OM SENI

FDN537N

Single N-Channel Power Trench® MOSFET

30 V, 6.5 A, 23 mΩ

Features

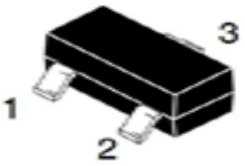
- Max $r_{DS(on)}$ = 23 mΩ at V_{GS} = 10 V, I_D = 6.5 A
- Max $r_{DS(on)}$ = 36 mΩ at V_{GS} = 4.5 V, I_D = 6.0 A
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability in a widely used surface mount package
- Fast switching speed
- 100% UIL Tested
- RoHS Compliant

General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench® process that has been optimized for $r_{DS(on)}$, switching performance and ruggedness.

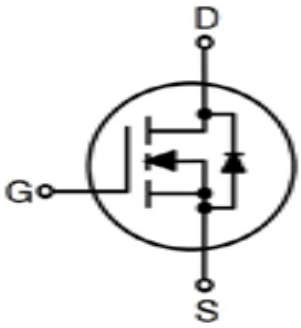
Application

- Primary DC-DC Switch



SOT–23

1 – Gate
2 – Source
3 – Drain



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			30	V
V_{GS}	Gate to Source Voltage		(Note 3)	±20	V
I_D	Drain Current -Continuous (Package limited)	T_C = 25 °C		8.0	A
	-Continuous	T_A = 25 °C	(Note 1a)	6.5	
	-Pulsed			25	
P_D	Power Dissipation		(Note 1a)	1.5	W
	Power Dissipation		(Note 1b)	0.6	
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)	80	°C/W
	Thermal Resistance, Junction to Ambient		(Note 1b)	180	

OM SENI

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		18		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V			1	μA
I_{GSS}	Gate to Source Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	1.2	1.8	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-6		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 6.5 A		19	23	mΩ
		V_{GS} = 4.5 V, I_D = 6.0 A		25	36	
		V_{GS} = 10 V, I_D = 6.5 A, T_J = 125 °C		25	30	
g_{FS}	Forward Transconductance	V_{DD} = 5 V, I_D = 6.5 A		24		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		360	465	pF
C_{oss}	Output Capacitance			143	180	pF
C_{rss}	Reverse Transfer Capacitance			22	35	pF
R_g	Gate Resistance			1.0		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 15 V, I_D = 6.5 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		5	10	ns
t_r	Rise Time			1	10	ns
$t_{d(off)}$	Turn-Off Delay Time			11	19	ns
t_f	Fall Time			1	10	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 15 V, I_D = 6.5 A		6.0	8.4	nC
	Total Gate Charge	V_{GS} = 0 V to 4.5 V; V_{DD} = 15 V, I_D = 6.5 A		3.0	4.2	nC
Q_{gs}	Total Gate Charge	V_{DD} = 15 V, I_D = 6.5 A		1.2		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 15 V, I_D = 6.5 A		1.1		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 6.5 A (Note 2)		0.86	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 6.5 A, di/dt = 100 A/μs		14	22	ns
Q_{rr}	Reverse Recovery Charge			3	10	nC

