KODENSHI AUK

S8200

Linear LED Driver IC

◈ Description

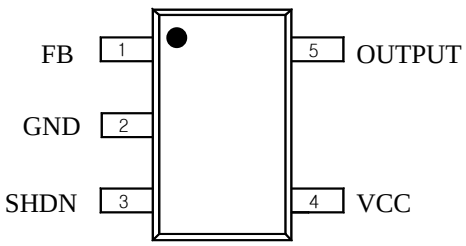
The S8200 is an integrated adjustable constant-current source, driving loads up to 150mA, The output current level can be adjusted via an external resistor. The integrated SHDN input of the S8200 permits LED brightness regulation by pulse width modulation (PWM), with the SHDN input, the LED brightness can be regulated via duty cycle. Also, SHDN low sets the S8200 in sleep mode, the SHDN pin also can be used as an enable input.

This discrete integration technology eliminates individual components by combining them into a single package, which results in a significant reduction of both system cost and board space. The device is a small surface mount package (SOT-25)

◈ Features

- Supplies stable bias current for LEDs
- LED drive current adjustable via single external resistor (Max 150mA)
- Low Cost, Low External Parts Count
- Small Surface-Mount SOT-25 Package
- Halogen-Free Package is Available

◈ Pin Assignment & Description



Package : SOT-25

Pin	Symbol	Description
1	FB	Feedback / 0.6V Reference
2	GND	Ground
3	SHDN	Disable On/Off
4	VCC	Power Supply
5	OUTPUT	Open Collector Output

◈ Ordering Information

Package Type	Device Name	Marking
SOT-25	S8200	82□ ※

※ □ : Year&Week Code

◈ Absolute maximum ratings

[Ta=25℃]

Characteristic	Symbol	Rating	Unit
Power Supply Voltage	$V_{CC(MAX)}$	25	V
Output Voltage	$V_{OUT(MAX)}$	25	V
Output Sink Current	$I_{OUT(MAX)}$	150	mA
Thermal Resistance Junction-Ambient	Rth(j-a)*	250	℃/W
Power Dissipation	P_D*	0.5	W
Operating Temperature Range	T_{opr}	-40 ~ +85	℃
Storage Temperature Range	T_{stg}	-55 ~ +125	℃

* Mounted on a glass epoxy circuit board of 30x30mm Pad dimension of 50mm^2

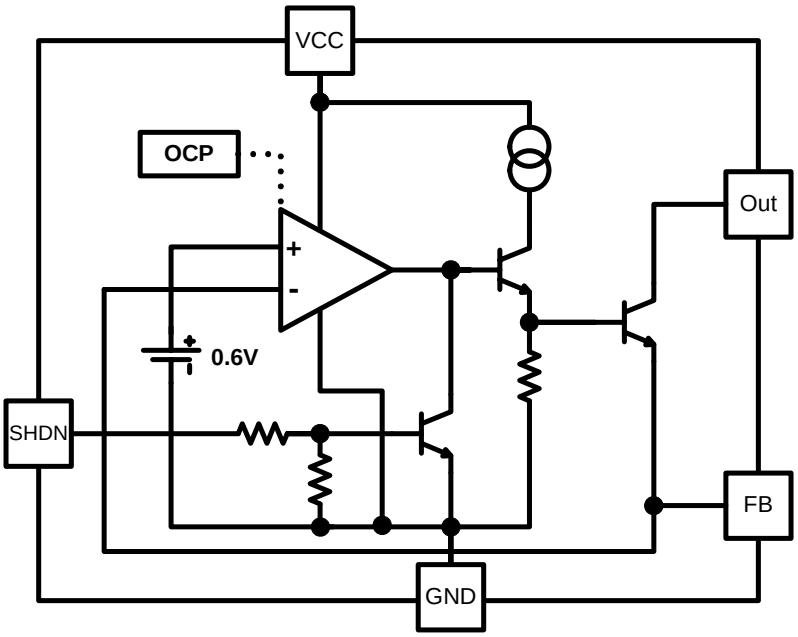
◈ Recommended operating conditions

Characteristic	Symbol	Rating		Unit
		Min	Max	
Power Supply Voltage	V_{CC}	3	24	V
Output Voltage	V_{OUT}	1.5	Vcc	V
Output Sink Current	I_{OUT}	-	100	mA
Shut Down Voltage	SHDN	-0.3	Vcc	V
Dimming Frequency (SHDN)	F_{DIM}	-	10	kHz

