



# High Performance Axial Leaded NUR460

Product Line Bipolar Power  
May, 2011

# Bipolar Power Roadmap for Power Diodes

- Production
- Development
- Plan

	Exist	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	2012	2013	
CCM PFC	BYC5, BYC8, BYC10 series 5A, 8A, 10A/ 600V SOD59/ SOD113/ SOT404	BYC8D series 8A/600V SOD59/SOD113	BYC10D series 10A/ 600V, Optimization SOD59/ SOD113	Next Generation Power Diode: GaN (Gallium Nitride) Schottky Diode					
	BYC15, BYC20 series 15A, 20A/ 600V SOD59/ SOD113	BYC30 series 3A/ 600V SOD59/ SOD113			TO247 Packages				
	BYC10-600CT 2x 5A/ 600V, Dual Diode SOT78	BYCBF series 8A / 600V, Pt Killing Technology SOD59 / SOD113							
	BYC58X-600 8A/600V, Casco Diode SOD113			BYC58A-600 & BYC515X-600 5A, 15A / 600V, Casco Diode SOD113					
DCM PFC	BYV25, BYV29 series 5A, 9A/ 600V SOD59/ SOD113/ SOT226/ SOT404/ SOT428	NUR460 4A/ 600V, Axial Lead Package SOD141 (DO-201AD)		RUR350 3A/ 600V SMC Package					
	BYV34 series 2x 10A/ 500V, 600V SOT78/ SOT186A/ SOT226	BYT79 series 15A/ 500V, 600V SOD59/ SOD113			Integrated Package (Power Diode + MOSFET)				
	BYV25F, BYV29F series 5A, 9A/ 600V SOD59/ SOD113/ SOT404/ SOT428	BYV29FD-600 9A / 600V SOT428			TO247 Packages				
	BYV410 series 2x 10A/ 600V, Interleave Diode SOT78/ SOT186A			BYV45, BYV415 series 2x 5A, 2x 15A/ 600V, interleave Diode SOT78 / SOT186A					
Ultrafast	BYW29 series 8A/ 100V, 150V, 200V SOD59/ SOD113	BYW29FD00K & BYW29FD100C 2x 10A / 100V, PVM (Platinum Nickel) Schottky Diode SOT78 / SOT186A					Trench Schottky		
	BYV32, BYV42 series 2x 10A, 2x 15A/ 100V, 150V, 200V SOT78/ SOT404/ SOT226			2x10A, 2x15A/ 1000V~1200V SOT78 / SOT104					
	BYT28-300 2x 5A/ 300V SOT78	BYV79E-200 14A/ 200V SOD59		TO247 Packages					
	BYQ28, BYQ30 2x 5A, 2x 8A/ 200V SOT78/ SOT186A/ SOT428	BYQ28E-300E & BYQ28E-300E 18A/ 200V, Optimization SOT78/ SOT186A		BYQ30E-300E, BYV12E-200E, BYV127E-200E 2x 8A, 2x 10A/ 200V, Optimization SOT78					

- ◆ Samples
- ◇ Production Release



# Product Profile – NUR460



## General Description :

- Ultra fast epitaxial diode in a SOD141(DO201-AD) axial lead plastic package.

## Features and Benefits:

- Fast switching,
- low thermal resistance
- Low forward voltage drop
- Soft recovery characteristics

