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DC POWER SUPPLIES

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SM 1500 with Power Sink Option

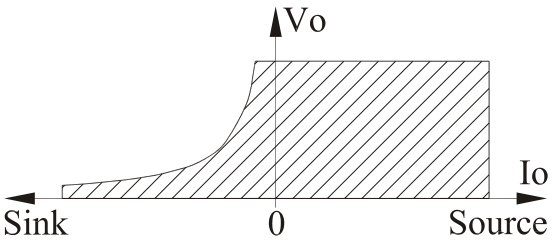
2 Quadrant operation: Source and Sink

SM52-AR-60

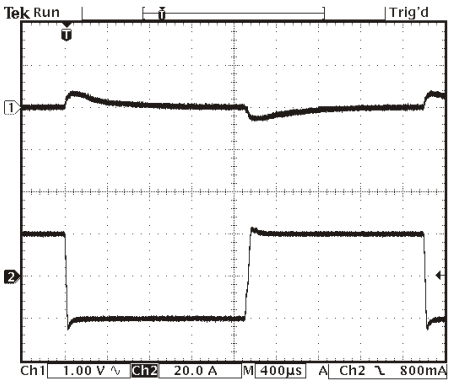
Models	Order Code
SM 15-100	P202
SM 35-45	P203
SM 52-30	P204
SM 52-AR-60	P205
SM 70-22	P206

The power sink option permits the power supply to absorb bursts of power fed back to the unit. An internal module senses the status of power supply and sinks current across the output terminals, thus maintaining a constant output voltage.

The Power Sink Option allows a faster response when the power supply is step programmed to a lower voltage at small load conditions.

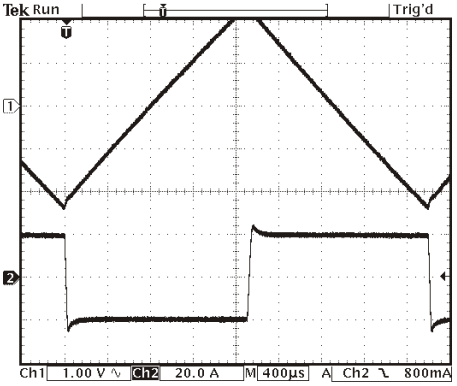


- Can absorb 200 W peak power
- Maintains output voltage setting regardless output power is positive or negative (source and sink)
- Ideal solution for supplying electric motors with PWM-speed control. These systems often return power to the power supply during a braking action
- Ideal solution for ATE systems requiring fast down programming at no load conditions
- Generation Automotive waveforms (fast)



SM35-45 **with** Power Sink Option
Current – 20 A means the load delivers 20 A to the power supply (sink operation)

Upper trace: output voltage
Lower trace: output current
(current switching from +20 A to –20 A at Vo=6 V)



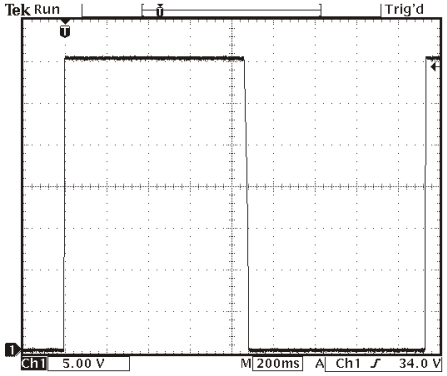
SM35-45 **without** Power Sink Option
*The output voltage is out of control when the output current is **negative***

Upper trace: output voltage
Lower trace: output current
(current switching from +20 A to –20 A at Vo=6 V)

