



## Description

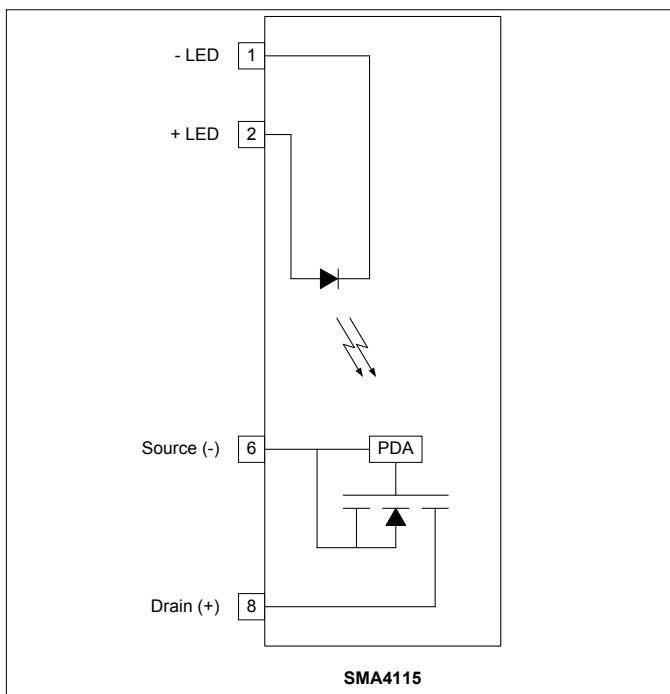
The SMA4115 is a DC, single-pole, single-throw, normally open solid-state relay in a 4 pin single inline package. The relay consists of an AlGaAs LED, optically coupled to a high performance Photo Diode Array (PDA), which in turn drives one low on-resistance, rugged source-to-source enhancement type DMOS transistor. The SMA4115 has an extremely low on resistance of 50mΩ (TYP) and a very high continuous load current rating of up to 3.4A. The combination of low on-resistance, small package outline and high load current capabilities make the SMA4115 a unique, unparallelled solid state relay.

The SMA4115 comes standard in a 4 pin SIP package.

## Applications

- Multiplexers
- Meter reading systems
- Data Acquisition
- Medical Equipment
- Battery Monitoring
- Home/Safety Security Systems

## Schematic Diagram



## Features

- Low On Resistance (75mΩ MAX)
- High Continuous Load Current (3.4A)
- Low Input Control Power Consumption (2mA TYP)
- High Input-to-Output Isolation (up to 5kV MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

## Agency Approvals

UL/C-UL: File # E201932  
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 Voltage .....	5V
Input Power Dissipation .....	40mW
Total Power Dissipation .....	1.2W
Solder Temperature – Wave (10sec).....	260°C
Solder Temperature – IR Reflow (10sec).....	260°C

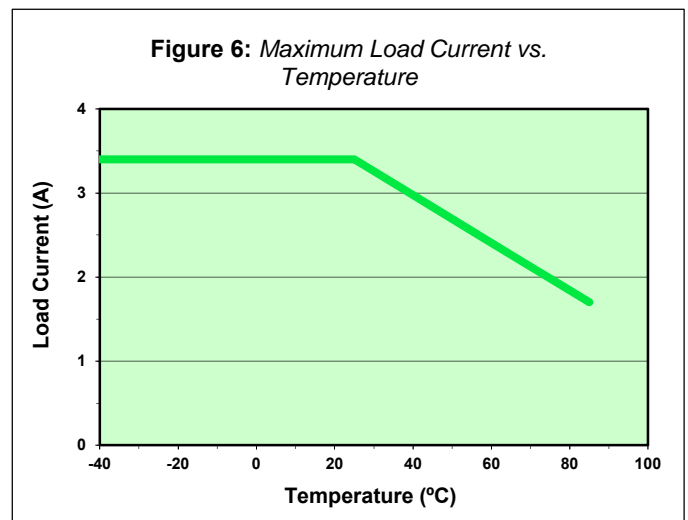
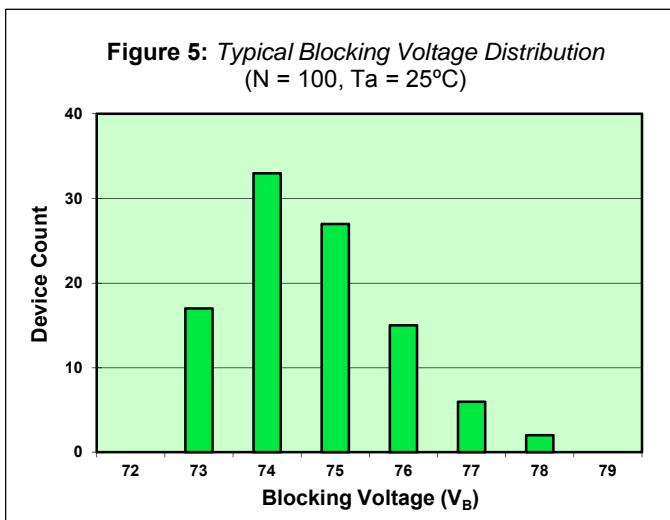
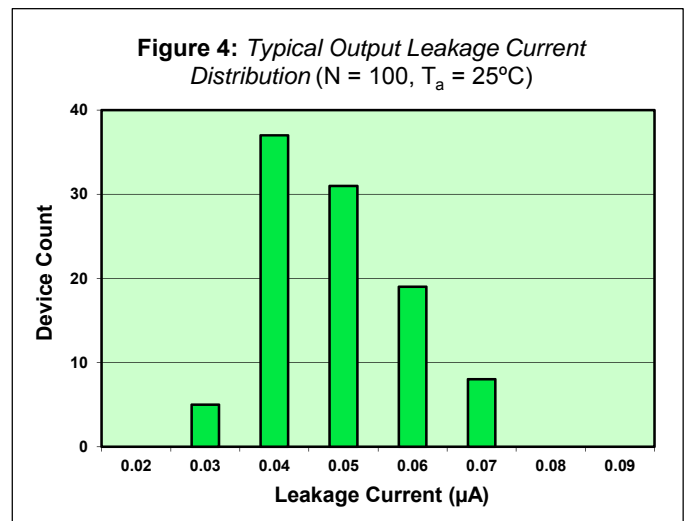
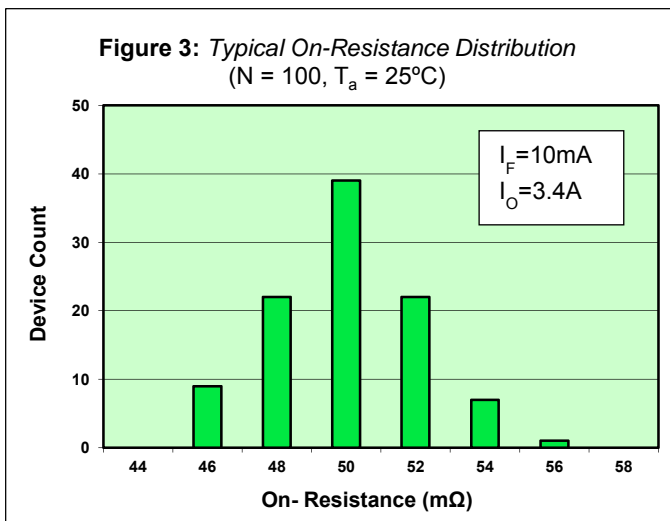
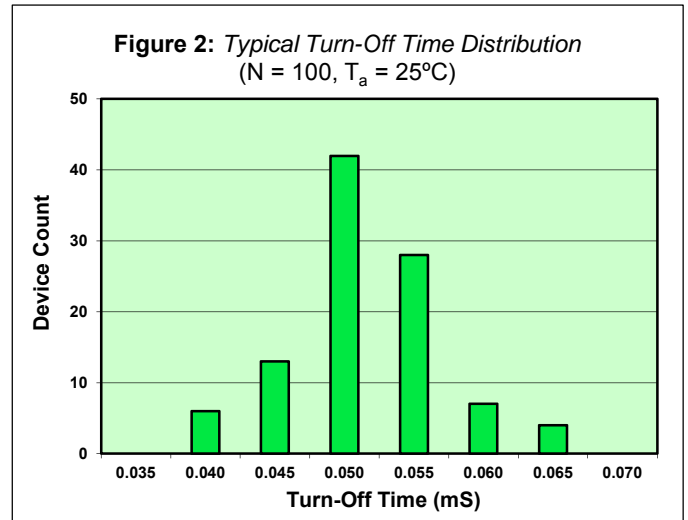
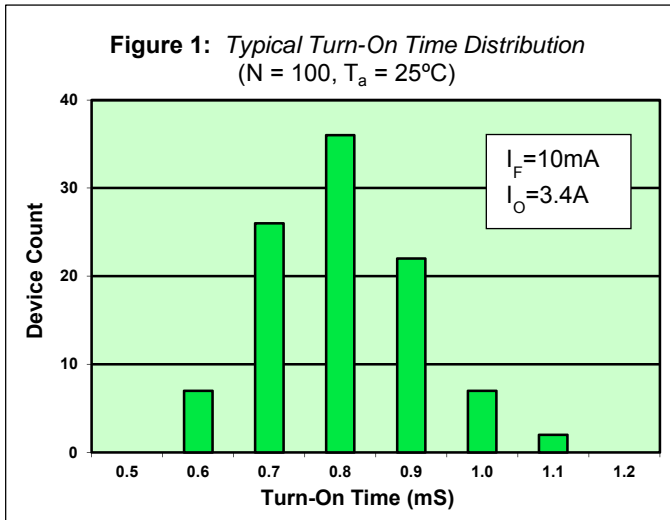
## Ordering Information

