



Description

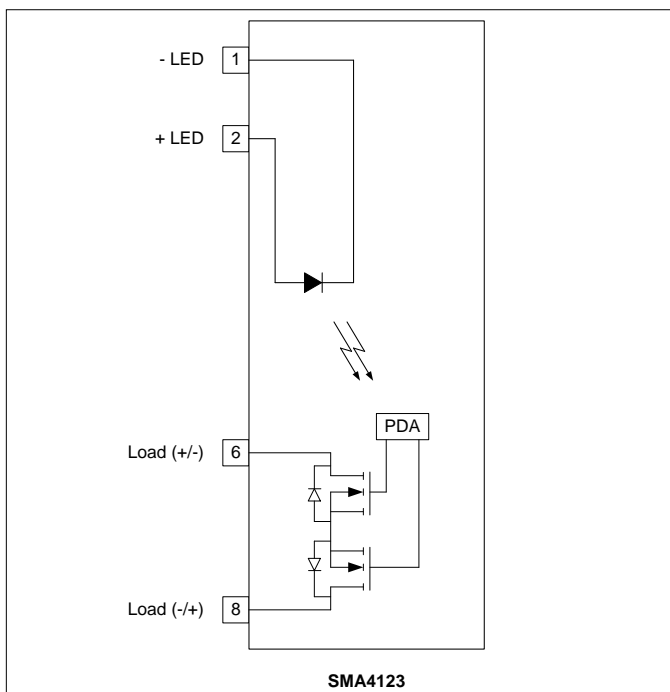
The SMA4123 is a single-pole, single-throw, normally open multipurpose solid state relay. The circuit is composed of an infra-red LED on the input side optically coupled to a Photo Diode Array which drives back-to-back low on resistance enhancement type DMOS transistors on the output. The SMA4123 has a low on resistance of 160mΩ (TYP) and a high continuous load current rating of up to 2.2 amps.

The SMA4123 comes standard in a 4 pin SIP package.

Applications

- Reed Relay Replacement
- Mechanical Relay Replacement
- Medical Equipment
- Battery Monitoring
- Multiplexers
- Test Equipment

Schematic Diagram



Features

- High Load Current (2.2A MAX)
- Low Input Control Current (1.5mA TYP)
- Low On Resistance (160mΩ TYP)
- High Input-to-Output Isolation (5kV option)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL/C-UL: File # E90096
VDE: File # 40035191 (EN 60747-5-2)

Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature-55 to +125°C
Operating Temperature-40 to +85°C
Continuous Input Current.....50mA
Transient Input Current.....500mA
Reverse Input Control Voltage5V
Input Power Dissipation.....40mW
Total Power Dissipation1.2W
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

