SDH SERIES CRD

DESCRIPTION

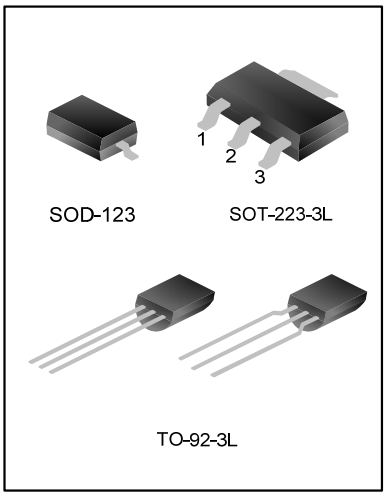
SDH series current regulative diode (CRD) is based on Silan's planar JFET process.

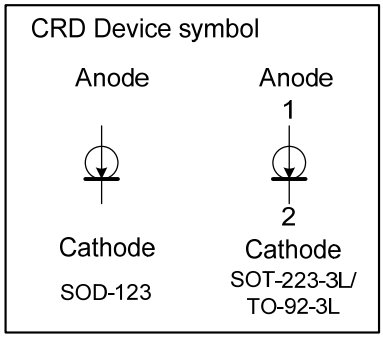
It features low start-up stabilized current supply voltage, stable constant-current characteristics and high forward breakdown voltage for its advanced process and smart design.

SDH series CRD has powerful anti-interference capacity of surge current between the anode and cathode, and no other assistant components are needed in application.

SDH series CRD supplies constant current to an electric circuit and is widely used in the constant-current LED driver, modules in phone circuitry, etc.

It is available in SOD-123, SOT-223-3L and TO-92-3L packages.





FEATURES

* Low start-up stabilized current supply voltage
* High dynamic impedance
* Constant-current range: 1mA-40mA.
* Be paralleled for current extension.
* Negative temperature coefficient for LED protection under high temperature

NOMENCLATURE

S D H X X X X

Current Regulative Diode

Package:S: SOD-123
H:SOT-223-3L
B:TO-92-3L

Current value in three figures:
The first two figures mean the value and the last one means how many "0" should be added; Unit is "μA";
e.g.: 153 denotes 15000μA, that is 15mA,
562 denotes 5600μA, that is 5.6mA,

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SDHXXXSTR	SOD-123	XXXS	Pb free	Tape&Reel
SDHXXXHTR	SOT-223-3L	SDHXXXH	Pb free	Tape&Reel
SDHXXXBTR	TO-92-3L	XXXB	Pb free	AMMO

ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified, Tc=25°C)

Characteristics	Symbol	Range		Unit
Power Dissipation	P_D	SOD-123	350	mW
		TO-92-3L	200	mW
		SOT-223-3L	100	mW
Chip-To-Ambient Thermal Resistance	$R_{\theta JA}$	300		°C/W
Maximum Operating Voltage	V_{max}	See the table below		V
Operating And Storage Junction Temperature	T_{stg}	-30~+150		°C

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, TC=25°C)

Specifica-tion	Constant current range[note]		Start saturation current[note]		Max. voltage – current ratio I_{VMAX}/Ip	Temperature coefficient [%/°C]	Max. voltage Vmax.(V)
	Test voltage	Ip(mA)	V_k [V]	I_k [mA]			
102	10V	0.88~1.32	1.7	Min.0.8Ip	max.1.1	-0.10~ -0.37	100
152	10V	1.28~1.72	2.0	Min.0.8Ip	max.1.1	-0.13~ -0.40	100
202	10V	1.68~2.32	2.3	Min.0.8Ip	max.1.1	-0.15~ -0.42	100
272	10V	2.28~3.10	2.7	Min.0.8Ip	max.1.1	-0.18~ -0.45	100
352	10V	3.00~4.10	3.2	Min.0.8Ip	max.1.1	-0.20~ -0.53	100
452	10V	3.90~5.10	3.7	Min.0.8Ip	max.1.1	-0.25~ -0.45	100
562	10V	5.00~6.50	4.5	Min.0.8Ip	max.1.1	-0.25~ -0.53	100
822	10V	6.56~9.84	3.1	Min.0.8Ip	max.1.0	-0.25~ -0.45	50
103	10V	8~12	3.5	Min.0.8Ip	max.1.0	-0.25~ -0.45	50
123	10V	9.6~14.4	3.8	Min.0.8Ip	max.1.0	-0.25~ -0.45	50
153	10V	12~18	4.3	Min.0.8Ip	max.1.0	-0.25~ -0.45	50
183	10V	16~20	4.6	Min.0.8Ip	max.1.0	-0.25~ -0.45	50
213	10V	18~24	5.0	Min.0.8Ip	max.1.0	-0.25~ -0.45	45
253	10V	22~28	5.5	Min.0.8Ip	max.1.0	-0.25~ -0.45	45
303	10V	27~33	6.0	Min.0.8Ip	max.1.0	-0.25~ -0.45	45

Note: pulse testing for 380μS.

TYPICAL CHARACTERISTIC CURVE

Figure 1. V-A characteristics curve

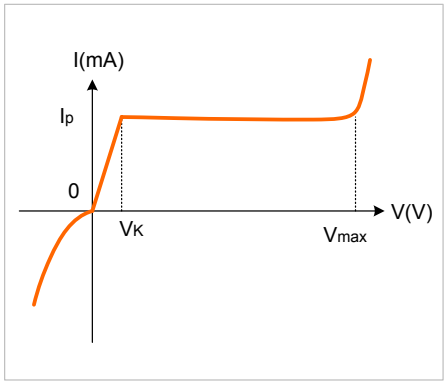


Figure 2. Typical forward characteristics curve

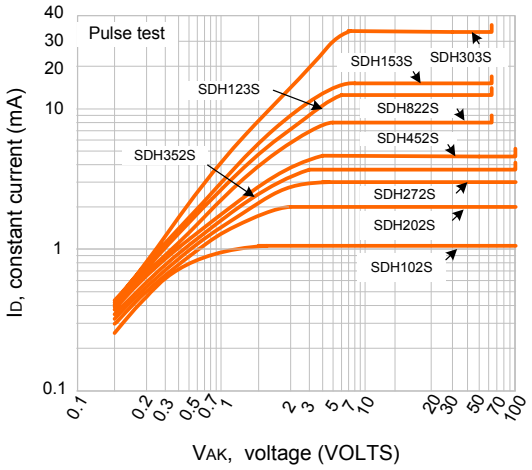


Figure 3, Steady-state current & time

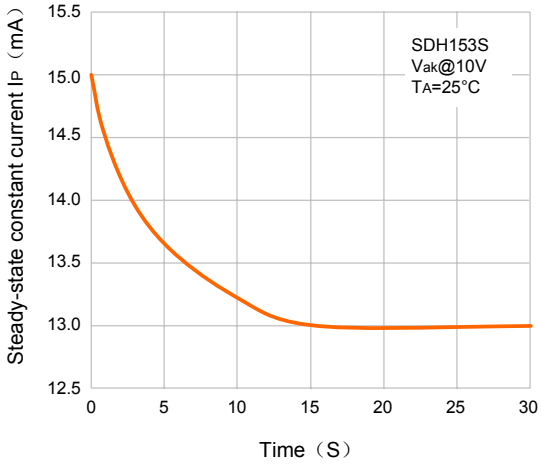


Figure 4, Pulse testing constant current & steady-state constant current

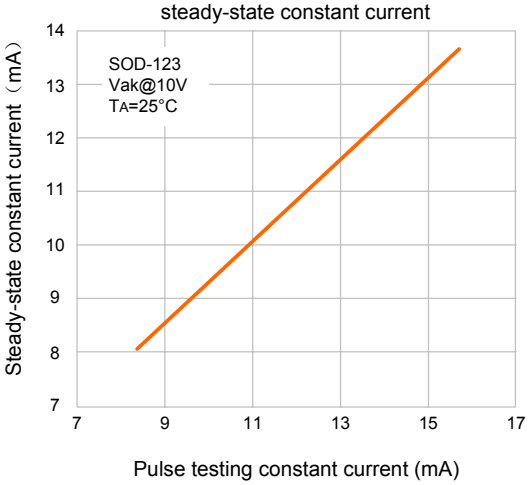


Figure 5, Steady-state current & time

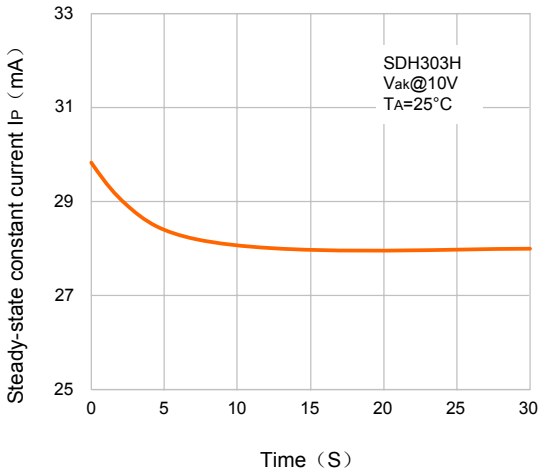
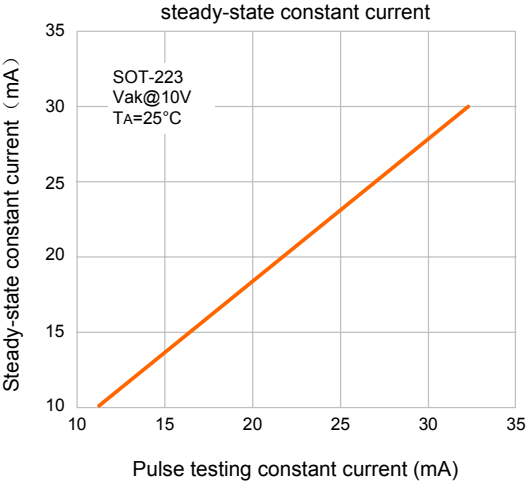


Figure 6, Pulse testing constant current & steady-state constant current



APPLICATION INFORMATION

1. Temperature characteristics of SDH series CRD

Due to SDH series CRD uses the JFET structure and has negative temperature coefficient; more attention should be paid to the test time when the constant current characteristic of CRD is evaluated. If the test time is long, the heat generated will affect the test data.

The SDH series constant current values listed in "ELECTRICAL CHARACTERISTICS" table are tested by pulse mode under the conditions that V_{ak}=10V with 380μS test pulse width. The same test conditions are recommended for customers.

In "TYPICAL CHARACTERISTICS CURVE", the relation between steady-state constant current and rated current after stabilization is given.

When in real applications, the customers should use proper CRD according the real application environments (ambient temperature, voltage drop on CRD)

2. SDH series CRD used for LED constant-current control

Using single CRD is OK for small current (1~25 mA) as shown in figure 1. For example, three 15mA LEDs can be driven by one SDH183 with 15mA steady-state current and corresponding supply voltage is decided by the voltage drop on three LEDs (suppose that LEDVF is 3.3V @ 15mA) plus the voltage drop on CRD (typical value of SDH183 Vk is 4.6V), that is 3 x 3.3V+4.6V=14.5V.

Using paralleled CRDs for large current more than 25mA as shown in figure 2. For example, 50 mA current can be achieved by two paralleled SDH303 with 25mA steady-state current, or by four paralleled SDH153 with 13mA steady-state current. It should be pointed out that when several CRDs are paralleled, the initial voltage of constant current source is equivalent to the maximum voltage among these CRDs, while the forward breakdown voltage is equivalent to the minimum voltage among them. In addition, at the same time of current extension, the dynamic impendence of constant current source is decreased.

In the application of SDH series CRD, the steady-state current of CRD is decided at first by the constant current needed by the application circuit, and then the specification, quantity of CRDs and the connection circuit are decided according to the relation between steady-state current and pulse test current.

