February 2004

FDS7079ZN3

30 Volt P-Channel PowerTrench® MOSFET

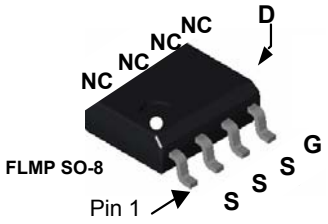
General Description

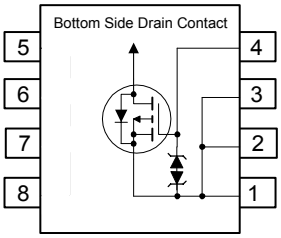
Advanced P Channel MOSFET combined with Advanced SO8 FLMP package providing a device with extremely low thermal impedance and improved electrical performance.

Applications for this device include multi-cell battery protection and charging, including protection and load switching in notebook computer and notebook battery packs.

Features

- –16 A, –30 V. $R_{DS(ON)}$ = 7.5 mΩ @ V_{GS} = –10 V
  $R_{DS(ON)}$ = 11.5 mΩ @ V_{GS} = – 4.5 V
- ESD protection diode (note 3)
- ESD rating: 4kV
- High performance trench technology for extremely low $R_{DS(ON)}$
- FLMP SO-8 package for enhanced thermal performance in industry-standard package size





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		±25	V
I_D	Drain Current – Continuous	(Note 1a)	–16	A
	– Pulsed		–60	
P_D	Power Dissipation for Single Operation	(Note 1a)	3.13	W
		(Note 1b)	1.5	
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)	40	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	0.5	

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDS7079ZN3	FDS7079ZN3	13''	12mm	2500 units

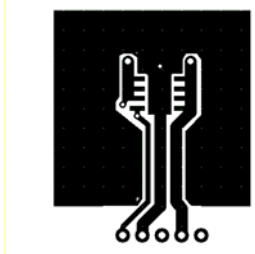
Electrical Characteristics

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		–20		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = –24 V, V_{GS} = 0 V			–1	μA
I_{GSS}	Gate–Body Leakage	V_{GS} = ±25 V, V_{DS} = 0 V			±10	μA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = –250 μA	–1	–1.5	–3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = –250 μA,Referenced to 25°C		0.5		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	V_{GS} = –10 V, I_D = –16 A V_{GS} = –4.5 V, I_D = –13 A V_{GS}= –10 V, I_D =–16A, T_J=125°C		6.7 9.4 9.2	7.5 11.5	mΩ
g_{FS}	Forward Transconductance	V_{DS} = –10 V, I_D = –16 A		47		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = –15 V, V_{GS} = 0 V, f = 1.0 MHz		3630		pF
C_{oss}	Output Capacitance			985		pF
C_{rss}	Reverse Transfer Capacitance			490		pF
R_G	Gate Resistance	V_{GS} = 15 mV, f = 1.0 MHz		3.0		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		10	19	ns
t_r	Turn–On Rise Time			20	35	ns
$t_{d(off)}$	Turn–Off Delay Time			64	102	ns
t_f	Turn–Off Fall Time			98	157	ns
Q_g	Total Gate Charge	V_{DS} = –15 V, I_D = –16 A, V_{GS} = –5 V		39	55	nC
Q_{gs}	Gate–Source Charge			10		nC
Q_{gd}	Gate–Drain Charge			15		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current				–2.5	A
V_{SD}	Drain–Source Diode Forward Voltage	V_{GS} = 0 V, I_S = –2.5 A (Note 2)		–0.7	–1.2	V
t_{RR}	Reverse Recovery Time	I_F = –16 A, d_{iF}/d_t = 100 A/μs (Note 2)		38		ns
Q_{RR}	Reverse Recovery Charge			24		nC

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) 40°C/W when mounted on a 1in^2 pad of 2 oz copper

b) 85°C/W when mounted on a minimum pad of 2 oz copper

Scale 1 : 1 on letter size paper

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

3. The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

Typical Characteristics

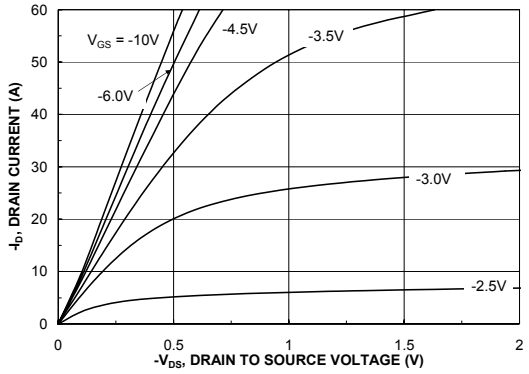


Figure 1. On-Region Characteristics.