## Applications:

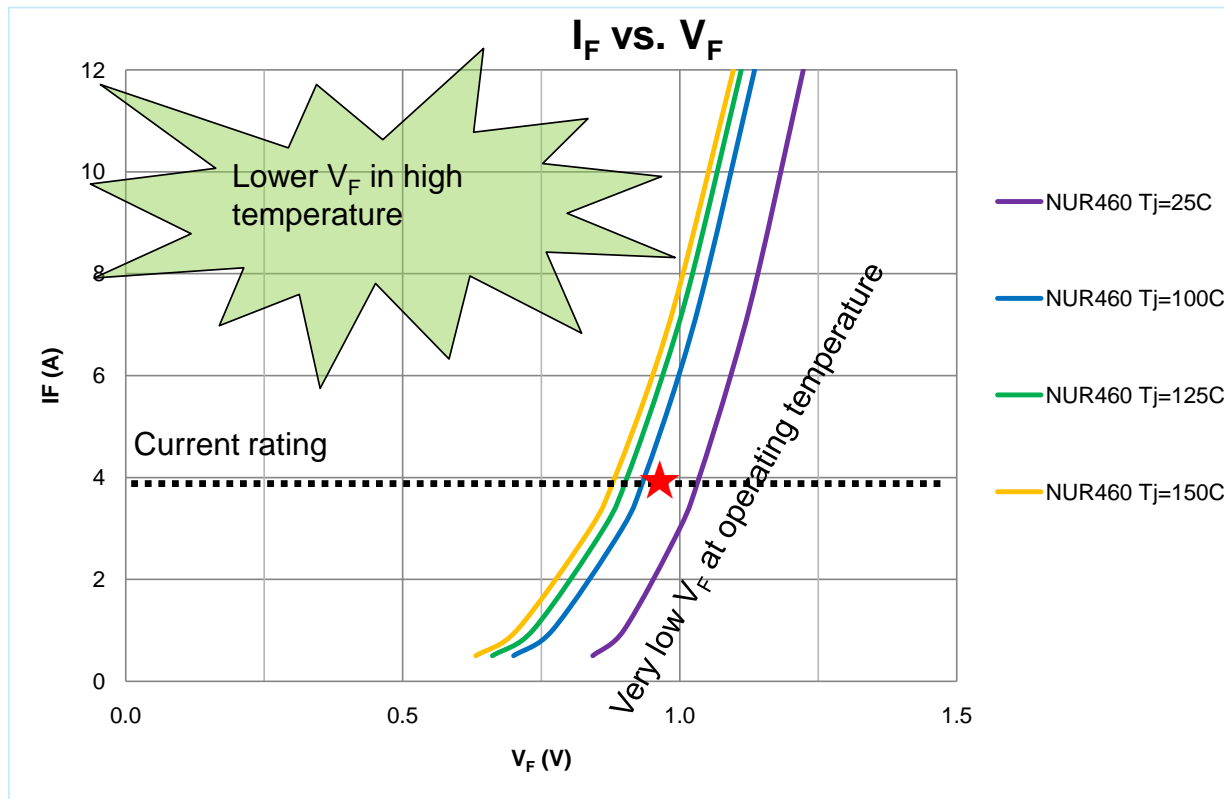
- High frequency switched-mode power supplies,
- Discontinuous mode, power factor correction



# Improved Electrical Characteristics

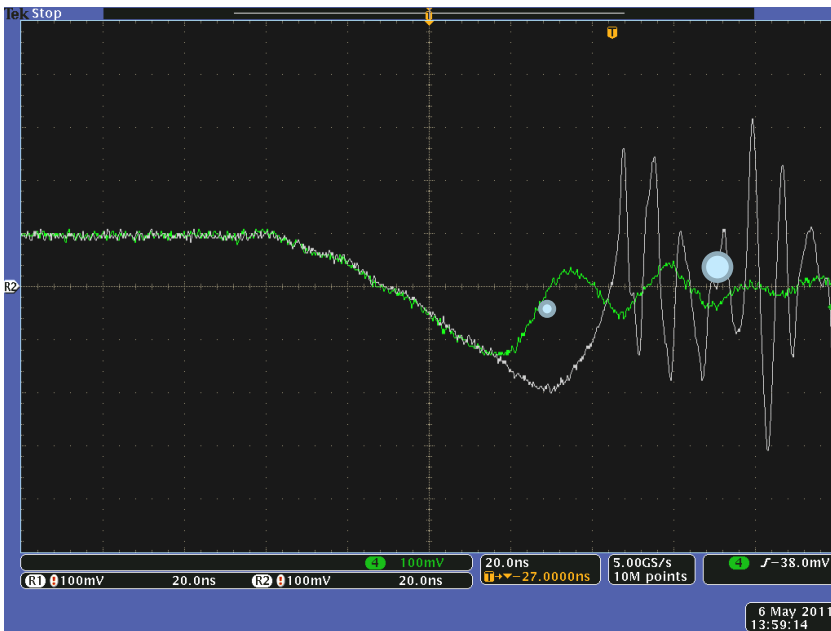


# Low $V_F$ leads to low on-state losses



# NUR460 - Soft reverse recovery and fast $t_{rr}$

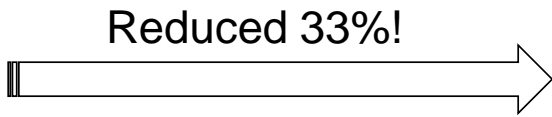
Reverse recovery characteristic @  $I_F=1A$ ,  $di_F/dt=50A/us$



Guess which is NUR460?