OM SENI

Typical Characteristics T_J = 25 °C unless otherwise noted

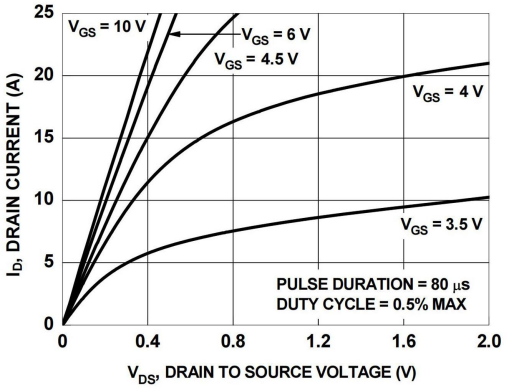


Figure 1. On Region Characteristics

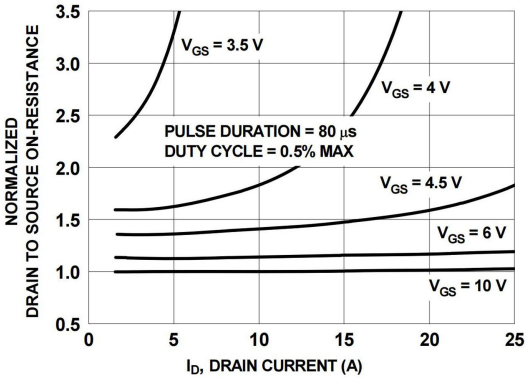


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

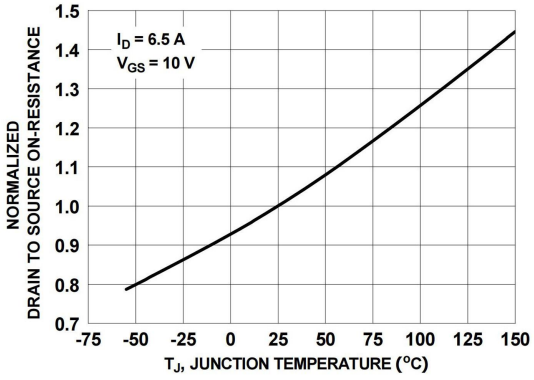


Figure 3. Normalized On Resistance vs Junction Temperature

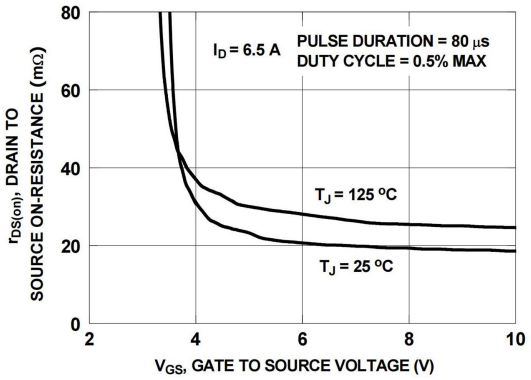


Figure 4. On-Resistance vs Gate to Source Voltage

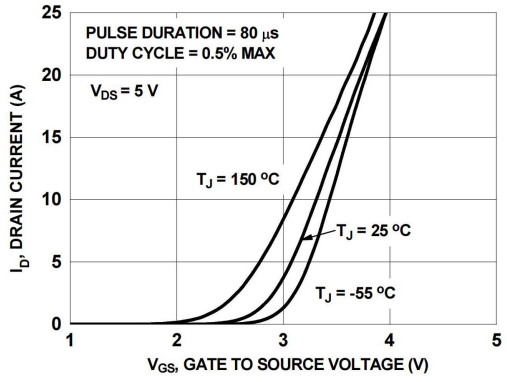


Figure 5. Transfer Characteristics

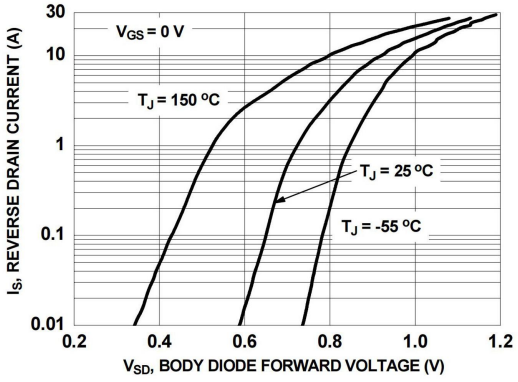


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

OM SENI

Typical Characteristics T_J = 25 °C unless otherwise noted

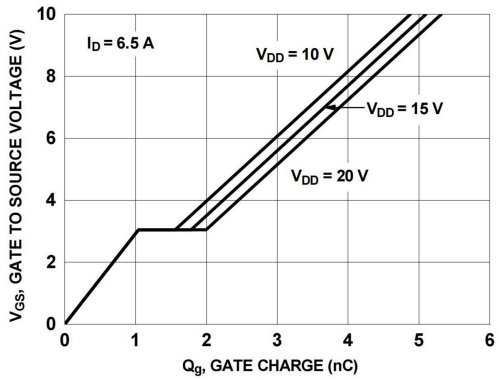


Figure 7. Gate Charge Characteristics

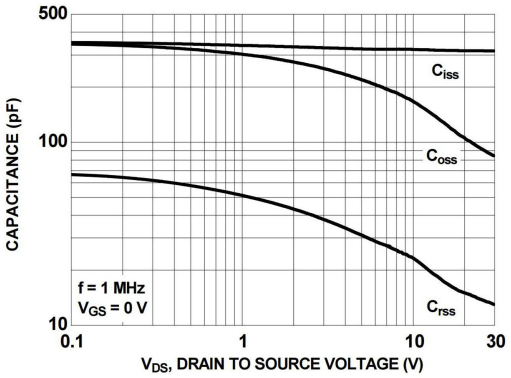


