



Part Number*	Relay Description
RA00HQ	25 A AC Solid State Relay
RA58HQ	25 A AC Solid State Relay with Thermal Protection and Thermal TRIP Status

* The Y suffix denotes parameters tested to MIL-R-28750 specifications. The W suffix denotes parameters tested to Teledyne specifications.

ELECTRICAL SPECIFICATIONS

(-55°C TO +110°C)

INPUT (CONTROL) SPECIFICATION

2 Terminal Configuration (See Figure 1)	Min	Max	Units
Input Voltage (See Note 2)	3.8	32	Vdc
Input Current	(V _{INPUT} = 5 Vdc)		15 mA
	(V _{INPUT} = 32 Vdc)		16
Turn-On Input Voltage	3.8		Vdc
Turn-Off Input Voltage		1.5	Vdc
Reverse Polarity		-32	Vdc

INPUT (CONTROL) SPECIFICATION

3 Terminal Configuration (See Figure 1)	Min	Max	Units
Bias Voltage (See Note 2)	3.8	32	Vdc
Bias Current (V _{INPUT} = 32 Vdc)		16	mA
Control Voltage Range	0	18	Vdc
Control Current at 5 Vdc		250	μAdc
Turn-On Control Voltage		0.3	Vdc
Turn-Off Control Voltage	3.2		Vdc

OUTPUT (LOAD) SPECIFICATIONS

	Min	Max	Units
Load Voltage	20	250	Vac
Frequency Range	40	440	Hz
Continuous Load Current (See Figure 3)	RA Series without heat sink		0.2 5 A
	RA Series with heat sink		0.2 25
Output Voltage Drop		1.5	Vrms
Surge Current, at 25°C		100	Arms

FEATURES/BENEFITS

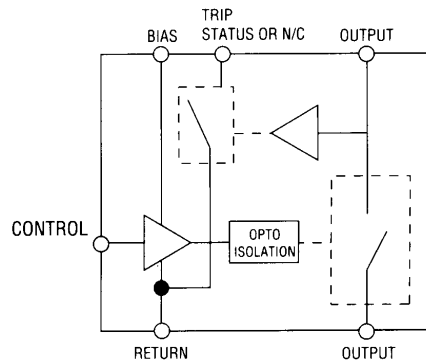
- Available with thermal protection and thermal TRIP status- Provides self-protection from thermal runaway conditions and indicates protection state for system BIT.
- Optical Isolation- Isolates control elements from load transients with reduced EMI.
- Fully Floating Output- Eliminates ground potential loops and allows the output to sink or source current.
- Buffered Control- Relay can be controlled directly from TTL or CMOS logic circuits.
- Integral Snubber Circuit- Enhances dV/dt capability while minimizing EMI.

DESCRIPTION

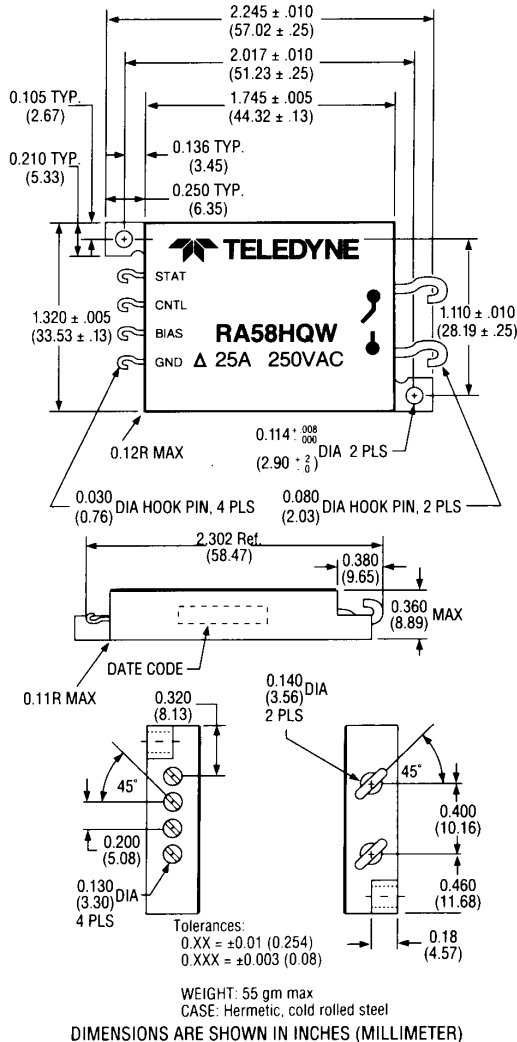
The RA series of solid state relays (SSRs) is designed for use in AC power switching applications where safety and reliability are primary concerns. These SSRs are rated for load voltages up to 250 Vrms from 40 to 440 Hz and are ideal for resistive and reactive loads with power factors as low as 0.2. Inverse parallel SCRs are configured for zero voltage turn on and can handle current surges up to 100 A. Optical isolation to 1500 Vrms between the control (input) and load (output) allows the load to be safely controlled by logic circuitry.

