OSRAM KRTBI D2LM31.31

产品规格书

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OSRAM

OSIRE® E3731i

KRTBI D2LM31.31

该产品是专门为要求高动态RGB照明场景的汽车内饰应用而设计的。该智能RGB产品除了R/G/B LED外，还集成了ams OSRAM的IC，这个嵌入式IC集成了三个R/G/B LED的驱动程序，还包括了R/G/B LED的光学测量数据。外部微控制器可以通过开放系统协议在菊花链拓扑结构中寻址和控制每个LED。开放协议允许微控制器读取这些数据，并运行任何颜色算法。它还允许读取回一个温度值来优化这个颜色算法。

应用

- 氛围灯

特点

- 封装: 白色SMD封装 , 无色透明硅树脂
- 芯片技术: Thinfilm / ThinGaN
- 典型发光角度: 120°（朗伯发射体）
- 颜色: λ_{dom} = 626 nm (● red); λ_{dom} = 533 nm (● true green); λ_{dom} = 462 nm (● blue)
- 防腐蚀级别: 2B
- 认证: AEC-Q102-003 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2); 500 V acc. to JESD22-C101 (CDM, Class C2)

AEC-Q102 QUALIFIED

特点

- Optical measurement data available at two setpoints (10 and 50 mA)
- Serial data communication via open system protocol (OSP)
- Integrated µDriver
- Needs 5V DC supply voltage
- Auto addressing of package inside daisy chain

Ordering Information

Type	Brightness I_F = 10 mA	Ordering Code
KRTBID2LM31.31-1R-JW+1G-J3+1B-5V		Q65113A6250
KRTBID2LM31.31-C5D7-JW+A5V9-13+R5S7-3Z		Q65113A6249
red	I_V = 320 … 900 mcd	
true green	I_V = 1000 … 2010 mcd	
blue	I_V = 125 … 355 mcd	

Typical brightness

T_S = 25 °C

Color	Current in mA	Value	Unit
red	10	560	mcd
true green	10	1460	mcd
blue	10	220	mcd
red	50	2520	mcd
true green	50	4300	mcd
blue	50	800	mcd

Relative Luminous Intensity

$I_v(50\ mA)/I_v(10\ mA) = f(I_F);\ T_S = 25\ °C$

Color	Current in mA	Value
red	50	4.5
true green	50	2.95
blue	50	3.65

Dominant wavelength

$\Delta\ \lambda\ dom = \lambda\ dom(50\ mA) - \lambda\ dom(10\ mA) = f(I_F);\ T_S = 25\ °C$

Color	Current in mA	Value	Unit
true green	50	-8	nm
blue	50	-2	nm

Absolute Maximum IC Ratings

Stresses beyond those listed under ”Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated under “operation Conditions” is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter	Symbol		Values
DC supply voltage1	V_{DD}, V_{LED}	min.	-0.3 V
		max.	7.0 V
SIO Voltage	SIO1/2_n/p	min.	-0.3 V
		max.	VDD +0.3 V
Reverse voltage	V_R		Not designed for reverse operation
Operating Temperature	T_{op}	min.	-40 °C
		max.	110 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	110 °C
Junction Temperature	T_j	min.	-40 °C
		max.	125 °C
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD_HBM}	min. max.	-2 kV 2 kV
All Pads acc. to JESD22-C101 (CDM, Class C2)	V_{ESD_CDM}	min. max.	-500 V 500 V

Operating Conditions

Parameter	comment	Symbol		Values
Power Supply Voltage (dc)	DC supply voltage IC and LED	V_{DD}, V_{LED}	min. max.	4.5 V 5.5 V
Startup time	Device ready for commands, time after VDD > VGOOD level	t_{start}	typ.	1 ms
Supply current IC at mode: (PIN: VDD IC, VDD = 5V)				
uninitialized state (after POR)			typ.	2.05 mA
ACTIVE mode	LED driver off	I_{Ic_activ}	typ.	2.05 mA
ACTIVE mode	LED driver on, PWM >=1, Current comparators of LED drivers: Avg. current Red*0.11 Avg. current Green*0.11 Avg. current Blue*0.11	$I_{Ic\_LED\_ON}$	typ.	2.05+1.5 +avg current R,G,B *0.11 mA
SLEEP mode		I_{Ic_sleep}	typ.	2.05 mA
DEEPSLEEP mode		$I_{Ic\_deep\_sleep}$	typ.	1.9 mA
Junction Temperature		T_j	min. max.	-40 °C 125 °C

Start-up and power down description

Parameter	comment	Symbol		Values
Deglitch time to detect Undervoltage		t_{UV}	typ.	50 us
Detection hysteresis		V_{DET_HYST}	typ.	100 mV
VDD POR	address is lost	VPoR	typ.	1.2 V
VDD communication stop		VDD_{COM_STOP}	typ.	2.6 V
VDD under voltage level	LED driver are disabled at this level if selected	VDD_{UVLO}	min. max.	4.1 V 4.5 V
VDD normal voltage range		VDD_{GOOD}	min. max.	4.5 V 5.5 V

特性

I_F = 10 mA; T_S = 25 °C

参数	图形符号		值 ● red	值 ● true green	值 ● blue
峰值波长	λ_{peak}	典型值	635 nm	526 nm	456 nm
主波长 [1]	λ_{dom}	最小值 典型值 最大值	620 nm 626 nm 632 nm	524 nm 533 nm 541 nm	449 nm 462 nm 473 nm
50% I_V 发光角度	2φ	典型值	120 °	120 °	120 °
反向电流 [2]	I_R		Not designed for reverse operation	Not designed for reverse operation	Not designed for reverse operation
实际热阻 PN结/焊点 [3]	$R_{thJS\ real}$	典型值 最大值	84 K / W 117 K / W	48 K / W 65 K / W	47 K / W 64 K / W

Typical Dominant Wavelength[1)]

Ts = 25 °C

Color	Current in mA	Value	Unit
● red	10	626	nm
● true green	10	533	nm
● blue	10	462	nm
● red	50	626	nm
● true green	50	525	nm
● blue	50	460	nm

亮度组

发射颜色	组	发光强度 [4] I_F = 10 mA 最小值 I_v	发光强度 [4] I_F = 10 mA 最大值 I_v
● red	1R	320 mcd	900 mcd
● red	C5	320 mcd	500 mcd
● red	C7	360 mcd	560 mcd
● red	C9	400 mcd	630 mcd
● red	D	450 mcd	710 mcd
● red	D5	500 mcd	800 mcd
● red	D7	560 mcd	900 mcd
● true green	1G	1000 mcd	2010 mcd
● true green	V9	1000 mcd	1590 mcd
● true green	AW	1120 mcd	1800 mcd
● true green	A5	1250 mcd	2010 mcd
● blue	1B	125 mcd	400 mcd
● blue	R5	125 mcd	201 mcd
● blue	R7	140 mcd	224 mcd
● blue	R9	159 mcd	250 mcd
● blue	S	180 mcd	280 mcd
● blue	S5	201 mcd	315 mcd
● blue	S7	224 mcd	355 mcd

波长组

● red

组	主波长 [1)] 最小值 λ_{dom}	主波长 [1)] 最大值 λ_{dom}
JP	620 nm	625 nm
MT	623 nm	629 nm
RW	627 nm	632 nm

