



November 1999
ADVANCE INFORMATION

FDZ2551N

Dual N-Channel 2.5V Specified PowerTrench™ BGA MOSFET

General Description

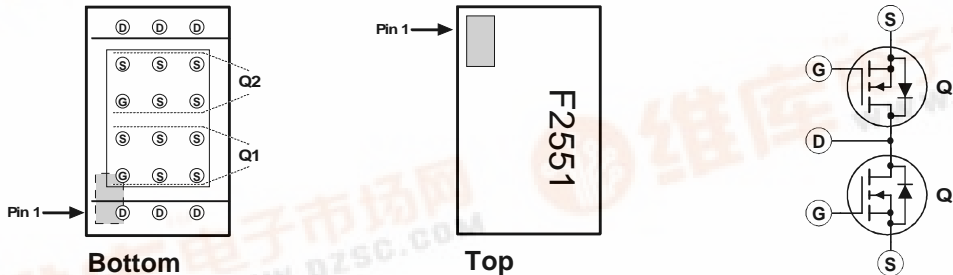
Combining Fairchild's advanced 2.5V specified PowerTrench process with state of the art BGA packaging, the FDZ2551N minimizes both PCB space and $R_{DS(ON)}$. This dual BGA MOSFET embodies a breakthrough in packaging technology which enables the device to combine excellent thermal transfer characteristics, high current handling capability, ultra-low profile packaging, low gate charge, and low $R_{DS(ON)}$.

Applications

- Battery management
- Load switch
- Battery protection

Features

- 9 A, 20 V. $R_{DS(ON)} = 0.018 \Omega @ V_{GS} = 4.5 V$
 $R_{DS(ON)} = 0.030 \Omega @ V_{GS} = 2.5 V.$
- Occupies only 0.10 cm² of PCB area. 1/3 the area of SO-8.
- Ultra-thin package: less than 0.70 mm height when mounted to PCB.
- Outstanding thermal transfer characteristics: significantly better than SO-8.
- Ultra-low $Q_g \times R_{DS(ON)}$ figure-of-merit.
- High power and current handling capability.



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V _{DSS}	Drain-Source Voltage	20	V
V _{GSS}	Gate-Source Voltage	±12	V
I _D	Drain Current – Continuous (Note 1a)	9	A
		20	
P _D	Power Dissipation (Steady State) (Note 1a)	3	W
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +175	°C

Thermal Characteristics

R _{θJA}	Thermal Resistance, Junction-to-Ambient (Note 1a)	50	°C/W
R _{θJC}	Thermal Resistance, Junction-to-Case (Note 1)	8	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
F2551	FDZ2551N	TBD	TBD	TBD



Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

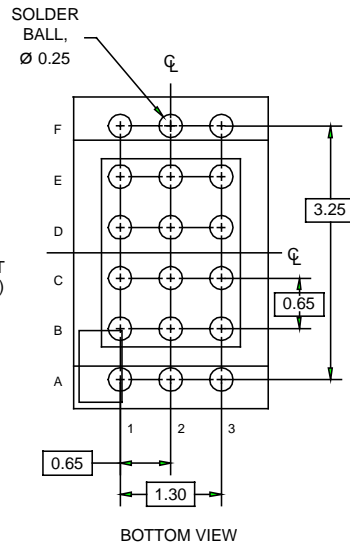
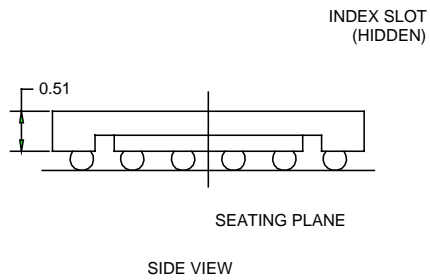
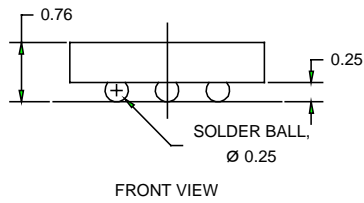
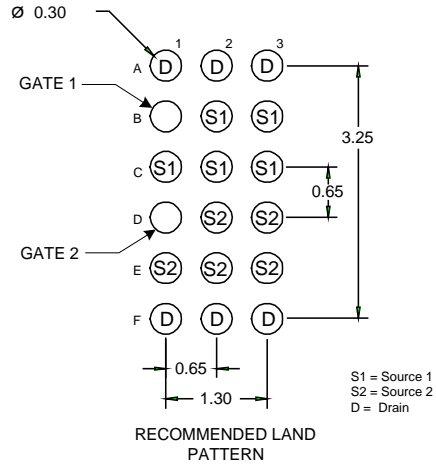
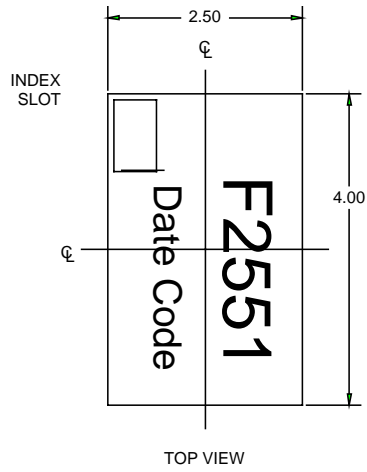
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		14		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	μA
I_{GSSF}	Gate–Body Leakage Current, Forward	$V_{GS} = 12\text{ V}, V_{DS} = 0\text{ V}$			100	nA
I_{GSSR}	Gate–Body Leakage Current, Reverse	$V_{GS} = -12\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.4	0.9	1.5	V
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 4.5\text{ V}, I_D = 9\text{ A}$ $V_{GS} = 2.5\text{ V}, I_D = 7\text{ A}$			0.018 0.030	Ω
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)		0.77	1.2	V

Notes:

- $R_{\theta JA}$ is a function of the junction-to-case ($R_{\theta JC}$), case-to-ambient ($R_{\theta CA}$) and the PC Board ($R_{\theta BA}$) thermal resistance. For the purpose of determining $R_{\theta JC}$ the case thermal reference is defined as the top surface of the package. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ and $R_{\theta BA}$ are determined by the user's design. Maximum current ratings assume single device operation.
 - $R_{\theta JA} = 50^\circ\text{C/W}$ (steady-state) when mounted on 1 in^2 of 2 oz. copper.

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

Dimensional Outline and Pad Layout



NOTES: UNLESS OTHERWISE SPECIFIED
A) ALL DIMENSIONS ARE IN MILLIMETERS.



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE ^x ™	ISOPLANAR™	TinyLogic™
CoolFET™	MICROWIRE™	UHC™
CROSSVOLT™	POP™	VCX™
E ² CMOS™	PowerTrench®	
FACT™	QFET™	
FACT Quiet Series™	QS™	
FAST®	Quiet Series™	
FAST _r ™	SuperSOT™-3	
GTO™	SuperSOT™-6	
HiSeC™	SuperSOT™-8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

- | | |
|---|---|
| <p>1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.</p> | <p>2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.</p> |
|---|---|

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.