FAIRCHILD SEMICONDUCTOR TM

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ADVANCE INFORMATION

FDZ5047N

30V N-Channel Logic Level PowerTrench® BGA MOSFET

General Description

Combining Fairchild's 30V PowerTrench process with state of the art BGA packaging, the FDZ5047N minimizes both PCB space and $R_{DS(ON)}$. This 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 $R_{DS(ON)}$.

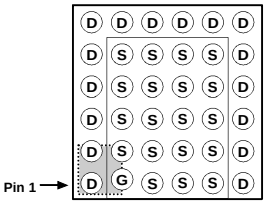
These MOSFETs feature faster switching and lower gate charge than other MOSFETs with comparable $R_{DS(ON)}$ specifications resulting in DC/DC power supply designs with higher overall efficiency.

Applications

- DC/DC Converters
- Solenoid drive

Features

- 22 A, 30 V. $R_{DS(ON)}$ = 0.0035 Ω @ V_{GS} = 10 V
  $R_{DS(ON)}$ = 0.0050 Ω @ V_{GS} = 4.5 V.
- Occupies only 27.5 mm^2 of PCB area.
  1/5 of the area of a TO-220 package.
- Ultra-thin package: less than 0.80 mm height when mounted to PCB.
- Outstanding thermal transfer characteristics.
- Ultra-low gate charge x $R_{DS(ON)}$ product.
- 175°C maximum junction temperature rating.



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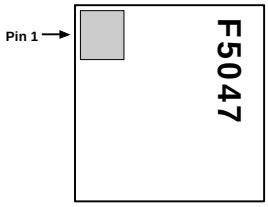

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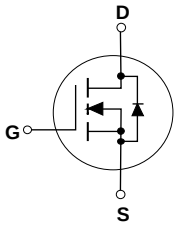

Absolute Maximum Ratings T_A=25°C unless otherwise noted

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)	22	A
	– Pulsed	75	
P_D	Total Power Dissipation @ T_A = 25°C	3.3	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-65 to +175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	45	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
F5047	FDZ5047N	TBD	TBD	TBD

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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		22		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V			1	µA
I_{GSSF}	Gate–Body Forward Leakage	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate–Body Reverse 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	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		–5		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	V_{GS} = 10 V, I_D = 22 A V_{GS} = 4.5 V, I_D = 18 A		3.0 4.2	3.5 5.0	mΩ
$I_{D(on)}$	On–State Drain Current	V_{GS} = 10 V, V_{DS} = 10V	50			A
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0 MHz		5400		pF
C_{oss}	Output Capacitance			1170		pF
C_{rss}	Reverse Transfer Capacitance			530		pF
Switching Characteristics (Note 2)						
Q_g	Total Gate Charge	V_{DS} = 15 V, I_D = 1 A, V_{GS} = 5 V		50	70	nC
Q_{gs}	Gate–Source Charge			16		nC
Q_{gd}	Gate–Drain Charge			16		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current (Note 1a)				3	A
V_{SD}	Drain–Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 22 A (Note 2)		0.95	1.2	V

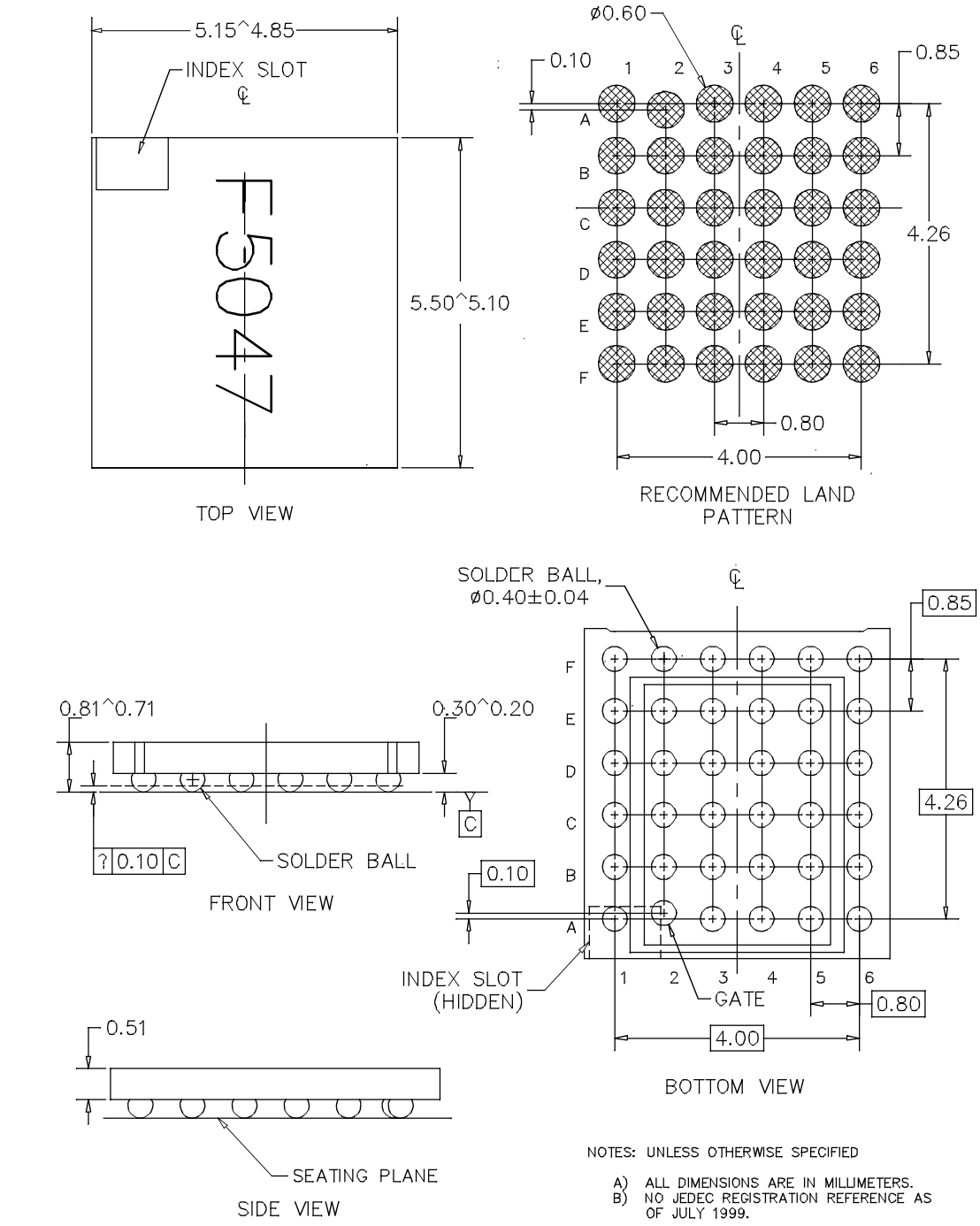
Notes:

1. $R_{\theta JA}$ 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.

(a). $R_{\theta JA}$ = 45°C/W (steady-state) when mounted on 1 in^2 of 2 oz. copper.

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

Dimensional Outline and Pad Layout



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