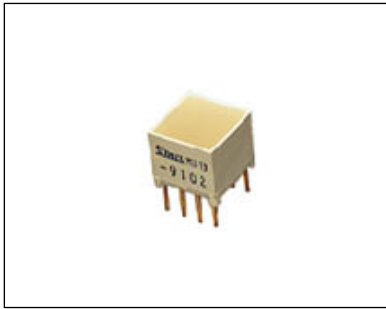




MU13 Series

Bi-Color / Light Bar Module

Features

Light emitting surface (Outer size)	9 x 9 mm (10.1 x 10.1 mm) (L x W)
Product features	• Bi-Color • Lead-free soldering compatible • RoHS compliant
Peak wavelength	Green : 555 nm Yellow : 570 nm Red : 660 nm
Die materials	Green, Yellow : GaP Red : GaAlAs
Soldering methods	TTW (Through The Wave) soldering and manual soldering
Soldering methods	More than 2kV(HBM)
Packing	Plastic bag

Recommended Applications

Electric Household Appliances, OA/FA, Other General Applications

Color and Luminous Intensity

Part No.	Material	Emitted Color	Resin Color	Luminous Intensity ^{※1} I _v (mcd)			Number of Chips
				MIN.	TYP.	I _F	
MU13-9101	GaP	Green	Milky White	7	14	20	5
	GaAlAs	Red		6	12	20	1
MU13-9102	GaP	Yellow	Milky White	20	40	20	5
	GaAlAs	Red		6	12	20	1

※1 Luminous Intensity : 5 chips (Green+ Yellow), 1 chip (Red)

Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute Maximum Ratings			Unit
		Green	Yellow	Red	
Power Dissipation ^{※2}	P _d	310	375	60	mW
Forward Current	I _F	25	30	30	mA
Pulse Forward Current ^{※3}	I _{FRM}	60	60	60	mA
Derating (Ta=25°C or higher)	ΔI _F	0.33	0.40	0.40	mA/°C
	ΔI _{FRM}	0.80	0.80	0.80	mA/°C
Reverse Voltage	V _R	4	4	4	V
Operating Temperature	T _{opr}	-40~+85			°C
Storage Temperature	T _{stg}	-40~+85			°C

※2 Power Dissipation : 5 chips (Green+ Yellow), 1 chip (Red)

The other Items : 1 chip

※3 I_{FRM} Measurement condition : Pulse Width ≤ 2ms, Duty ≤ 1/5

Electro-Optical Characteristics

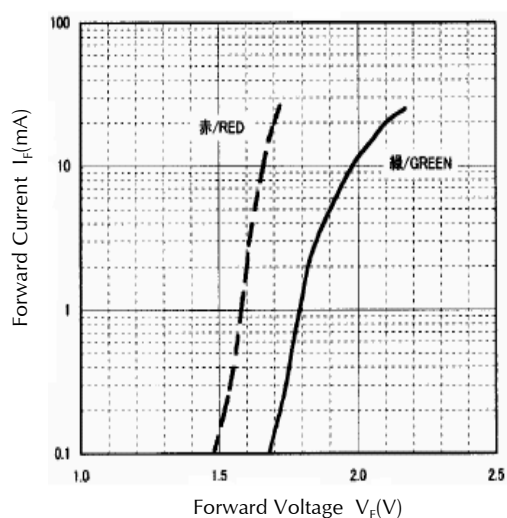
(Ta=25°C)

Item		Symbol	Characteristics				Unit
	Conditions			Green	Yellow	Red	
Forward Voltage	I _F =20mA	V _F	TYP.	2.2	2.1	1.7	V
			MAX.	2.5	2.5	2.0	
Reverse Current	V _R =4V	I _R	MAX.	100	100	100	μ A
Peak Wavelength	I _F =20mA	λ _p	TYP.	555	570	660	nm
Spectral Line Half Width	I _F =20mA	Δ λ	TYP.	30	30	30	nm

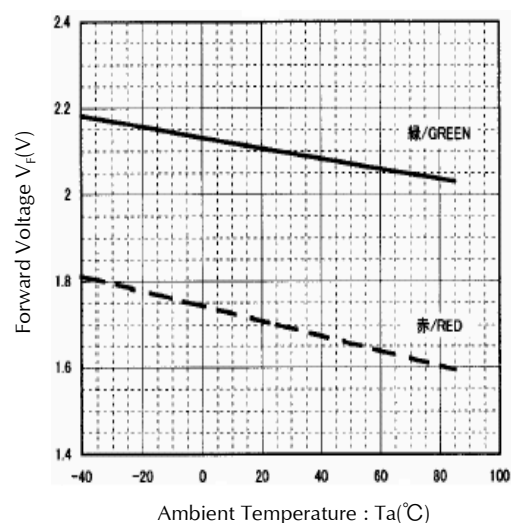
※ The above Items : 1 chip

Technical Data(9101)

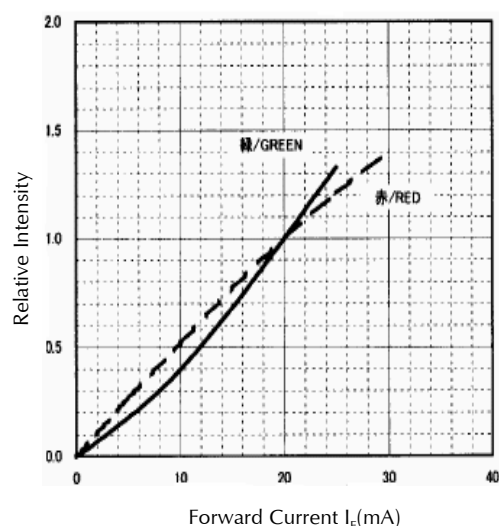
Forward Voltage vs. Forward Current
Condition : $T_a = 25^\circ\text{C}$



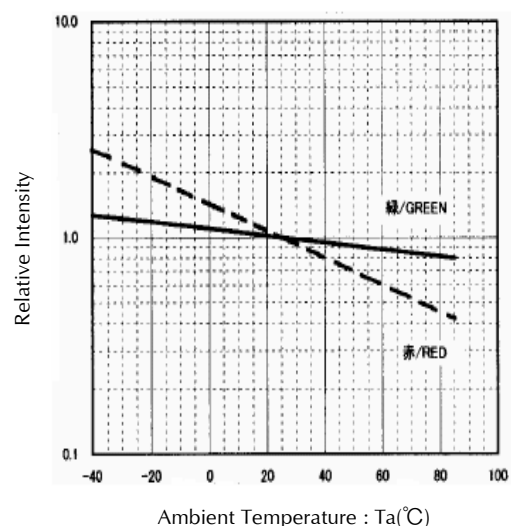
Ambient Temperature vs. Forward Voltage



Forward Current vs. Relative Intensity
Condition : $T_a = 25^\circ\text{C}$



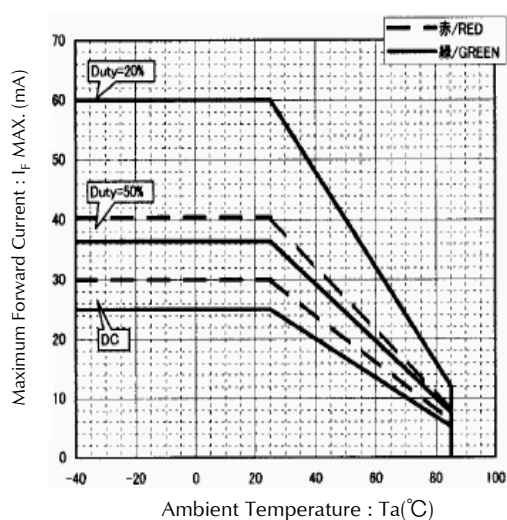
Ambient Temperature vs. Relative Intensity
Condition : $I_F = 20\text{mA}$



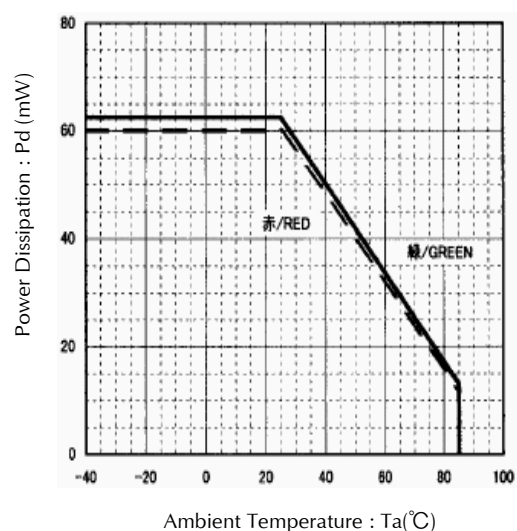
Technical Data(9101)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : $f \geq 100\text{Hz}$

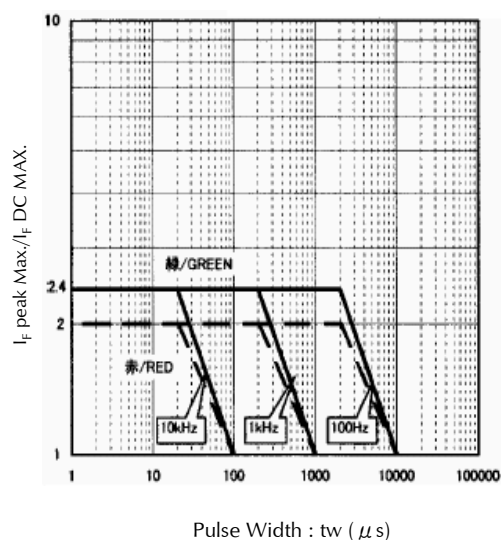


Power Dissipation vs. Ambient Temperature



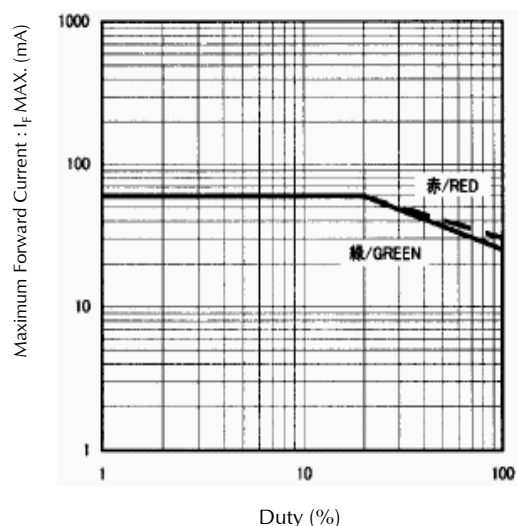
Pulse Width vs. Maximum Tolerable Peak Current

Condition : $T_a = 25^\circ\text{C}$



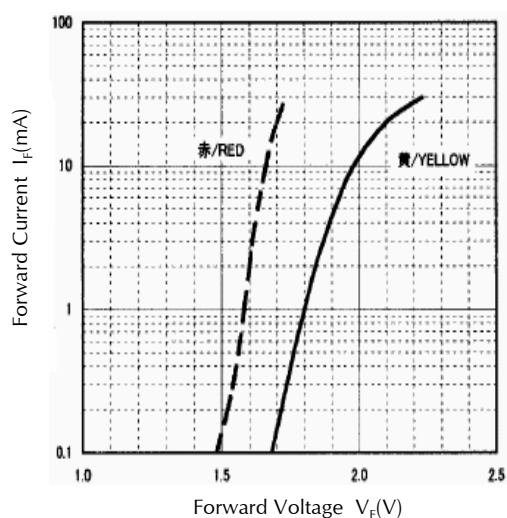
Dynamic Drive Rating

Duty cycle vs. Maximum Forward Current
Condition : $T_a = 25^\circ\text{C}$

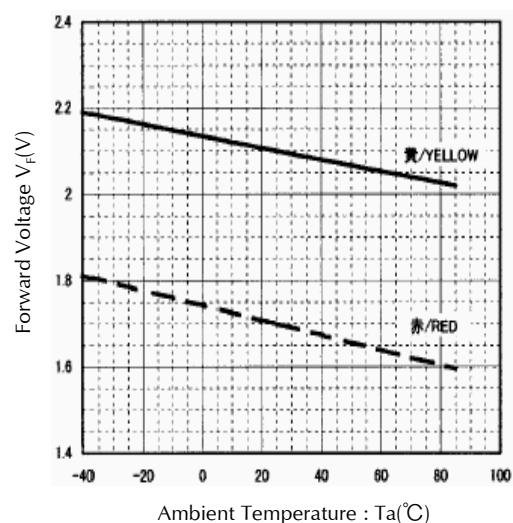


Technical Data(9102)

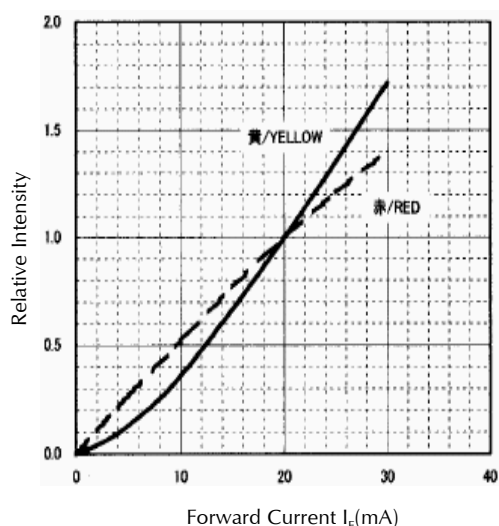
Forward Voltage vs. Forward Current
Condition : $T_a = 25^\circ\text{C}$



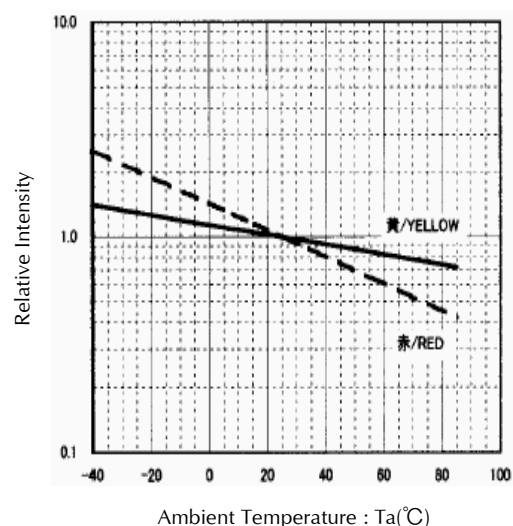
Ambient Temperature vs. Forward Voltage



Forward Current vs. Relative Intensity
Condition : $T_a = 25^\circ\text{C}$



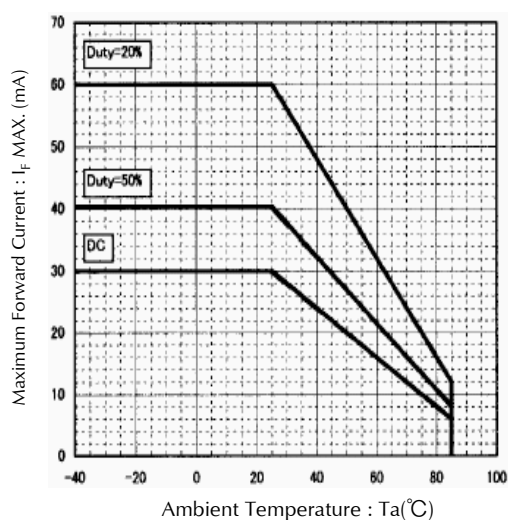
Ambient Temperature vs. Relative Intensity
Condition : $I_F = 20\text{mA}$



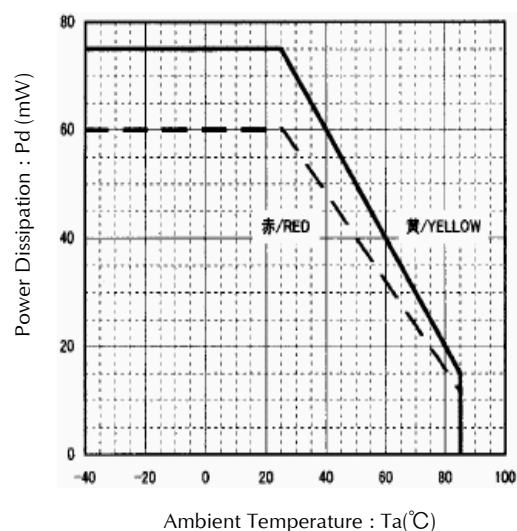
Technical Data(9102)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : $f \geq 100\text{Hz}$

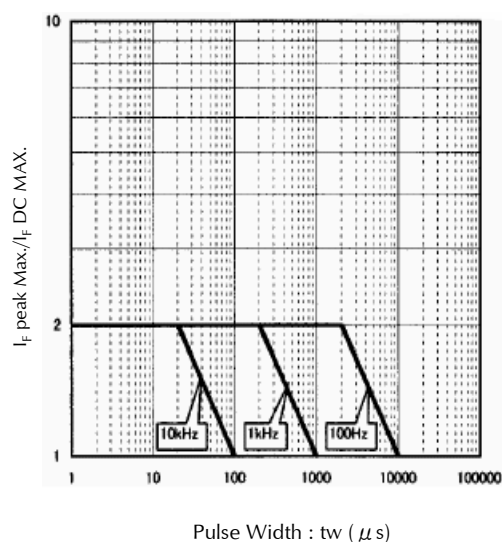


Power Dissipation vs. Ambient Temperature



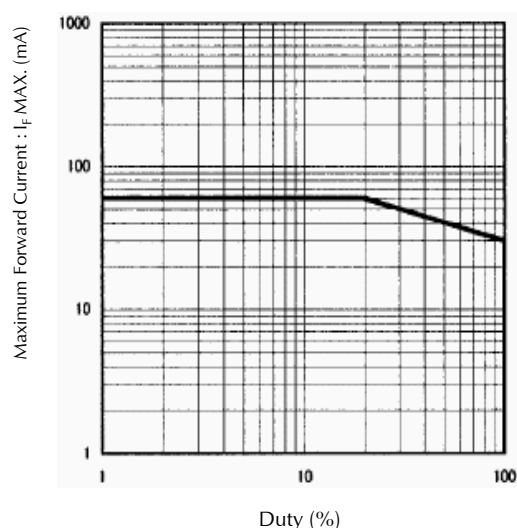
Pulse Width vs. Maximum Tolerable Peak Current

Condition : $T_a = 25^\circ\text{C}$



Dynamic Drive Rating

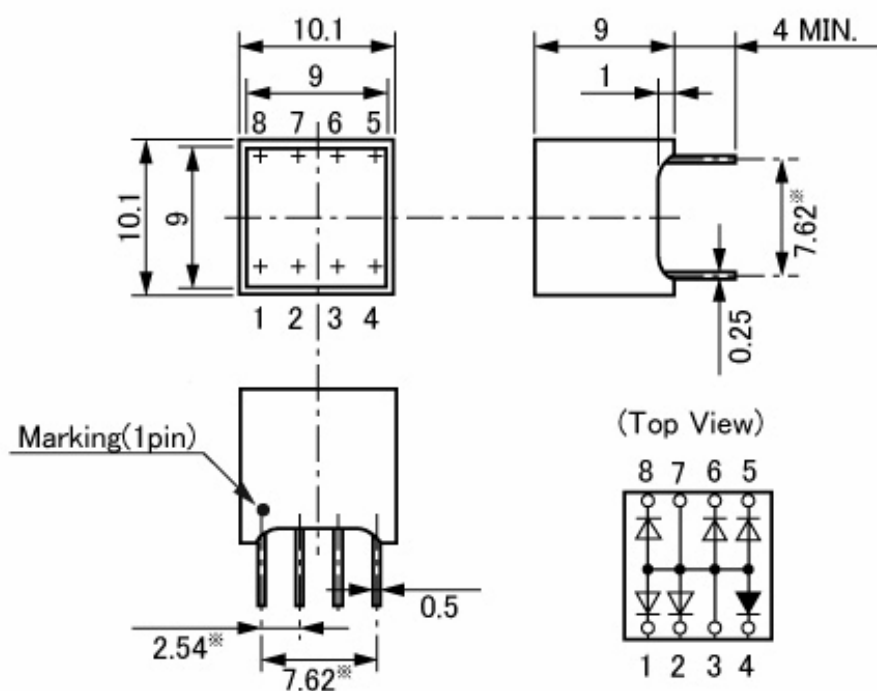
Duty cycle vs. Maximum Forward Current
Condition : $T_a = 25^\circ\text{C}$



Package Dimensions

(Unit: mm)

(Tolerance : ± 0.25 mm)



● ※ mark : The measure of resin root

TTW (Through The Wave) soldering Conditions

Pre-heating	100 °C 60 s	(MAX.) Resin surface temperature (MAX.)
Solder Bath Temp.	265 °C	(MAX.)
Dipping Time	5 s	(MAX.)
Position	At least 2.0 mm away from resin body	

- 1) The dip soldering process shall be 2 times maximum.
- 2) The product shall be cooled to normal temperature before the second dipping process.

Manual Soldering Conditions

Iron tip temp.	400 °C	(MAX.) (30 W Max.)
Soldering time and frequency	3 s 2 times	(MAX.) (MAX.)
Position	At least 2.0 mm away from resin body	

Reliability Testing Result

Reliability Testing Result	Applicable Standard	Testing Conditions	Duration	Failure
Room Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = 25°C, If = Maximum Rated Current	1,000 h	0/10
Resistance to Soldering Heat	EIAJ ED-4701/300(302)	260±5°C, 3mm from package base	10sec	0/10
Temperature Cycling	EIAJ ED-4701/100(105)	Minimum Rated Storage Temperature(30min) ~ Normal Temperature(15min) ~ Maximum Rated Storage Temperature(30min) ~ Normal Temperature(15min)	5 cycles	0/10
Wet High Temp. Storage Life	EIAJ ED-4701/100(103)	Ta = 60±2°C, RH = 90±5%	1,000 h	0/10
High Temp. Storage Life	EIAJ ED-4701/200(201)	Ta = Maximum Rated Storage Temperature	1,000 h	0/10
Low Temp. Storage Life	EIAJ ED-4701/200(202)	Ta = Minimum Rated Storage Temperature	1,000 h	0/10
Lead Tension	EIAJ ED-4701/400(401)	5N, 1time	10sec	0/10
Vibration, Variable Frequency	EIAJ ED-4701/400(403)	98.1m/s ² (10G), 100 ~ 2KHz sweep for 20min., XYZ each direction	2 h	0/10
Lead Bend	EIAJ ED-4701/400(401)	2.5N, 0° ↔ 90°	2 times	0/10
Shock	JIS C 7201 A-8	It falls on wood engraving from height of 75cm.	3 times	0/10

Failure Criteria

Items	Symbols	Conditions	Failure criteria
Luminous Intensity	Iv	If=20mA	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	V _F	If=20mA	Testing Max. Value ≥ Spec. Max. Value x 1.2
Reverse Current	I _R	V _R =4V	Testing Max. Value ≥ Spec. Max. Value x 2.5
Cosmetic Appearance	-	-	No notable, decoloration, deformation and cracking

Special Notice to Customers Using the Products and Technical Information Shown in This Data Sheet

- 1) The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.
- 2) For the purpose of product improvement, the specifications, characteristics and technical data described in the data sheets are subject to change without prior notice. Therefore it is recommended that the most updated specifications be used in your design.
- 3) When using the products described in the data sheets, please adhere to the maximum ratings for operating voltage, heat dissipation characteristics, and other precautions for use. We are not responsible for any damage which may occur if these specifications are exceeded.
- 4) The products described in the data sheets are made to be used in standard electronic applications such as office automation appliances, communication devices, audio visual, home appliances, and measuring instruments.
- 5) If the products in the data sheets are to be used for purposes other than the above which requires high level reliability and safety where failure and or malfunction of the product may cause death or other serious effects on the human body such as airplane, space activity, transportation, medical, nuclear), please contact our sales personnel.
- 6) In order to export the products or technologies described in this data sheet which are under the "Foreign Exchange and Foreign Trade Control Law," it is necessary to first obtain an export permit from the Japanese government.
- 7) No part of this data sheet may be reprinted or reproduced without prior written permission from Stanley Electric Co., Ltd.
- 8) The most updated edition of this data sheet can be obtained from the address below:
<http://www.stanley-components.com>