- ✓ lower switching losses
- ✓ Better EMI performance

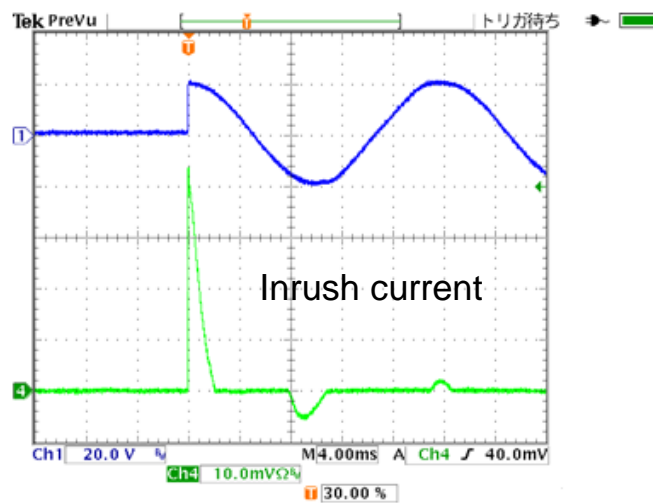
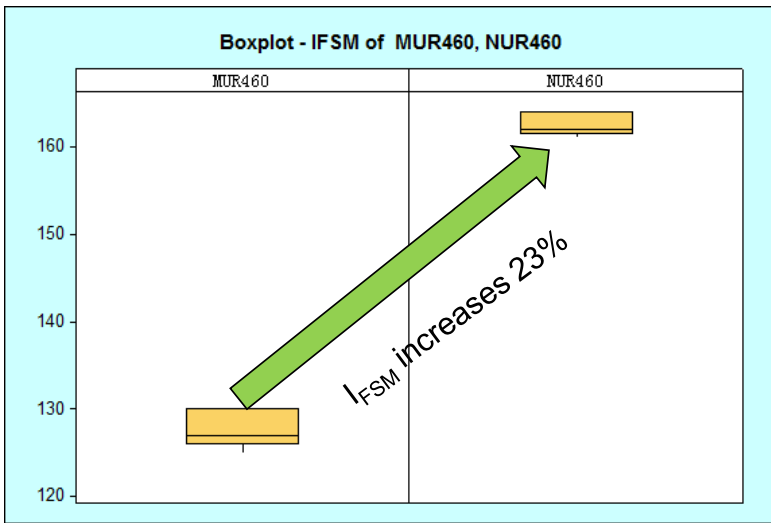
MUR460  
 $t_{rr} = 48ns$



NUR460  
 $t_{rr} = 36ns$



# $I_{FSM}$ comparison



The higher  $I_{FSM}$ , the more reliability!