◈ Electrical Characteristics (Ta=25℃, unless otherwise noted.)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current 1	I_{Q1}	V_{CC}=5V, Iout=10mA, Vout=open	-	2.0	3.0	mA
Supply Current 2	I_{Q2}	V_{CC}=22V, Iout=10mA, Vout=open	-	2.2	3.5	mA
Vo Leak Current	Ileak	Vcc=5V, Vout=22V	-	0.1	1	μA
Feedback Voltage	V_{FB}	V_{CC}=5V, Iout=10mA	586	600	614	mV
Dropout Voltage	Vdrop	V_{CC}=5V, Iout=100mA	-	0.8	1.5	V
Line Regulation	$\triangle V_{FB1}$	V_{CC}=3V~22V, Iout=10mA	-	3	10	mV
Load Regulation	$\triangle V_{FB2}$	V_{CC}=5V, Iout=1mA~100mA	-	2	10	mV
SHDN Voltage On	Vdis on	V_{CC}=5V, Iout=10mA, Vout=Vcc	1.5	-	-	V
SHDN Voltage Off	Vdis off	V_{CC}=5V, Iout=10mA, Vout=Vcc	-	-	0.5	V
SHDN Pin Current	Idis	Vcc=5V, SHDN=5V	230	430	630	μA
Short Circuit Current	I_{SC}	R_{FB}=0Ω	-	250	-	mA

◈ Functional block diagram



◈ Design Consideration

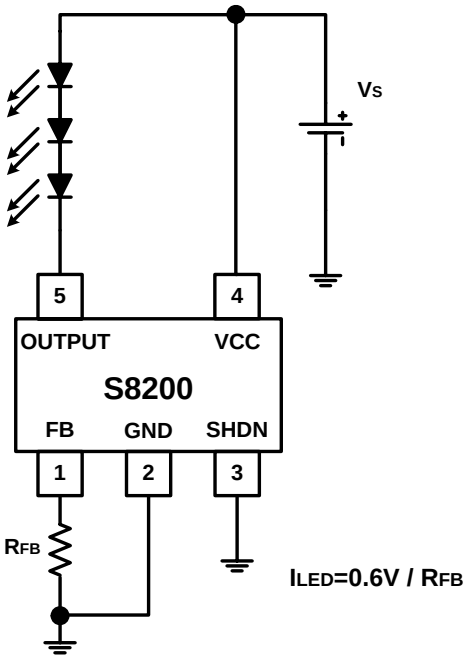
1) Calculation for R_{FB}
- $R_{FB} = 0.6V / I_{LED}$

2) Calculation for Vdrop
- $Vdrop = V_{CC} – V_{LED}$

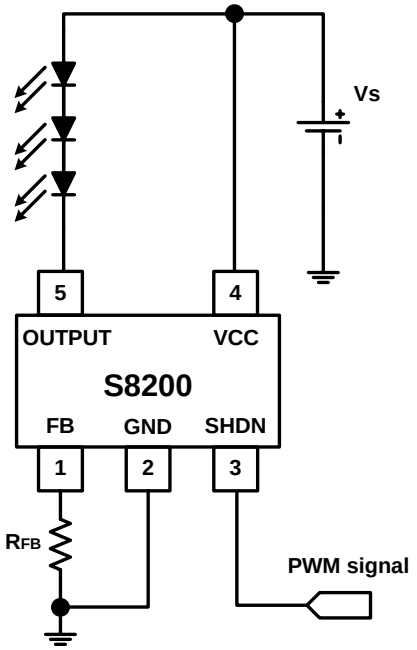
3) Calculation for Power Dissipation on the S8200
- $P_{D1} = (Vdrop – V_{FB}) \times I_{LED}$
- $P_{D2} = V_{CC} \times I_Q$
- $P_{D(total)} = P_{D1} + P_{D2}$

4) If does not use an Dimming function, connect SHDN Pin with the ground.