Part Number	Description
SMA4115	4 pin SIP, (25/Tube)
SMA4115-H	4 pin SIP, V <sub>ISO</sub> = 5kV, (25/Tube)

**NOTE:** Suffixes listed above are not included in marking on device for part number identification

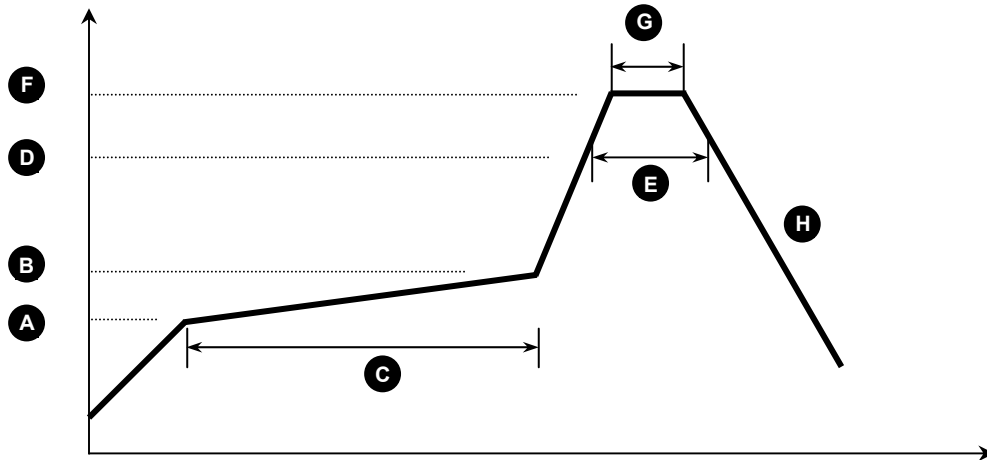
**Electrical Characteristics,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
<b>Input Specifications</b>						
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	$\mu\text{A}$	$V_R = 5\text{V}$
Turn-On Current	$I_F$	-	2	10	mA	$I_O = I_{O(\text{MAX})}$
Turn-Off Current	$I_{\text{FOFF}}$	-	1	-	mA	$I_O = I_{O(\text{MAX})}$
<b>Output Specifications</b>						
Blocking Voltage	$V_B$	60	-	-	V	$I_F = 0\text{mA}, I_O = 1\mu\text{A}$
Continuous Load Current	$I_O$	-	-	3.4	A	$I_F = 10\text{mA}$
On Resistance	$R_{\text{ON}}$	-	50	75	mΩ	$I_F = 10\text{mA}, I_O = I_{O(\text{MAX})}$
Leakage Current	$I_{\text{leak}}$	-	0.1	1	$\mu\text{A}$	$I_F = 0\text{mA}, V_O = 60\text{V}$
Offset Voltage	$V_{\text{OFFSET}}$	-	-	0.2	mV	$I_F = 10\text{mA}$
<b>Coupled Specifications</b>						
Turn-On Time	$T_{\text{ON}}$	-	1	5	mS	$I_F = 10\text{mA}, I_O = I_{O(\text{MAX})}, V_O = 20\text{V}$
Turn-Off Time	$T_{\text{OFF}}$	-	0.1	2	mS	$I_F = 0\text{mA}, I_O = I_{O(\text{MAX})}, V_O = 20\text{V}$
Coupled Capacitance	$C_{\text{COUPLED}}$	-	2	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/ $\mu\text{S}$	dV = 50V
<b>Isolation Specifications</b>						
Isolation Voltage (-H Option)	$V_{\text{ISO}}$	3,750	-	-	$V_{\text{RMS}}$	RH ≤ 50%, t=1min
		5,000	-	-		
Input-Output Resistance	$R_{\text{I-O}}$	-	$10^{12}$	-	Ω	$V_{\text{I-O}} = 500V_{\text{DC}}$