波长组

● true green

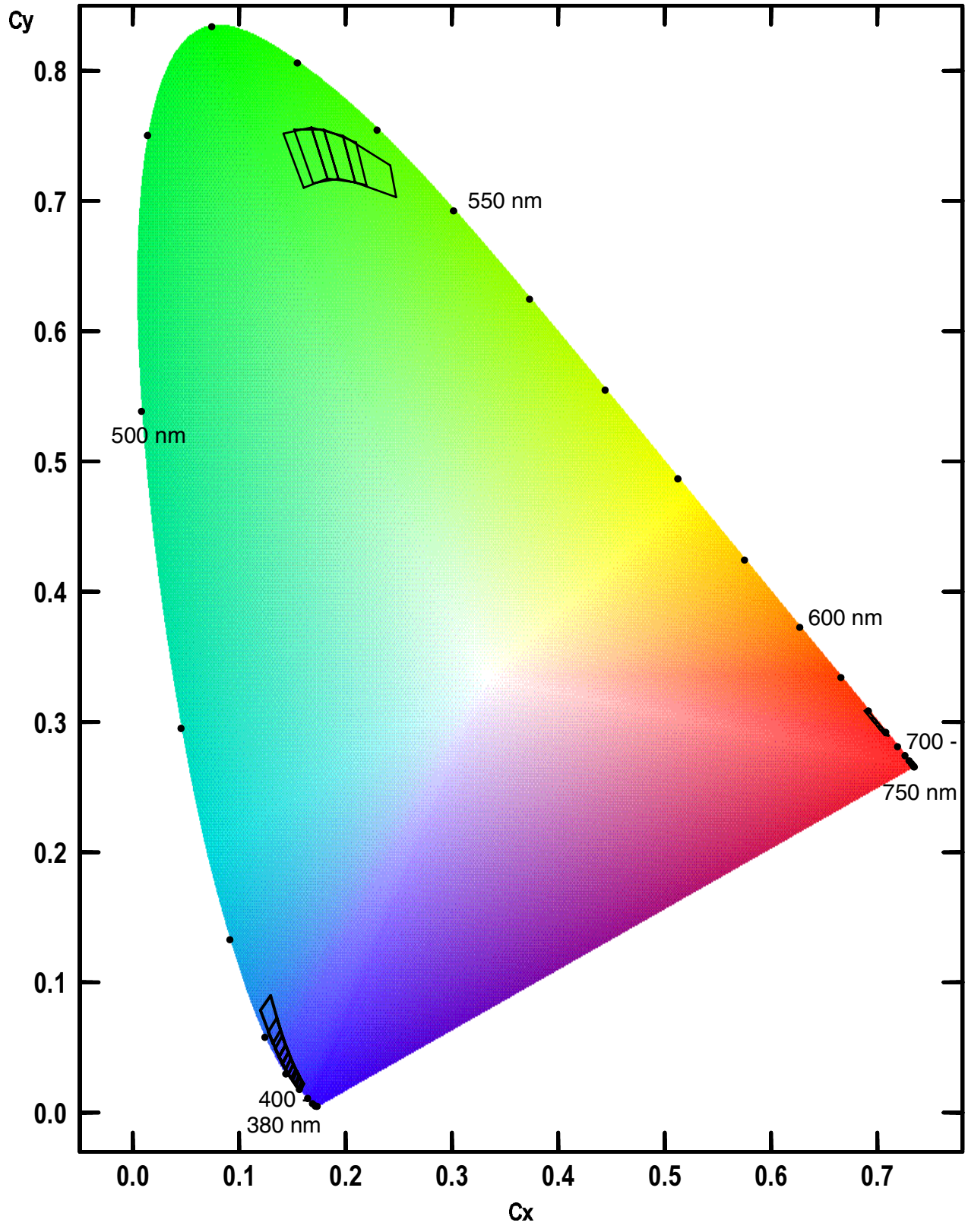
组	主波长 [1)] 最小值 λ_{dom}	主波长 [1)] 最大值 λ_{dom}
JP	524 nm	529 nm
LR	526 nm	531 nm
PU	529 nm	534 nm
RW	531 nm	536 nm
U3	534 nm	541 nm

波长组

● blue

组	主波长 [1)] 最小值 λ_{dom}	主波长 [1)] 最大值 λ_{dom}
51	449 nm	453 nm
3C	451 nm	456 nm
AF	454 nm	459 nm
DH	457 nm	461 nm
FK	459 nm	463 nm
HM	461 nm	465 nm
KP	463 nm	467 nm
MS	465 nm	470 nm
QV	468 nm	473 nm

色品坐标组


Cy
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
550 nm
500 nm
600 nm
700 -
750 nm
400 -
380 nm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Cx

色度坐标组

● red

组	Cx	Cy
JP	0.6879	0.3086
	0.6915	0.3083
	0.7006	0.2993
	0.6969	0.2996
MT	0.6936	0.3030
	0.6972	0.3027
	0.7066	0.2934
	0.7028	0.2938
RW	0.7000	0.2966
	0.7037	0.2962
	0.7105	0.2895
	0.7067	0.2899

色度坐标组

● true green

组	Cx	Cy
JP	0.1606	0.7102
	0.1415	0.7518
	0.1679	0.7565
	0.1831	0.7174
LR	0.1694	0.7136
	0.1517	0.7547
	0.1794	0.7549
	0.1933	0.7170
PU	0.1831	0.7174
	0.1678	0.7565
	0.1973	0.7500
	0.2091	0.7142
RW	0.1932	0.7170
	0.1794	0.7549
	0.2098	0.7449
	0.2196	0.7122

色度坐标组

● true green

组	Cx	Cy
U3	0.2091	0.7142
	0.1974	0.7500
	0.2419	0.7273
	0.2474	0.7029

色度坐标组

● blue

组	Cx	Cy
3C	0.1543	0.0317
	0.1588	0.0243
	0.1556	0.0186
	0.1500	0.0246
	0.1543	0.0317
51	0.1570	0.0268
	0.1606	0.0222
	0.1576	0.0168
	0.1534	0.0206
	0.1570	0.0268
AF	0.1509	0.0370
	0.1562	0.0285
	0.1524	0.0219
	0.1462	0.0293
	0.1509	0.0370
DH	0.1487	0.0414
	0.1532	0.0332
	0.1489	0.0262
	0.1436	0.0332
	0.1487	0.0414

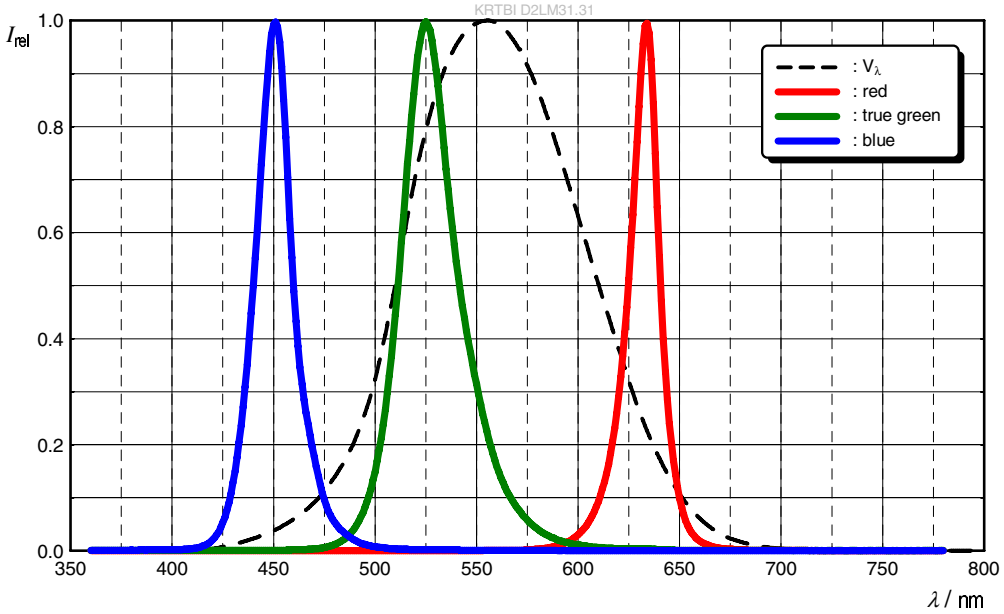
色度坐标组

- blue

组	Cx	Cy
FK	0.1463	0.0463
	0.1509	0.0370
	0.1462	0.0293
	0.1407	0.0376
	0.1463	0.0463
HM	0.1436	0.0519
	0.1487	0.0414
	0.1436	0.0332
	0.1375	0.0428
	0.1436	0.0519
KP	0.1404	0.0588
	0.1463	0.0463
	0.1407	0.0376
	0.1338	0.0493
	0.1404	0.0588
MS	0.1354	0.0727
	0.1436	0.0519
	0.1375	0.0428
	0.1272	0.0620
	0.1354	0.0727
QV	0.1295	0.0899
	0.1389	0.0631
	0.1317	0.0532
	0.1199	0.0785
	0.1295	0.0899

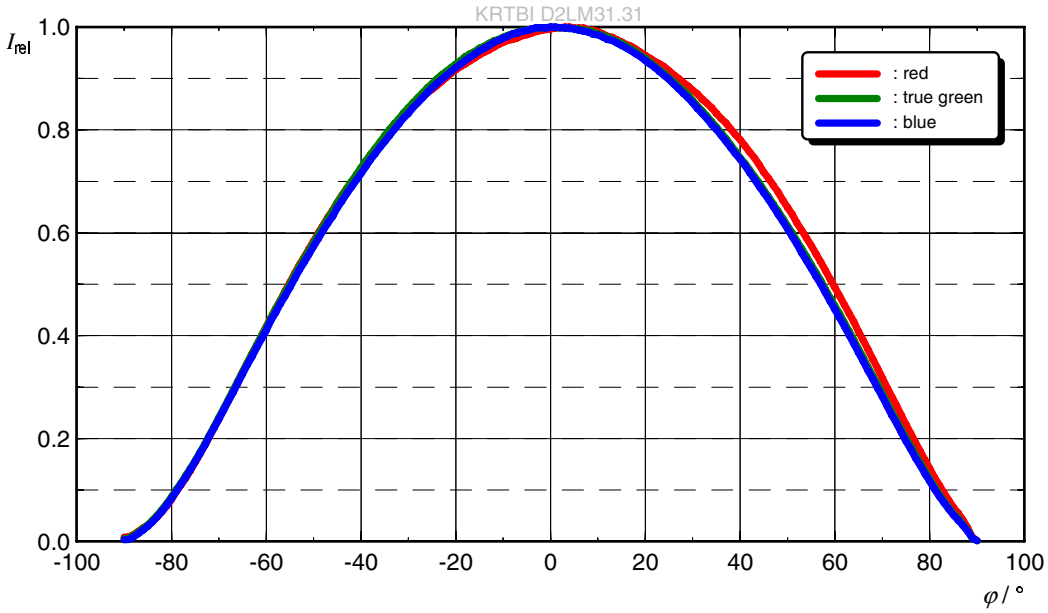
相对光谱发射 5)