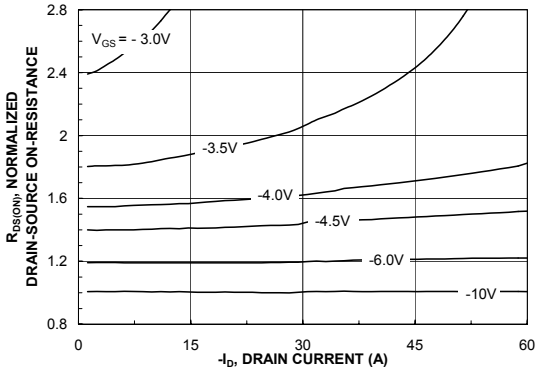
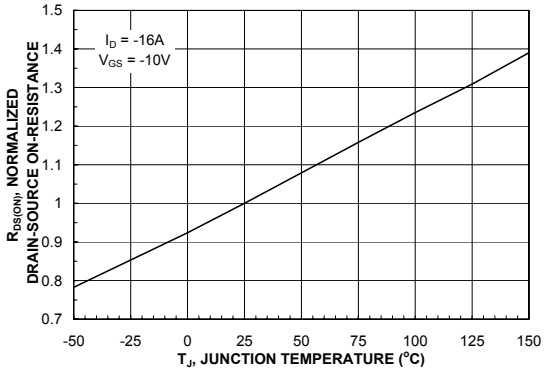


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.



igure 3. On-Resistance Variation with Temperature.

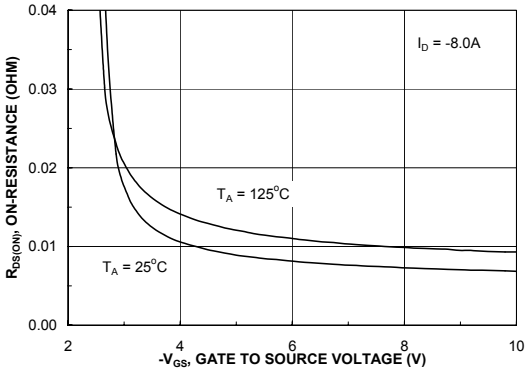


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

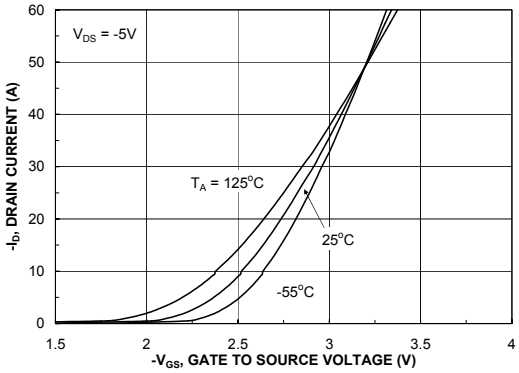


Figure 5. Transfer Characteristics.

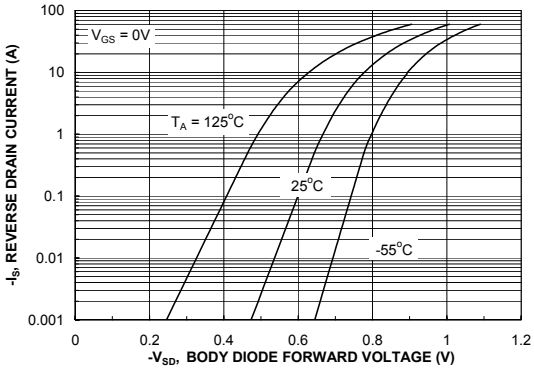


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

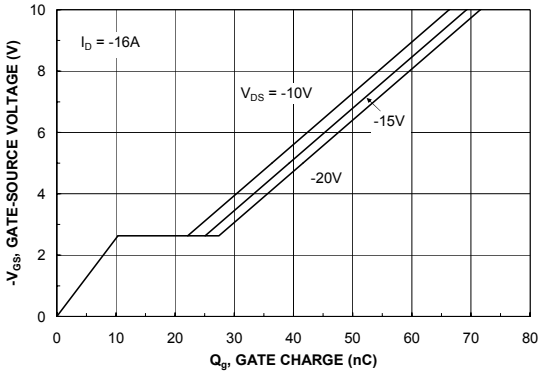


Figure 7. Gate Charge Characteristics.

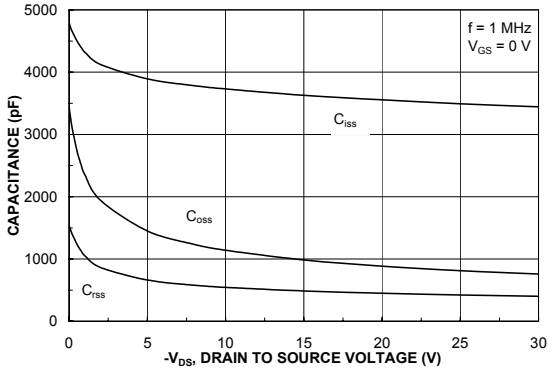


Figure 8. Capacitance Characteristics.

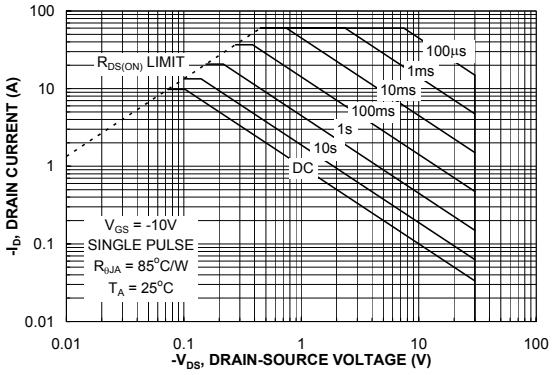


Figure 9. Maximum Safe Operating Area.

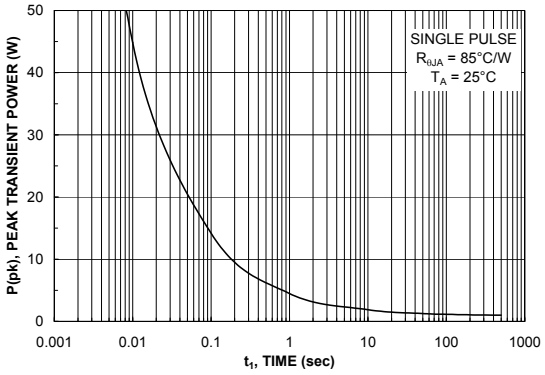


Figure 10. Single Pulse Maximum Power Dissipation.

