

The background is a collage of three images: on the left, a group of men in business suits sitting together; in the center, a white wind turbine against a blue sky; on the right, the front end of a silver car with its headlights on.

EXTENDED TEMPERATURE MOSFETS
APEC 2015

Press Presentation
March 15-19, 2015
Charlotte, NC, Booth 905



Fairchild Update



Making the world a smarter, cleaner place

Revenue – \$1.43B in FY 2014, up 2%

Aggressively driving operational efficiency and maximizing margins

- Significant reduction in customer returns

Delivering best-in-class solutions

- Increasing reliability, reducing standby power, reducing device power losses, and reducing EMI



Demonstrating Energy Efficiency at Booth #905

“Power Driven” at APEC2015

Extended Temperature

- **Higher Power Density** - Thermal comparison between legacy and new smaller/thinner packaging

Industrial Motion Control

- **Compact, High Performance Power Inversion** - Discrete and integrated (**Motion SPM®**) solutions for motor control

Power Supplies

- **World’s First 1000V Integrated Power Switch** - Energy-efficiency that meets or exceeds regulations and standards

LED Lighting

- **Single-Stage Primary-Side Regulated LED Drivers** with PFC for flyback or buck-boost

Renewable Energy

- **Smart Protection and Isolation for Inverter Designs** - High-voltage insulation solutions

Automotive

- **Vehicle Electrification and Traction Inverters** - High-efficiency building blocks

Packaging Portfolio

- **The Latest Module and Discrete Packages**



“Power Driven”

Delivering More & Delighting Customers

New Products

[Fairchild’s New Extended Temperature MOSFETs Rated at 175° C for Industry’s Highest Power Density and Reliability](#) – Mar. 17, 2015

[Fairchild’s 800V SuperFET® II MOSFET Family Delivers Lowest On-Resistance and Broad Package Range](#) – Mar. 10, 2015

[Fairchild’s High-Current, High Efficiency MOSFETs Now Available in TO-Leadless Packaging for Automotive](#) – Mar. 2, 2015

[Fairchild Simplifies Dimmable LED Lighting Design Across Wide Range of Dimmers](#) – Feb. 4, 2015

[Fairchild Launches World’s First 1000-Volt Integrated Power Switch](#) – Nov. 11, 2014

[Fairchild’s New 1200V Smart Power Modules Deliver Amazing Thermal Performance for Industrial Motor Control](#) – Nov. 12, 2014

[Fairchild’s New LED Driver Delivers Best-in-Class Solid State Lighting Performance](#) – Nov. 13, 2014

Customer Recognition

[Fairchild Receives Yulong’s 2014 Best Supplier Award](#)
– Feb. 2, 2015

[Fairchild Recognized with Outstanding Partner Award from OPPO](#) –
Feb. 11, 2015

[Fairchild Receives Huawei 2014 Core Partner Award](#)
– Dec. 10, 2014





Providing More Efficiency & Reliability

Product Family	Fairchild Advantage	Benefit
Extended Temperature MOSFETs	175°C Rating	Enabling up to 85% higher power density than MOSFETs rated to only 150° C.
FSL4110LR Integrated Power Switch	1000 V Breakdown Voltage	Highest breakdown voltage in a single package
1200V Motion SPM® 2	1.33°C/W Thermal Resistance	15% lower than competing solutions
FL7733A PSR Flyback LED Driver	Up to 60W Output Power & < 10% THD	Simplifies supply chain, maximizes reliability with a single solution
FL7734 Phase-Cut Dimmable Single-Stage LED Drive	5W to 30W Operating Range	Widest range of its class in a single device
800V SuperFET® II MOSFET	0.60 mΩ R _{dson} in TO-247	29% lower than competing device
TO – Leadless for Automotive	0.65 mΩ - 6.3 mΩ R _{dson}	Excellent, best in class



Today's News

Fairchild's New Extended Temperature
Mid-voltage MOSFETs Rated At 175° C
For *Exceptional* Power Density



Enabling Higher Power Density
For High-Temperature Designs



Up to 3X The Reliability



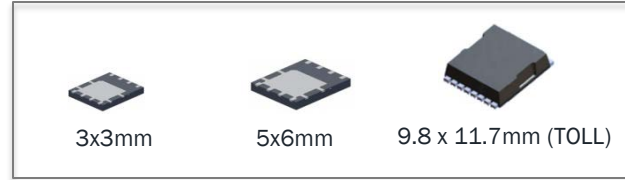
- 175° C rating enables up to 85% power density improvement & up to 3x enhanced reliability (vs. standard 150° C)
- Industry-leading RDS-on & switching figure of merit
- Power56 (5x6mm), Power33 (3x3mm) and TO-LL (9.8x11.7mm) packages
- Broad, 30V to 150V, mid-voltage family