The RA series is available with thermal protection and thermal TRIP status. In case of a thermal runaway condition, the SSR will shut down the output switch and latch off until the input is reset and the junction temperature returns to a safe level. When the output does latch off, the TRIP status line will yield a logic level output indicating the protection state of the SSR. This feature provides the user with failure mode indication while enhancing the system diagnostic capability. These SSRs are packaged in low profile hermetically sealed cases.

BLOCK DIAGRAM



MECHANICAL SPECIFICATIONS



OUTPUT (LOAD) SPECIFICATIONS

	Min	Max	Units
Leakage Current at 250 Vac, 400 Hz		10	mArms
Turn-On Time		1/2	cycle
Turn-Off Time		1	cycle
Zero Voltage Turn-On		±15	V pk
Load Power Factor	0.2		
dV/dt	100		V/μs
Transient Voltage, (t < 5s) (See Note 4)		±500	V pk
Thermal Trip Temperature (Case) (RA58HQ Only)	120	150	°C
Dielectric Strength (60 Hz)	1500		Vac
Insulation Resistance (@ 500 Vdc)	10 ⁹		Ohm
Input to Output Capacitance	20		pF
Junction Temperature at Rated Current	125		°C
Thermal Resistance Junction to Case	0.7		°C/W
Thermal Resistance Junction to Ambient	16		°C/W

STATUS OUTPUT TRUTH TABLE

Status Output State	Control Input	Output (Load) State
Off (High)	Low	On
On (Low)	Low	Tripped
Off (High)	High	Off
On (Low)	High	Non-Applicable Condition

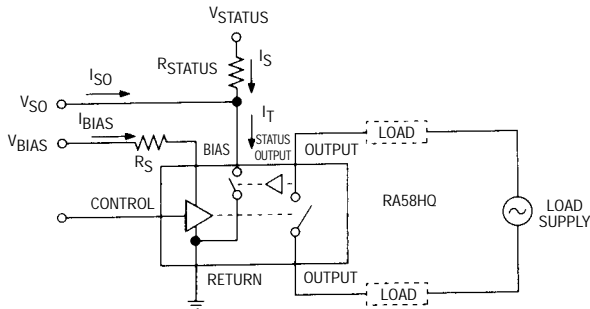
STATUS OUTPUT SPECIFICATIONS

	Min	Max	Units
Status Supply Voltage	3.8	32	Vdc
Status Leakage Current @ 32 Vdc	10		μAdc
Status Sink Current ($V_{SO} \leq 0.4$ Vdc)	10		mAdc

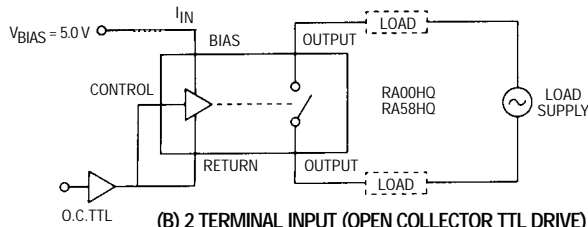
SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

ENVIRONMENTAL SPECIFICATIONS

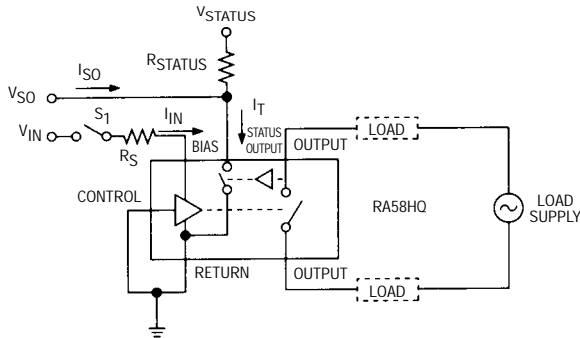
Temperature Range	Operating	-55°C to +110°C
	Storage	-55°C to +125°C
Vibration		30 g, 10 to 2000 Hz
Constant Acceleration		5000 g
Shock		100 g, 6 ms pulse



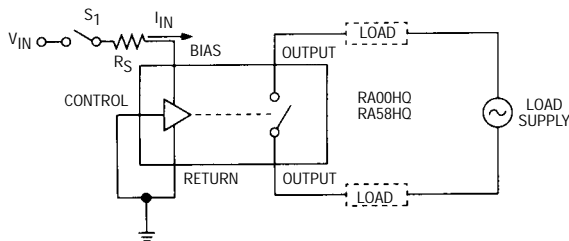
(A) 3 terminal input with status (See Note 5)



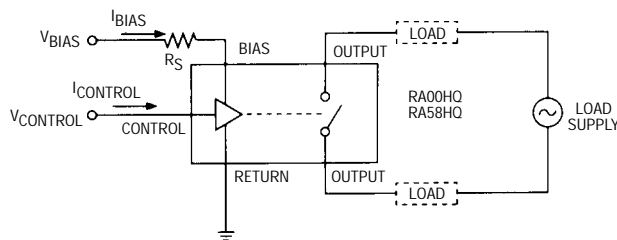
(B) 2 terminal input (open collector TTL drive)



