

SM1500 - Power Sink Option

2 Quadrant operation: Source and Sink



SM52-AR-60

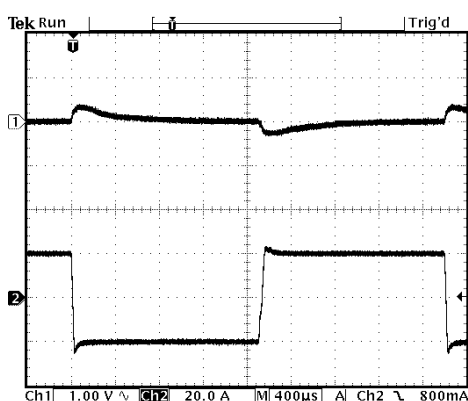
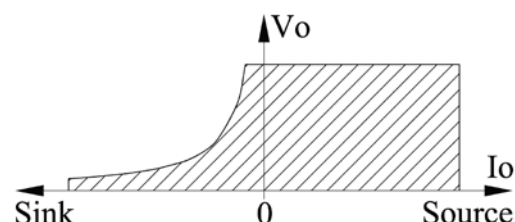
The Power Sink Option permits the power supply to absorb bursts of power fed back to the unit. An internal module senses the status of power supply and sinks current across the output terminals, thus maintaining a constant output voltage.

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

- Can absorb up to 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)

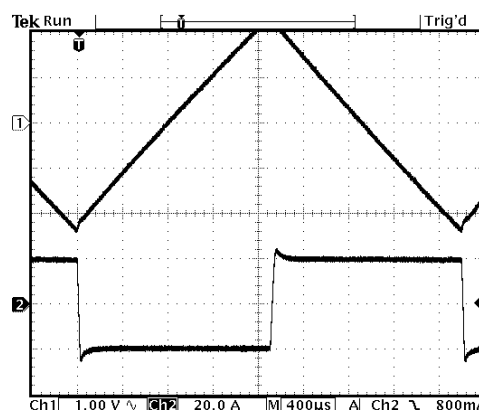
Models	Order-Code
SM 15-100	Option P202
SM 35-45	Option P203
SM 52-30	Option P204
SM 52-AR-60	Option P205
SM70-22	Option P206

Order code table



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 $+20\text{ A}$ to -20 A at $V_o=6\text{ V}$)

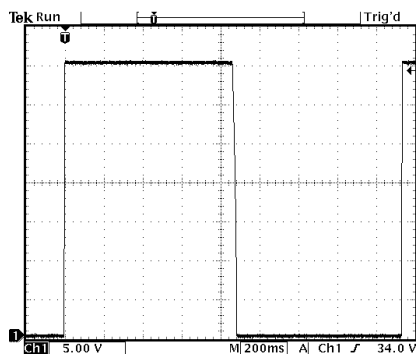


SM35-45 **without** Power Sink Option
The output voltage is out of control when the output current is **negative**

Upper trace: output voltage
Lower trace: output current
(current switching from $+20\text{ A}$ to -20 A at $V_o=6\text{ V}$)

