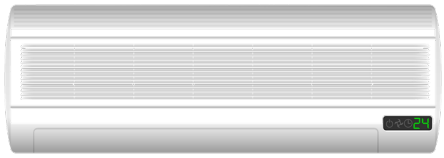
Working Together for a Greener Society

Future of Power Electronics and the Earth

Auxiliary Switch Diodes for Snubbers

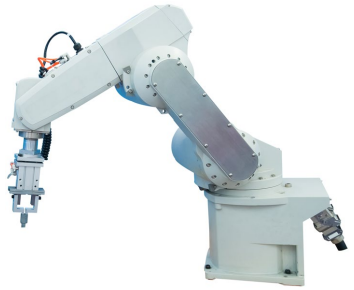
SARS01 / SARS05

Air Conditioner



Refrigerator

Industrial



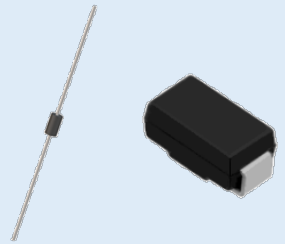
Adapter

Finding ways to improve flyback switching power supplies?

- **Better cross regulation**
- **Higher efficiency**

Let us introduce our

“SARS01” and **“SARS05”** then.



Our diodes will meet your needs!

Overview

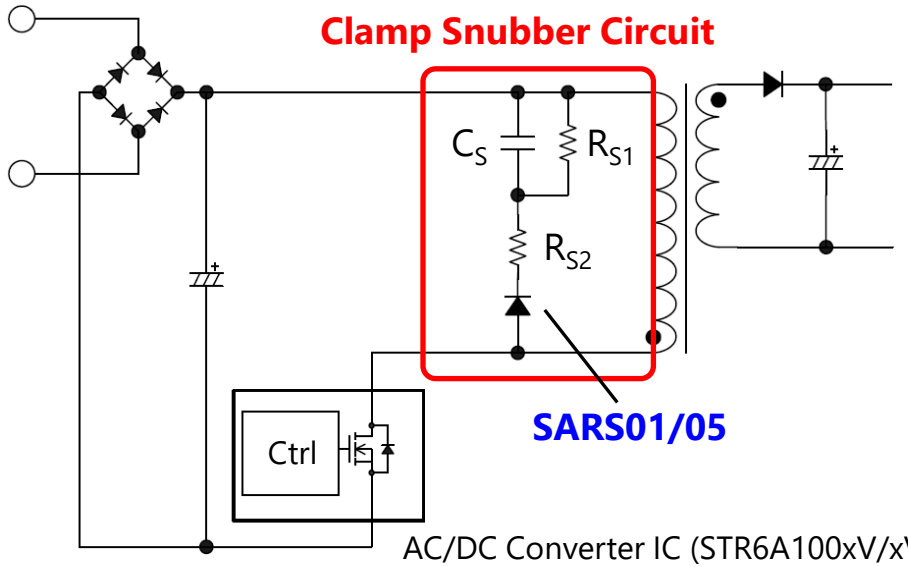
The SARS01/05 are auxiliary switch diodes for snubbers, especially for a clamp snubber circuit in the primary side of a flyback switching power supply.

Switching power supplies using our SARS01/05 will bring better multiple-output cross regulation **by reducing the ringing voltage at turn-off**, and **higher power supply efficiency by utilizing energy in the ringing voltage**.