$I_{rel} = f(\lambda)$; I_F = 10 mA; T_S = 25 °C



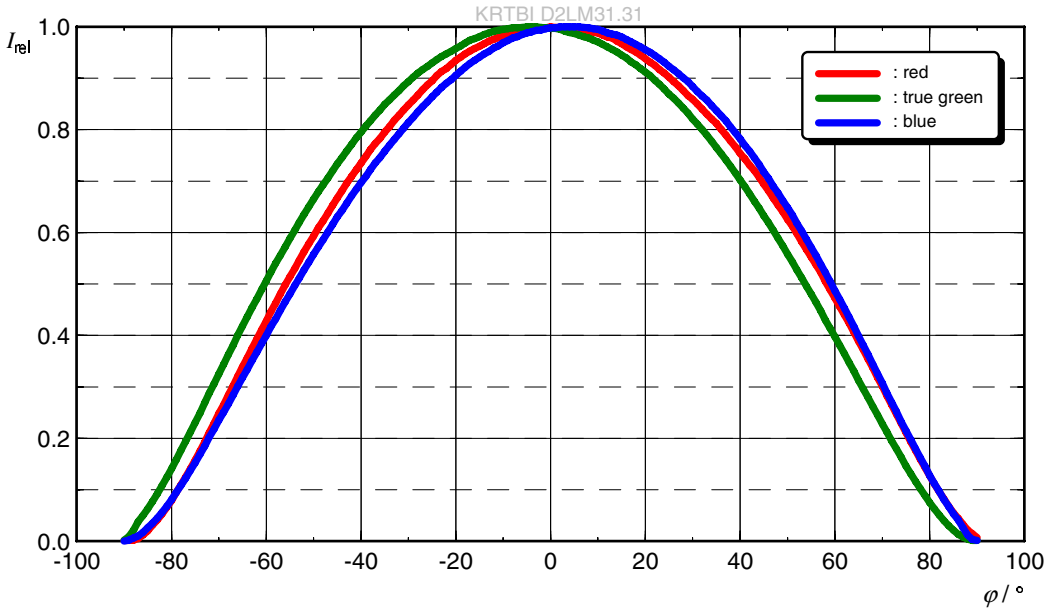
辐射特性（水平） 5)

$I_{rel} = f(\phi)$; $T_S = 25$ °C



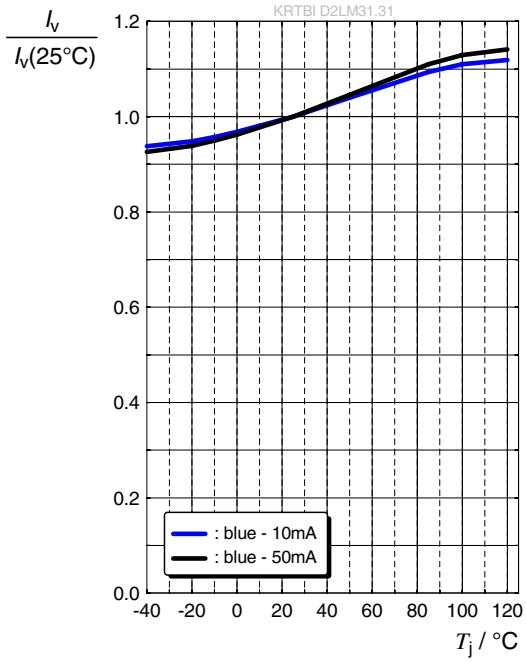
辐射特性（垂直） 5)

$I_{rel} = f(\phi)$; $T_S = 25$ °C



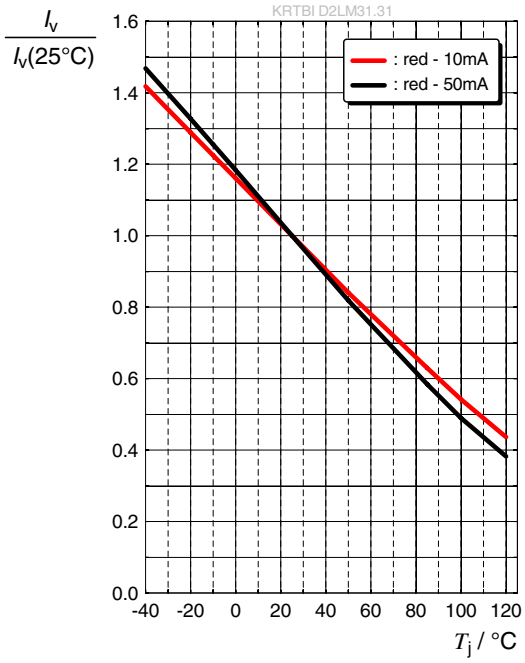
相对发光强度 5)

$I_V/I_V(25°C)=f(T_j)$; blue



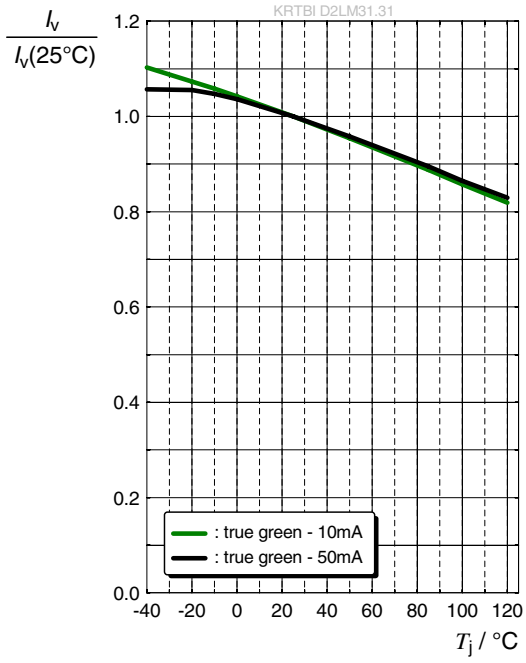
相对发光强度 5)

$I_V/I_V(25°C) = f(T_j)$; red



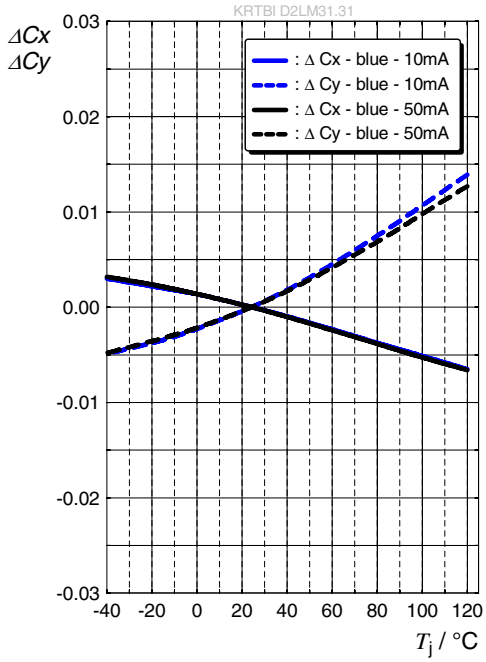
相对发光强度 5)

$I_V/I_V(25°C)=f(T_j)$; true green



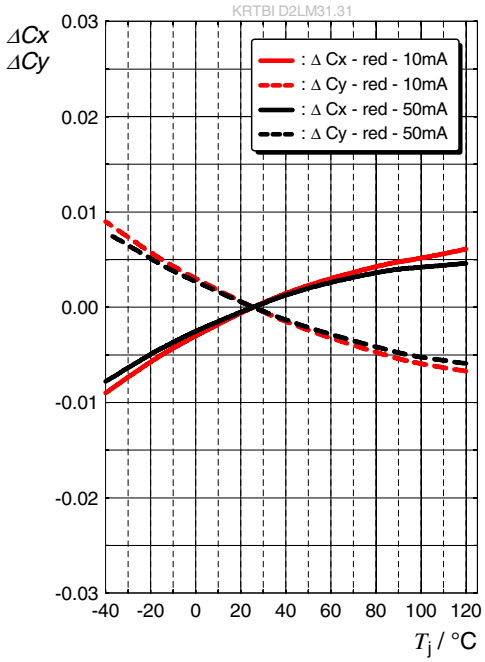
色品坐标偏移 5)

ΔCx, ΔCy = f(T_j); blue



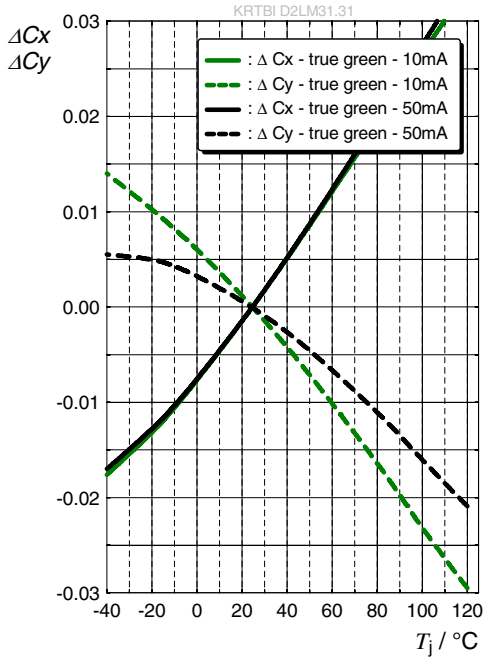
色品坐标偏移 5)

ΔCx, ΔCy = f(T_j); red



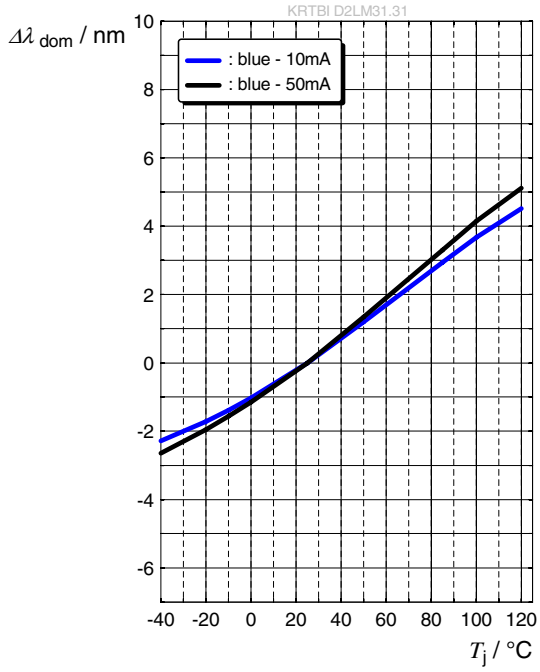
色品坐标偏移 5)

ΔCx, ΔCy = f(T_j); true green



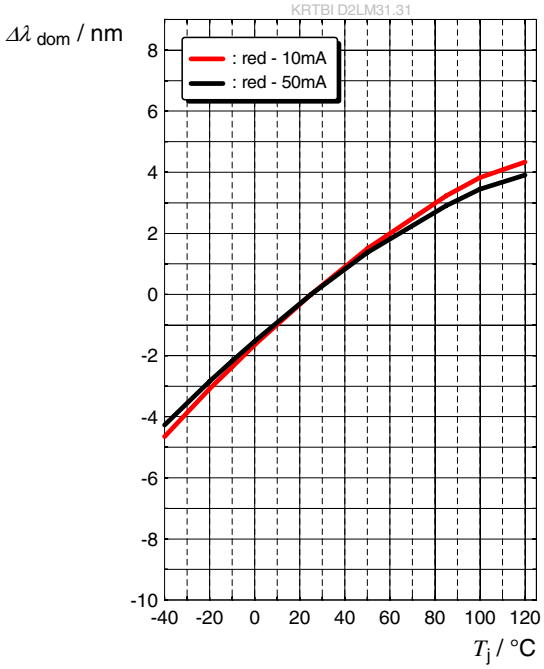
主波长 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25°C) = f(T_j)$



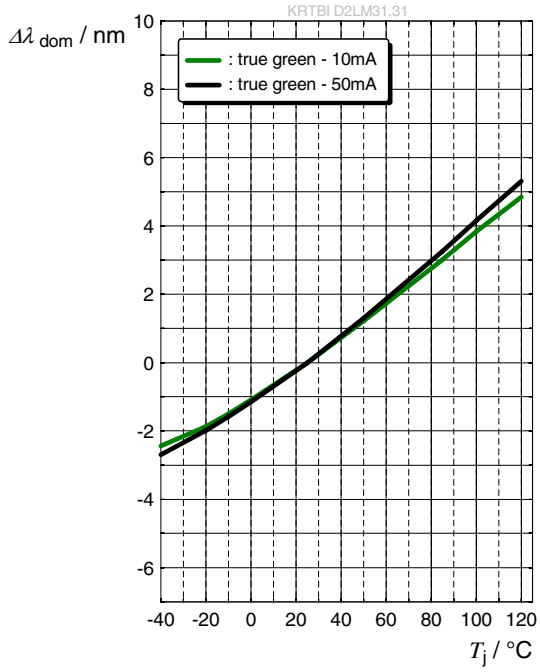
主波长 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j)$



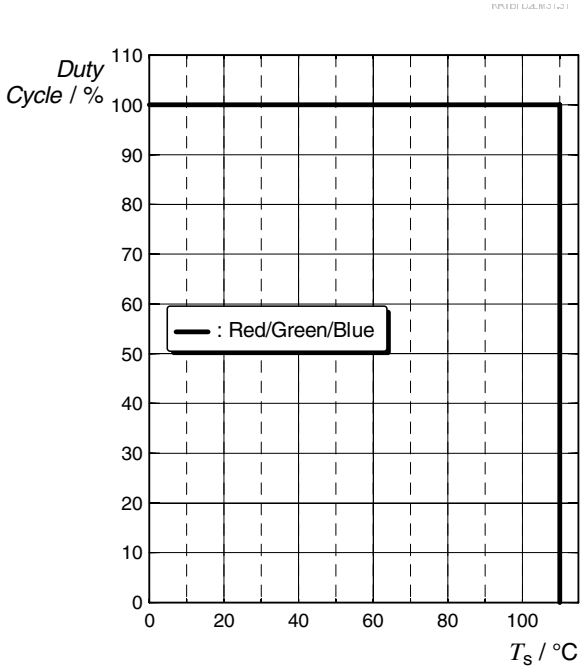
主波长 5)

$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j)$

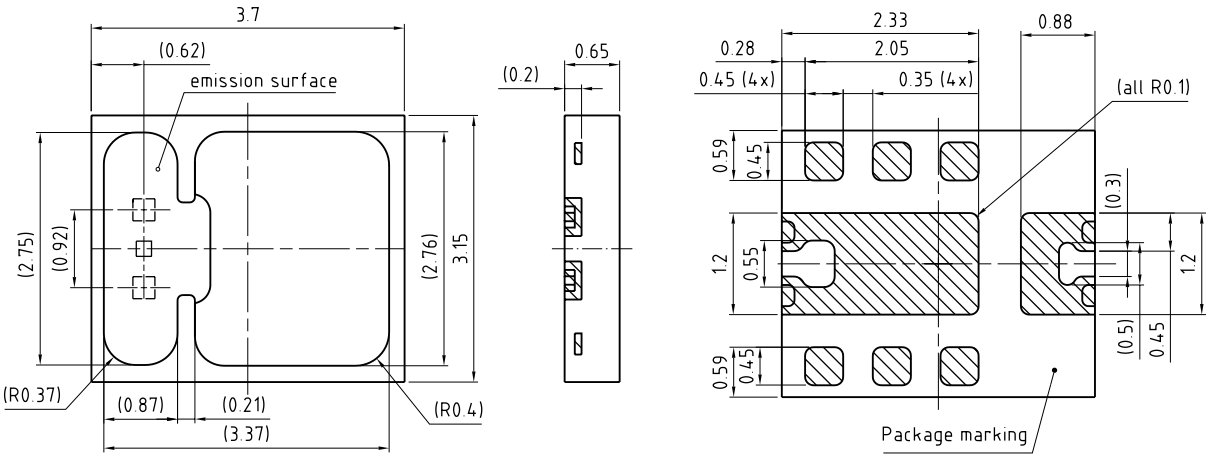


容许脉冲处理能力

Current setting = 50mA red - green - blue



尺寸图 6)



general tolerance ±0.1
lead finish Au

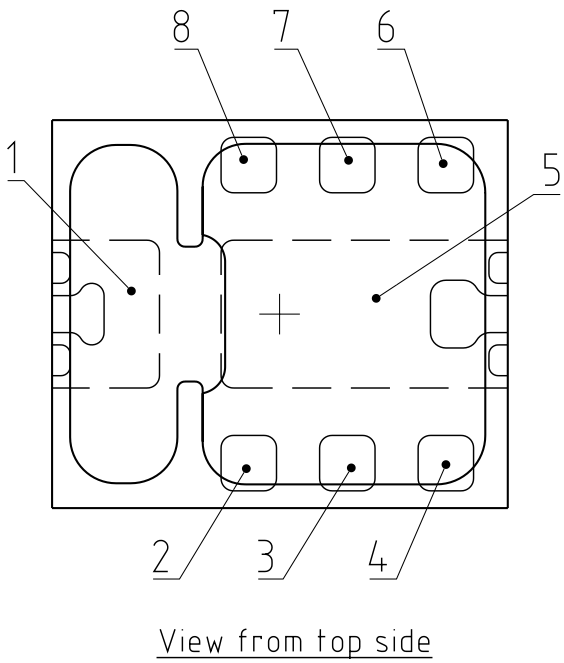
C67062-A0425-A2-01

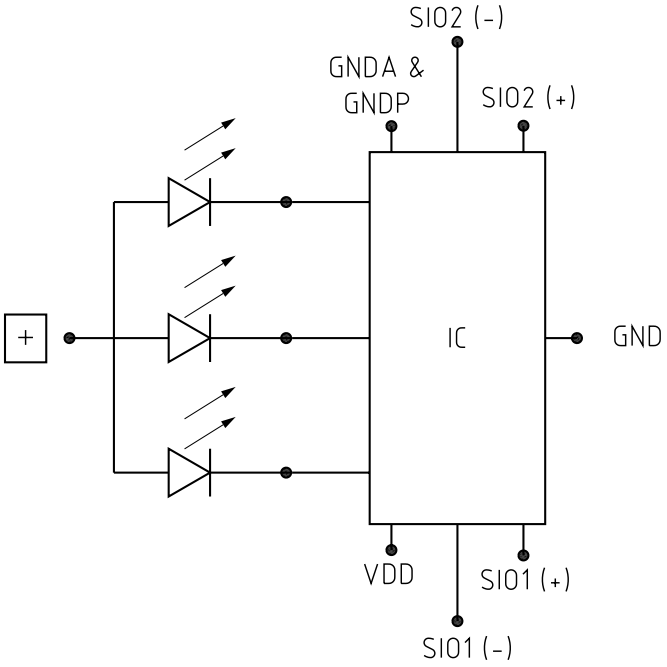
备注:

近似重量: 22.2 mg

腐蚀试验: 类别: 2B
测试条件: 25°C / 75 % RH / 10 ppm H_2S / 21 days (IEC 60068-2-43)

内部电子电路

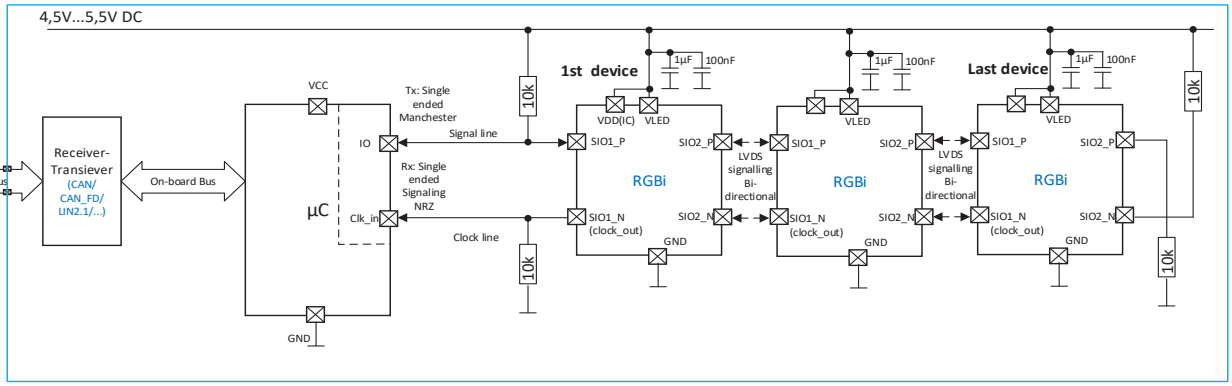




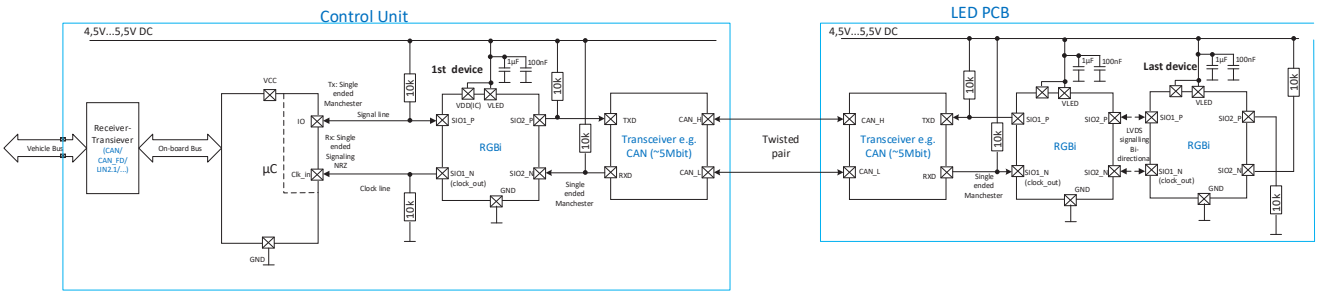
识别码	描述
1	VLED
2	VDD (IC)
3	SIO1 (-)
4	SIO1 (+)
5	NA (pull to GND)
6	SIO2 (+)
7	SIO2 (-)
8	GNDA & GNDP

Application Description

A typ. application is a dynamic ambient light with more than 50 LEDs/PCB.
First device in a daisy chain communicates with uC via single-ended interface. In forward direction (MCU -> chain) it is asynchronous Manchester coded signal. In backward direction it is synchronous communication. Device sends messages back to MCU per request only. (Master slave system)
Between devices in both directions the communication uses LVDS physical layer and telegrams are also Manchester coded.



Application with Transceivers



To allow a communication over cable between RGBi devices a connectivity to transceiver e.g. CAN FD via single ended Manchester coded communication is an option. The protocol will not change to a CAN protocol.

Temperature sensor

The T-sensor is included in the IC and trimmed at production.
The performance is stable over the full temperature range with an 8bit register for readout.
Readout is possible during sleep or active device state, the device must be addressed.
Calculation ADC value to °C
Temperature [°C]= 1.08 x ADC readout value – 126°C
Accuracy: +-5°C within range -40°C - +125°C

One Time Programming Memory

OTP includes optical measurement data of Red, Green & Blue for 10mA & 50mA. This allows a PWM calculation or calibration of each RGBi within the MCU to achieve a very accurate color setpoint.

Parameter	Comment	Symbol		Values
Optical data size		M_LED_cal	typ.	168 bit
ID size		M_ID		21 bit
VDD voltage range for readout	See VDDGOOD	VDD	min. typ. max	4.5 V 5 V 5.5 V

Single Ended, LVDS Link and Data Structure

Overview

- Bi-directional and uni-directional (loop back to master MCU)
- LVDS - differentiell Manchester coded
- Single ended – Manchester coded & Manchester decoded (NRZ, clock & data)
  Push-pull interface, clock is invertible
- Communication direction and SIO connection is flexible
- Communication speed is typ. 2,4Mbps Manchester coded

Communication modes

Each one of the 2 available SIO interfaces do support 4 different modes.
Each SIO only can operate in semi-duplex mode meaning it either does receive or transmit a telegram at the same time. However, it is possible that a device does receive a telegram at one SIO and start transmitting at the other SIO interface.
The 4 communication modes are:

1. “LVDS-mode”: The SIO communication is using LVDS signaling for transmitting and receiving a communication telegram. The bit stream is using Manchester encoding to transfer DATA & CLK on the same line.
2. “MCU-mode-normal”:In this mode a SIO is using single-ended mode for the signaling. Received telegrams are Manchester encoded on SIOx_P port. For transmitting, the device is decoding the Manchester signal, SIOx_P will deliver the DATA in NRZ format and SIOx_N delivers the corresponding clock.
3. “MCU-mode-EOL(EndOfLine)”:
   This is similar to “MCU mode, normal” but the SIO port does consider itself to be at the end of the daisy chain. This is needed for READ ONLY.
4. “CAN-mode”:
   In this mode, it is possible to communicate via a CAN FD transceiver. SIOx_P is always in output state and transmits telegram as Manchester encoded signals (single-ended), SIOx_N is always in input state and receives telegrams as Manchester encoded signal (single-ended).

Communication mode selection

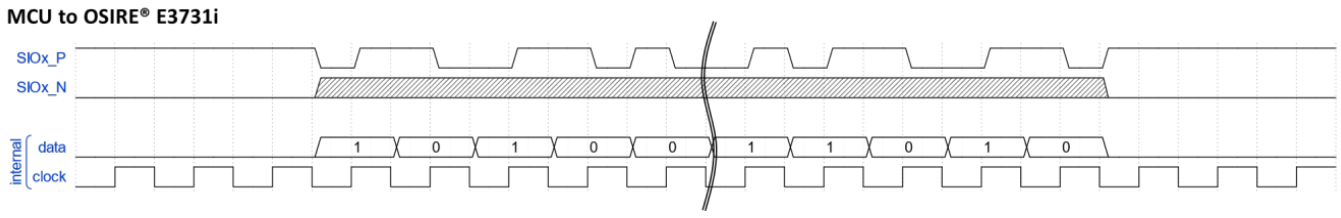
Communication mode auto detection takes place during initialization phase via voltage level check on SIOx_x and this mode cannot be changed during the operation cycle. After a HW Reset (POR) the Initialization with mode selection takes place again.

SIO_P State	SIO_N State	Signal level	RX encoding	TX encoding	SIO_P type	SIO_N type	Application case
		LVDS	Manchester	Manchester	bidirectional	bidirectional	LVDS
pull up	pull down	Single ended	Manchester on SIO_P	Data on SIO_P; Clock on SIO_N	bidirectional	Output or inactive	MCU mode normal
pull down	pull up	Single ended	-	Data on SIO_P; Clock on SIO_N	Output	Output	End of Line, MCU mode EOL
pull up	pull up	Single ended	Manchester on SIO_N	Manchester on SIO_P	Output only	Input only	CAN mode (ext. transceiver)

Single-ended communication physical layer and bit coding

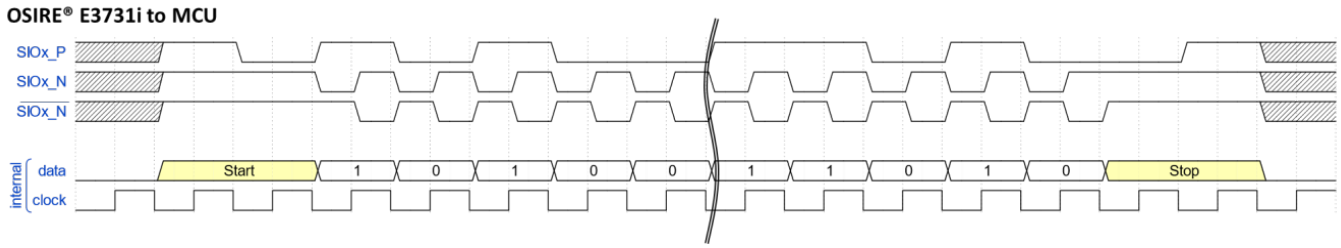
Single ended communication in the master->slave direction is performed using Manchester encoding. In that case a bit stream is sent via SIOx_P only; SIOx_N of the device is ignored. Slave-master communication is performed with NRZ coding. In that case SIOx_N provides a clock signal. The clock signal is inverted if it's selected via setup register. Communication Data rate effective is typ. 2.4Mbps.

MCU transmitting – single ended Manchester coded out:

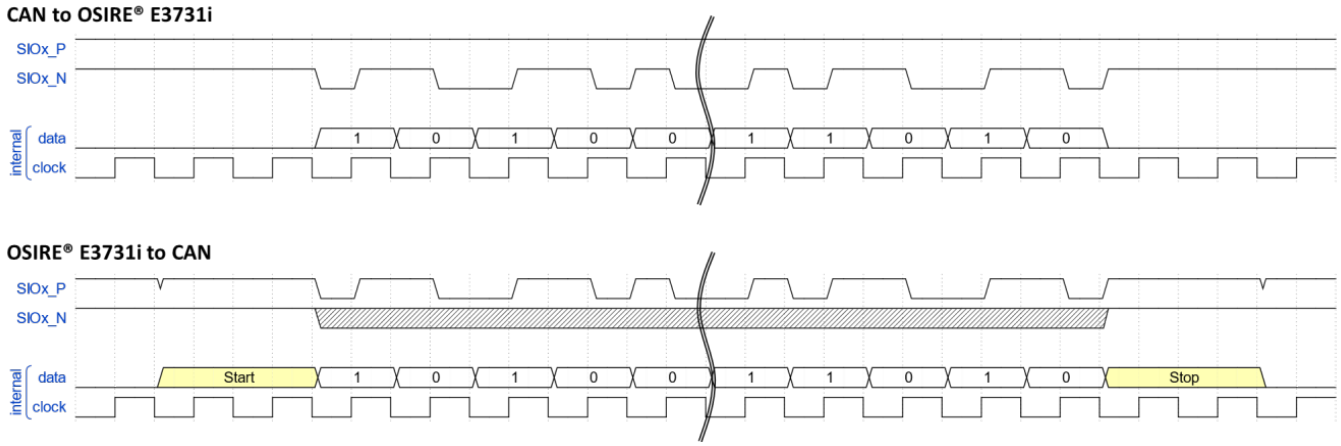


MCU receiving – single ended Manchester decoded in (NRZ – clock & data receiving)

The receiving clock could be inverted via setup register



Transceiver – single ended Manchester coded out & in

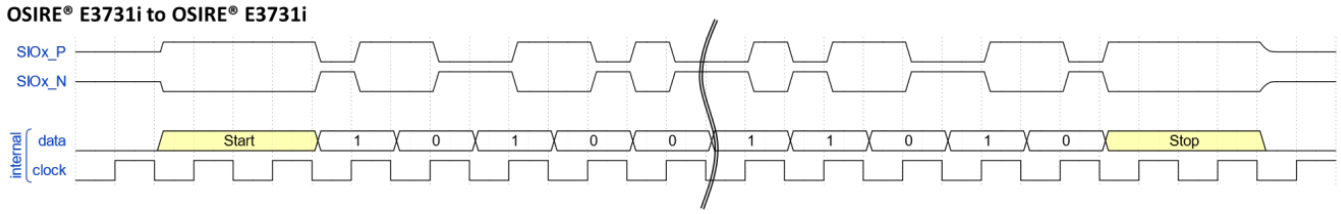


If a transceiver is detected on SIOx the output and input message is via single ended Manchester encoded communication with typ. 2.4 Mbit/s data transfer rate. For the transceiver the data transfer rate depends on the data signal due to the Manchester encoded data. Means up to the double transfer rate is needed (4.8 Mbit/s). Requires a 5 Mbit/s transceiver

Differential communication physical layer and bit coding

Physical layer

For differential communication the termination resistance R_term_LVDS is 200 Ohm, differential voltage V_diff_LVDS is app. 300 mV, data rate is typ. 2.4 Mbps. Common mode voltage is typ.1.2 V, it means the max voltage on the communication lines during communication is typ. 1.35 V and the min. voltage is typ. 1.05 V



Physical layer parameters

Parameter	Symbol	Comment		Values
Threshold on SIOx_x to detect communication mode (high)	V_th_se_high	Detection via pull up to VCC (typ.10k)	min.	2.85 V
Threshold on SIOx_x to detect communication mode (low)	V_th_se_low	Detection via pull down to GND (typ10k)	max.	0.7 V
Output low level for pin SIOx_P and SIOx_N for single-ended communication	V_SIOx_P/N(O,L)		max.	0.7 V
Output high level for pin SIOx_P and SIOx_N for single-ended communication	V_SIOx_P/N(O,H)		Min.	VDD - 0.7 V
data rate for slave->master direction (internally generated)	f_com_int		typ.	2.4 Mbps
Clock period for single ended communication Manchester decoded device			typ.	417 ns
data rate for MCU ->slave communication	f_com_m		min. typ. max.	2.23 Mbps 2.43 Mbps 2.62 Mbps
Minimum Time between two messages sent from MCU (fast forwarding)				8.3 µs
High level input voltage single ended communication	Vin_high_se	CMOS logic	min.	2.0 V
Low level input voltage for single ended communication	Vin_low_se	CMOS logic	max.	0.8 V
LVDS common mode voltage with active communication	V_LVDS_com		typ.	1.2 V
LVDS common mode voltage with no active communication	V_LVDS_off		typ.	0
LVDS differential voltage	V_LVDS_diff		typ.	300 mV
LVDS termination resistance	R_LVDS	Included in IC	typ.	200 Ohm
LVDS Tx current	I_LVDS_TX		typ.	1.5 mA
Max number of addresses	Max_address		typ.	1000

Transceiver connectivity typ. CAN FD

Parameter	Symbol	Comment		Values
Data rate (real)			min. typ. max.	2.31 Mbps 2.43 Mbps 2.55 Mbps
Data rate (signal)		Manchester coded signal = data rate x2	min. max.	2.31 Mbps 5.1 Mbps
Allowed duty cycle variance on receiver	$DUTY_{RX}$		min. max.	40 % 55 %
Duty cycle variance on transmitter	$DUTY_{TX}$		typ.	50 %

Constant current LED drivers

Overview

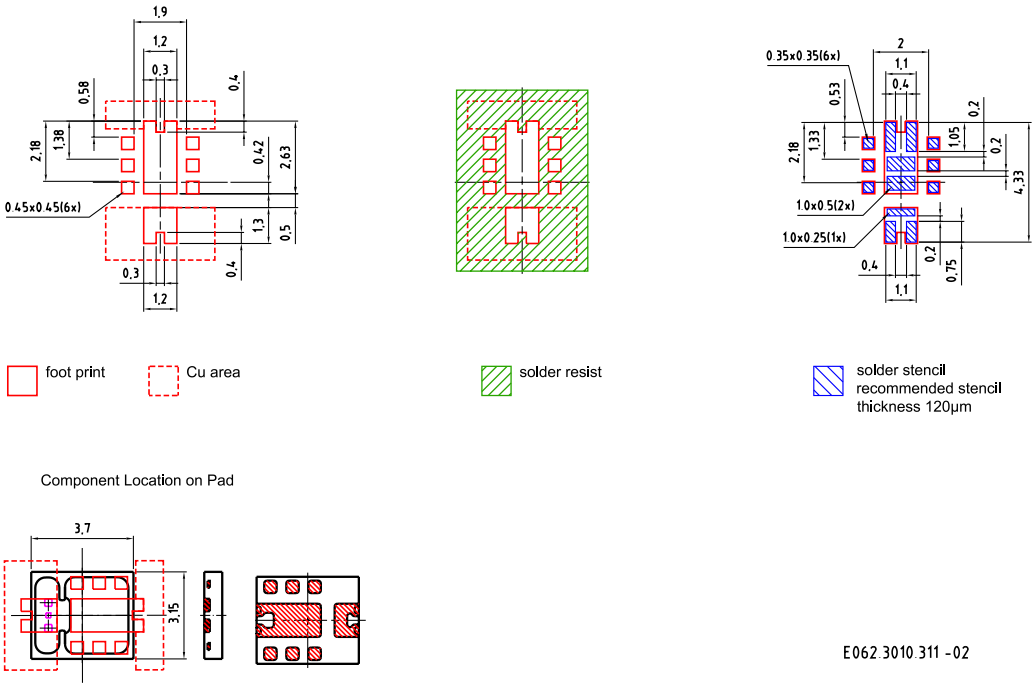
- 3 channel constant current LED drivers (high stability over full temperature range)
- PWM controlled
- 15bit PWM engine
- 500 Hz & 1000 Hz mode

Description

There are 3 integrated current sink drivers to activate three LED's. The drivers can be set for 2 current settings via command. The current drivers are controlled by a PWM with a frequency of 500 Hz or 1000 Hz. Received PWM setting is latched till the next PWM command. Current driver activation is performed with phase shift to avoid high di/dt.

Parameter	comment	Symbol		Values
Peak current setting 1	"nightmode" set via PWM command	I_dr_1	min. max.	9.5 mA 10.5 mA
Peak current setting 2	"daymode" set via PWM command	I_dr_2	min. max.	47.5 mA 52.5 mA
PWM frequency 1	Set by setup register	f_dr_1	min.	500 Hz
PWM frequency 2	Set by setup register	f_dr_2	min.	1000 Hz
PWM frequency accuracy		f_tol	min. max.	-5 % 5 %
PWM resolution 1	For f_dr_1	PWM_1		15 bit
PWM resolution 2	For f_dr_2	PWM_2		14 bit
Min PWM value	Recommended for open/short detection	PWM_value	min.	64 LSB
Rise time 1 (default)	For I_dr_1 (typ. 10mA)	t_rise_1	typ.	50 ns
Fall time 1 (default)	For I_dr_1 (typ. 10mA)	t_fall_1	typ.	50 ns
Rise time 2 (default)	For I_dr_2 (typ. 50mA)	t_rise_2	typ.	50 ns
Fall time 2 (default)	For I_dr_2 (typ. 50mA)	t_fall_2	typ.	50 ns
Phase shift between driver LED1(Red), LED2(Blue) and LED3(Green) current sink.		phase_shift_sink	typ.	1/3 period

推荐焊盘 6)



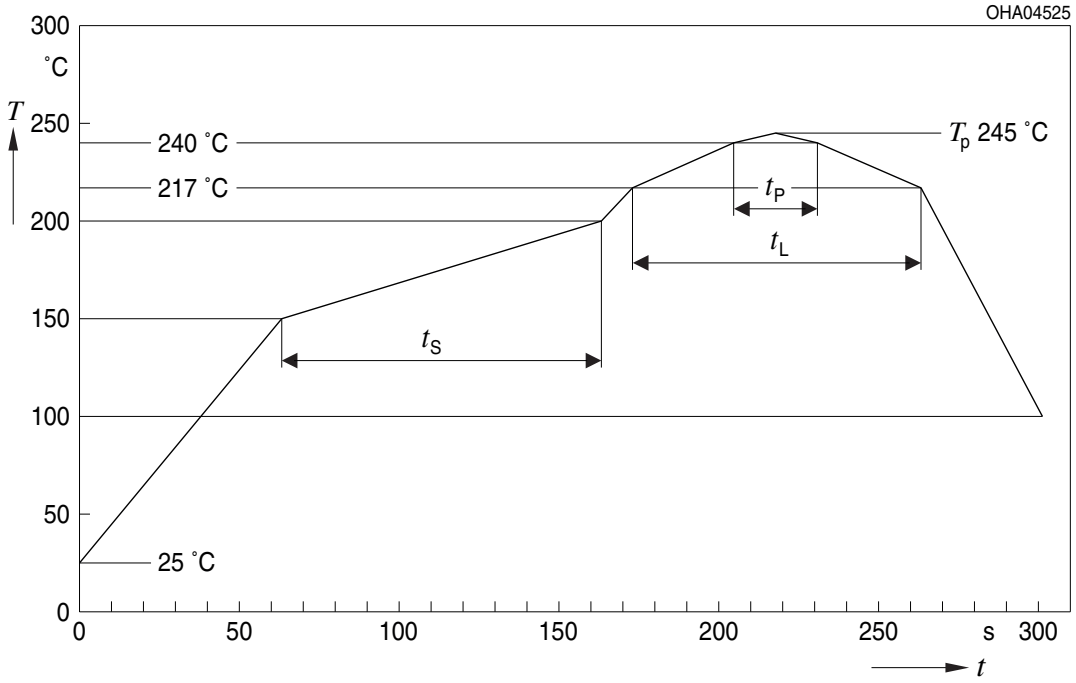
Component Location on Pad

E062.3010.311 -02

为了获得更佳的焊点连接效果，我们建议在标准氮气环境下进行焊接。 封装不适合超声波清洁。

回流焊曲线

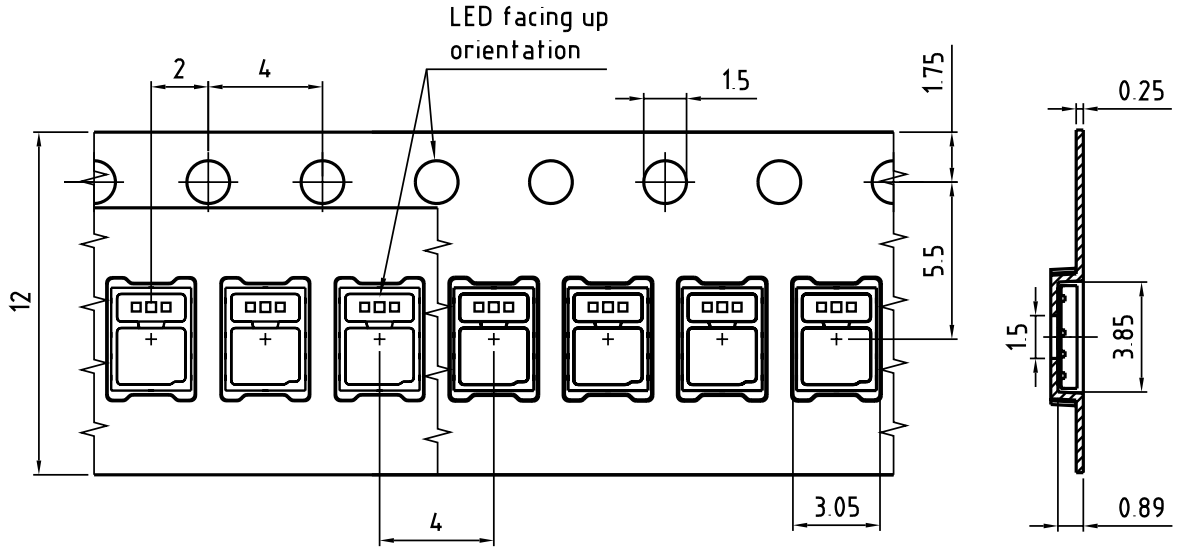
产品符合MSL等级 2 根据JEDEC J-STD-020E



曲线特征	符号	无铅组装			单位
		最小值	推荐值	最大值	
预热升温速率*) 25 °C 至 150 °C			2	3	K/s
时间 t_S T_{Smin} 至 T_{Smax}	t_S	60	100	120	s
峰值升温速率*) T_{Smax} 至 T_P			2	3	K/s
液相线温度	T_L		217		°C
超过液相线温度的时间	t_L		80	100	s
峰值温度	T_P		245	260	°C
温度保持在指定峰值温度 T_P - 5 K 的 5 °C 范围内的时间	t_P	10	20	30	s
降温速度* T_P 至 100 °C			3	6	K/s
时间 25 °C 至 T_P				480	s

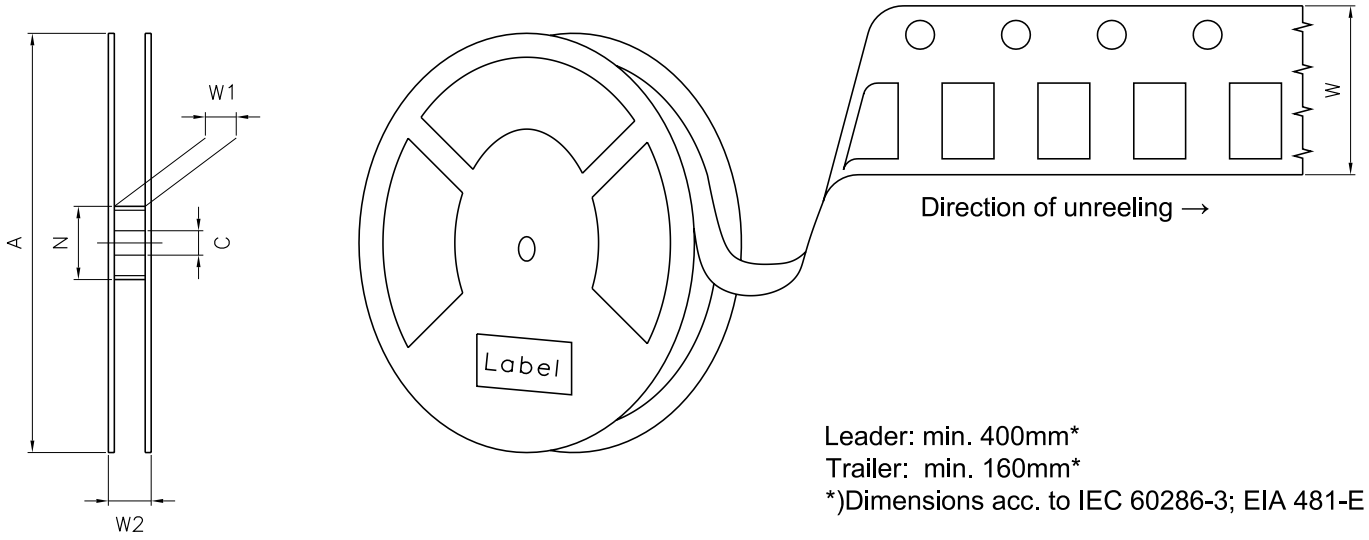
所有温度均指从元件顶部测得的封装中心温度
* 斜率计算 DT/Dt: Dt 最大值为 5 s; 涵盖整个 T 范围

编带机 [6)]



C67062-A0387-B2-03

编带和卷带 7)

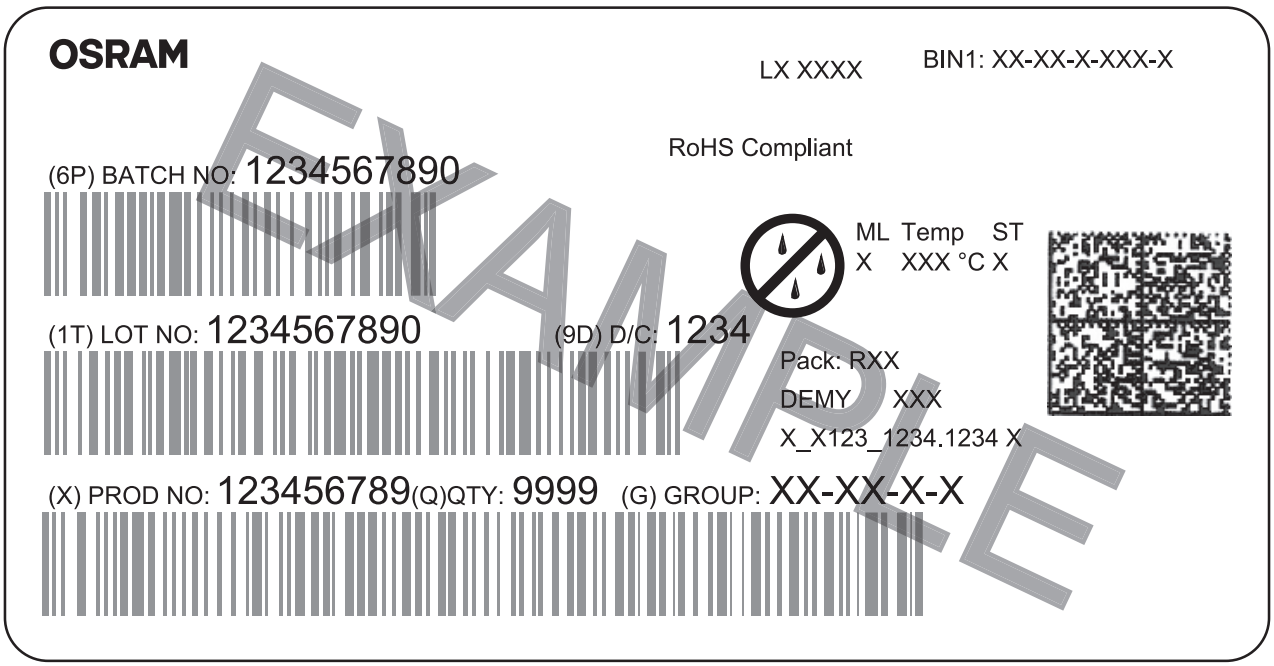


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

盘尺寸

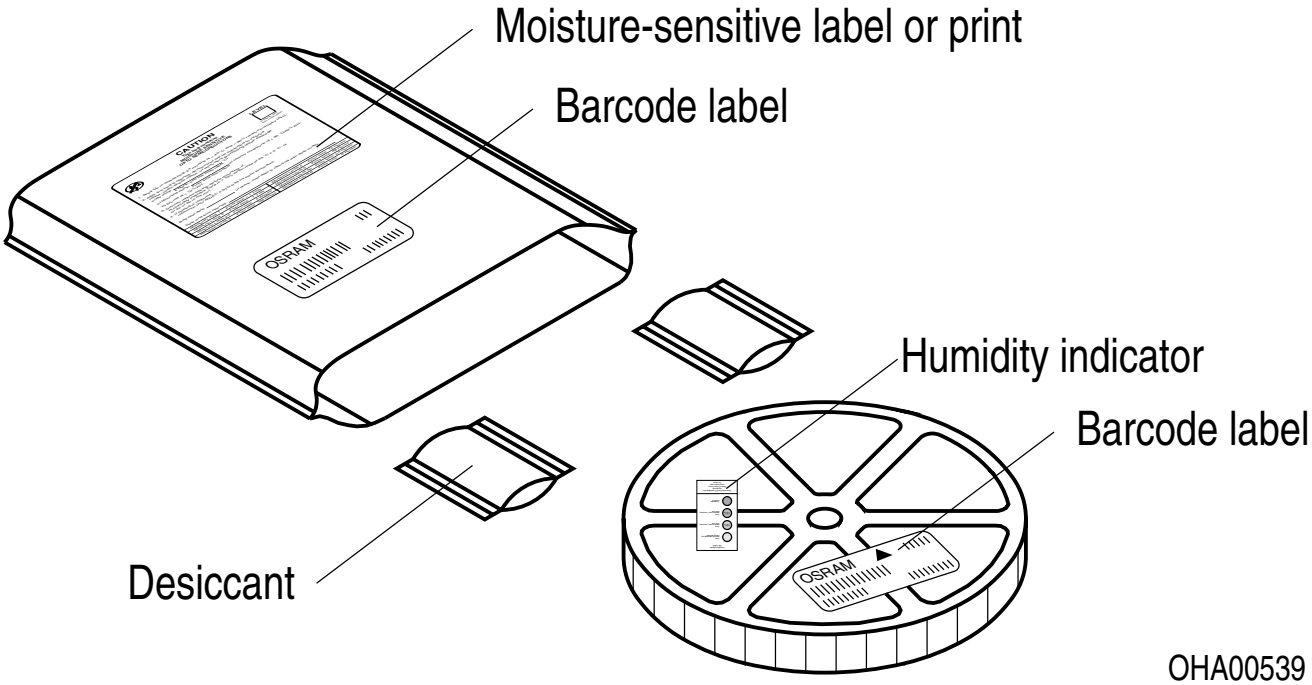
A	W	N_{min}	W_1	$W_{2\,max}$	每卷带上的数量
180 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	2000

条形码-产品-标签（BPL）



OHA04563

干燥包装工艺和材料 6)



OHA00539

根据JEDEC-STD-33,湿敏产品包装在一个干燥的袋子中，包含干燥剂和湿度卡.

备注

人眼安全的评估按照IEC 62471:2008标准(photo biological safety of lamps and lamp systems)进行。在本CIE标准的风险分组系统中，本数据表中指定的LED属于该类 **低风险 (暴露时间 100 s)**. 在某些情况下(如不同的暴露时间、瞳孔大小、观察距离等)，尽管这些产品对人眼没有危害。但是理论上来说，由于强光光源的致盲作用，它们具有很高的二次曝光可能性。例如当注视其他明亮的光源(如前照灯)时，也会出现视力暂时下降和余像情况，也可能会导致不同程度的急躁、恼怒、视力受损等情形。

除其他物质外，该器件的子组件还包含金属填充材料，包括银。金属填充材料可能会受到含残留侵蚀性物质的环境的影响。因此，我们建议客户在存储、生产和使用过程中尽量少将器件暴露于腐蚀性物质环境中。当使用上述测试条件进行测试时，器件在规定的测试持续时间内表现出了颜色的变化，但其各项性能的变化均未超出失效极限的定义。IEC60810中描述了相关的各项失效极限。

更多的应用信息，请访问 https://ams-osram.com/support/application-notes

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词汇表

1) **波长:** 波长值在持续15毫秒，IC所能驱动的最大PWM频率的脉冲电流下测得，内部再现性±0.5 nm，扩展不确定度±0.1 nm（依据GUM法覆盖系数K=3的不确定度测量）

2) **反向工作:** 并非设计用于反向工作。连续反向工作会导致器件迁移和损坏。

3) **热电阻:** Rth max以统计值（6σ）为基础。

4) **亮度:** 亮度值在持续15毫秒，IC所能驱动的最大PWM频率的脉冲电流下测得，内部再现性±8%，扩展不确定度±11%（依据GUM法覆盖系数K=3的不确定度测量）

5) **典型值:** 由于半导体器件制造工艺的特殊条件，技术参数的典型数据或计算相关性只能反映统计数字。这些参数不一定对应每个产品的实际参数，可能不同于产品的典型数据和计算相关性或典型特性线。如有要求（例如由于技术改进），这些典型数据会被更改，恕不另行通知。

6) **测量公差:** 除非图纸中另有说明，公差表示为±0.1，尺寸表示为mm。

7) **编带和卷料:** 所有尺寸和公差均遵循IEC 60286-3，单位为mm。

修订历史

版本	日期	修改
1.0	2023-07-26	初始版本

EU RoHS and China RoHS compliant product
此产品符合欧盟 RoHS 指令的要求；
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