

# SM800 - Power Sink Option

2 Quadrant operation: Source and Sink



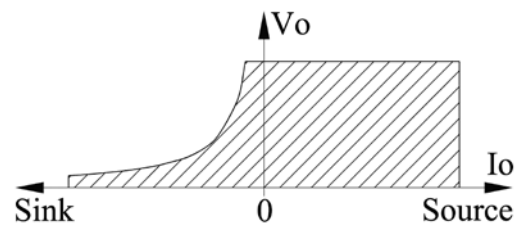
SM70-AR-24

Models	Order-Code
SM 7.5-80	Option P245
SM 18-50	Option P246
SM 70-AR-24	Option P247
SM 400-AR-4	Option P248

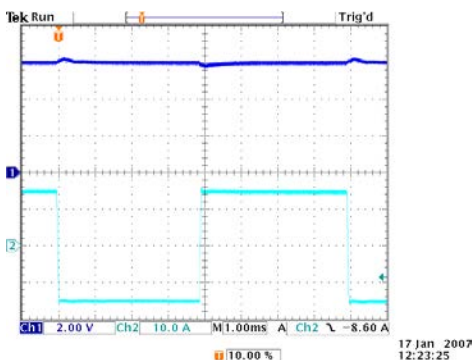
Order code table

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.

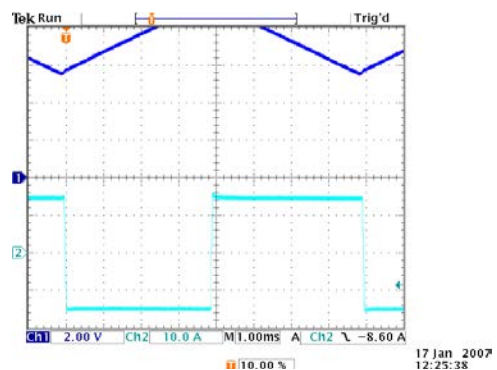


- Can absorb up to 140 W peak power
- Maintains output voltage setting regardless output power is positive or negative (source and sink)
- Ideal solution for supplying electric motors with PWM-speed control. These systems often return power to the power supply during a braking action
- Ideal solution for ATE systems requiring fast down programming at no load conditions
- Generation Automotive waveforms (fast)



SM18-AR-50 **with** Power Sink Option  
Current  $-15\text{ A}$  means the load delivers  $15\text{ A}$  to the power supply (sink operation)

Upper trace: output voltage  
Lower trace: output current  
(current switching from  $+15\text{ A}$  to  $-15\text{ A}$  at  $V_o=6\text{ V}$ )

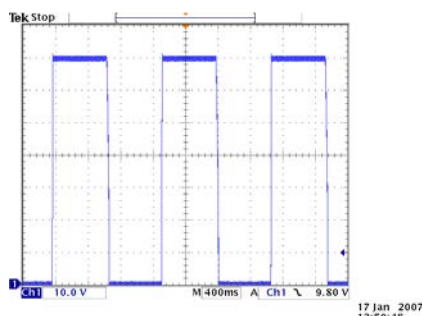


SM18-AR-50 **without** Power Sink Option  
The output voltage is out of control when the output current is **negative**

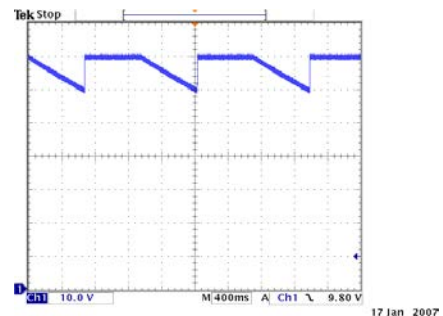
Upper trace: output voltage  
Lower trace: output current  
(current switching from  $+15\text{ A}$  to  $-15\text{ A}$  at  $V_o=6\text{ V}$ )

