



PFC Device Corporate
節能元件股份有限公司

Company Profile



About PFC Device Co..

Established : 2005, April 12th (HQ located in Santa Clara, CA., US)

Capital : US\$: 5 M

Employee : 18 (4 R&D in US; 12 staffs in TW; 2 RSI in CN)

Main Technology: Mos process innovation

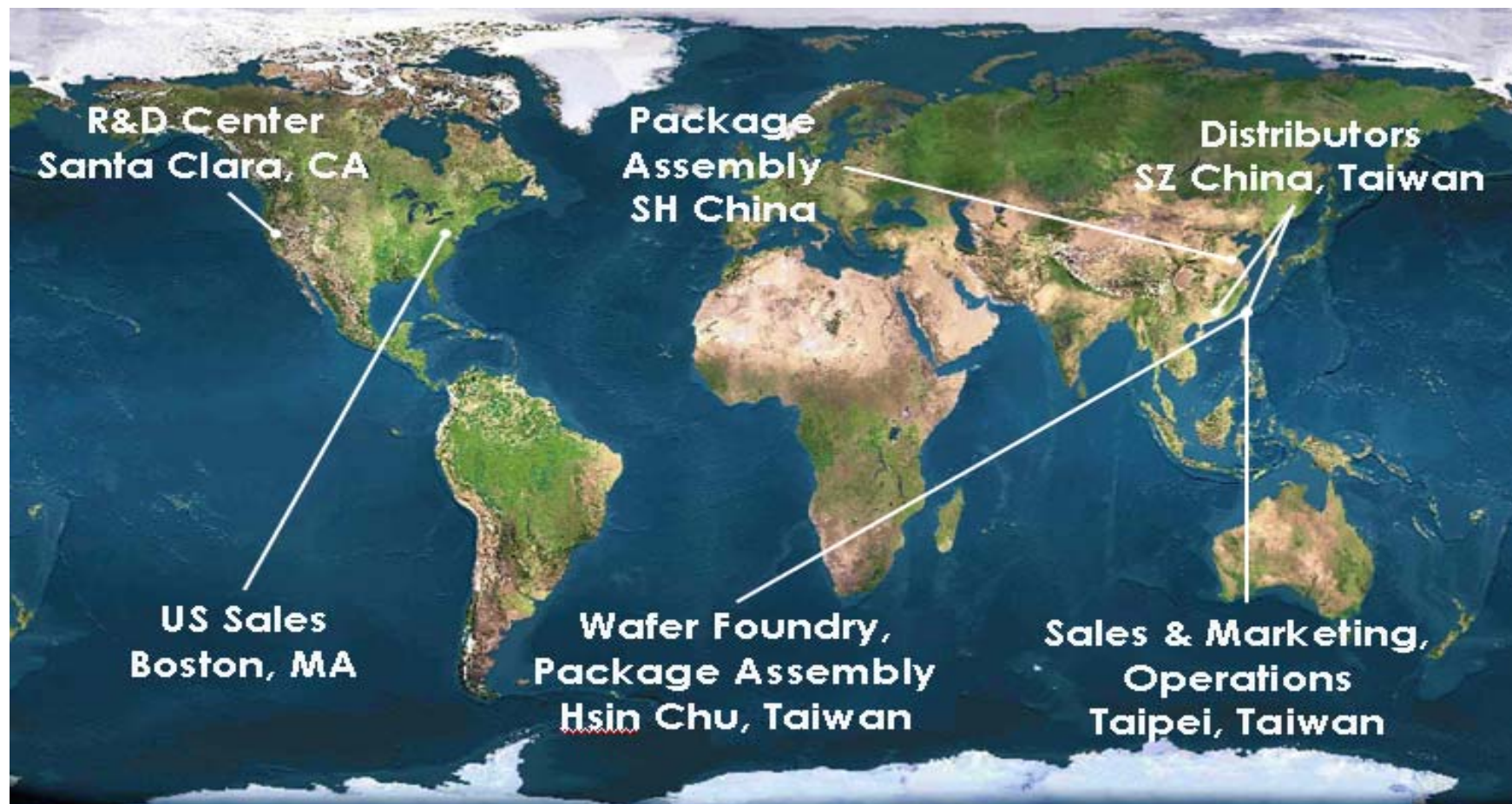
Main Products : Standard Vf Mos-Schottky, Low Vf Mos-Schottky,
Ultra Low Vf Mos-Schottky, Mos-Schottky Bridge

Business Partner: AMPI/ GTM/ CJ/ E-teck

Certification : ISO-9001, ISO-9002, ISO14001, TS16949, Sony GP



Global Locations





VISION

成為世界一流的高效能解決方案的元件供應商

-Become the first-tier solution provider of the hi-efficiency and energy saving components.-



MISSION

- 提供最佳品質的產品與服務, 以確保公司以及顧客的持續獲利與成長

Provide the best product quality and services to our customers to ensure Company and Customers continuous growth in revenue and profit.

- 贏得顧客, 員工與股東的信賴

Be the most reliable partner of Customers, Employee and Stockholders



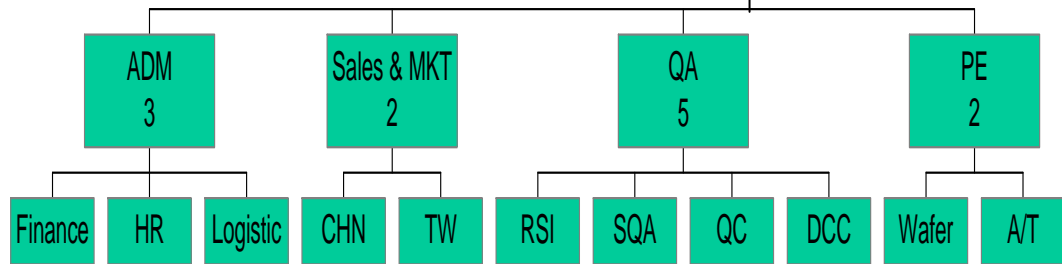
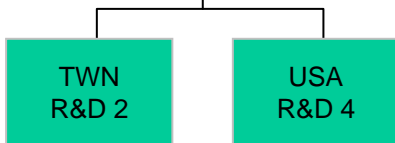
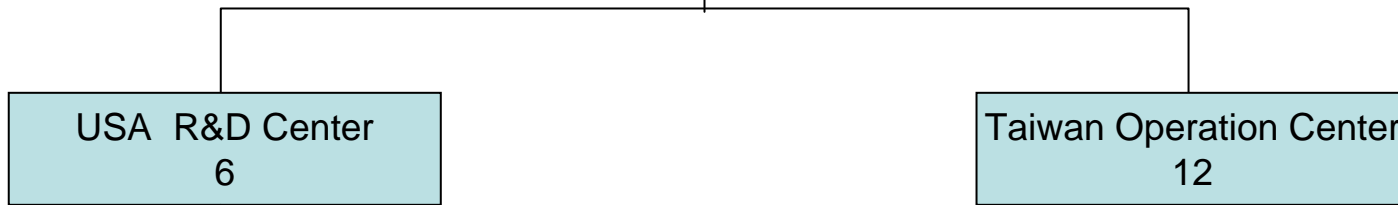
Core Competence

- **High performance Mos-Schottky with competitive cost**
 - Devices TJ @ 175C (Max. @ 200C)
 - “Low VF” & “Ultra Low VF” Mos-Schottky devices
 - Full products family of High Voltage (Vb@300V) and High Current (Io@60A) Mos-Schottky
- **Able to apply to broad range of products to improve users efficiency and design**
- **Advance development technology in MOS & Trench process applied in varies Discrete products**
- **Continuous process innovation to improve the component performance with varies package.**



Organization

PFC Device Corp..