**SMA4115 Performance & Characteristics Plots,  $T_A = 25^\circ\text{C}$**  (unless otherwise specified)


**SMA4115 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:**

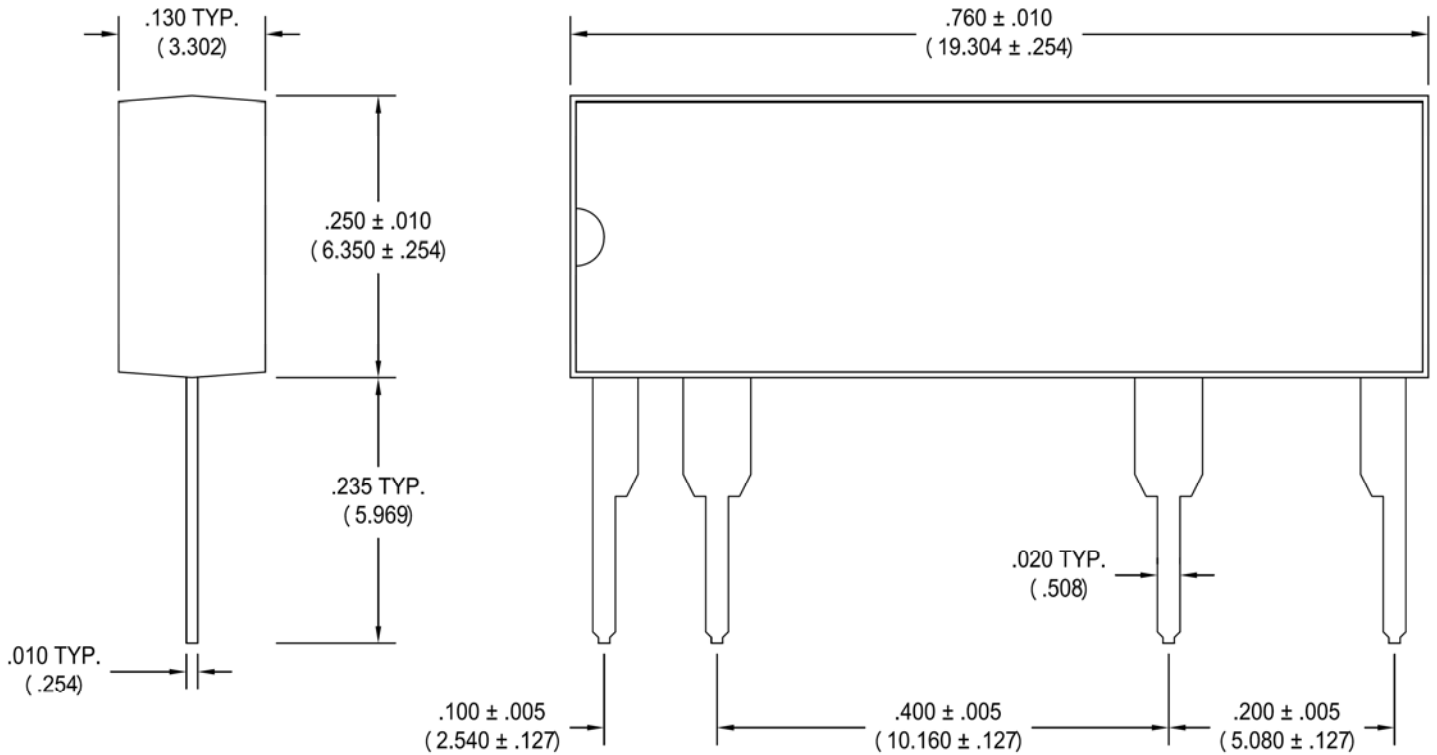
Maximum Temperature: 260°C (at terminal)  
 Maximum Time: 10s  
 Pre-heating: 100 - 150°C (30 - 90s)  
 Single Occurrence

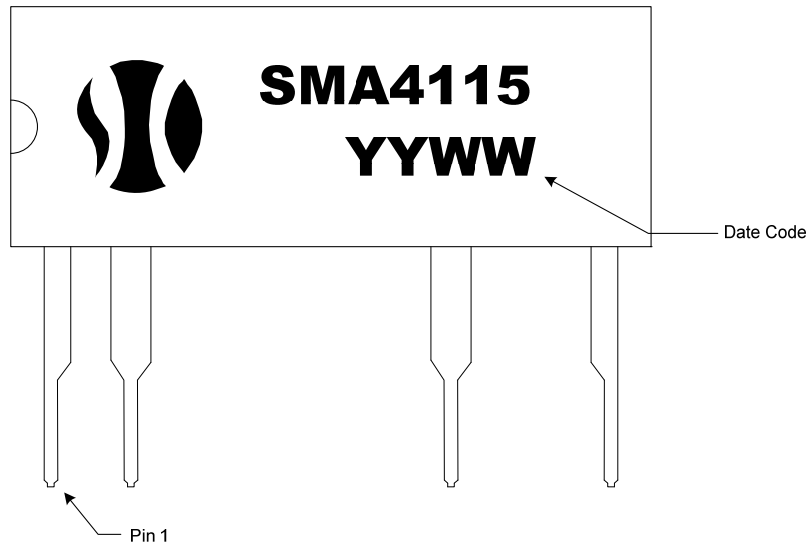
**(3) Hand Solder:**

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

**SMA4115 Package Dimensions**

4 PIN SIP Package

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


**SMA4115 Package Marking**

**SMA4115 Package Weights**

Device	Single Unit	Full Tube (25pcs)	Full Pouch (10 tubes)
SMA4115(-H)	0.88	35	370

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

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