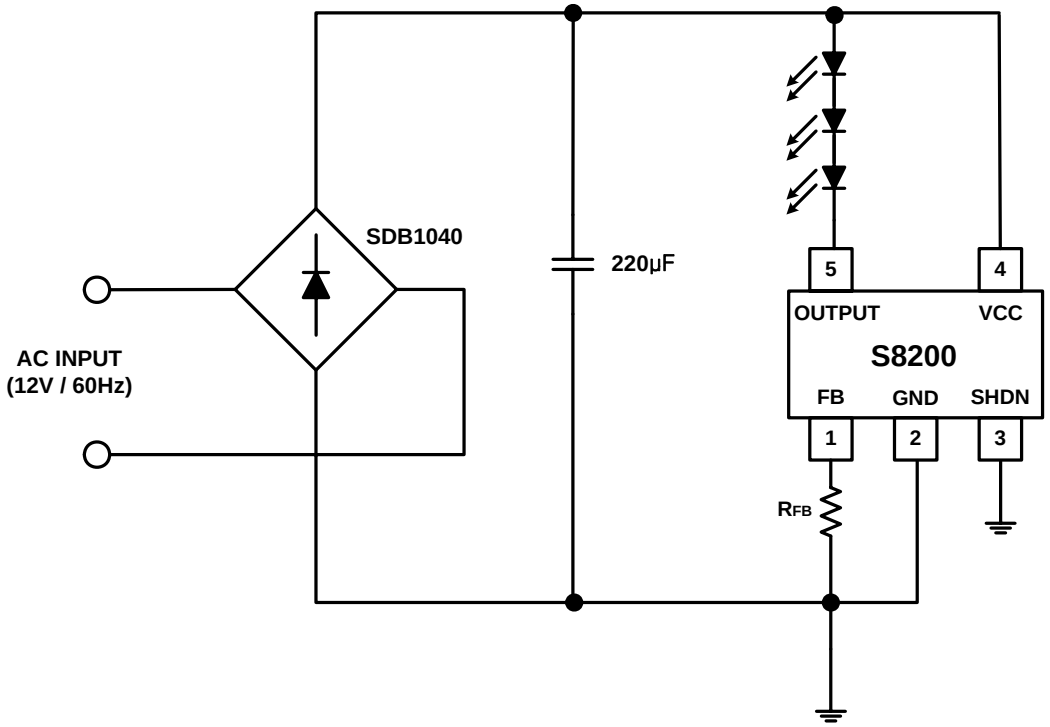
◈ Typical Applications



<APP1. Constant Current LED Driver Circuit>

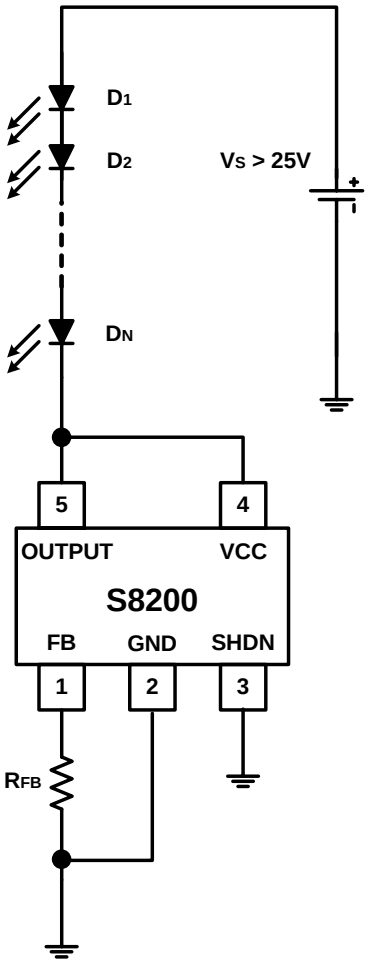


<APP2. PWM Dimming LED Driver Circuit>

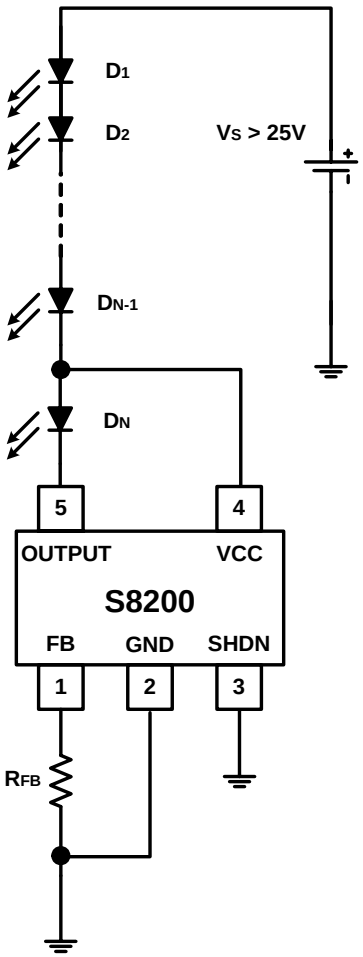


<APP3. V_{AC} Landscape Lighting Application Circuit>

◈ Typical Applications



<APP4. High Voltage Operation of S8200 (1) >

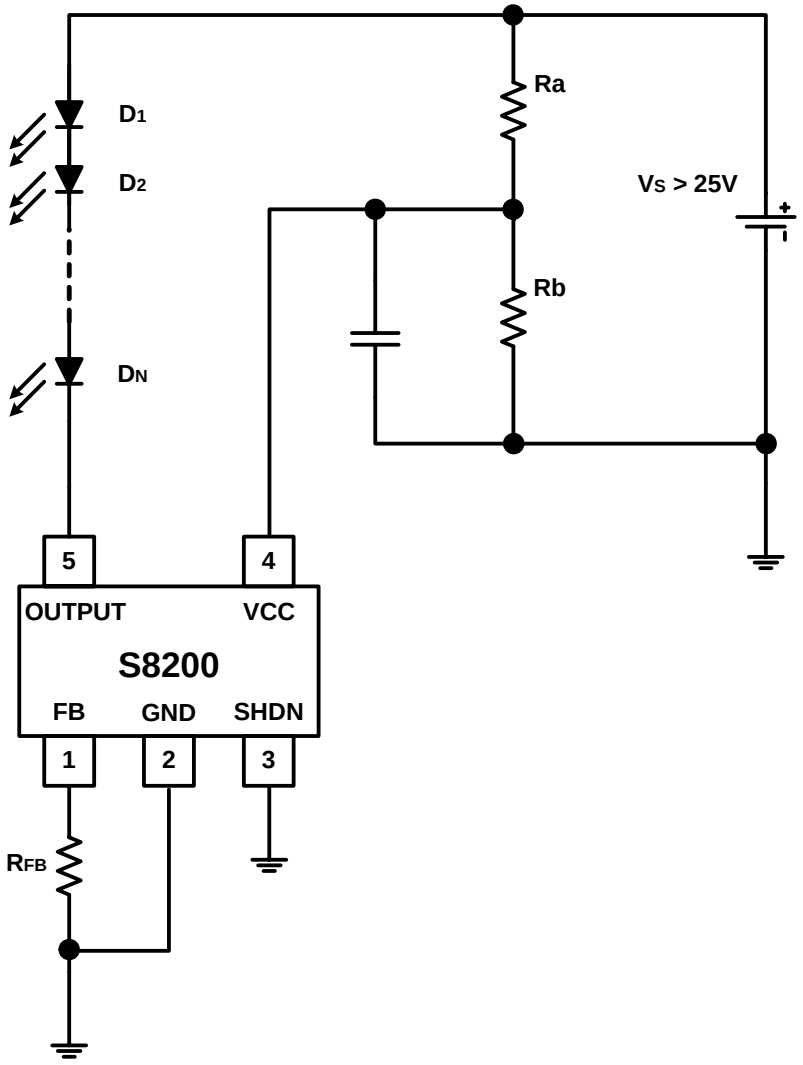


<APP5. High Voltage Operation of S8200 (2) >

For operation in excess of S8200 specified maximum voltage (V_{CC} & V_{OUT}) of 25V, one way is to connect a sufficient number of LEDs between the power supply voltage and the DC input of the V_{CC}&V_{OUT} (pin 4, 5) such that the voltage seen at pin 4, 5 is less than 25V.
That is to say, use additional LEDs to drop the voltage fed to the S8200 below its maximum rating, in the usual way. Refer to **APP4,5** Note that the exact number of diodes required will depend on the supply voltage V_{CC} and output voltage V_{OUT} ,the voltage drops across the particular LEDs being used. (Red, Blue and White LEDs have different forward voltage drop.) Use enought LEDs such that voltage at pin4,5 of S8200 is < 25V

※ Attention : When V_S uses to exceed 25V, Dimming functions the use is impossible.