Educational Background	
Dtoctor	6
Master	4
College	8

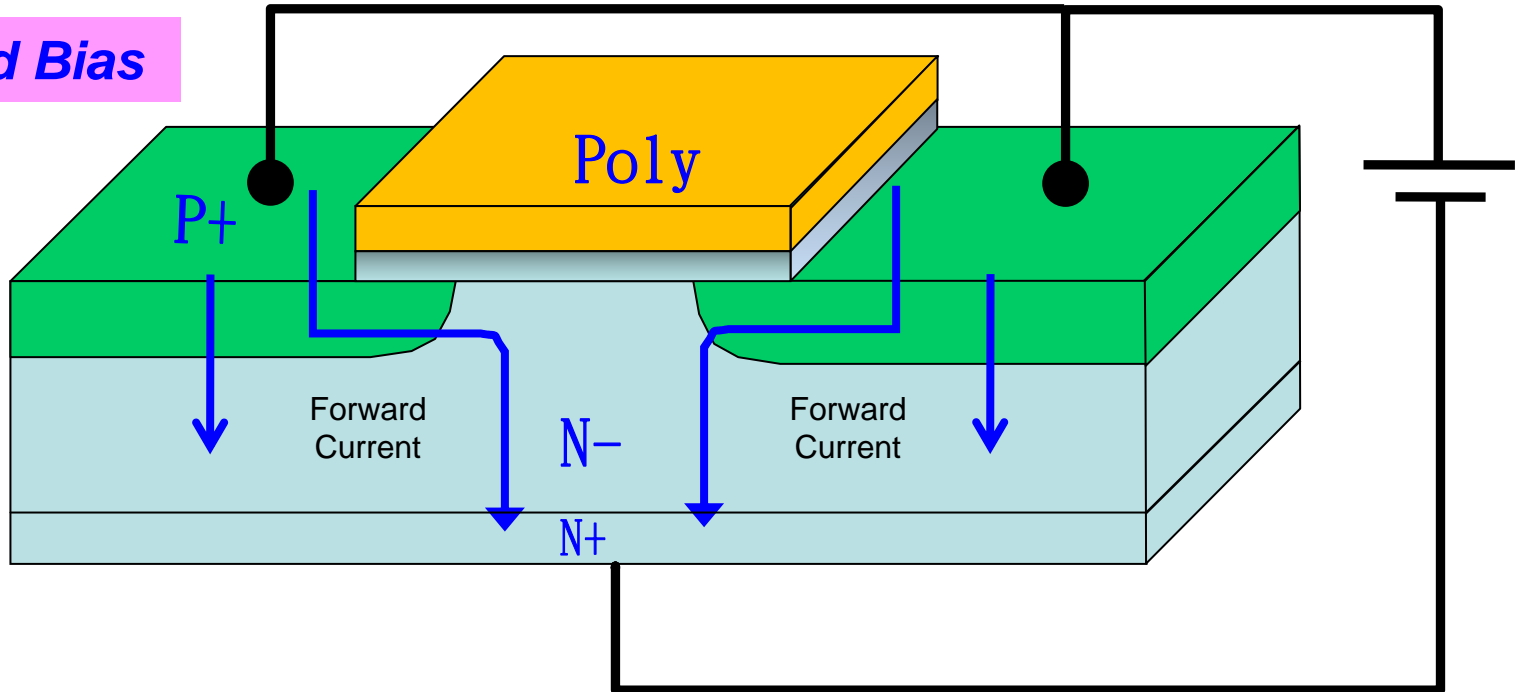


PFC Products Brief Information



PFR MOS-Schottky Device Structure

At Forward Bias



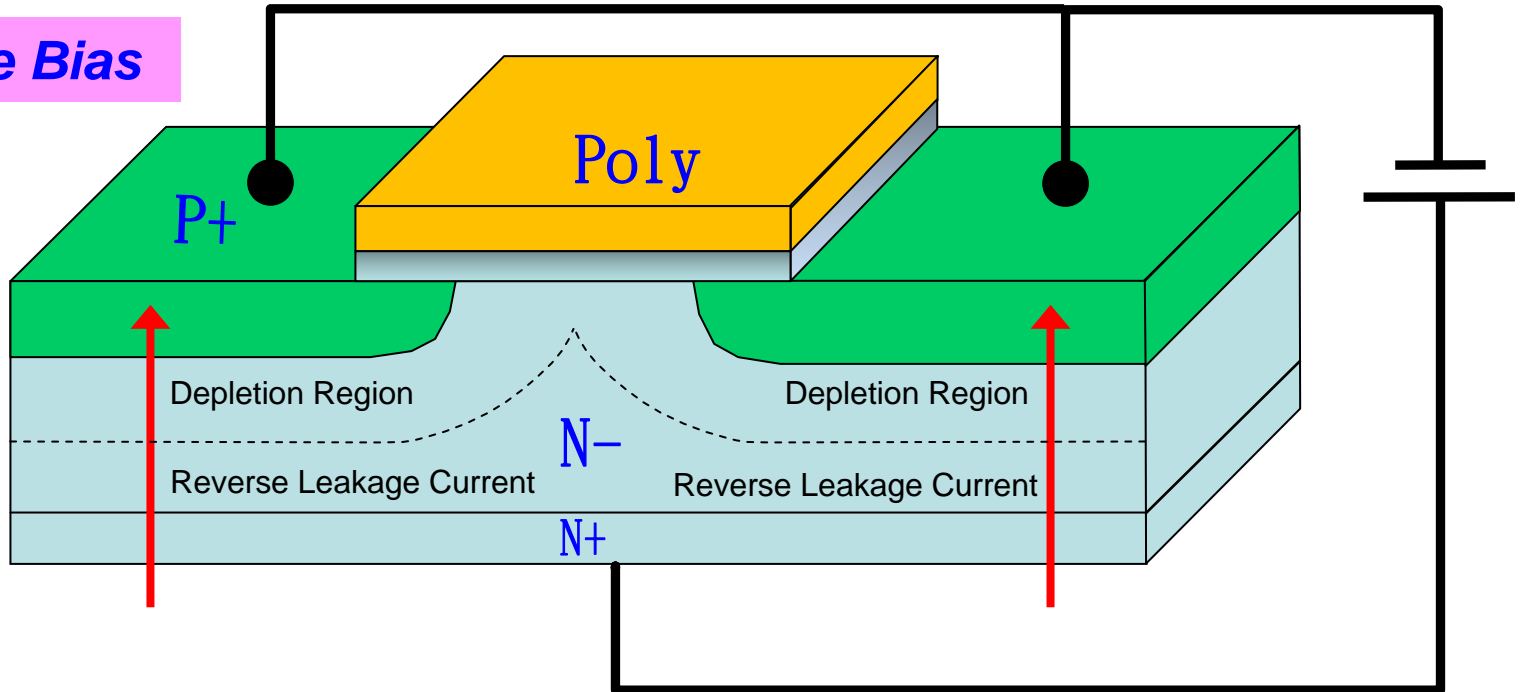
Advantage:

- (1). With both Lower V_f and Lower I_r
- (2). Lower V_f (by Low turn on voltage of MOS channel)
- (3). Lower I_r (by Low P-N junction leakage and well reverse pinch-off MOSchannel)



PFR MOS-Schottky Device Structure

At Reverse Bias



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Patenting Status

Item	Subject	Application No.		
		USA	Taiwan	China
01	Merging MOS and P-N junction diode device and method for manufacturing	12/427,223	097114725	PIN090590E
02	Merging MOS and schottky diode device and method for manufacturing	12/427,256	097114729	PIN090591E
03	High voltage trench schottky device and method for manufacturing	under application process		
04	Improve the switching performace in MMP device	under application process		
05	Trench termination device and method for manufacturing	uap	098121651	uap
06	Micro trench for merging MOS and PN junction diode device and method for manufacturing	under application process		



Rectifier Wafer Technology Comparison

Device	PN-Junction Diode	Fast Diode	Schottky Barrier Diode	PFC MOS-SKY
Forward Voltage, V_f	High	Very-High	Low	Ultra-Low
Reverse Leakage Current, I_r	Low	Low	High	Ultra-Low
Surge reliability	High	High	Low	High
Thermal immunity	High	High	Low	High
Switching Speed, (1/trr)	Low	High	High	High