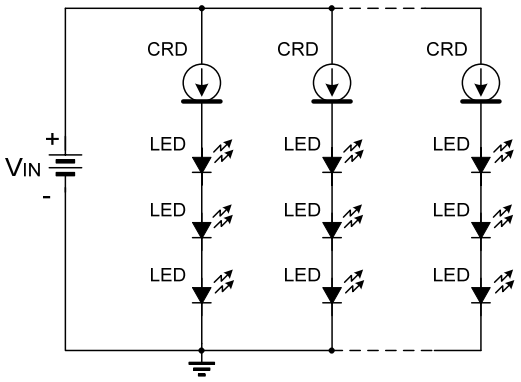


Figure 1

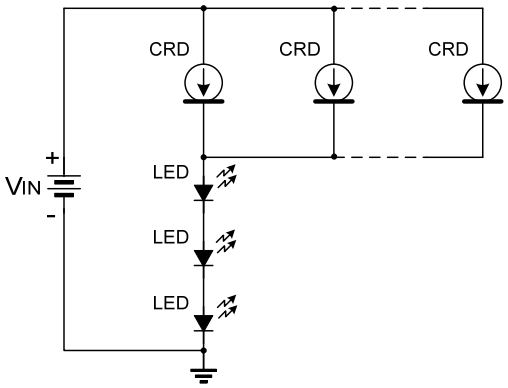
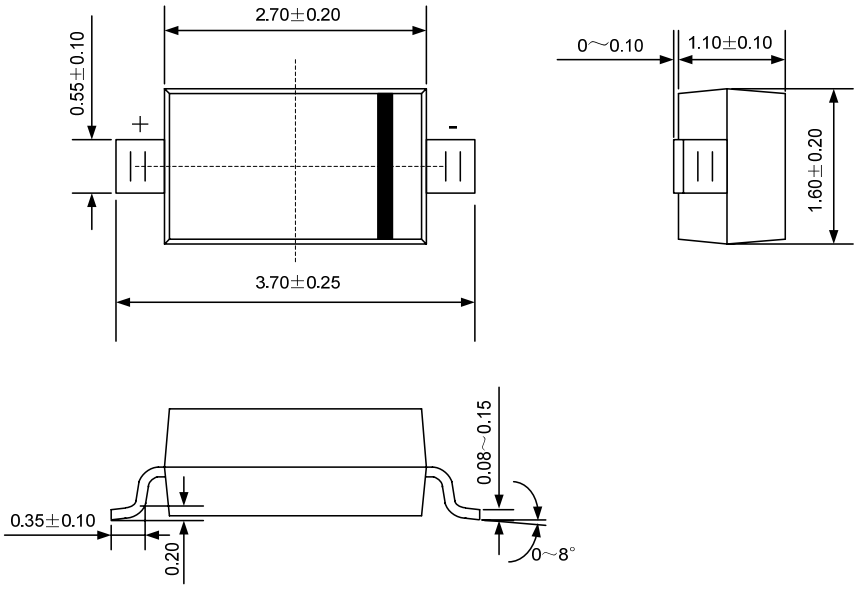