◈ Typical Applications



<APP6. Power Supply Where Separates Operation of S8200 >

◈ Electrical Characteristic Curves

Fig.1 V_{FB} vs T_A

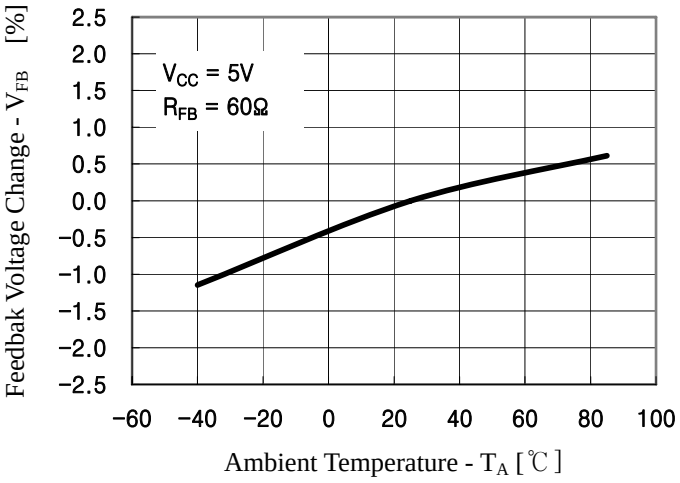


Fig.2 Line Regulation vs T_A

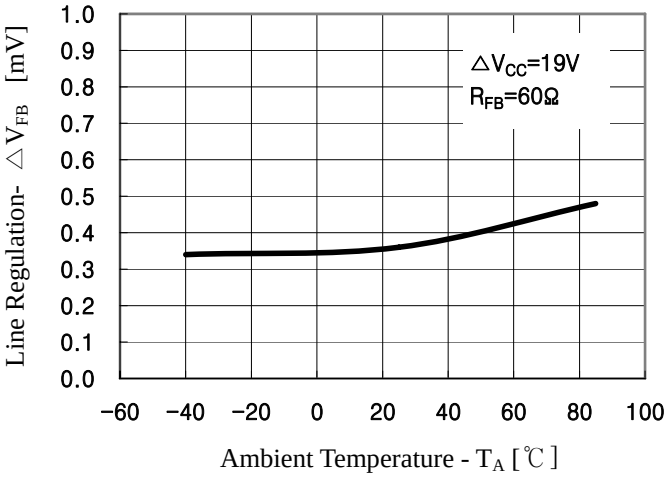


Fig.3 Load Regulation vs T_A

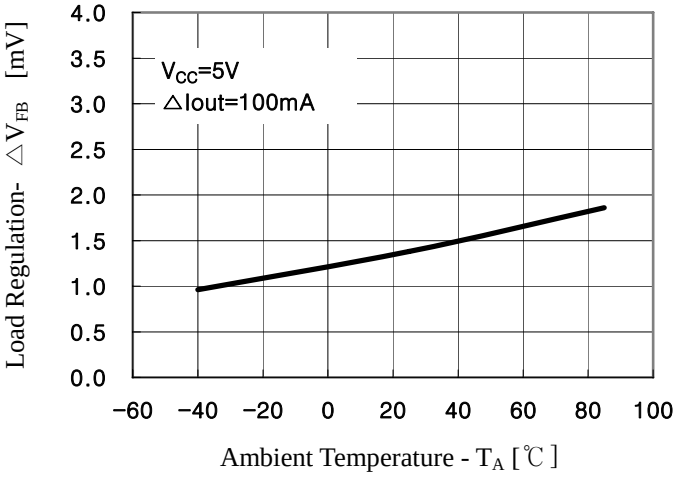


Fig.4 Quiescent Current vs T_A

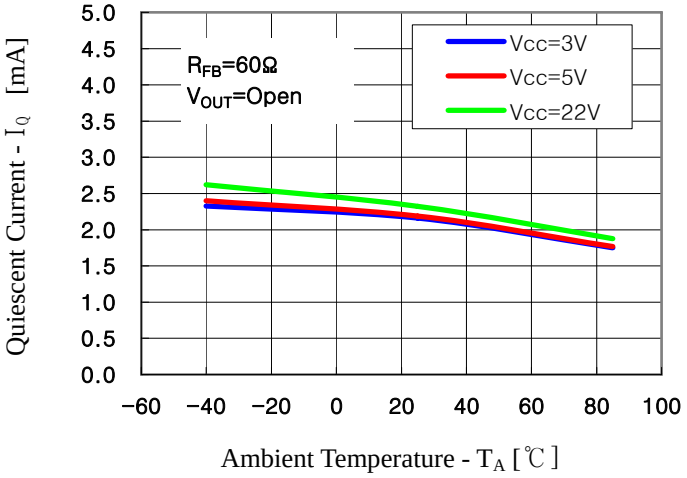


Fig.5 Dropout Voltage vs T_A

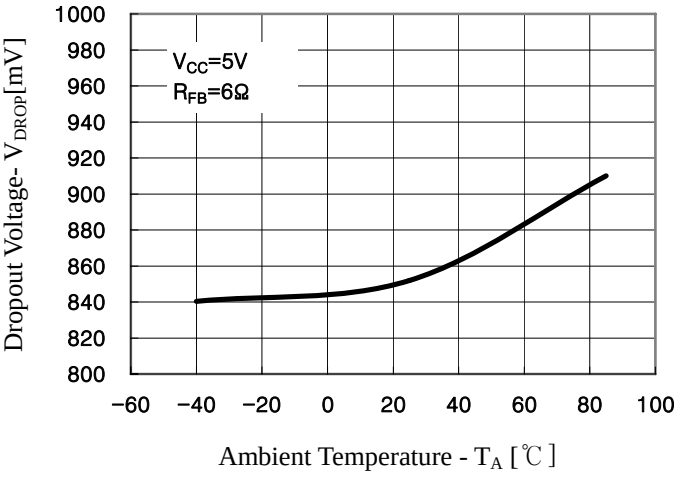
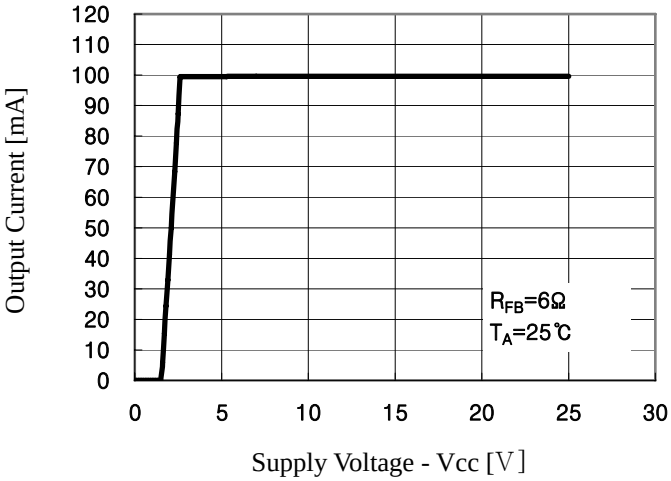
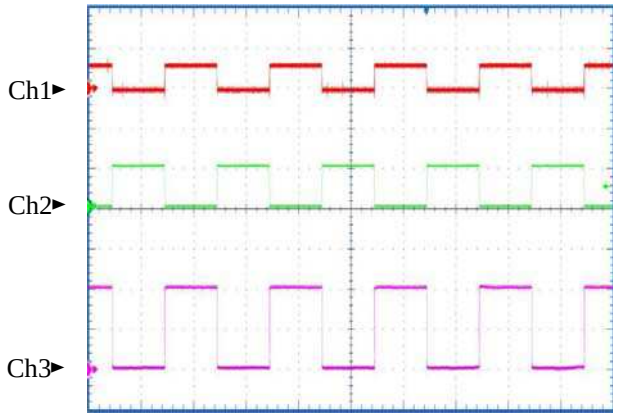