Main Features

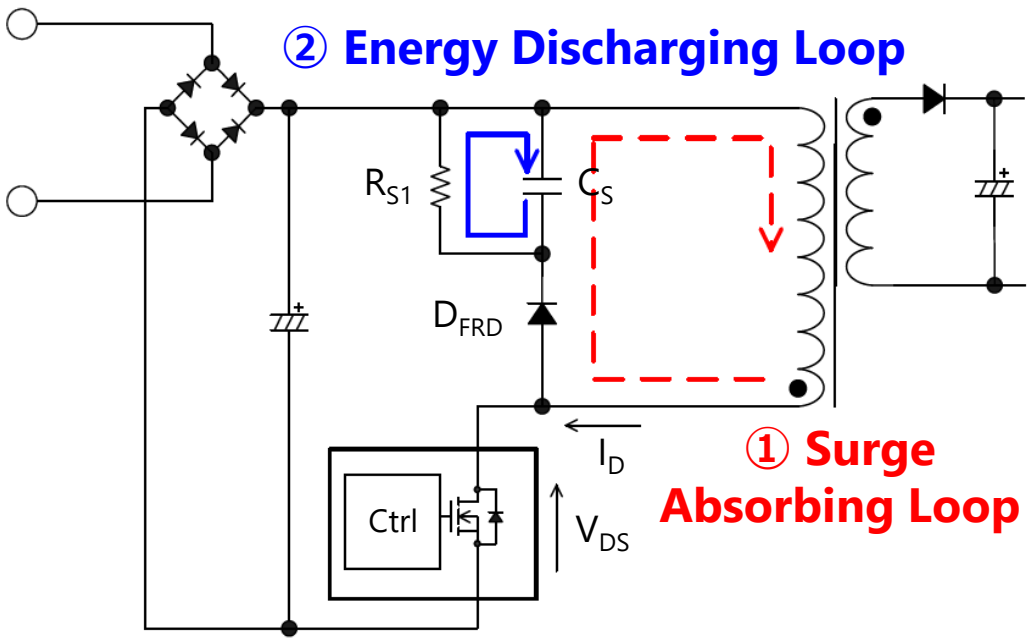
- **Better multiple-output cross regulation**
- **Lower noise**
- **Higher efficiency**

Typical Application



Operation when the clamp snubber uses a general fast recovery diode (FRD)

FRD-used Clamp Snubber



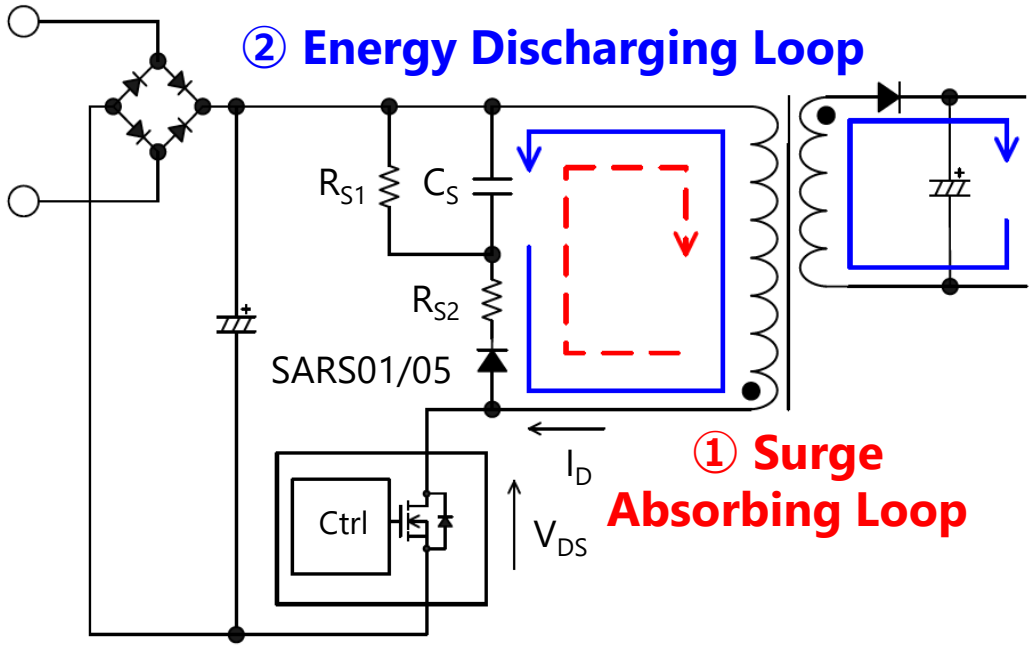
① Charges the capacitor C_S with the surge voltage at power MOSFET turn-off.
② Consumes the energy stored in C_S with the resistor R_{S1}.

CONS

- The surge voltage and ringing at turn-off **can worsen multiple-output cross regulation**.
- All the energy consumed in ② becomes loss and **can raise the R_{S1} temperature**.

Operation when the clamp snubber uses our SARS01/05

SARS-used Clamp Snubber



①Charges the capacitor C_S with the surge voltage at power MOSFET turn-off.