(C) 2 terminal input (direct drive) with status

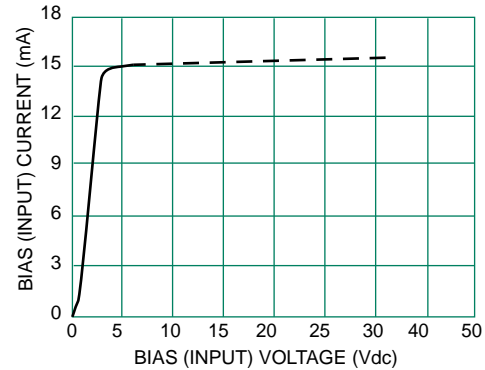


(D) 2 terminal input (direct drive)

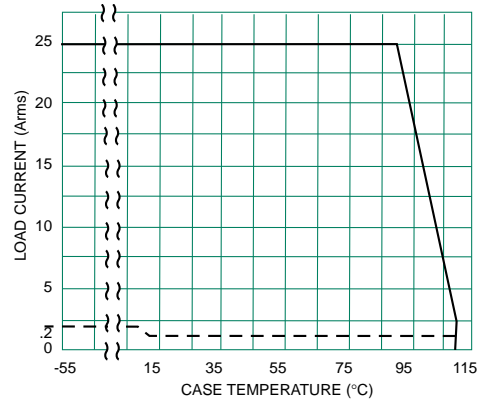


(E) 3 terminal input without status

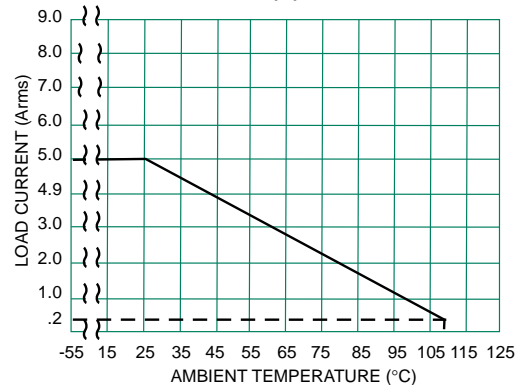
WIRING CONFIGURATIONS
FIGURE 1 (See Notes 1 & 2)



INPUT CURRENT VS VOLTAGE
FIGURE 2 (See Note 2)

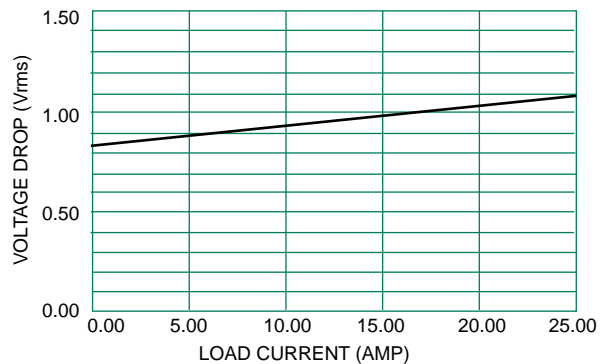


RA SERIES WITH HEAT SINK
(A)

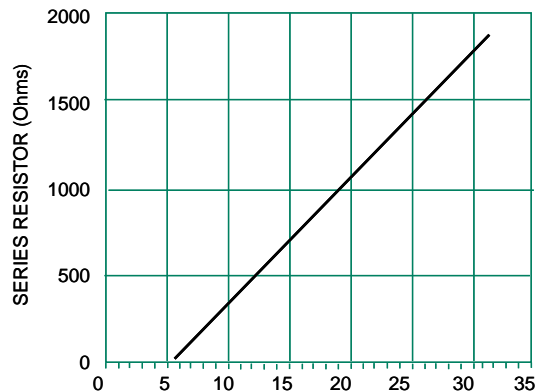


RA SERIES WITHOUT HEATSINK
(B)

THERMAL DERATING CURVES
FIGURE 3



**TYPICAL OUTPUT VOLTAGE DROP VS LOAD
CURRENT AT 25°C AMBIENT
(With 2° C/W Heatsink)
FIGURE 4**



**SERIES LIMIT BIAS RESISTOR VS BIAS VOLTAGE
FIGURE 5 (See Note 2)**

NOTES:

1. Control input is compatible with CMOS or open collector TTL (with pull up resistor).
2. For bias voltages above 6 Vdc, a series resistor is recommended. Use a standard resistor value equal to or less than the value found from Figure 5.
3. Unless otherwise noted, the input voltage for functional tests shall be 5 Vdc.
4. Transient suppression must be used to limit the voltage to < 500 Vpeak when switching inductive loads. Load voltage must be applied before turning ON an inductive load.
5. Control input implies presence of bias voltage.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE