

FDS7079ZN3

30 Volt P-Channel PowerTrench® MOSFET

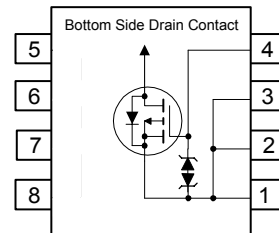
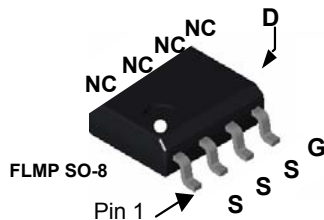
General Description

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. $R_{DS(ON)} = 7.5 \text{ m}\Omega @ V_{GS} = -10 \text{ V}$
 $R_{DS(ON)} = 11.5 \text{ m}\Omega @ V_{GS} = -4.5 \text{ V}$
- 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 _{θJA}	Thermal Resistance, Junction-to-Ambient (Note 1a)	40	°C/W
R _{θJC}	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 $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250\text{ }\mu\text{A}$, Referenced to 25°C		-20		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
I_{GSS}	Gate–Body Leakage	$V_{GS} = \pm 25\text{ V}, V_{DS} = 0\text{ V}$			± 10	μA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1	-1.5	-3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250\text{ }\mu\text{A}$, Referenced to 25°C		0.5		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = -10\text{ V}, I_D = -16\text{ A}$ $V_{GS} = -4.5\text{ V}, I_D = -13\text{ A}$ $V_{GS} = -10\text{ V}, I_D = -16\text{ A}, T_J = 125^\circ\text{C}$		6.7 9.4 9.2	7.5 11.5	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = -10\text{ V}, I_D = -16\text{ A}$		47		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		3630		pF
C_{oss}	Output Capacitance			985		pF
C_{rss}	Reverse Transfer Capacitance			490		pF
R_G	Gate Resistance	$V_{GS} = 15\text{ mV}, f = 1.0\text{ MHz}$		3.0		Ω

Switching Characteristics (Note 2)

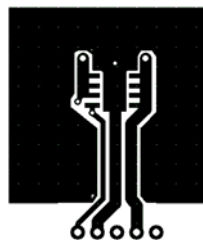
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = -15\text{ V}, I_D = -1\text{ A},$ $V_{GS} = -10\text{ V}, R_{GEN} = 6\text{ }\Omega$		10	19	ns
t_r	Turn–On Rise Time			20	35	ns
$t_{d(off)}$	Turn–Off Delay Time			64	102	ns
t_f	Turn–Off Fall Time			98	157	ns
Q_g	Total Gate Charge	$V_{DS} = -15\text{ V}, I_D = -16\text{ A},$ $V_{GS} = -5\text{ V}$		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	$V_{GS} = 0\text{ V}, I_S = -2.5\text{ A}$ (Note 2)		-0.7	-1.2	V
t_{RR}	Reverse Recovery Time	$I_F = -16\text{ A},$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ (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) $40^\circ\text{C}/\text{W}$ when mounted on a 1 in^2 pad of 2 oz copper



b) $85^\circ\text{C}/\text{W}$ when mounted on a minimum pad of 2 oz copper

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300 μs , 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

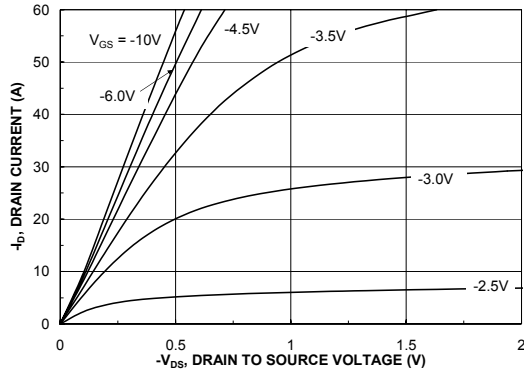


Figure 1. On-Region Characteristics.

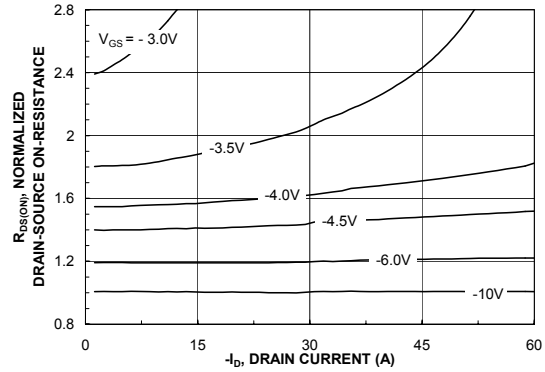


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

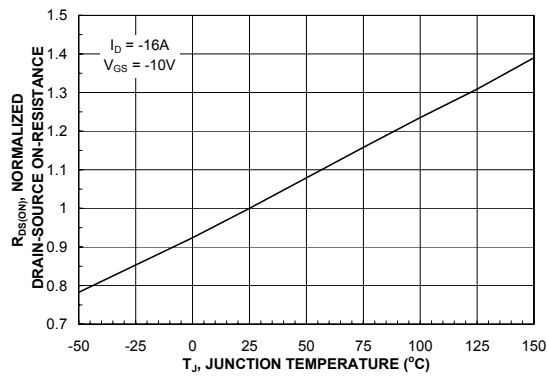


Figure 3. On-Resistance Variation with Temperature.

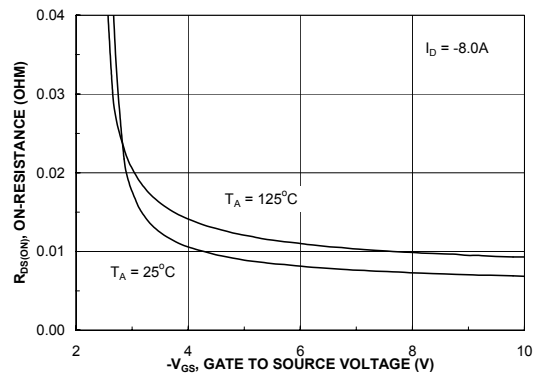


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

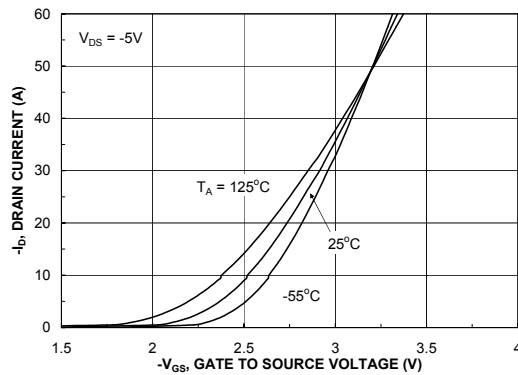


Figure 5. Transfer Characteristics.

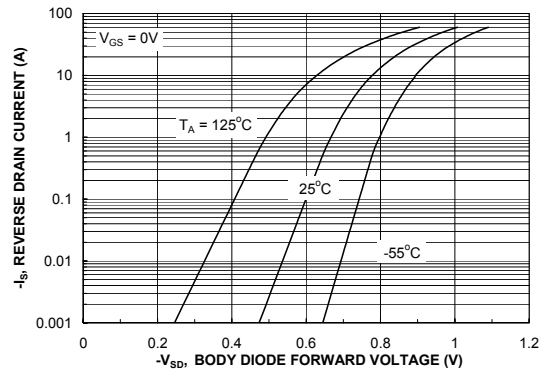


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

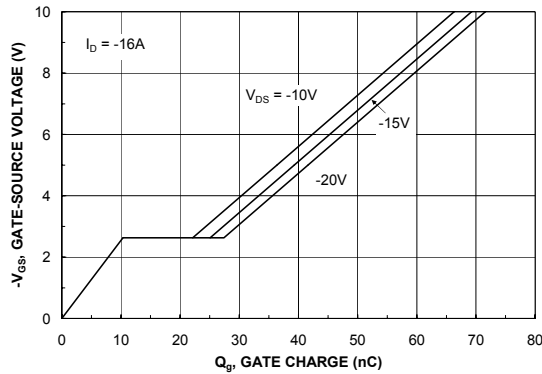


Figure 7. Gate Charge Characteristics.