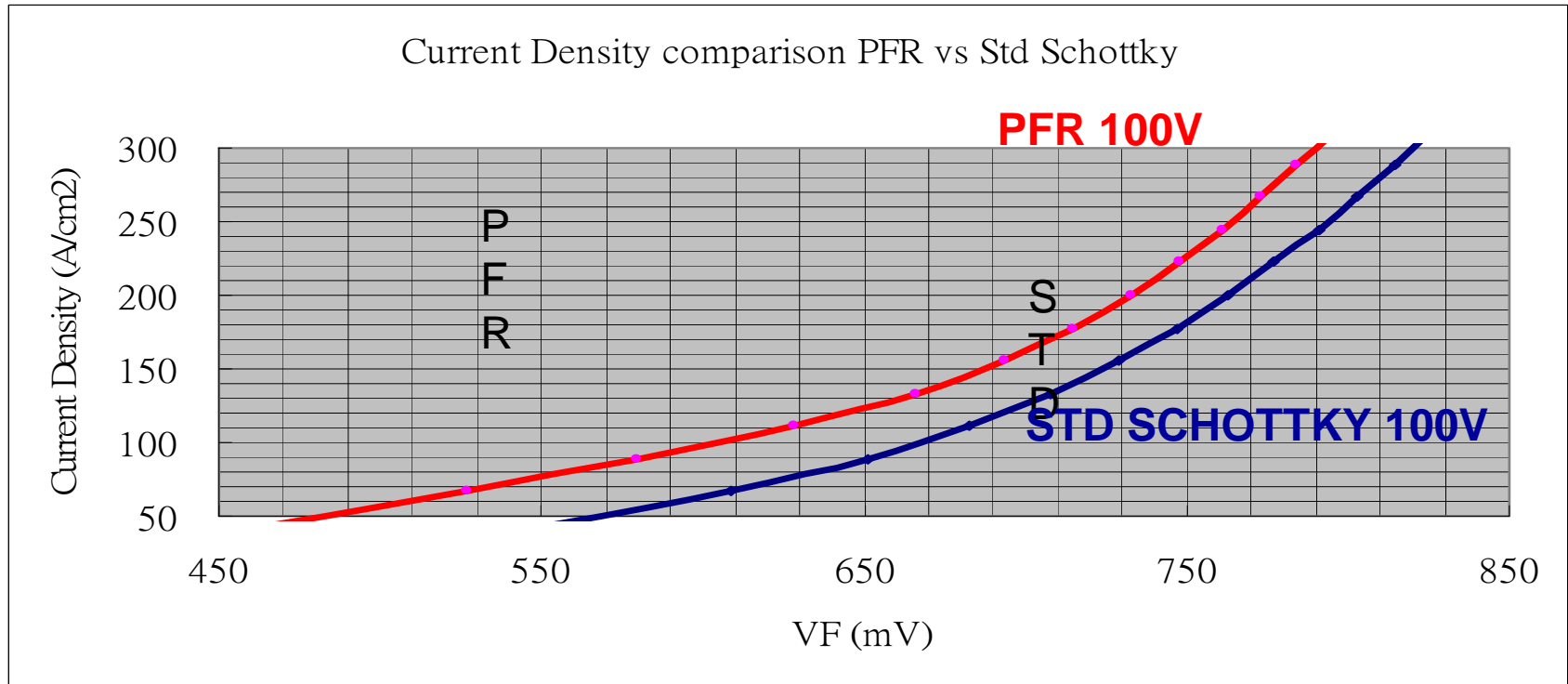


Comparison of MOS-Schottky and traditional Schottky

Device	MOS-Schottky	SBD
Structural	CMOS	Schottky barrier metal
Process	IC CMOS process	Diode Process
Capability	Excellent	Fair
Reliability	Excellent	Fair



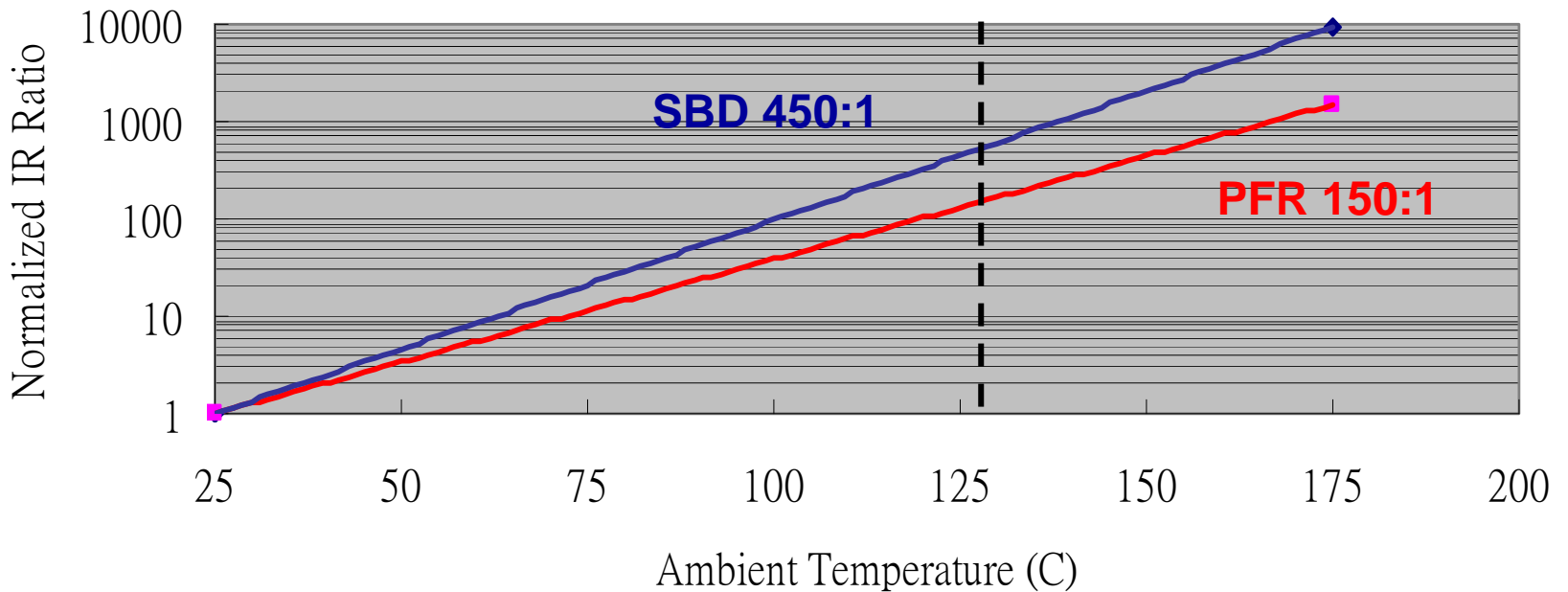
Forward voltage Comparison between PFR series and SBD





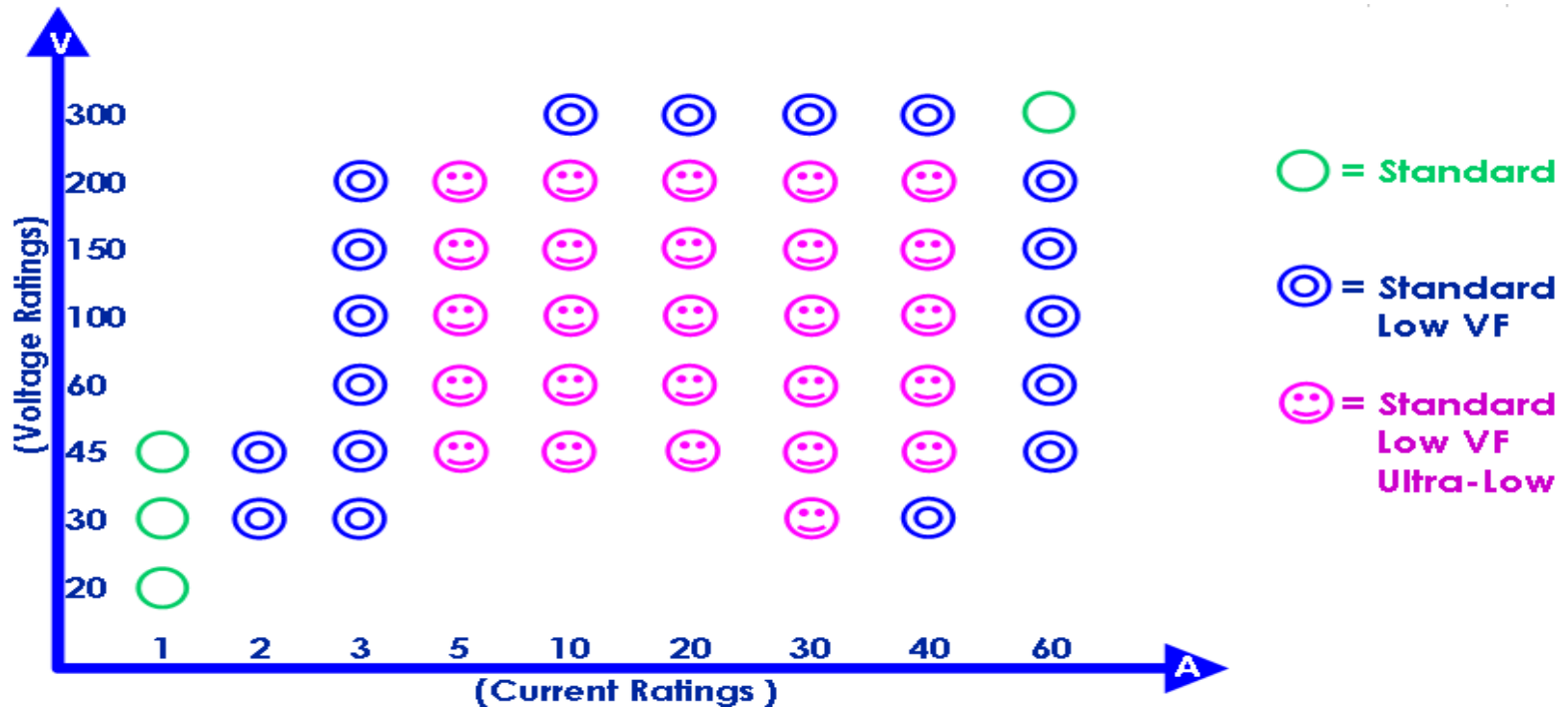
Reverse Leakage Current Comparison between PFC Mos-Schottky and SBD

Normalized IR Ratio





Current Product Portfolio





Current Product Portfolio

Product Offerings (Standard, Surface Mount Packages)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	SURFACE MOUNT PACKAGES				
		Mini SMA	SMA	SMB	SMC	TO-263
1	30	P130F	P130			
1	40	P140F	P140			
2	30	P230F	P230	P230B		
2	40	P240F	P240	P240B		
3	40		P340	P340B		
3	60		P360	P360B		
3	100		P3100	P3100B		
5	45			P540B	P545C	
5	60			P560B	P560C	
5	100			P5100B	P5100C	
10	45					PFR1045CTB
10	60					PFR1060CTB
10	100					PFR10100CTB
10	150					PFR10150CTB
10	200					PFR10200CTB
10	300					PFR10300CTB
20	45					PFR2045CTB
20	60					PFR2060CTB
20	100					PFR20100CTB
20	150					PFR20150CTB
20	200					PFR20200CTB
20	300					PFR20300CTB
30	30					PFR3030CTB
30	45					PFR3045CTB
30	60					PFR3060CTB
30	100					PFR30100CTB
30	150					PFR30150CTB
30	200					PFR30200CTB
30	300					PFR30300CTB



Current Product Portfolio

Product Offerings (Standard, Power Packages)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	POWER PACKAGES				
		TO-126	TO-262	TO-220AB	ITO-220AB	TO-247
5	45	PFR545				
5	60	PFR560				
5	100	PFR5100				
10	45		PFR1045CTI	PFR1045CT	PFR1045CTF	
10	60		PFR1060CTI	PFR1060CT	PFR1060CTF	
10	100		PFR10100CTI	PFR10100CT	PFR10100CTF	
10	150		PFR10150CTI	PFR10150CT	PFR10150CTF	
10	200		PFR10200CTI	PFR10200CT	PFR10200CTF	
10	300		PFR10300CTI	PFR10300CT	PFR10300CTF	
20	45		PFR2045CTI	PFR2045CT	PFR2045CTF	
20	60		PFR2060CTI	PFR2060CT	PFR2060CTF	
20	100		PFR20100CTI	PFR20100CT	PFR20100CTF	
20	150		PFR20150CTI	PFR20150CT	PFR20150CTF	
20	200		PFR20200CTI	PFR20200CT	PFR20200CTF	
20	300		PFR20300CTI	PFR20300CT	PFR20300CTF	
30	30		PFR3030CTI	PFR3030CT	PFR3030CTF	PFR3030PT
30	45		PFR3045CTI	PFR3045CT	PFR3045CTF	PFR3045PT
30	60		PFR3060CTI	PFR3060CT	PFR3060CTF	PFR3060PT
30	100		PFR30100CTI	PFR30100CT	PFR30100CTF	PFR30100PT
30	150		PFR30150CTI	PFR30150CT	PFR30150CTF	PFR30150PT
30	200		PFR30200CTI	PFR30200CT	PFR30200CTF	PFR30200PT
30	300		PFR30300CTI	PFR30300CT	PFR30300CTF	PFR30300PT
40	30			PFR4030CT	PFR4030CTF	PFR4030PT
40	45			PFR4045CT	PFR4045CTF	PFR4045PT
40	60			PFR4060CT	PFR4060CTF	PFR4060PT
40	100			PFR40100CT	PFR40100CTF	PFR40100PT
40	150			PFR40150CT	PFR40150CTF	PFR40150PT
40	200			PFR40200CT	PFR40200CTF	PFR40200PT
40	300			PFR40300CT	PFR40300CTF	PFR40300PT
60	45			PFR6045CT		PFR6045PT
60	60			PFR6060CT		PFR6060PT
60	100			PFR60100CT		PFR60100PT
60	150			PFR60150CT		PFR60150PT
60	200			PFR60200CT		PFR60200PT
60	300			PFR60300CT		PFR60300PT



Current Product Portfolio

Product Offerings (Standard and L Series, Low VF, Axial Leaded Packages)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	AXIAL LEADED PACKAGES		
		DO-41	DO-15	DO-201AD
1	30	PFS130		
1	40	PFS140		
2	30		PFS230	
2	40		PFS240	
3	40			PFS340
3	60			PFS360
3	100			PFS3100
5	45			PFS545
5	60			PFS560
5	100			PFS5100

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	AXIAL LEADED PACKAGES		
		DO-41	DO-15	DO-201AD
1	30	PFS1L30		
1	40	PFS1L40		
2	30		PFS2L30	
2	40		PFS2L40	
2	60		PFS2L60	
2	100		PFS2L100	
3	40			PFSL340
3	60			PFSL360
3	100			PFSL3100
5	45			PFS5L45
5	60			PFS5L60
5	100			PFS5L100



Current Product Portfolio

Product Offerings (L Series, Low VF, Surface Mount Packages)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	SURFACE MOUNT PACKAGES				
		Mini SMA	SMA	SMB	SMC	TO-263
1	30	P1L30F	P1L30			
1	40	P1L40F	P1L40			
2	30	P2L30F	P2L30	P2L30B		
2	40	P2L40F	P2L40	P2L40B		
3	40		P3L40	P3L40B		
3	60		P3L60	P3L60B		
3	100		P3L100	P3L100B		
5	45			P5L45B	P5L45C	
5	60			P5L60B	P5L60C	
5	100			P5L100B	P5L100C	
10	45					PFR10L45CTB
10	60					PFR10L60CTB
10	100					PFR10L100CTB
10	150					PFR10L150CTB
10	200					PFR10L200CTB
10	300					PFR10L300CTB
20	45					PFR20L45CTB
20	60					PFR20L60CTB
20	100					PFR20L100CTB
20	150					PFR20L150CTB
20	200					PFR20L200CTB
20	300					PFR20L300CTB
30	30					PFR30L30CTB
30	45					PFR30L45CTB
30	60					PFR30L60CTB
30	100					PFR30L100CTB
30	150					PFR30L150CTB
30	200					PFR30L200CTB
30	300					PFR30L300CTB



Current Product Portfolio

Product Offerings (L Series, Low VF, Power Packages)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	POWER PACKAGES				
		TO-126	TO-262	TO-220AB	ITO-220AB	TO-247
5	45	PFR5L45				
5	60	PFR5L60				
5	100	PFR5L100				
10	45		PFR10L45CTI	PFR10L45CT	PFR10L45CTF	
10	60		PFR10L60CTI	PFR10L60CT	PFR10L60CTF	
10	100		PFR10L100CTI	PFR10L100CT	PFR10L100CTF	
10	150		PFR10L150CTI	PFR10L150CT	PFR10L150CTF	
10	200		PFR10L200CTI	PFR10L200CT	PFR10L200CTF	
10	300		PFR10L300CTI	PFR10L300CT	PFR10L300CTF	
20	45		PFR20L45CTI	PFR20L45CT	PFR20L45CTF	
20	60		PFR20L60CTI	PFR20L60CT	PFR20L60CTF	
20	100		PFR20L100CTI	PFR20L100CT	PFR20L100CTF	
20	150		PFR20L150CTI	PFR20L150CT	PFR20L150CTF	
20	200		PFR20L200CTI	PFR20L200CT	PFR20L200CTF	
20	300		PFR20L300CTI	PFR20L300CT	PFR20L300CTF	
30	30		PFR30L30CTI	PFR30L30CT	PFR30L30CTF	PFR30L30PT
30	45		PFR30L45CTI	PFR30L45CT	PFR30L45CTF	PFR30L45PT
30	60		PFR30L60CTI	PFR30L60CT	PFR30L60CTF	PFR30L60PT
30	100		PFR30L100CTI	PFR30L100CT	PFR30L100CTF	PFR30L100PT
30	150		PFR30L150CTI	PFR30L150CT	PFR30L150CTF	PFR30L150PT
30	200		PFR30L200CTI	PFR30L200CT	PFR30L200CTF	PFR30L200PT
30	300		PFR30L300CTI	PFR30L300CT	PFR30L300CTF	PFR30L300PT
40	30			PFR40L30CT	PFR40L30CTF	PFR40L30PT
40	45			PFR40L45CT	PFR40L45CTF	PFR40L45PT
40	60			PFR40L60CT	PFR40L60CTF	PFR40L60PT
40	100			PFR40L100CT	PFR40L100CTF	PFR40L100PT
40	150			PFR40L150CT	PFR40L150CTF	PFR40L150PT
40	200			PFR40L200CT	PFR40L200CTF	PFR40L200PT
40	300			PFR40L300CT	PFR40L300CTF	PFR40L300PT
60	45			PFR60L45CT		PFR60L45PT
60	60			PFR60L60CT		PFR60L60PT
60	100			PFR60L100CT		PFR60L100PT
60	150			PFR60L150CT		PFR60L150PT
60	200			PFR60L200CT		PFR60L200PT
60	300			PFR60L300CT		PFR60L300PT



Current Product Portfolio

Product Offerings (V Series, Ultra Low VF,)

IO (AV) / IF (AV) Max. (A)	VRRM Min. (V)	SURFACE MOUNT	AXIAL LEADED PACKAGES	POWER PACKAGES			
		TO-263	R6	TO-262	TO-220AB	ITO-220AB	TO-247
10	45	PFR10V45CTB	PFS10U45	PFR10V45CTI	PFR10V45CT	PFR10V45CTF	
10	60	PFR10V60CTB	PFS10U60	PFR10V60CTI	PFR10V60CT	PFR10V60CTF	
10	100	PFR10V100CTB		PFR10V100CTI	PFR10V100CT	PFR10V100CTF	
10	150	PFR10V150CTB		PFR10V150CTI	PFR10V150CT	PFR10V150CTF	
10	200	PFR10V200CTB		PFR10V200CTI	PFR10V200CT	PFR10V200CTF	
20	45	PFR20V45CTB		PFR20V45CTI	PFR20V45CT	PFR20V45CTF	
20	60	PFR2060CTB		PFR20V60CTI	PFR20V60CT	PFR20V60CTF	
20	100	PFR20V100CTB		PFR20V100CTI	PFR20V100CT	PFR20V100CTF	
20	150	PFR20V150CTB		PFR20V150CTI	PFR20V150CT	PFR20V150CTF	
20	200	PFR20V200CTB		PFR20V200CTI	PFR20V200CT	PFR20V200CTF	
30	30	PFR30V30CTB		PFR30V30CTI	PFR30V30CT	PFR30V30CTF	PFR30V30PT
30	45	PFR30V45CTB		PFR30V45CTI	PFR30V45CT	PFR30V45CTF	PFR30V45PT
30	60	PFR30V60CTB		PFR30V60CTI	PFR30V60CT	PFR30V60CTF	PFR30V60PT
30	100				PFR30V100CT		PFR30V100PT
30	150				PFR30V150CT		PFR30V150PT
30	200				PFR30V200CT		PFR30V200PT
40	30				PFR40V30CT		PFR40V30PT
40	45				PFR40V45CT		PFR40V45PT
40	60				PFR40V60CT		PFR40V60PT
40	100				PFR40V100CT		PFR40V100PT
40	150				PFR40V150CT		PFR40V150PT
40	200				PFR40V200CT		PFR40V200PT
60	100				PFR60V100CT		PFR60V100PT



Package Line-up



MINI SMA



SMA



SMB



SMC



DO-41



DO-15



DO-201AD



R6



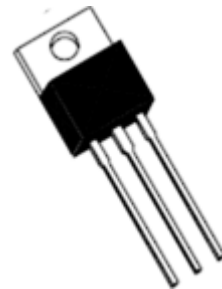
TO-126



TO-252



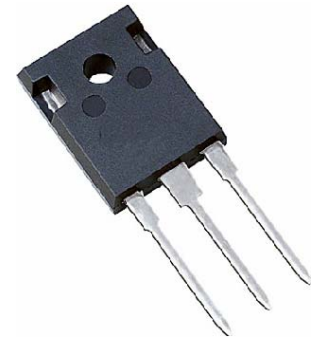
TO-251



TO-220AB



ITO-220AB



TO-247



PFC Product Nomenclature

PFR 30 L 100 CT

A B C D E

A: PFR=Mos-Schottky

B: Current Rating (20=20A, 30=30A, etc)

C: Product Type (N/A= Standard VF, L= Low VF, V= Ultra Low VF)

D: Voltage Code = VRRM (40=40V, 100=100V, etc.)

E: Package Code

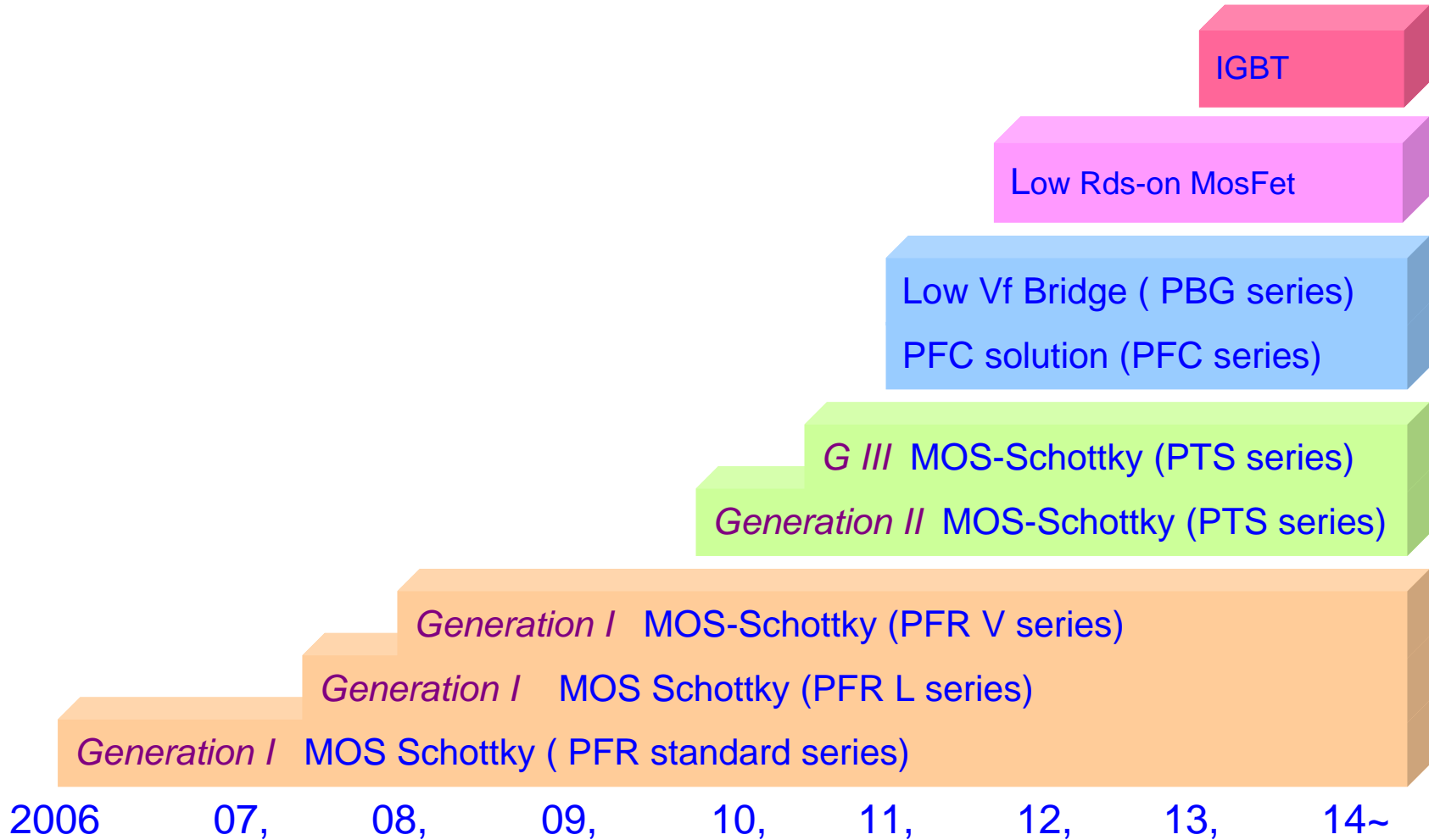
CT: TO-220AB None: TO-220AC

CTB: TO-263 CTI: TO-262

PT: TO-247 CTF: ITO-220



5 Years Product Road Maps



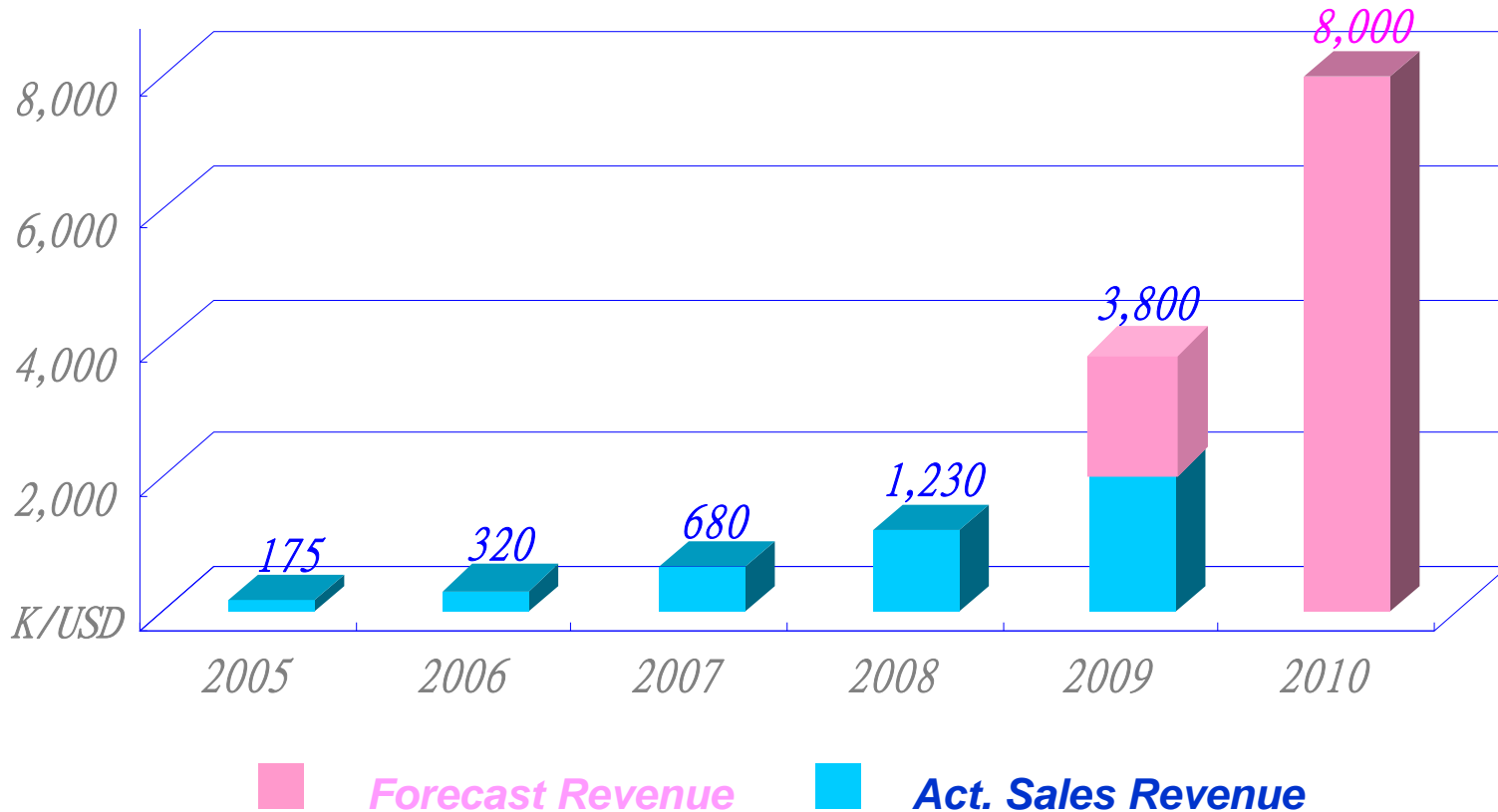


Major Customers



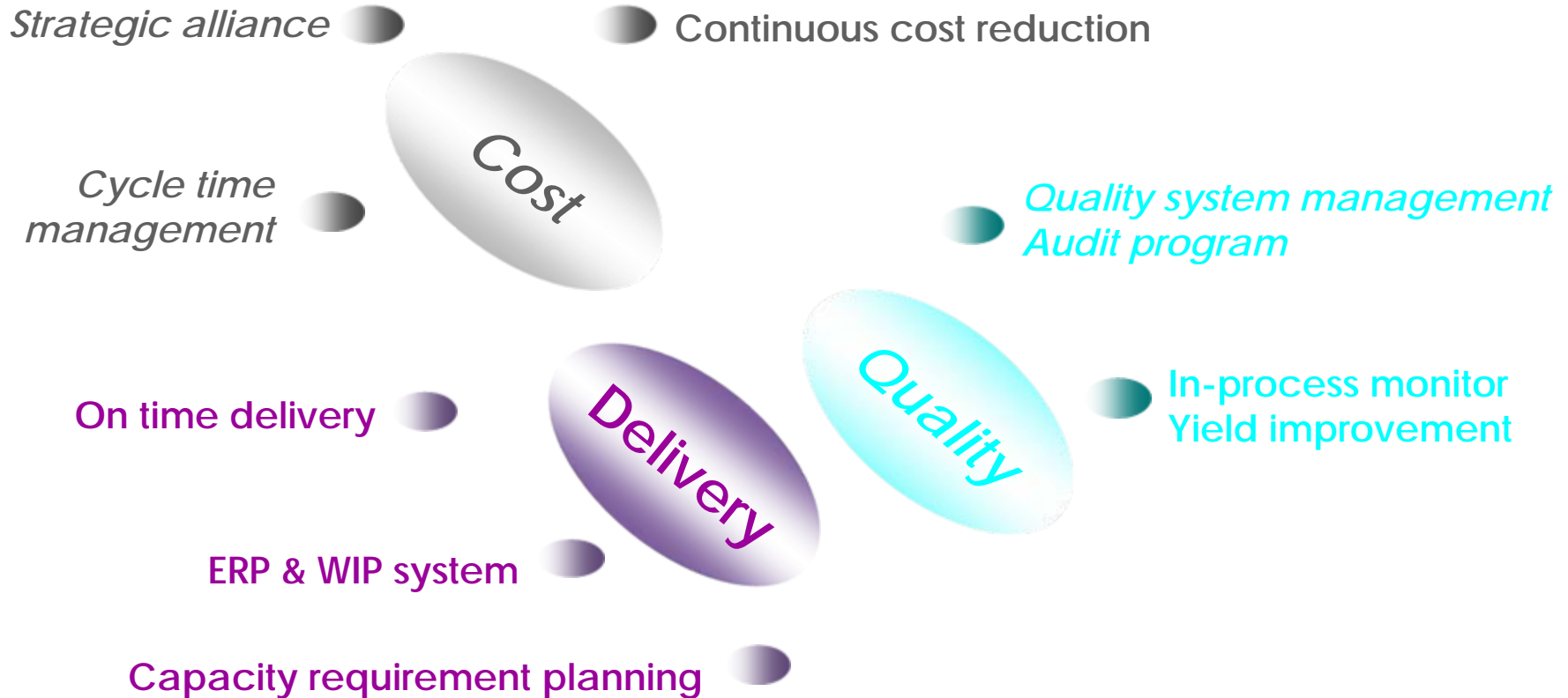


Sales Revenue Yr05 ~ Yr10 (Proj.)





Supply Chain Management

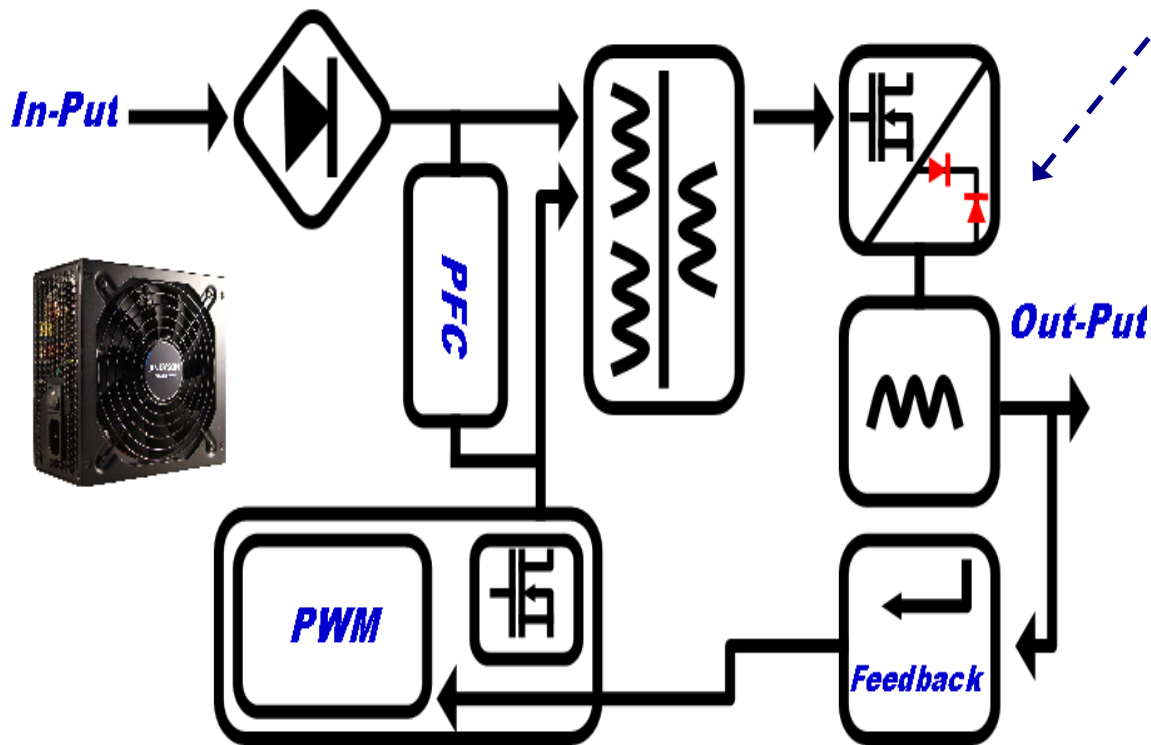


Market Application





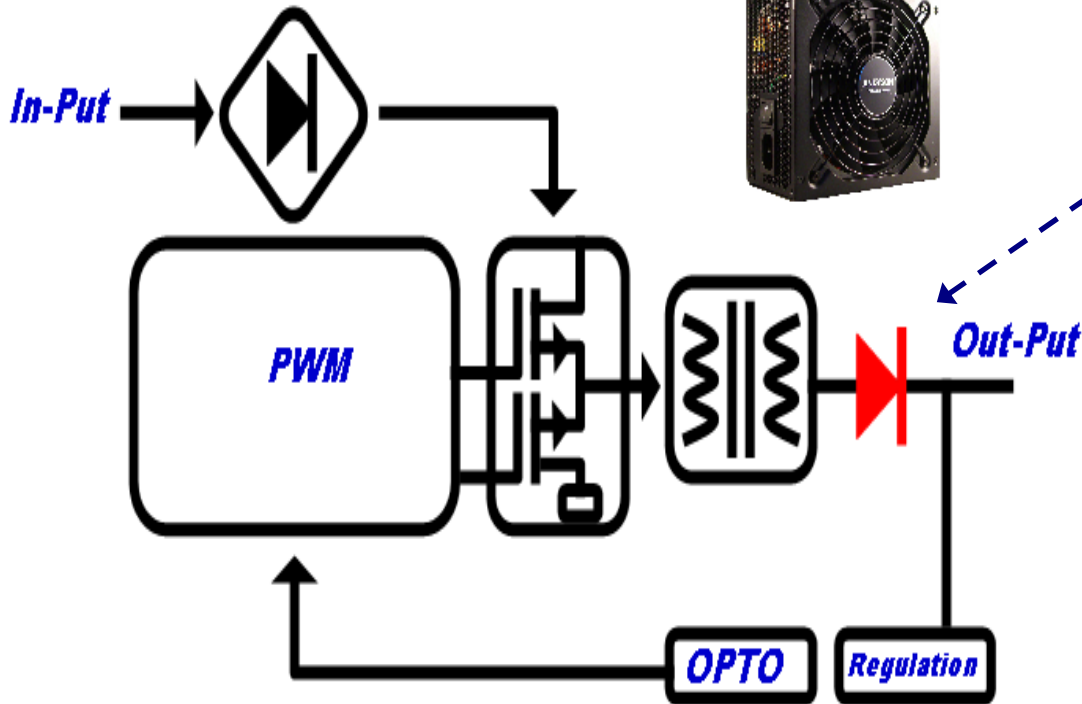
SMPS (Forward 順向式轉換)



- Out-Put +3.3V :
PFR30L30CT, PFR30V30CT
PFR40L30CT, PFR40V30CT
- Out-Put +5V :
PFR30L45CT, PFR30V45CT
PFR40L45CT, PFR40V45CT
PFR60L45CT
- Out-Put +12V :
PFR30L60CT, PFR30V60CT
PFR40L60CT, PFR40V45CT
PFR60L60CT



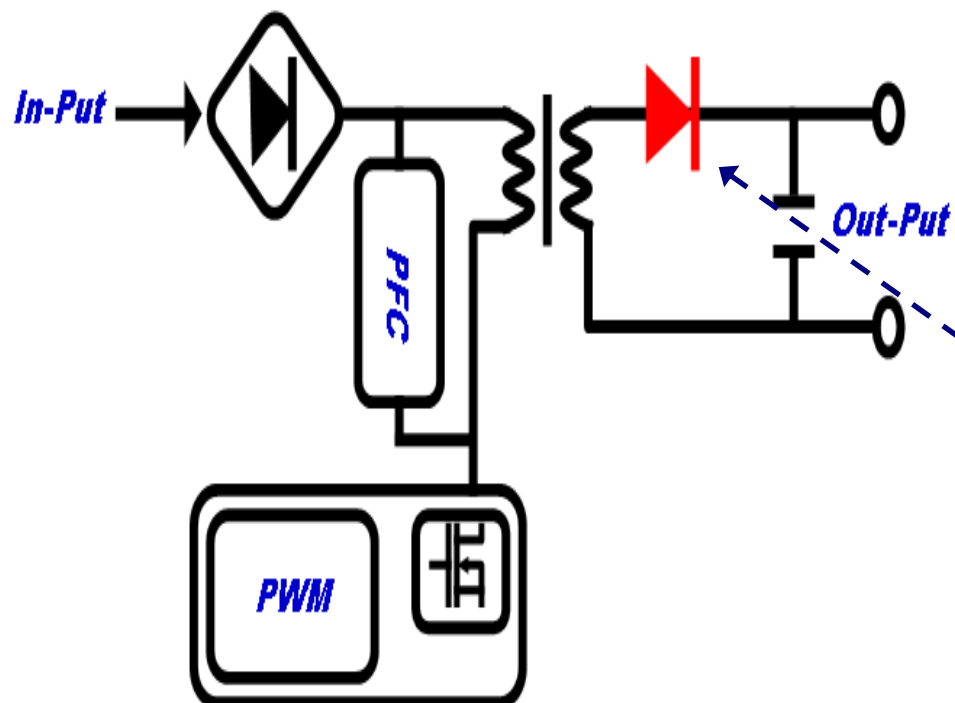
SMPS (Resonance 諧振式轉換)



- Out-Put +3.3V :
PFR30L30CT, PFR30V30CT
PFR40L30CT, PFR40V30CT
- Out-Put +5V :
PFR30L45CT, PFR30V45CT
PFR40L45CT, PFR40V45CT
PFR60L45CT
- Out-Put +12V :
PFR30L60CT, PFR30V60CT
PFR40L60CT, PFR40V45CT
PFR60L60CT



AC/DC Adapter (Flyback 反馳式轉換)



Out-Put +12V :

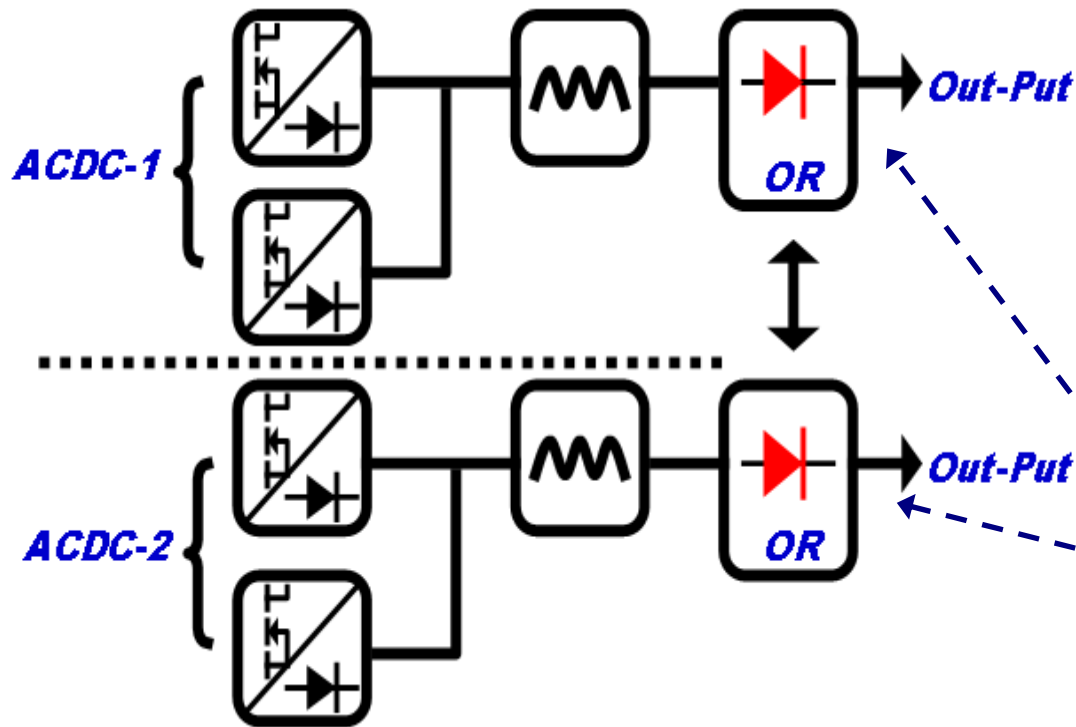
PFR20L100CT/CTF, PFR20V100CT/CTF
PFR30L100CT/CTF, PFR30V100CT/CTF