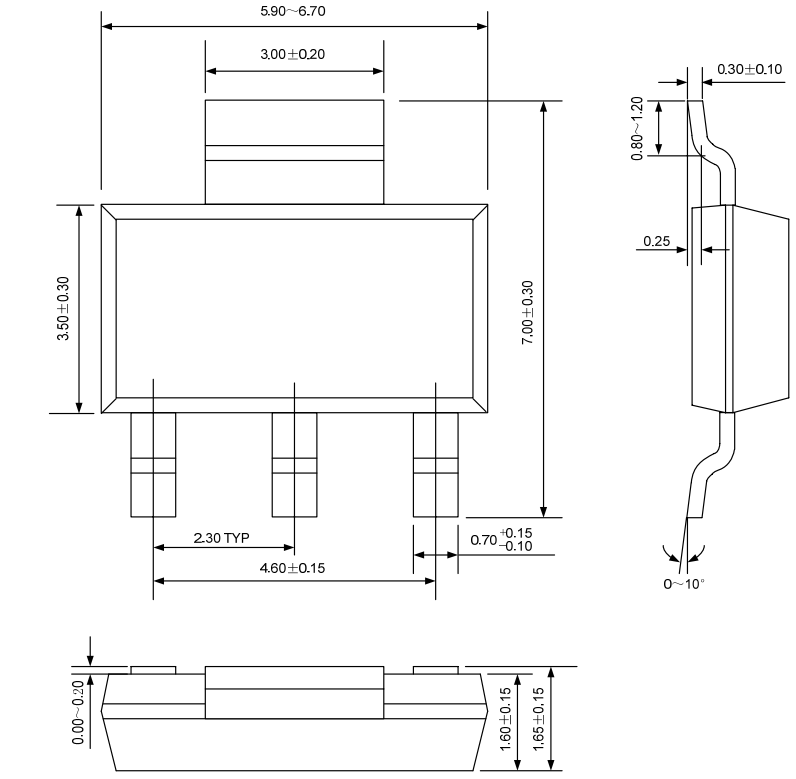
Figure 2

PACKAGE OUTLINE

SOD-123 UNIT: mm

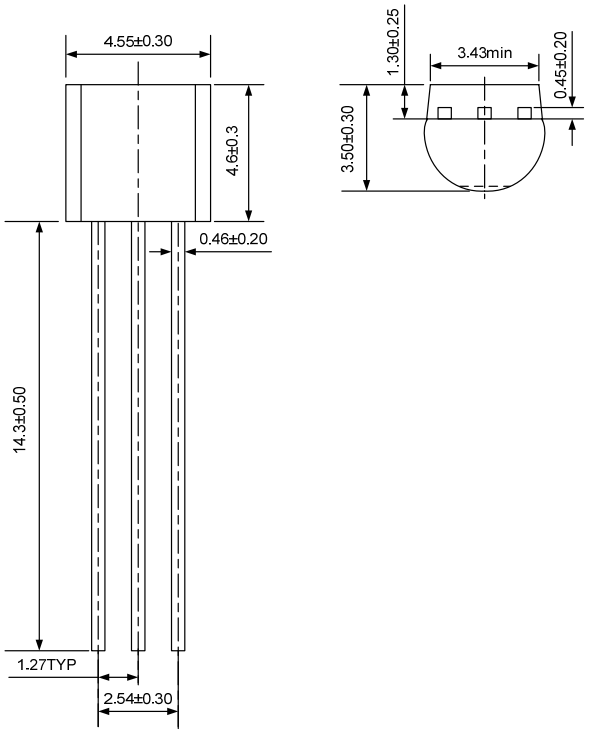


SOT-223-3L UNIT: mm

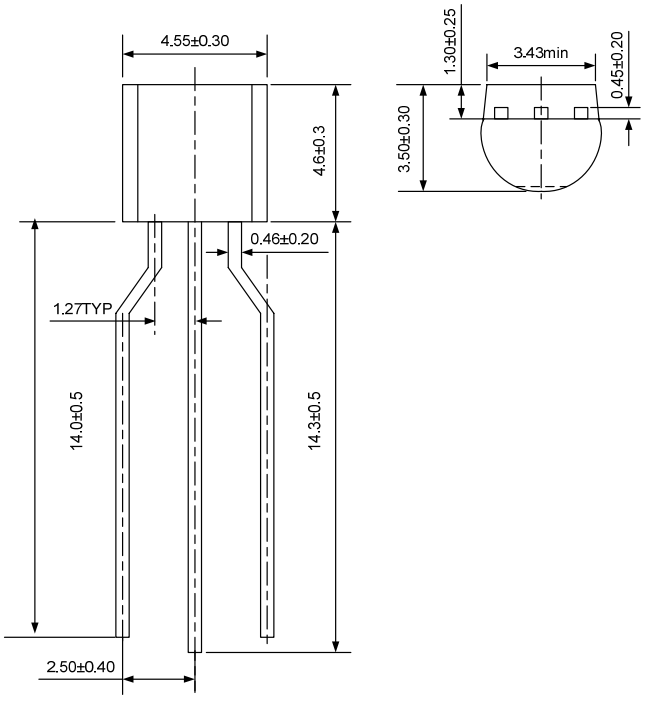


PACKAGE OUTLINE(Continued)

TO-92-3L(1) UNIT: mm



TO-92-3L(2) UNIT: mm



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ATTACHMENT

Revision History

Date	REV	Description	Page
2010.09.29	1.0	Original	
2011.01.05	1.1	Modify the template of datasheet	