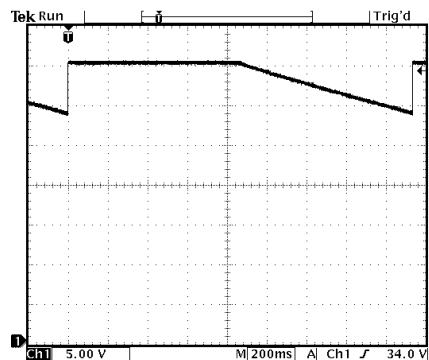
Power Sink Specifications	SM15-100 <i>Option P202</i>	SM35-45 <i>Option P203</i>	SM52-30 <i>Option P204</i>	SM52-AR-60 <i>Option P205</i>	SM70-22 <i>Option P206</i>
Sink Power Rating max. peak power (electronically limited) max. continuous power ($T_{amb.} = 25^{\circ}\text{C}$) max. continuous power ($T_{amb.} = 50^{\circ}\text{C}$)	200W 175W 90W				
Max duration Sink Peak Power $P_{sink} = 200\text{ W}$, $T_{amb.} = 25^{\circ}\text{C}$ Duty cycle for use a Peak Power $P_{sink} = 200\text{ W}$, $T_{amb.} = 25^{\circ}\text{C}$ $P_{sink} \leq 200\text{ W}$, $t_{on} \leq 20\text{s}$ t_{on} = time, power dissipation is $> 0\text{ W}$ t_{off} = time, power dissipation is 0 W $P_{av} = P_{peak} * t_{on} / (t_{off} + t_{on})$	max. $t_{on} = 60\text{s}$, following $t_{off} = 400\text{s}$ (for cooling down) $t_{on} \leq 60\text{s}$ / $t_{off} \geq 10\text{s}$ average power $\leq 175\text{W}$				
Max Sink Current ($V_0 \geq 2\text{ V}$ and $P \leq 200\text{ W}$)	Limited at 40 A	Limited at 40 A	Limited at 30 A	Limited at 40 A	Limited at 30 A
Protection	Electronic Power Limit 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 $V_0 = 6\text{ V}$, $I_0: +40\text{ A} \rightarrow -15\text{ A}$ recovery within 100 mV / deviation: $V_0 = 15\text{ V}$, $I_0: +25\text{ A} \rightarrow -8\text{ A}$ recovery within 100 mV / deviation: $V_0 = 35\text{ V}$, $I_0: +20\text{ A} \rightarrow -3\text{ A}$ recovery within 100 mV / deviation: $V_0 = 52\text{ V}$, $I_0: +10\text{ A} \rightarrow -2\text{ A}$ recovery within 100 mV / deviation: $V_0 = 70\text{ V}$, $I_0: +10\text{ A} \rightarrow -1\text{ A}$ recovery within 1 V / deviation: (load current switches from positive to negative)	$di/dt = -1.7\text{A}/\mu\text{s}$ 300 μs / 0.20 V	$di/dt = -1.7\text{A}/\mu\text{s}$ 500 μs / 0.45 V	-	$di/dt = -1.7\text{A}/\mu\text{s}$ 700 μs / 0.50 V	-
	$di/dt = -1.6\text{A}/\mu\text{s}$ 500 μs / 0.15 V	$di/dt = -1.6\text{A}/\mu\text{s}$ 600 μs / 0.40 V	$di/dt = -1.6\text{A}/\mu\text{s}$ 640 μs / 0.70 V	$di/dt = -1.3\text{A}/\mu\text{s}$ 900 μs / 0.45 V	-
	-	$di/dt = -1.3\text{A}/\mu\text{s}$ 1.10ms / 0.35 V	$di/dt = -1.3\text{A}/\mu\text{s}$ 800 μs / 0.60 V	$di/dt = -0.83\text{A}/\mu\text{s}$ 1.30ms / 0.35 V	$di/dt = -1.3\text{A}/\mu\text{s}$ 800 μs / 0.70 V
	-	-	$di/dt = -0.7\text{A}/\mu\text{s}$ 800 μs / 0.60 V	$di/dt = -0.6\text{A}/\mu\text{s}$ 1.90ms / 0.35 V	$di/dt = -0.6\text{A}/\mu\text{s}$ 1.00ms / 0.70 V
	-	-	-	-	$di/dt = -0.6\text{A}/\mu\text{s}$ 1.20ms / 0.50 V
	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 <i>without Power Sink</i> Unit with Hi Speed Programming Option Fall time at no load (90 – 10%) Fall time at no load <i>without Power Sink</i>	(15 $\rightarrow$ 0 V) 8ms 2s P202 + P211 320 μs 60ms	(35 $\rightarrow$ 0 V) 18ms 5.5s P203 + P212 570 μs 200ms	(52 $\rightarrow$ 0 V) 10ms 4s P204 + P212 650 μs 270ms	(26/52 $\rightarrow$ 0 V) 10ms / 45ms 4s / 7.5s P205 + P213 550 μs / 1.2ms 170ms / 550ms	(70 $\rightarrow$ 0 V) 18ms 5.5s P206 + P214 1.0ms 550ms
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 30V, the max sink current will be 6.7 A ($30\text{ V} \times 6.7\text{ A} = 200\text{ W} = \text{max power}$).
- 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 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