Out-Put +19V, 24V :

PFR10L100CT/CTF, PFR10V100CT/CTF
PFR20L100CT/CTF, PFR20V100CT/CTF
PFR30L100CT/CTF, PFR30V100CT/CTF
PFR20L200CT/CTF, PFR20V200CT/CTF
PFR30L200CT/CTF, PFR30V200CT/CTF



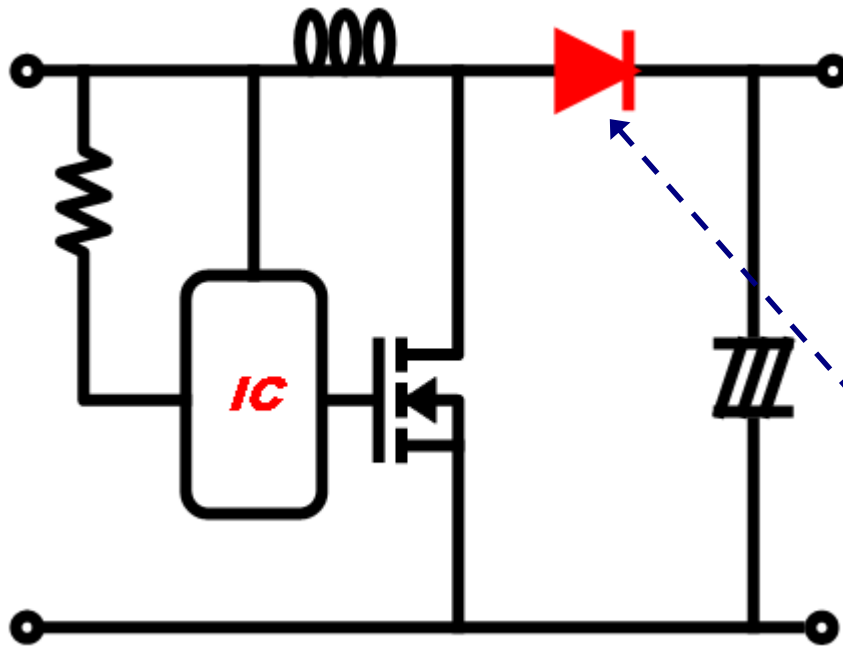
OR-ing Diode



PFR40L15PT
PFR60L15PT



PWM Boost Controller

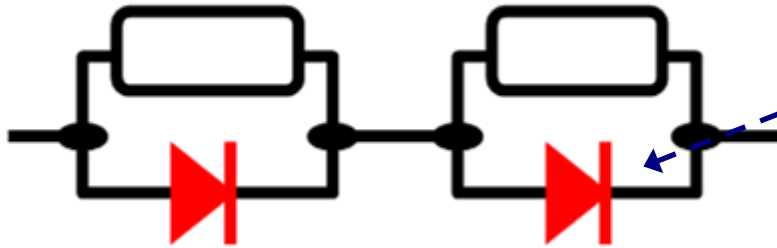


P2L40F, P3L40F
P2L40, P3L40, P5L40



Solar Module (JUNCTION BOX)

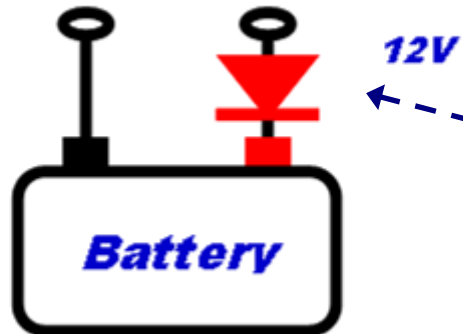
Bypass Diode



PFS10U45
PFS10U60



Blocking Diode



PFR30L45CTB
PFR30L60CTB





PFC Mos-Schottky Performance



Performance Compare

350W SMPS

負載條件: 100% load:+12V/16.6A, +5V/9.3A, +3.3V/13A, -12v/0.3A -5Vsb/1.7A
 50% load:+12V/8.3A, +5V/4.7A, +3.3V/6.5A, -12V/0.1A, -5Vsb/0.9A
 20% load:+12V/3.3A, +5V/1.9A, +3.3V/2.6A, -12V/0.1A, -5Vsb/0.3A
 每個附載加12V/0.3A 的FAN

Current Supplier: +12V/STPS41H100CT x 2, +5V/S30SC4M_TO247 x 1, +3.3V/STPS30L45CT x 2

Item↕	+12V↕	+5V↕	+3.3V↕	-12V↕	+5Vsb↕	Pout↕ (W)↕	115Pin↕ (W)↕	230Pin↕ (W)↕	115↕ 效率↕	230↕ 效率↕
20% load↕	11.93↕	5.17↕	3.35↕	11.7↕	5.10↕	58.26	82.3↕	81.5↕	75.1↕	75.88
50%load↕	11.88↕	5.1↕	3.31↕	11.85↕	5.05↕	149.82	187.1↕	183.6↕	81.98↕	83.54
100%load↕	11.83↕	4.99↕	3.25↕	11.9↕	4.97↕	297.05	374.2↕	362.2↕	80.33↕	82.99

PFC: +12V/PFR40L60CT x 2, +5V/ PFR30V45CT x 2, +3.3V/ PFR30V30CT x 2

Item↕	+12V↕	+5V↕	+3.3V↕	-12V↕	+5Vsb↕	Pout↕ (W)↕	115Pin↕ (W)↕	230Pin↕ (W)↕	115↕ 效率↕	230↕ 效率↕
20% load↕	11.95↕	5.16↕	3.35↕	11.52↕	5.1↕	60.63	80.2↕	79.7↕	80.07	80.57
50%load↕	11.91↕	5.09↕	3.31↕	11.65↕	5.04↕	149.99	183.2↕	179.9↕	83.82	85.36
100%load↕	11.83↕	4.98↕	3.25↕	11.7↕	4.96↕	296.88	367.5↕	355.7↕	81.75	84.46



Performance Compare

負載條件: 100% load:+12V/16.6A, +5V/9.3A, +3.3V/13A, -12v/0.3A -5Vsb/1.7A
 50% load:+12V/8.3A, +5V/4.7A, +3.3V/6.5A, -12V/0.1A, -5Vsb/0.9A
 20% load:+12V/3.3A, +5V/1.9A, +3.3V/2.6A, -12V/0.1A, -5Vsb/0.3A
 每個附載加12V/0.3A 的FAN

350W SMPS

Current supplier: +12V/SBR60A60CT x 2, +5V/ SBR40U45CT x 2, +3.3V/ SBR30U30CT x 2

Item↕	+12V↕	+5V↕	+3.3V↕	-12V↕	+5Vsb↕	Pout↕ (W)↕	115Pin↕ (W)↕	230Pin↕ (W)↕	115↕ 效率↕	230↕ 效率↕
20% load↕	11.95↕	5.17↕	3.35↕	11.5↕	5.1↕	60.65	80.3↕	79.7↕	79.99	80.59
50% load↕	11.91↕	5.09↕	3.31↕	11.65↕	5.04↕	149.99	183.5↕	180.2↕	83.69	85.22
100% load↕	11.83↕	4.98↕	3.25↕	11.7↕	4.96↕	296.88	367.5↕	355.4↕	81.75	84.53

PFC: +12V/PFR40V60CT x 2, +5V/ PFR30V45CT x 2, +3.3V/ PFR30V30CT x 2

Item↕	+12V↕	+5V↕	+3.3V↕	-12V↕	+5Vsb↕	Pout↕ (W)↕	115Pin↕ (W)↕	230Pin↕ (W)↕	115↕ 效率↕	230↕ 效率↕
20% load↕	11.96↕	5.16↕	3.34↕	11.53↕	5.1↕	60.64	79.9↕	79.4↕	80.38	80.89
50% load↕	11.92↕	5.09↕	3.31↕	11.65↕	5.04↕	150.08	182.8↕	179.8↕	84.05	85.46
100% load↕	11.83↕	4.98↕	3.25↕	11.7↕	4.96↕	296.88	367.0↕	355.5↕	81.86	84.51



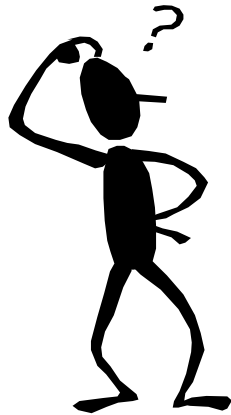
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Q & A





Thanks for Your Time!

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