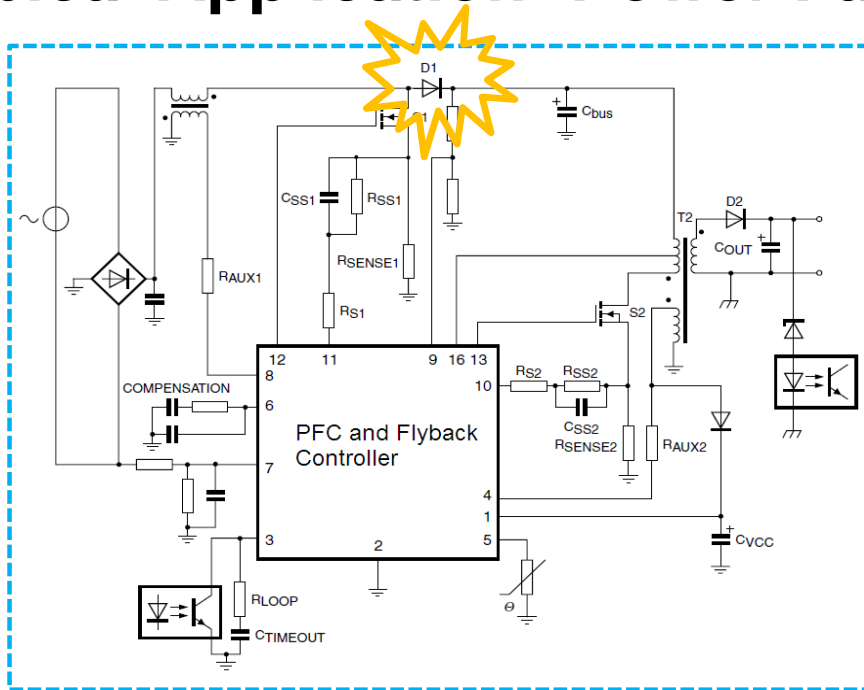


# Outstanding Performance In Application





# Typical Application- Power Factor Correction



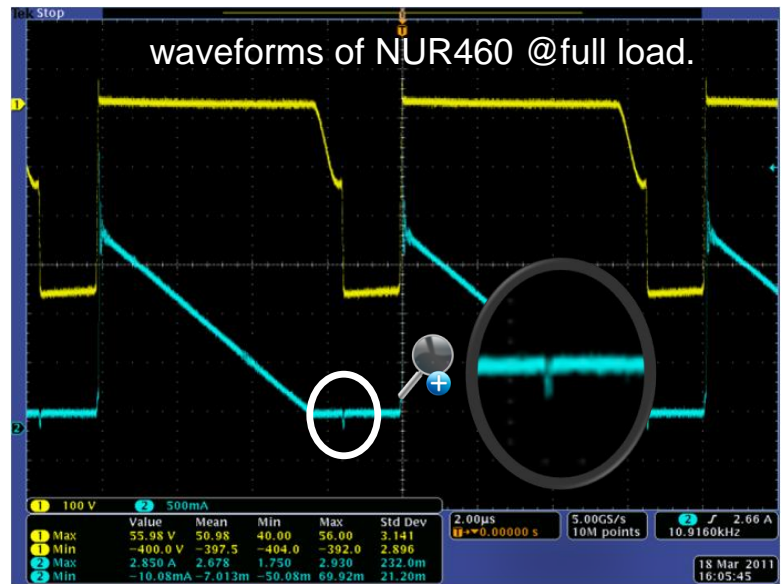
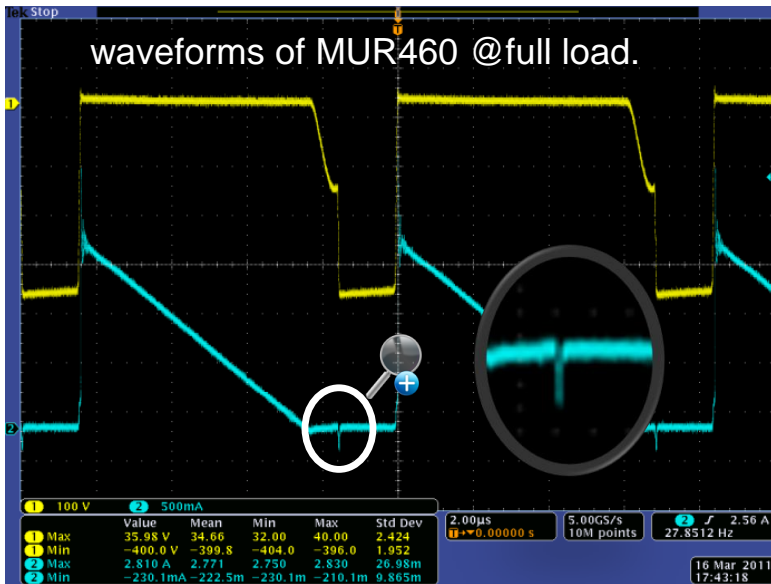
The PFC block create a 380V ~ 400V (DC) supply voltage using a high performance axial leaded NUR460 designated D1 in the circuit diagram.



# Cleaner and Greener (1/2)

CH1 (Yellow)  
CH2 (Blue)