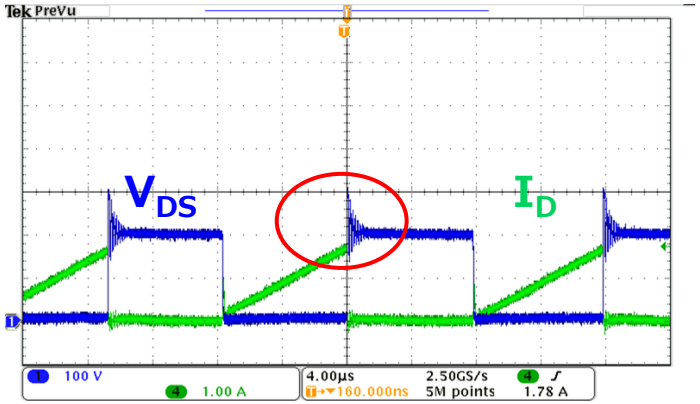
②Discharges the energy in C_S backward to ① until the C_S voltage equals flyback voltage, owing to the long reverse recovery time. This discharged energy is transferred to the secondary side, not turned into loss.

PROS

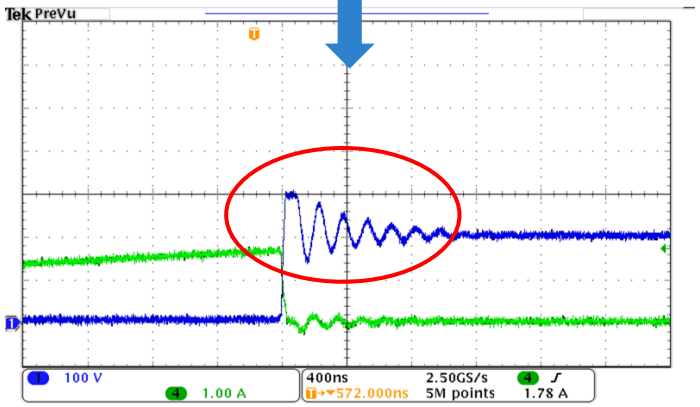
- **Higher power supply efficiency with effective energy transfer to the secondary side**
- **Better cross regulation with suppressed surge voltage and early-converged ringing**
- **Lower loss in R_{S1} allows larger resistance values (smaller resistors will be usable)**