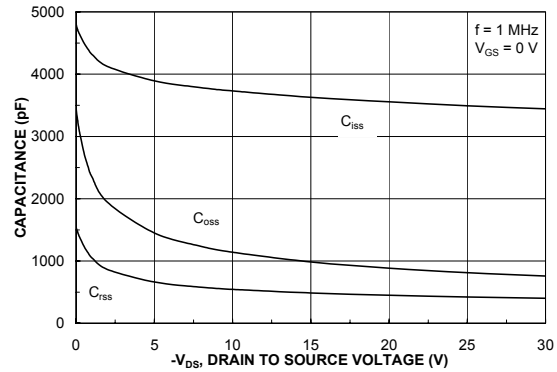


Figure 8. Capacitance Characteristics.

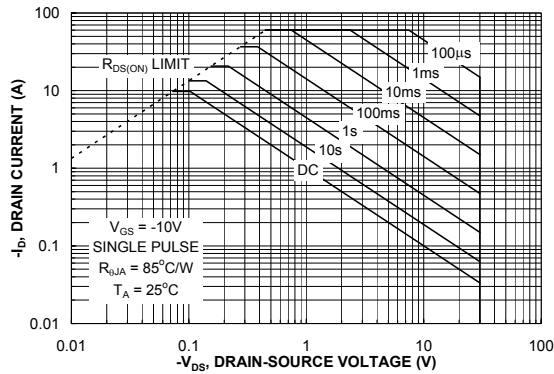


Figure 9. Maximum Safe Operating Area.

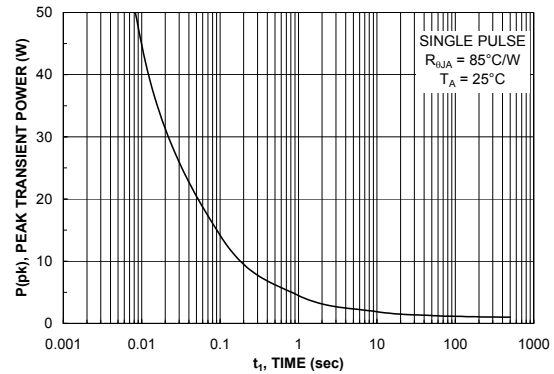


Figure 10. Single Pulse Maximum Power Dissipation.

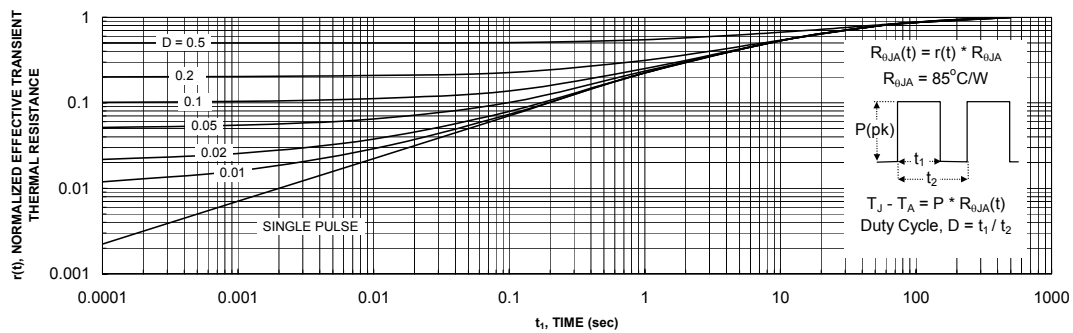
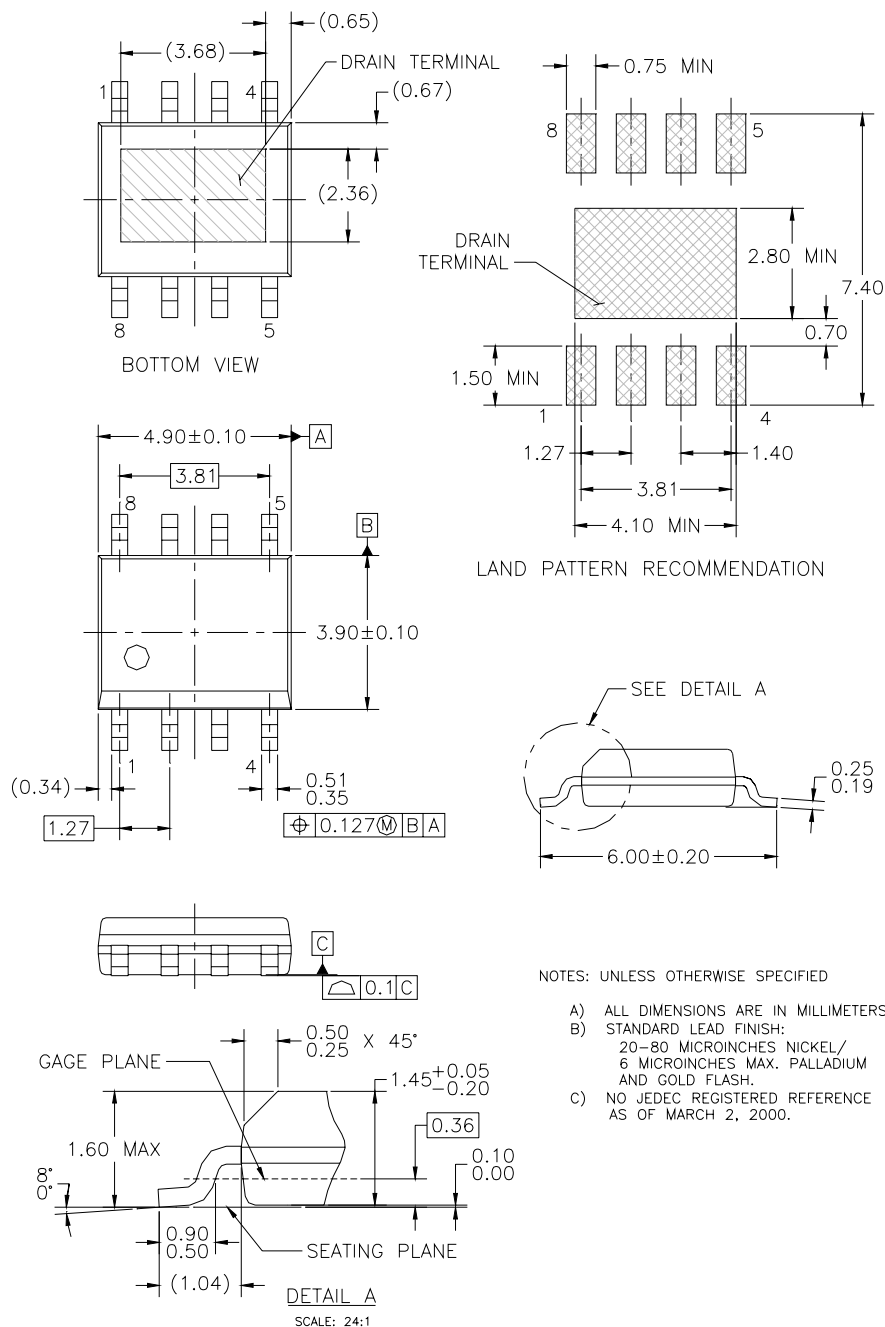


Figure 11. Transient Thermal Response Curve.

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



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