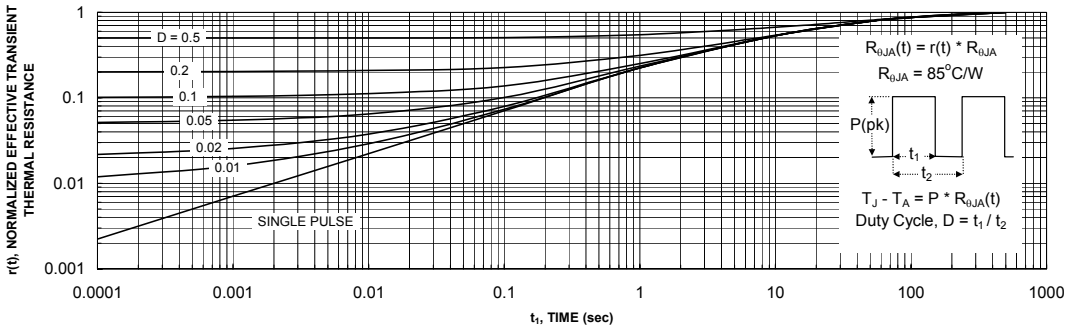
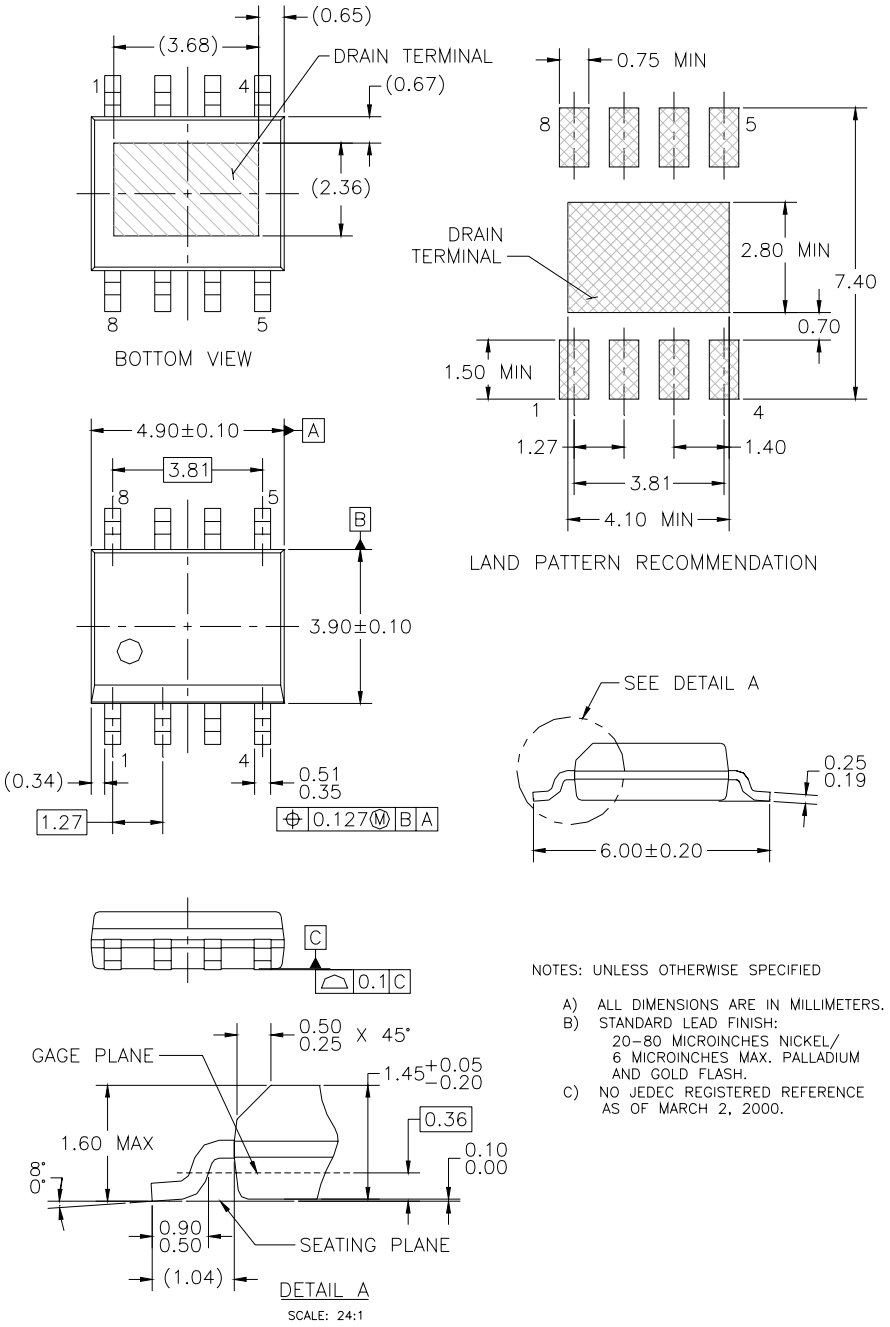


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.

Dimensional Outline and Pad Layout



NOTES: UNLESS OTHERWISE SPECIFIED

A) ALL DIMENSIONS ARE IN MILLIMETERS.
B) STANDARD LEAD FINISH:
20–80 MICROINCHES NICKEL/
6 MICROINCHES MAX. PALLADIUM
AND GOLD FLASH.
C) NO JEDEC REGISTERED REFERENCE
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