Giving Designers Higher Power Density

Applications

- High Density DC-DC converters
- High Density AC-DC converters
- High Density Motor Drive Circuits



End Systems

- Multi-kW Power Supplies
- Solar Micro Inverters
- Power Tools
- Avionics
- Forklifts, Trains & Agricultural Equipment
- Small Form Factor AC-DC Adaptors





Enabling Smaller, More Reliable, High Speed Switching Solutions

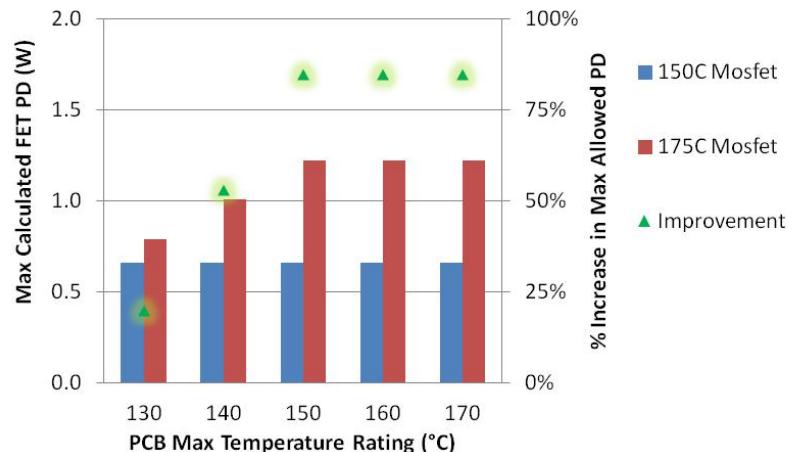
Higher Power Density Enables

- Smaller form factor with same power output
- Same board design with more power output

Fairchild Extended Temperature Advantage

- Traditional 150°C rated FET's, limited to 125°C max junction temp per IPC-9592
- New 175°C junction rating, raises limit to 150°C
 - Example: FDMS86150ET100 can dissipate ~.5W more power on the same board design vs 150C rated FDMS86150 at a 150C allowed PCB Temperature

Max FET PD vs Max TJ and Max PCB Rating Using IPC9592 Junction Derating Rules



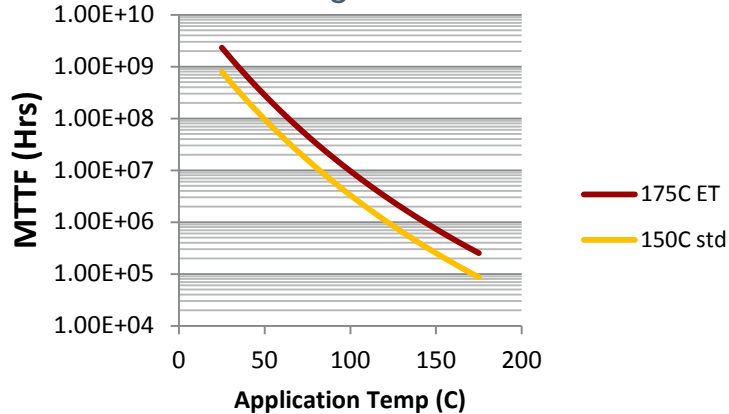
Max TJ Rating		PCB Max Temp					Units
		130	140	150	160	170	C
Mosfet	IPC9592	Max Power Disipation in MosFET (W)					-
150	125	0.7	0.7	0.7	0.7	0.7	W
175	150	0.8	1.0	1.2	1.2	1.2	W
Improvement		20%	53%	85%	85%	85%	%

Assumes TA = 95C, Theta JA = 45C/W, Theta JC = 0.8C/W

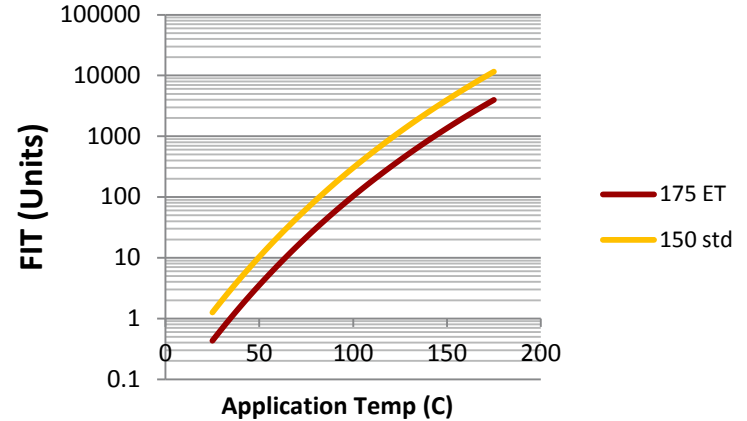


Up to 3X Reliability Improvement

Up to 3x Improvement in MTTF (Mean Time to Failure) rating



Up to 3x Improvement in FIT (Failure in Time) rating



- MTTF & FIT analysis both have a temperature component.
- Designing a part for sustained higher operating temperatures enhances MTTF & FIT results



Leading High Performance ET Portfolio

Fairchild Offers

- Better RDS-on performance
- Higher voltage nodes

Designers Achieve

- Higher efficiency & power density
- More flexibility on MOSFET voltage ratings

Bvdss	RDS-on max (mOhm)		Fairchild
	Fairchild	Competitor	% better
30V	0.65	1.02	36%
40V	0.85	1.4	39%
60V	1.65	5.2	68%
80V	2.4	8.5	70%
100V	4.85	12	59%
120V	7.2	no offering	N/A
150V	12.4	no offering	N/A

(5x6 example, same advantage with 3x3)



Expanding Leadership in Extended Temperature FETs

- Over 350 ET FETs today
- Adding 19 of our most advanced switching devices to our ET portfolio

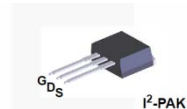
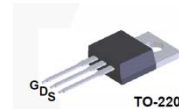
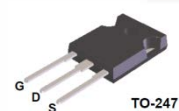
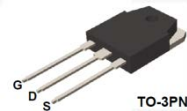
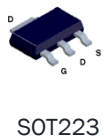
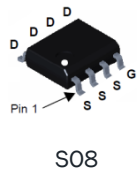
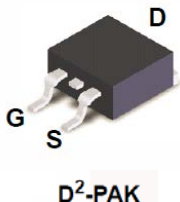
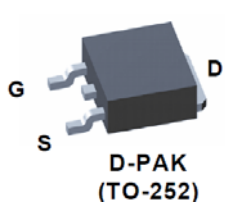
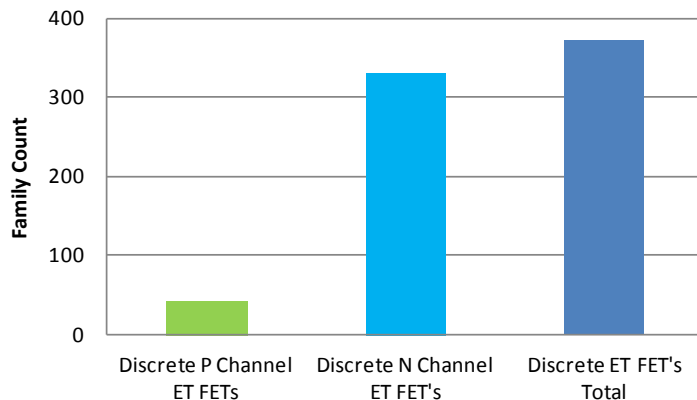
19 NEW Devices!

H-PSOF (TOLL)
9.8 x 11.7mm

Power56
5x6mm

Power33
3x3mm

Fairchild's ET Family of FET's





Complete N-Channel Portfolio

With Tj Rating of 175° C vs. 150° C

What / Why	Series	Package	Application	175C Rated	Voltage						
					30	40	60	80	100	120	150
Small Form Factor Replacement	FDMSxxxxET	Powerclip56	AC-DC,	YES	√	√	√	√	√	√	√
	FDMCxxxxET	Powerclip33	DC-DC, Solar		√	√	√	√	√		√
D2PAK replacement	FDBL Series	H-PSOF TOLL	Hot Swap, Motor Drive	YES	√	√	√	√			√



Summary

Enabling Higher Power Density For High Temperature Designs

- 175° C Junction Temperature Rating Series for:
 - Improved FIT and MTTF rating by 3x
 - Lowest RDS-on & FOM for enhanced efficiency
- Covers voltage range from 30V to 150V
- 3x3, 5x6 & NEW TOLL Packaging



Thank You!