Operational waveforms when the clamp snubber uses
a general FRD or our SARS01/05

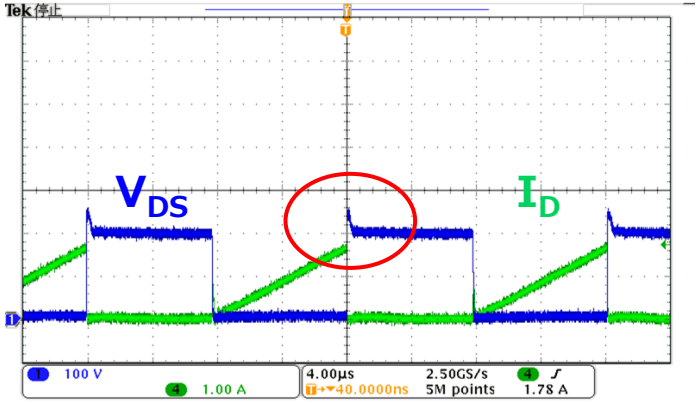
FRD-used



Enlarged



SARS-used



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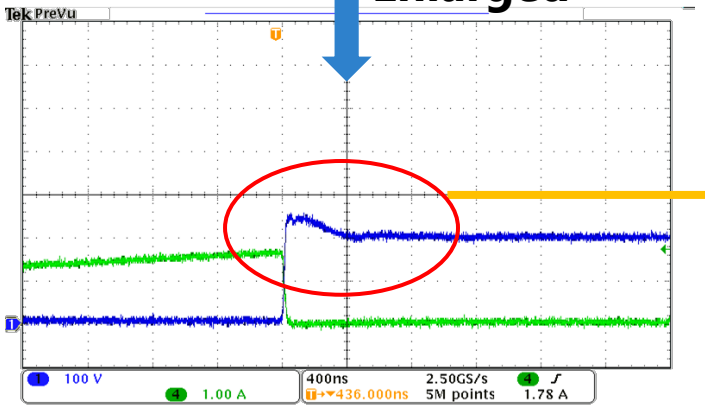
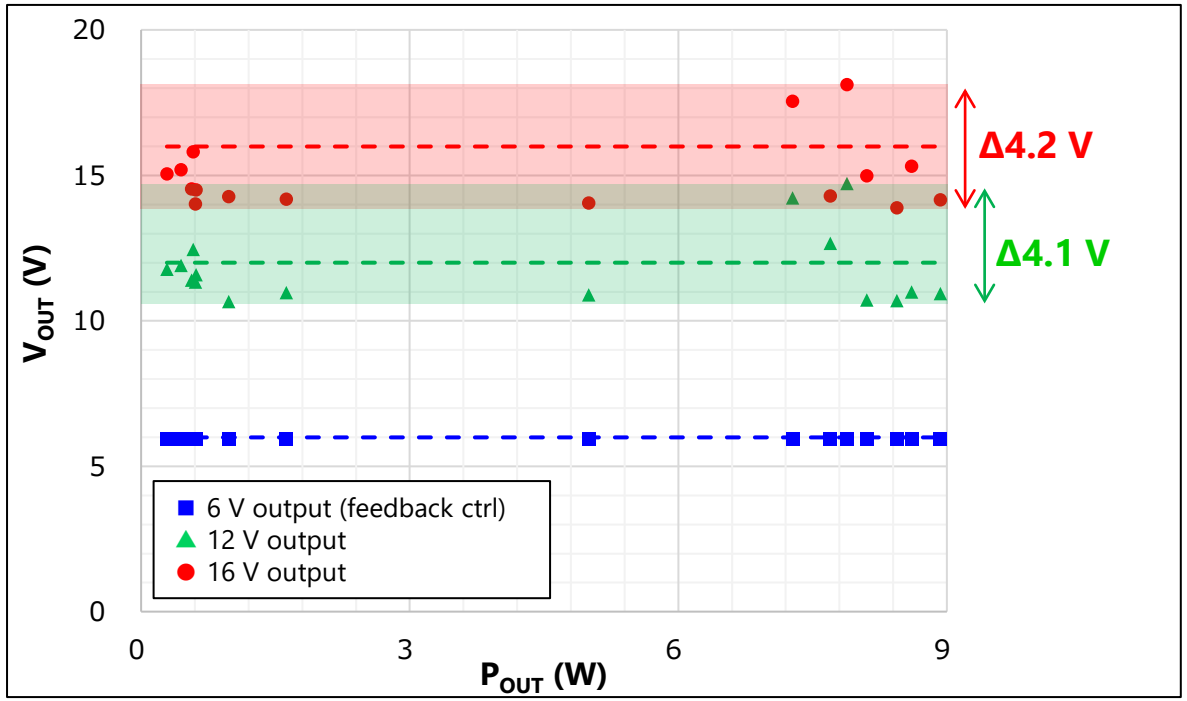