Power Sink Specifications	SM7.5-80 <i>Option P245</i>	SM18-50 <i>Option P246</i>	SM70-AR-24 <i>Option P247</i>	SM400-AR-4 <i>Option P248</i>
<b>Sink Power Rating</b> max. peak power (electronically limited) max. continuous power ( $T_{amb.} = 25\text{ }^{\circ}\text{C}$ ) max. continuous power ( $T_{amb.} = 50\text{ }^{\circ}\text{C}$ )	140W 140W 110W			
<b>Max duration Sink Peak Power</b> $P_{sink} = 140\text{ W}$ , $T_{amb.} = 25\text{ }^{\circ}\text{C}$ <b>Duty cycle for use a Peak Power</b> $P_{sink} = 140\text{ W}$ , $T_{amb.} = 25\text{ }^{\circ}\text{C}$	Continuous  100%			
<b>Max Sink Current</b> ( $V_0 \geq 2\text{ V}$ and $P \leq 140\text{ W}$ )	Limited at 36 A	Limited at 36 A	Limited at 25 A	Limited at 5 A
<b>Protection</b>	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.			
<b>Recovery time / Deviation</b> $V_0 = 6\text{ V}$ , $I_0: +30\text{ A} \rightarrow -10\text{ A}$ recovery within 100 mV / deviation:  $V_0 = 15\text{ V}$ , $I_0: +20\text{ A} \rightarrow -4\text{ A}$ recovery within 100 mV / deviation:  $V_0 = 24\text{ V}$ , $I_0: +15\text{ A} \rightarrow -2\text{ A}$ recovery within 100 mV / deviation:  $V_0 = 60\text{ V}$ , $I_0: +9\text{ A} \rightarrow -1\text{ A}$ recovery within 100 mV / deviation:  $V_0 = 150\text{ V}$ , $I_0: +3\text{ A} \rightarrow -0.5\text{ A}$ recovery within 1 V / deviation:  $V_0 = 350\text{ V}$ , $I_0: +1\text{ A} \rightarrow -0.1\text{ A}$ recovery within 1 V / deviation:  <i>(load current switches from positive to negative)</i>	$di/dt = -0.7\text{ A}/\mu\text{s}$ 200 $\mu\text{s}$ / 0.15 V	$di/dt = -0.7\text{ A}/\mu\text{s}$ 400 $\mu\text{s}$ / 0.25 V  $di/dt = -0.5\text{ A}/\mu\text{s}$ 700 $\mu\text{s}$ / 0.20 V	-  $di/dt = -0.5\text{ A}/\mu\text{s}$ 700 $\mu\text{s}$ / 0.85 V  $di/dt = -0.4\text{ A}/\mu\text{s}$ 800 $\mu\text{s}$ / 0.75 V  $di/dt = -0.3\text{ A}/\mu\text{s}$ 4ms / 0.65 V	-  -  -  $di/dt = -0.1\text{ A}/\mu\text{s}$ 800 $\mu\text{s}$ / 4.0 V  $di/dt = -0.05\text{ A}/\mu\text{s}$ 2.0ms / 2.7 V  <i>note: values are typical</i>
<b>Programming Down Speed</b>  Fall time at <b>no load</b> (90 – 10%) Fall time at no load <i>without Power Sink</i>  Unit with Hi Speed Programming Option Fall time at <b>no load</b> (90 – 10%) Fall time at no load <i>without Power Sink</i>	(7.5 → 0 V) 6.5ms 5s  <b>P245 + P250</b> 120 $\mu\text{s}$ 65ms	(18 → 0 V) 17ms 6s  <b>P246 + P251</b> 390 $\mu\text{s}$ 210ms	(70 → 0 V) 25ms 4s  <b>P247 + P252</b> 1ms 760ms	(400 → 0 V) 19ms 4.5s  <b>P248 + P253</b> <i>Not possible.</i>
<b>Parallel and Series operation</b> 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 4.7 A ( $30\text{ V} \times 4.7\text{ A} = 140\text{ W} = \text{max power}$ ).  
- A higher sink current than the maximum current will cause the output voltage to rise.



**SM70-AR-24 with Power Sink Option**  
fast discharge of output capacitors by Power Sink circuit  
  
Trace: output voltage  
Voltage Programming Speed at NO LOAD



**SM70-AR-24 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