

POWER-GATE™ Solid-State Devices

OR'ing (programmable)

Specification Sheet

Generation 3.0

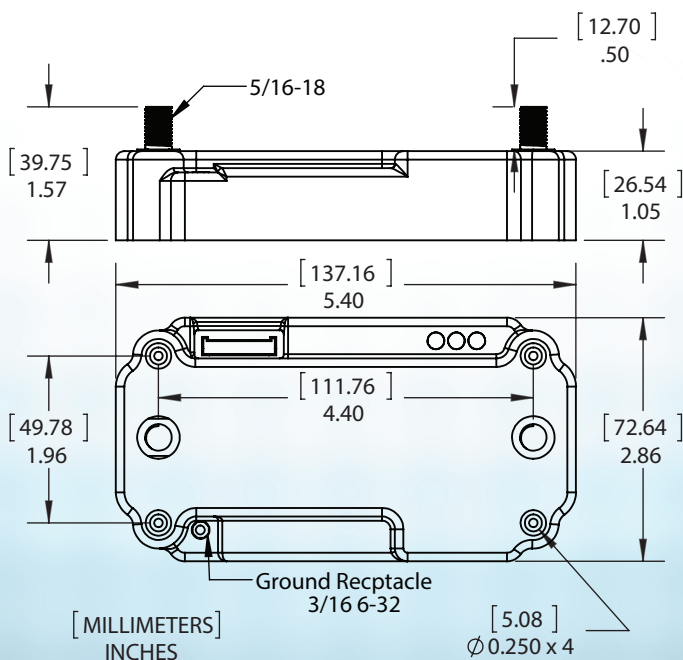


The POWER-GATE Programmable OR'ing functionality is achieved using two, bi-directional solid state relays (RB devices). For Absolute Maximum Ratings, Recommended Operating Conditions, and Electrical Specifications, please view the specification sheet for the POWER-GATE Bi-Directional Relays located on our website. The information herein relates to OR'ing performance when deployed as an RB assembly programmed to behave as a smart OR'ing device.



MECHANICAL SPECIFICATIONS

Two devices per assembly



ADDITIONAL INFORMATION

Electronic assembly inserted into ABS encapsulation shell then backfilled with black, flame retardent, filled epoxy specifically developed for the potting of electronic modules.

Four integrated mounting holes pre-drilled to .250"

Mounting posts, 5/16-18 x .50" with provided brass washers and nylon insert 5/16-18 nuts. Mounting torque not to exceed 75 inch-pounds or 8.5 newton-meters.

SWITCHING SPECIFICATIONS

All devices, $T_A = 25 \pm 3 \text{ }^\circ\text{C}$, relays operated within recommended operating conditions,
all voltages referenced to relay ground, unless otherwise specified.

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
t_{sw}	Switching delay when primary source falls below programmed under-voltage threshold	-	5.6	-	ms	V_p : 28 to 18 V, V_s = 24 V, Primary under-voltage trip threshold = 25 V
$t_{DT,P2S}$	Load deadtime when switching sources, after primary source falls below programmed under-voltage trip threshold	-	0.76	-		V_p : 28 to 18 V, V_s = 24 V, Primary under-voltage trip threshold = 25 V
$t_{DT,S2P}$	Load deadtime when switching sources, after primary source rises above programmed under-voltage reset threshold	-	4.0	-		V_p : 18 to 28 V, V_s = 24 V, Primary under-voltage reset threshold = 26.5 V

NOTES:

- 1) V_p = Primary Source Voltage, V_s = Secondary Source Voltage, V_L = Load Voltage
- 2) Operating current for both relays drawn from primary source when $V_p > V_s - 3.6 \text{ V}$, from secondary source otherwise.
- 3) Switching delay defined as difference between time when V_p falls below under-voltage trip threshold and time when, after secondary relay turns on, $V_L = V_s$.
- 4) Load deadtime defined as difference between time when V_L falls below 5 V (when primary relay is turning off), and the time when V_L rises above 5 V (when secondary relay is turning on).

TYPICAL PERFORMANCE

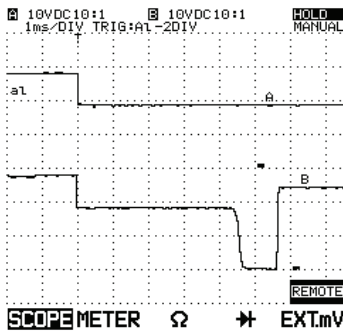


Figure 1: Switching delay when primary source falls below programmed under-voltage threshold.

Top Trace: V_p
Bottom Trace: V_L
 V_p : 28 to 18 V, V_s = 24 V

Primary source under-voltage trip threshold = 25 V

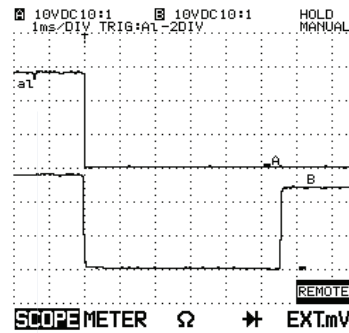


Figure 2: Switching delay when primary source falls shorted to ground.

Top Trace: V_p
Bottom Trace: V_L
 V_p : 28 to 0 V, V_s = 24 V

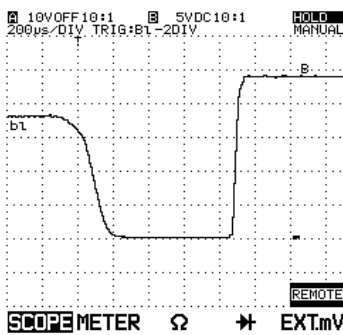


Figure 3: Load deadtime when switching sources, after primary source falls below programmed under-voltage trip threshold.

Trace: V_L
 V_p : 28 to 18 V, V_s = 24 V

Primary source under-voltage trip threshold = 25 V

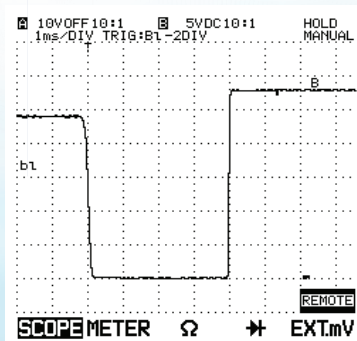


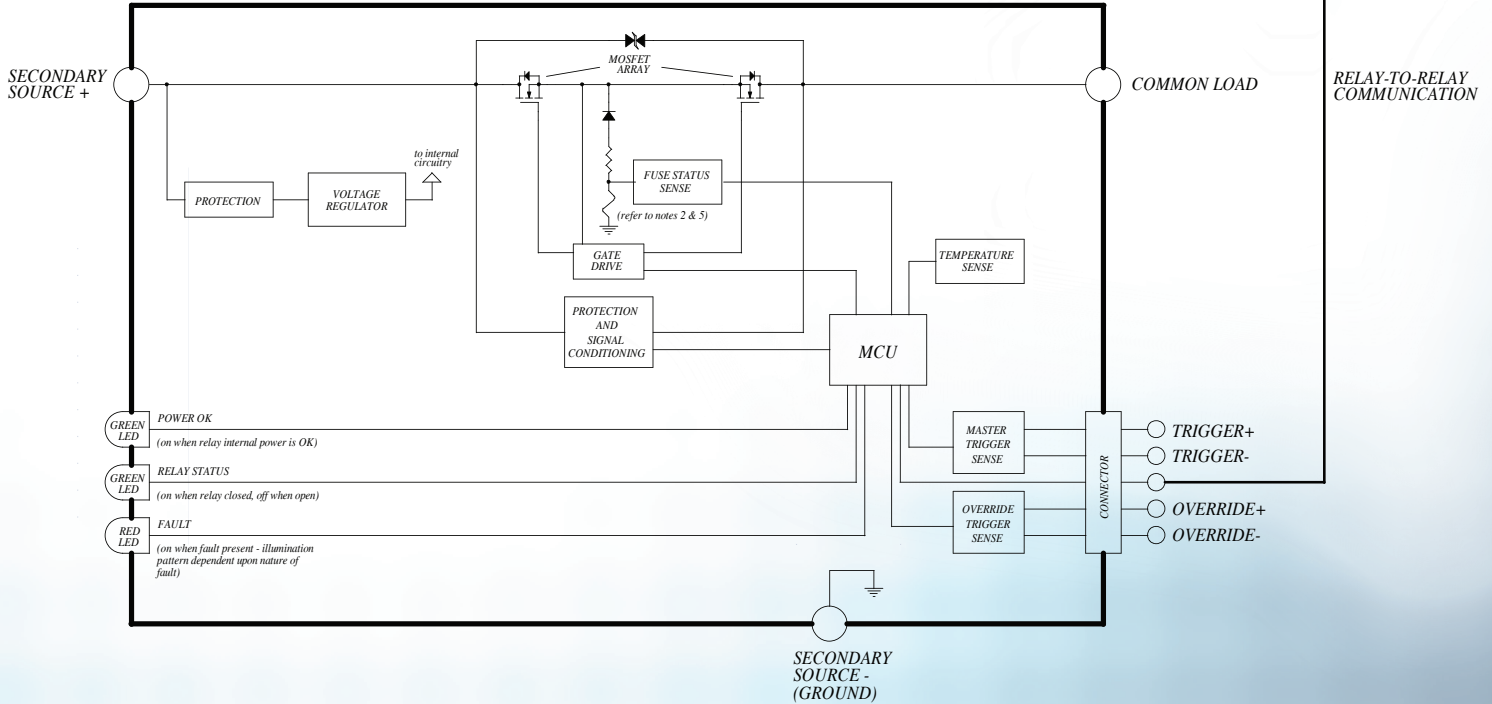
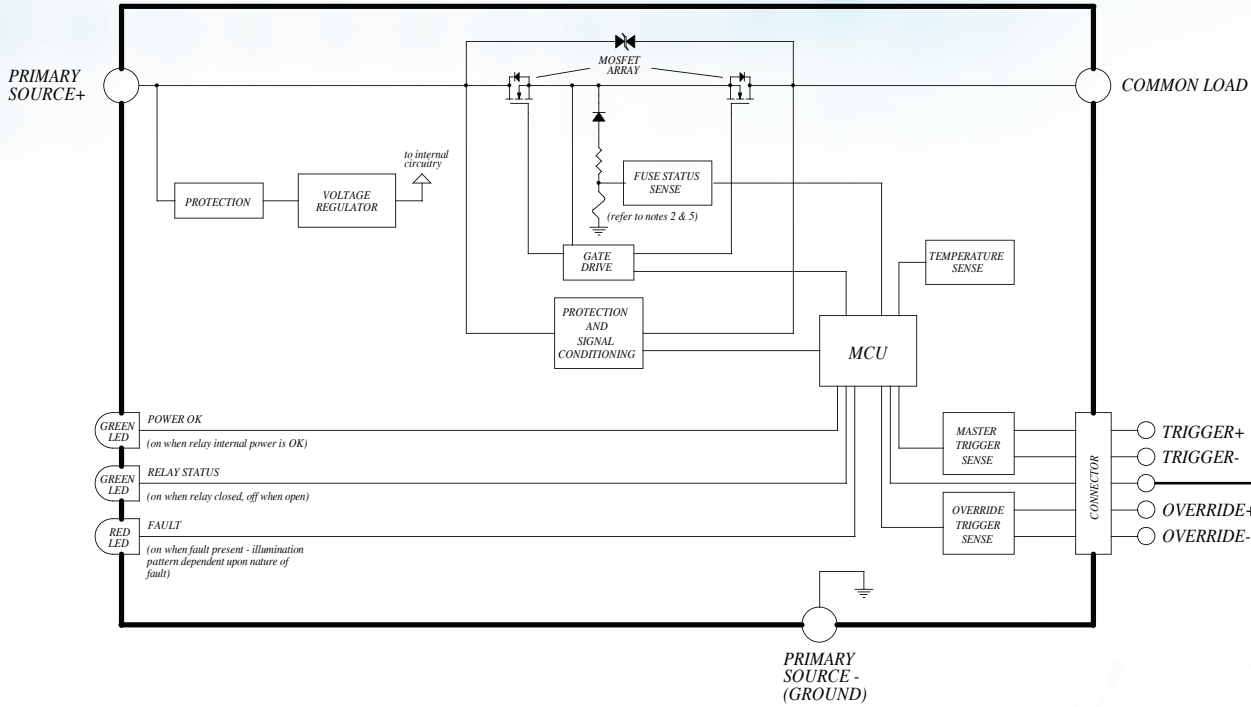
Figure 4: Load deadtime when switching sources, after primary source rises above programmed under-voltage reset threshold.

Trace: V_L
 V_p : 18 to 28 V, V_s = 24 V

Primary source under-voltage reset threshold = 26.5 V

FUNCTIONAL BLOCK DIAGRAM

Diagram 1



POWER-GATE programmable OR'ing configuration is designed to selectively connect one of two sources to a common load. As opposed to the non-programmable OR'ing diodes, which connect the higher of two sources to the common load, regardless of the source's absolute voltages, the programmable OR'ing configuration allows the user to choose any switching voltage threshold and delay. For example, a common configuration (shown below) is to OR a primary power supply and a backup battery. When the primary source voltage falls and stays below the user-defined under-voltage trip threshold for the user-defined delay, its corresponding relay will automatically disconnect the primary source from the load and command the load to be connected to the backup battery. When the primary source voltage then rises and stays above the user-defined under-voltage reset threshold for the user-defined delay, the load will automatically be disconnected from the backup battery and reconnected to the primary source.

The relays are configured standard as break-before-make, resulting in a short dead-time (refer to switching specifications) where the load is connected to neither source. This prevents cross-conduction between the sources, which is especially important if one source becomes shorted to ground.