PROS

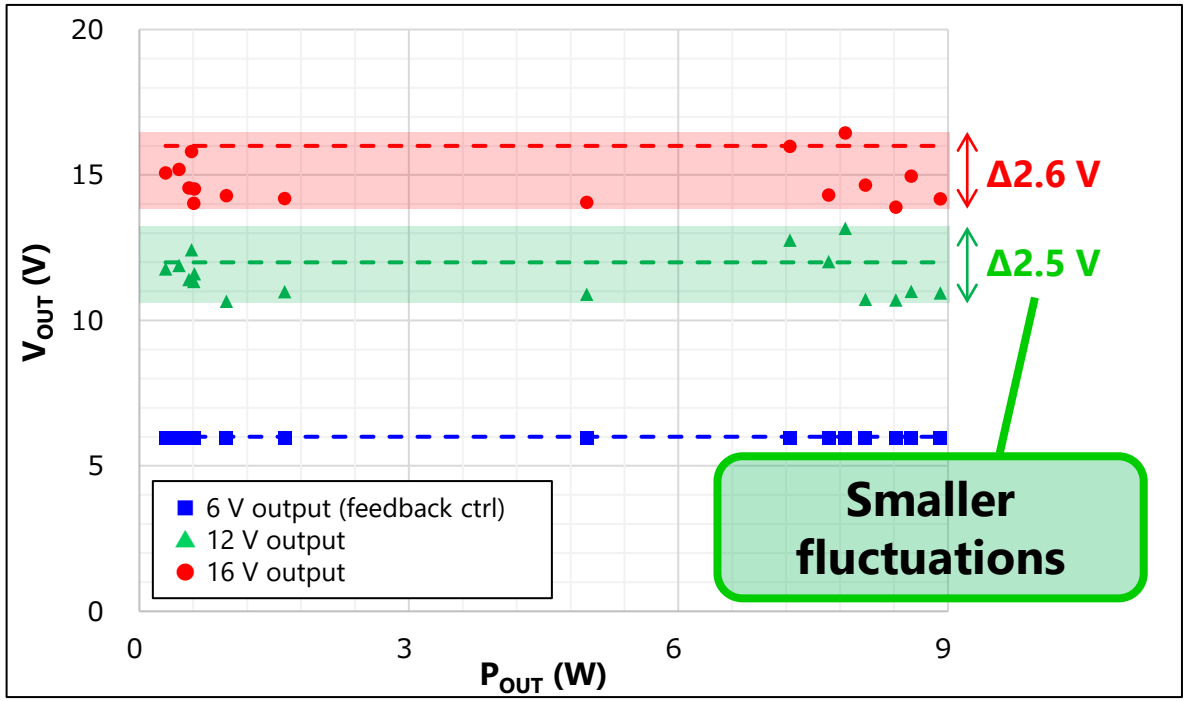
The SARS-used circuit suppresses the ringing.

Cross regulations when the power supply circuit uses the clamp snubber with a general FRD or our SARS01/05

FRD-used (12 V or 16 V)



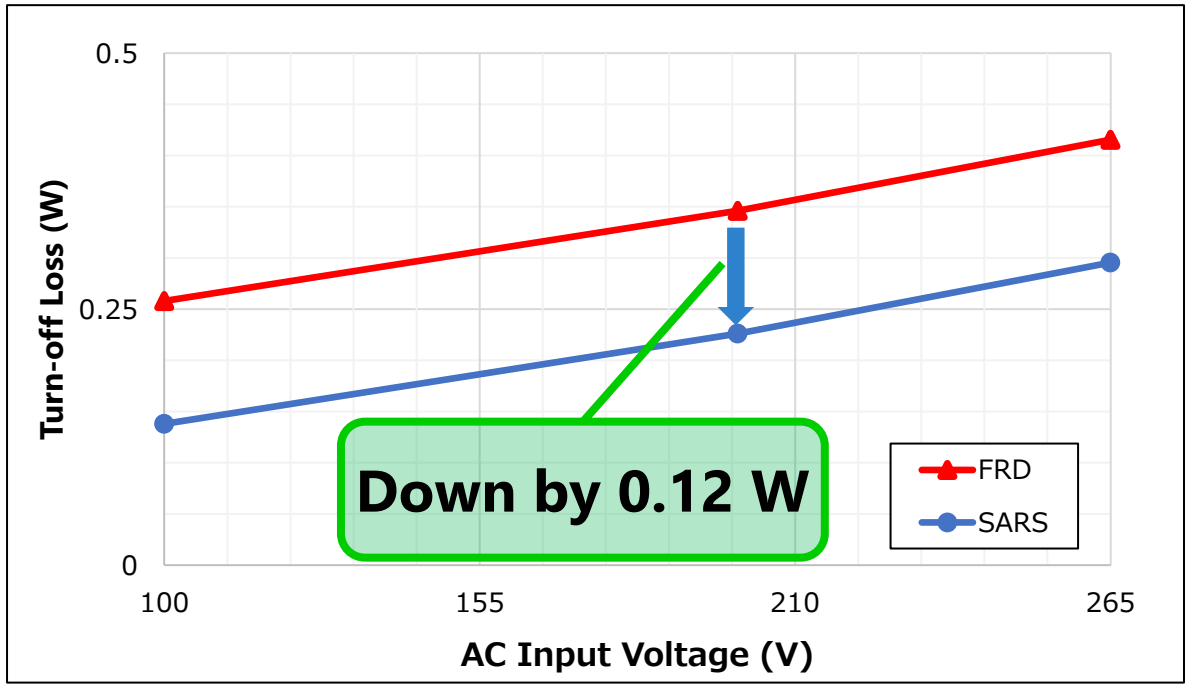
SARS-used (12 V or 16 V)



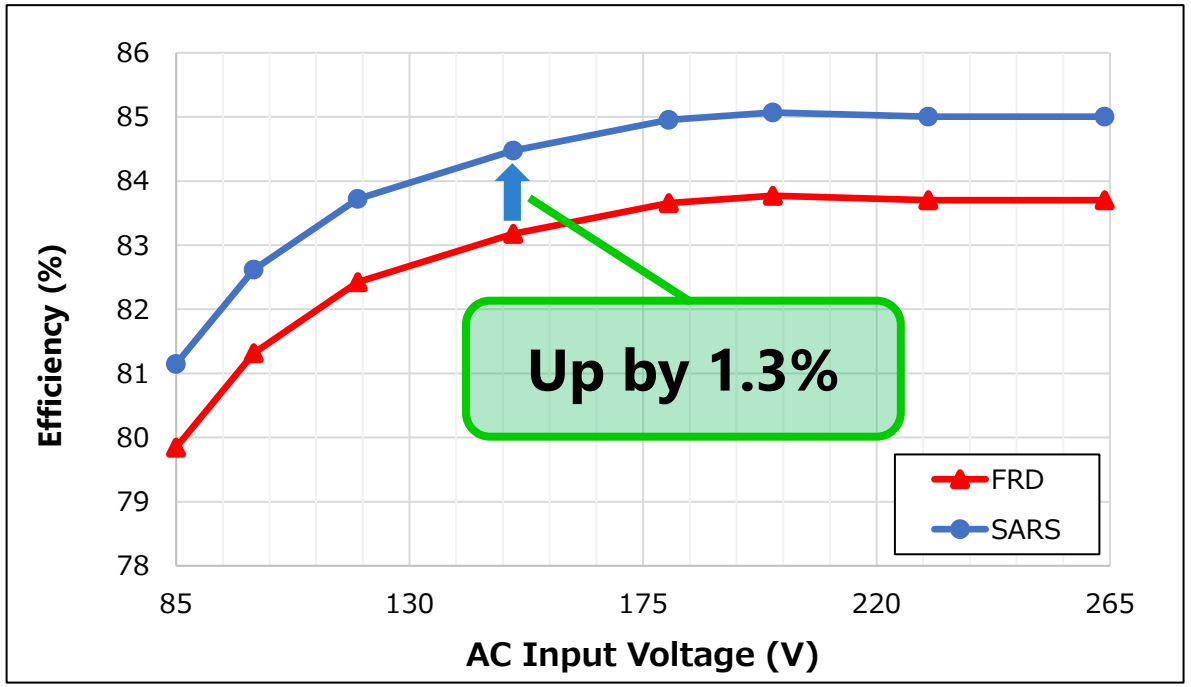
The SARS-used power supply circuit yields better cross regulation.

Efficiencies when the power supply circuit uses
the clamp snubber with a general FRD or our SARS01/05

Switching Loss



Efficiency



The SARS-used power supply circuit yields lower switching loss and higher efficiency.

Here, we provide the SARS01/05 specifications.
The two different packages will give you application-based choices.

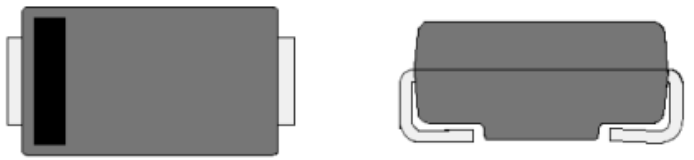
Electrical Characteristics

Part Number	$I_{F(AV)}$	V_F (Max.)	V_{RSM}	t_{rr} (Max.)	Package	Application
SARS01	1.2 A	0.92 V	800 V	18 µs	Axial (through-hole)	Medium to large power supplies
SARS05	1.0 A	1.05 V	800 V	19 µs	SJP (surface mount)	Small to medium power supplies

Packages

- **SARS01**
  Axial (φ2.7 × 5.0L / φ0.6)

- **SARS05**
  SJP (4.5 mm × 2.6 mm)



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