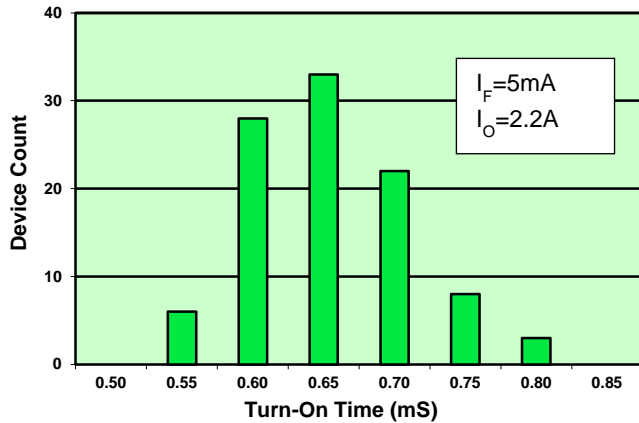
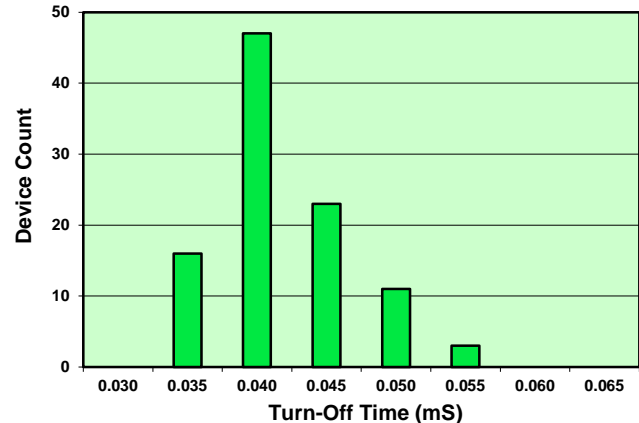
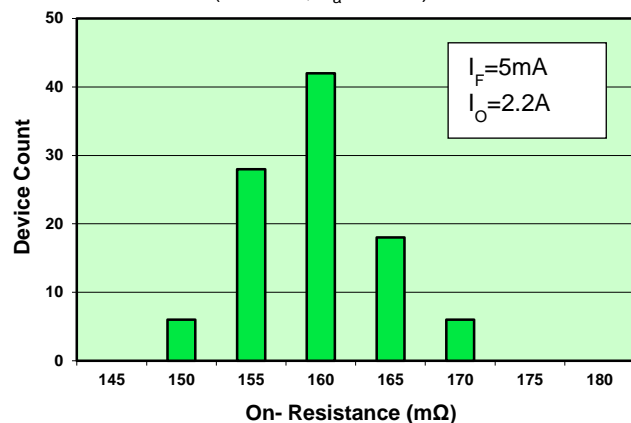
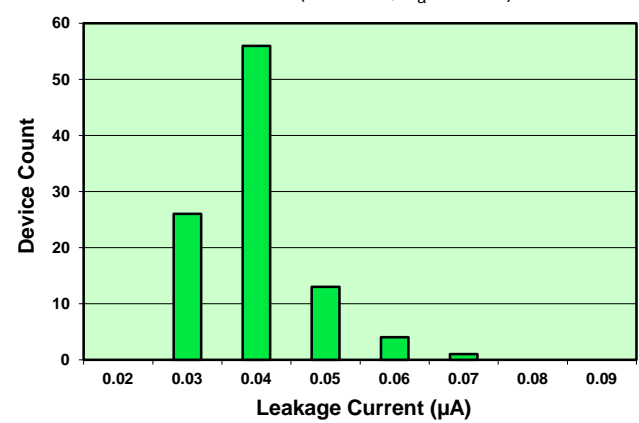
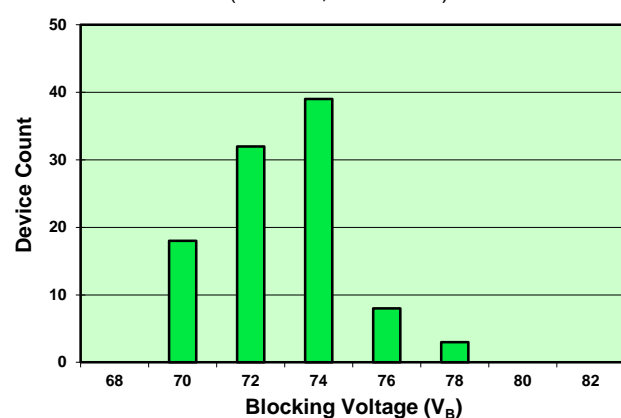
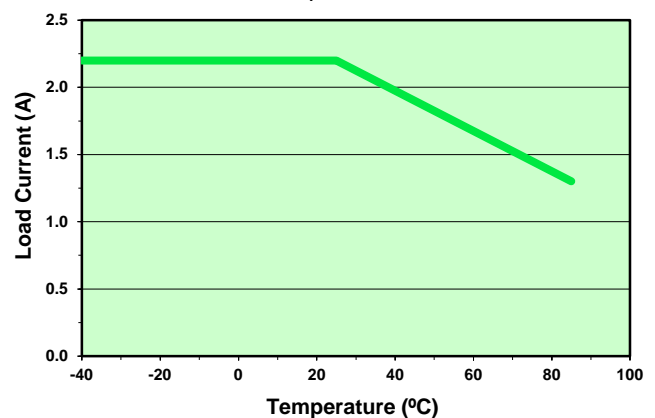
Ordering Information

Part Number	Description
SMA4123	4 pin SIP, (25/Tube)
SMA4123-H	5kV _{RMS} V _{ISO} , 4 pin SIP, (25/Tube)

NOTE: (-H) suffix listed above may not be included in marking on device for part number identification