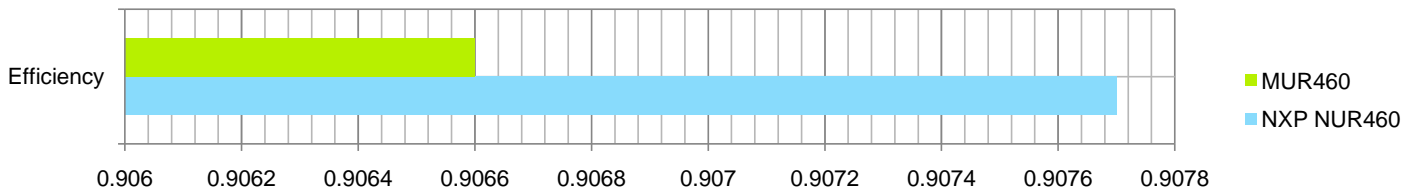
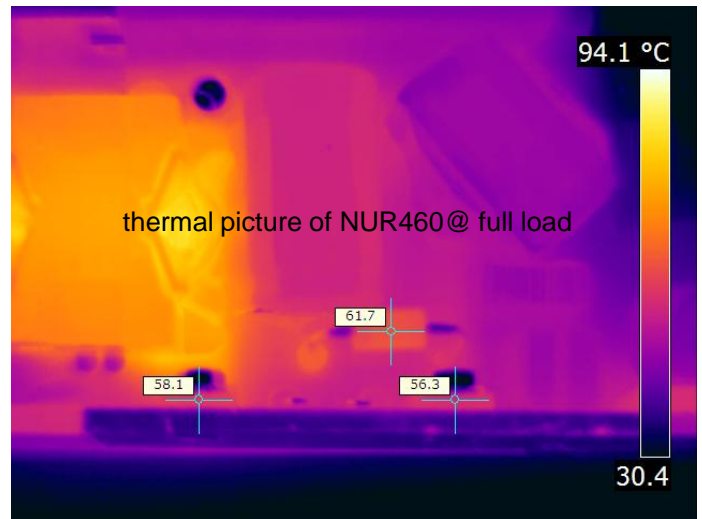
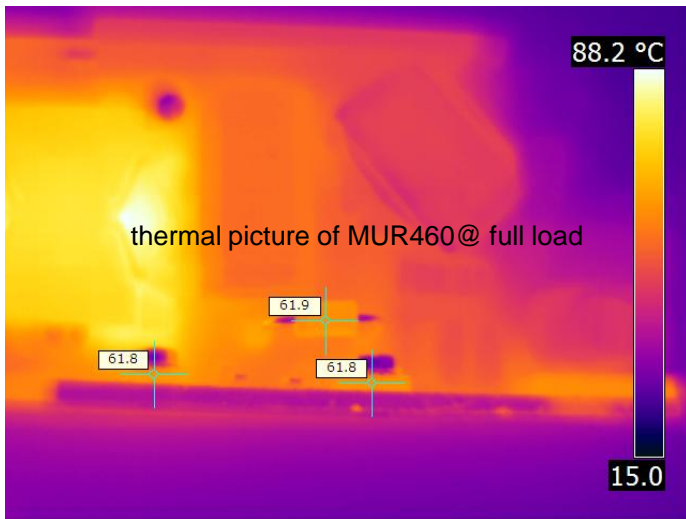
voltage across D1;  
current across D1;



The blip in the highlighted area shows the reverse recovery current of D1 at the moment when the voltage on it rises rapidly. At this point the MOSFET voltage is still significant, and the blip in the diode current appears as an additional turn-transient in the MOSFET. Needless to say, the smaller blip of NUR460 leads to less heat dissipated into MOSFET.



## Cleaner and Greener (2/2)



The thermal pictures indicate that temperature rises of D1 and MOSFETs S1/S2 are lower when using the NUR460 than using the MUR460. This is in accordance with the efficiency results. NUR460 is well suited for 90W active boost PFC circuit and gives better performance than that of MUR460 in terms of efficiency and temperature rise. The faster  $t_{rr}$  accounts for its better performance.



# Web links

## Datasheets

- [http://www.nxp.com/products/diodes/power\\_diodes\\_ultrafast\\_recovery/index.html#ps](http://www.nxp.com/products/diodes/power_diodes_ultrafast_recovery/index.html#ps)

## Selection Guide

- [http://www.nxp.com/acrobat\\_download/literature/9397/75016163.pdf](http://www.nxp.com/acrobat_download/literature/9397/75016163.pdf)

## Power bipolar / Thyristors / Power Diodes

- <http://www.nxp.com>

## Cross reference tool

- <http://www.nxp.com/search/advanced/>



## References materials (Power Diodes):

**Leaflets** - [http://www.nxp.com/all\\_literature/index.html#dio](http://www.nxp.com/all_literature/index.html#dio)

**App notes** - [http://www.nxp.com/all\\_appnotes/71100.html](http://www.nxp.com/all_appnotes/71100.html)

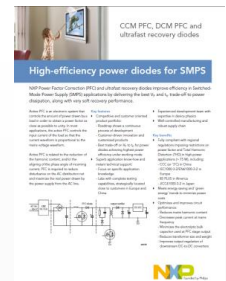
## Technical support

**General questions** - <http://www.nxp.com/techsupport/index.php>

**Specific questions** - [bipolar.power@nxp.com](mailto:bipolar.power@nxp.com)



**NXP**



**WHERE** to find the information to get kick-started