Power Sink Specifications	SM15-100 ***option P202***	SM35-45 ***option P203***	SM52-30 ***option P204***	SM52-AR-60 ***option P205***	SM70-22 ***option P206***
Sink Power Rating max. peak power (electronically limited) max. continuous power ($T_{amb.}$ = 25 °C) max. continuous power ($T_{amb.}$ = 50 °C)	200 W 175 W 90 W				
Max. duration Sink Peak Power P_{sink} = 200 W, $T_{amb.}$ = 25 °C	max. t_{on} = 60 s, following t_{off} = 400 s (for cooling down)				
Duty Cycle for use at Peak Power P_{sink} = 200 W, $T_{amb.}$ = 25 °C P_{sink} <= 200 W, t_{on} <= 20 s t_{on} = time, power dissipation is > 0 W t_{off} = time, power dissipation is 0 W $P_{av} = P_{peak} * t_{on} / (t_{off} + t_{on})$	t_{on} <= 20 s / t_{off} >= 10 s average power <= 175 W				
Max. Sink Current (V_o >= 2 V and P <= 200 W)	Limited at 40 A	Limited at 40 A	Limited at 30 A	Limited at 40 A	Limited at 30 A
Protection	Electronic Power Limit (200 W) limits the current. The temperature of the power sink is fan controlled and the circuit shuts down in case of thermal overload.				
Recovery time / Deviation Vo = 6 V, I_o: +40 A → –15 A recovery within 100 mV / deviation:	di/dt = –1.7 A/µs 300 µs / 0.20 V	di/dt = –1.7 A/µs 500 µs / 0.45 V	-	di/dt = –1.7 A/µs 700 µs / 0.50 V	-
Vo = 15 V, I_o: +25 A → –8 A recovery within 100 mV / deviation:	di/dt = –1.6 A/µs 500 µs / 0.15 V	di/dt = –1.6 A/µs 600 µs / 0.40 V	di/dt = –1.6 A/µs 640 µs / 0.70 V	di/dt = –1.3 A/µs 900 µs / 0.45 V	-
Vo = 35 V, I_o: +20 A → –3 A recovery within 100 mV / deviation:	-	di/dt = –1.3 A/µs 1.10 ms / 0.35 V	di/dt = –1.3 A/µs 800 µs / 0.60 V	di/dt = –0.83 A/µs 1.30 ms / 0.35 V	di/dt = –1.3 A/µs 800 µs / 0.70 V
Vo = 52 V, I_o: +10 A → –2 A recovery within 100 mV / deviation:	-	-	di/dt = –0.7 A/µs 800 µs / 0.60 V	di/dt = –0.6 A/µs 1.90 ms / 0.35 V	di/dt = –0.6 A/µs 1.00 ms / 0.70 V
Vo = 70 V, I_o: +10 A → –1 A recovery within 100 mV / deviation:	-	-	-	-	di/dt = –0.6 A/µs 1.20 ms / 0.50 V
(load current switches from positive to negative)	*note: values are typical*	*note: values are typical*	*note: values are typical*	*note: values are typical*	*note: values are typical*
Programming Down Speed Fall time at **no load** (90 - 10%) Fall time at no load *without Power Sink*	(15 → 0 V) 8 ms 2 s	(35 → 0 V) 18 ms 5.5 s	(52 → 0 V) 10 ms 4 s	(26/52 → 0 V) 10 ms / 45 ms 4 s / 7.5 s	(70 → 0 V) 18 ms 5.5 s
Unit with Fast Programming Option *Fall time at* **no load** (90 - 10%) Fall time at no load *without Power Sink*	***P202+P211*** 320 µs 60 ms	***P203+P212*** 570 µs 200 ms	***P204+P212*** 650 µs 270 ms	***P205+P213*** 550 µs / 1.2 ms 170 ms / 550 ms	***P206+P214*** 1.0 ms 550 ms
Parallel and Series operation Refer to power sink manual for details and restrictions.	Using multiple units in parallel operation, only one unit can have a power sink. Using multiple units in series operation, all units must have a power sink.				

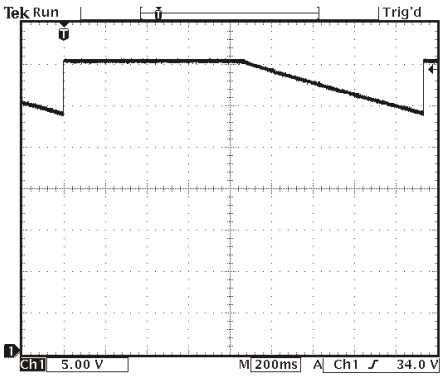
Notes:

- *The maximum sink current at higher voltages will not be the maximum specified current due to the power limit. For example at 30 V the maximum sink current will only be 6.7 A (30 V x 6.7 A = 200 W = maximum power).*
- *A higher sink current than the maximum current will cause the output voltage to rise.*



SM35-45 **with** Power Sink Option
fast discharge of output capacitors by the power sink circuit

trace: output voltage
Voltage Programming Speed at NO LOAD



SM35-45 **without** Power Sink Option
slow response time during voltage step down, time needed to discharge the output capacitors

trace: output voltage
Voltage Programming Speed at NO LOAD