Figure 8. Capacitance vs Drain to Source Voltage

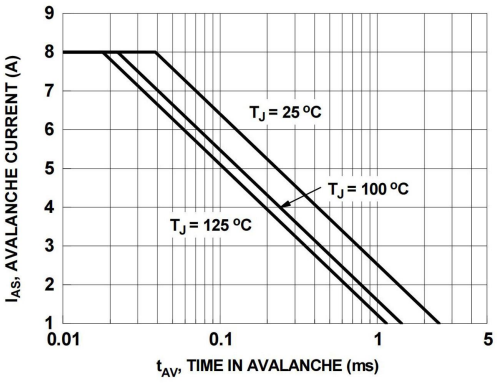


Figure 9. Unclamped Inductive Switching Capability

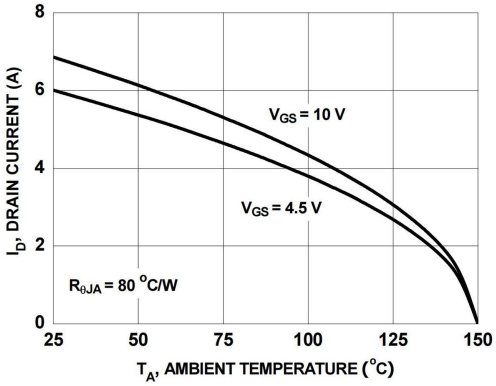


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

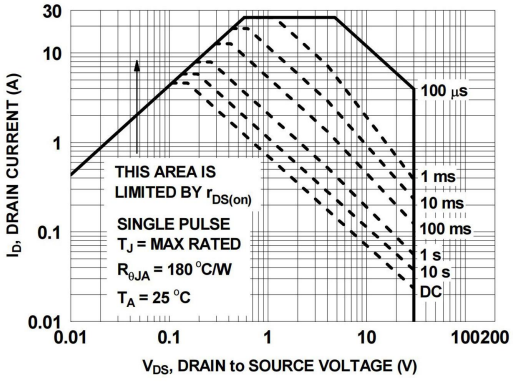


Figure 11. Forward Bias Safe Operating Area

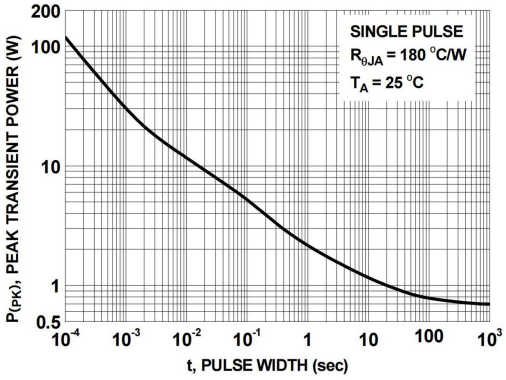


Figure 12. Single Pulse Maximum Power Dissipation

OM SENI

Typical Characteristics T_J = 25 °C unless otherwise noted

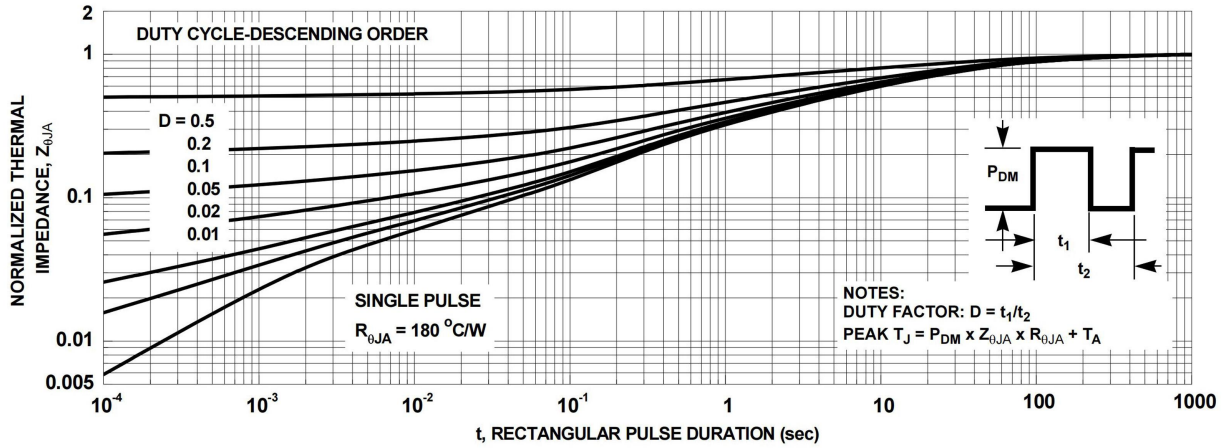


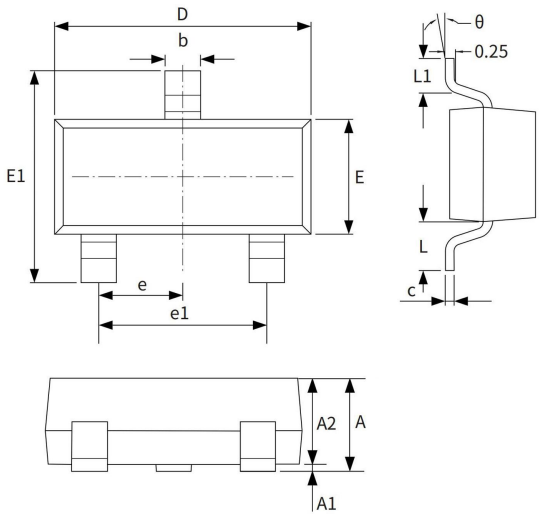
Figure 13. Junction-to-Ambient Transient Thermal Response Curve

OM SENI

Ordering Information

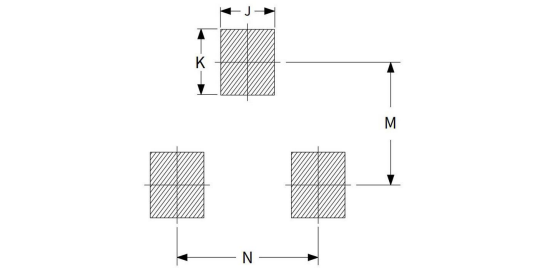
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

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