30	0.50	0.012	0.020
θ	-	8°	-	8°

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	0.75	0.85	0.030	0.033
K	0.85	0.95	0.033	0.037
M	1.95	2.05	0.077	0.081
N	1.85	1.95	0.073	0.077