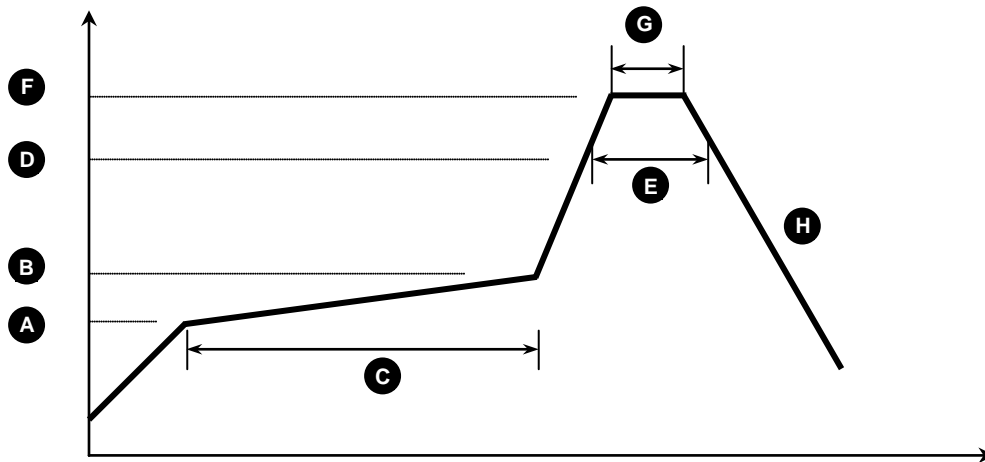
Electrical Characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.4	1.8	V	$I_F = 10\text{mA}$
LED Reverse Voltage	BV_R	5	-	-	V	$I_R = 10\mu\text{A}$
Input Reverse Current	I_R	-	-	10	μA	$V_R = 5\text{V}$
Turn-On Current	I_F	-	1.5	5	mA	$I_O = 2.2\text{A}$
Turn-Off Current	I_{FOFF}	-	0.5	-	mA	$I_O = 2.2\text{A}$
Output Specifications						
Blocking Voltage	V_B	60	-	-	V	$I_F = 0\text{mA}$, $I_O = 1\mu\text{A}$
Continuous Load Current	I_O	-	-	2.2	A	$I_F = 5\text{mA}$
On Resistance	R_{ON}	-	160	200	mΩ	$I_F = 5\text{mA}$, $I_O = 2.2\text{A}$
Leakage Current	I_{leak}	-	0.1	1	μA	$I_F = 0\text{mA}$, $V_O = 600\text{V}$
Output Capacitance	C_{OUT}	-	20	-	pF	$V_O = 25\text{V}$, $f = 1.0\text{MHz}$
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	$I_F = 10\text{mA}$
Coupled Specifications						
Turn-On Time	T_{ON}	-	1	2	mS	$I_F = 5\text{mA}$, $I_O = 2.2\text{A}$
Turn-Off Time	T_{OFF}	-	0.1	1	mS	$I_F = 0\text{mA}$, $I_O = 2.2\text{A}$
Coupled Capacitance	C_{COUPLED}	-	2	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/ μS	$dV = 50\text{V}$
Isolation Specifications						
Isolation Voltage	V_{ISO}	3,750	-	-	V_{RMS}	$\text{RH} \leq 50\%$, $t = 1\text{min}$
-H Option		5,000	-	-		
Input-Output Resistance	$R_{\text{I-O}}$	-	10^{12}	-	Ω	$V_{\text{I-O}} = 500\text{V}_{\text{DC}}$

SMA4123 Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)
Figure 1: Typical Turn-On Time Distribution
(N = 100, $T_a = 25^\circ\text{C}$)

Figure 2: Typical Turn-Off Time Distribution
(N = 100, $T_a = 25^\circ\text{C}$)

Figure 3: Typical On-Resistance Distribution
(N = 100, $T_a = 25^\circ\text{C}$)

Figure 4: Typical Output Leakage Current Distribution
(N = 100, $T_a = 25^\circ\text{C}$)

Figure 5: Typical Blocking Voltage Distribution
(N = 100, $T_a = 25^\circ\text{C}$)

Figure 6: Maximum Load Current vs. Temperature


SMA4123 Solder Reflow Temperature Profile Recommendations
(1) Infrared Reflow:

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250°C:



Process Step	Description	Parameter
A	Preheat Start Temperature (°C)	150°C
B	Preheat Finish Temperature (°C)	180°C
C	Preheat Time (s)	90 - 120s
D	Melting Temperature (°C)	230°C
E	Time above Melting Temperature (s)	30s
F	Peak Temperature, at Terminal (°C)	260°C
G	Dwell Time at Peak Temperature (s)	10s
H	Cool-down (°C/s)	<6°C/s

(2) Wave Solder:

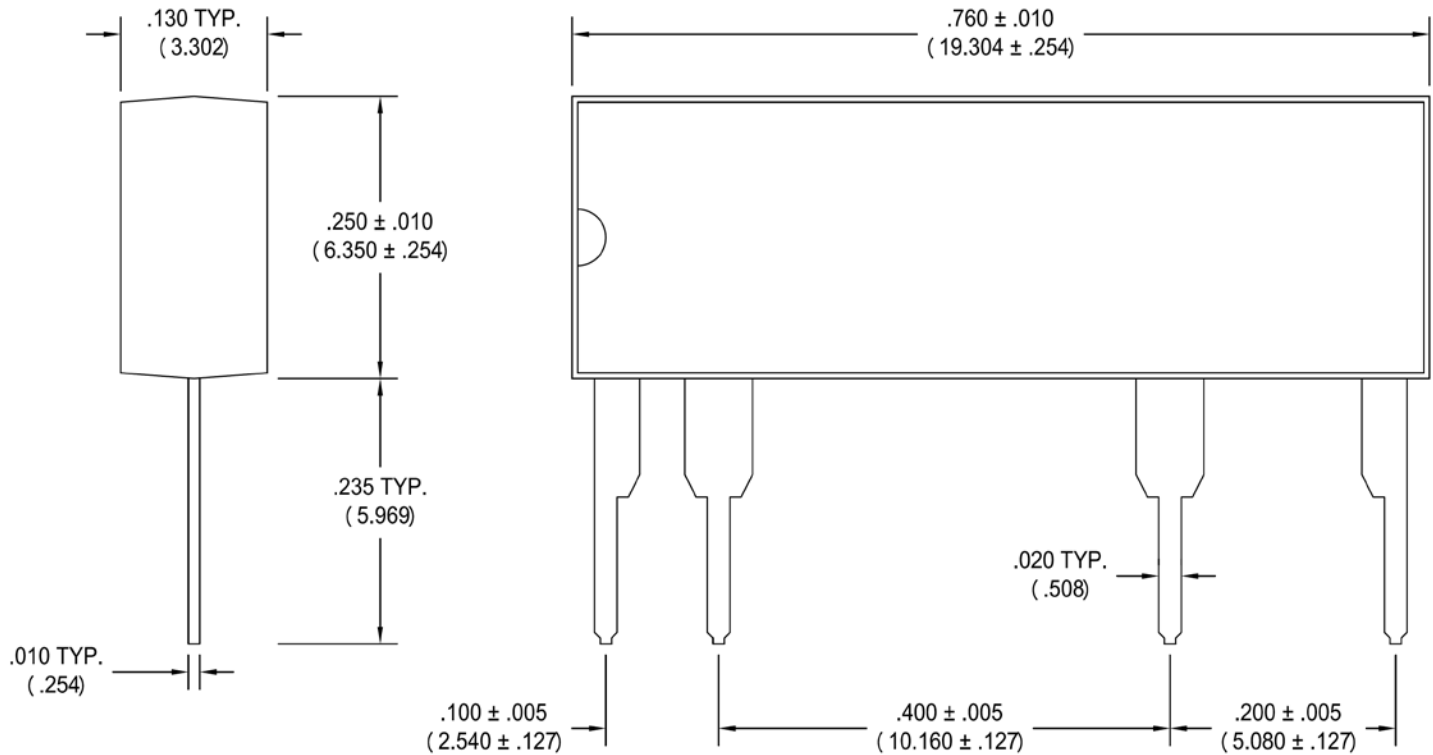
Maximum Temperature: 260°C (at terminal)
Maximum Time: 10s
Pre-heating: 100 - 150°C (30 - 90s)
Single Occurrence

(3) Hand Solder:

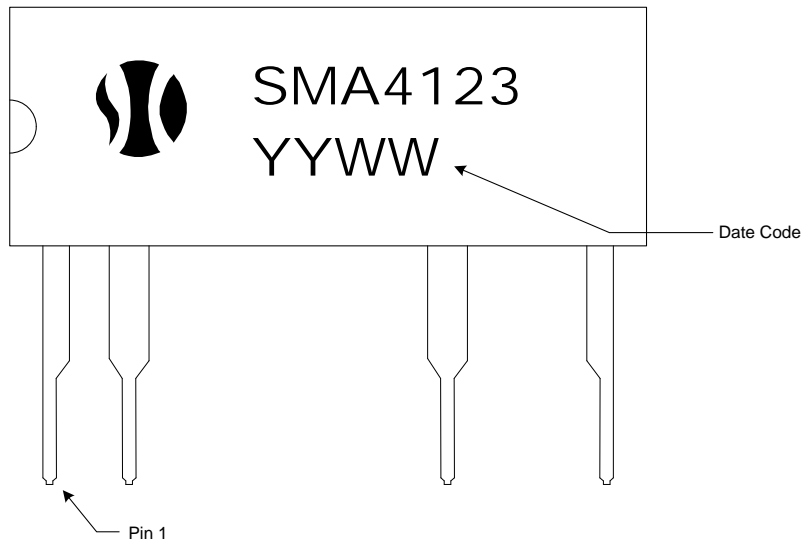
Maximum Temperature: 350°C (at tip of soldering iron)
Maximum Time: 3s
Single Occurrence

SMA4123 Package Dimensions

4 PIN SIP Package

Note: All dimensions in inches with millimeters [mm] in parenthesis ()


SMA4123 Package Marking



SMA4123 Package Weights

Device	Single Unit	Full Tube (25pcs)	Full Pouch (10 tubes)
SMA4123	0.88	35	370

Note: All weights above are in GRAMS, and include packaging materials where applicable

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