Fig.6 Output Current vs Supply Voltage



◈ Electrical Characteristic Curves

Fig.7 Dimming Waveform

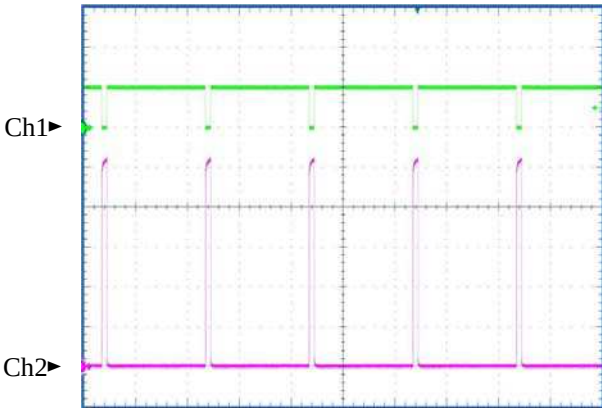


Ch1 : V_{FB}, 1V/Div

Ch2 : SHDN, 5V/Div

Ch3 : I_{OUT}, 5mA/Div

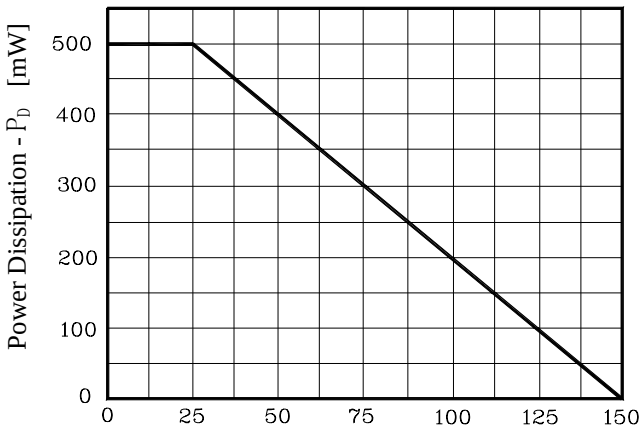
Fig.8 Short Circuit Current



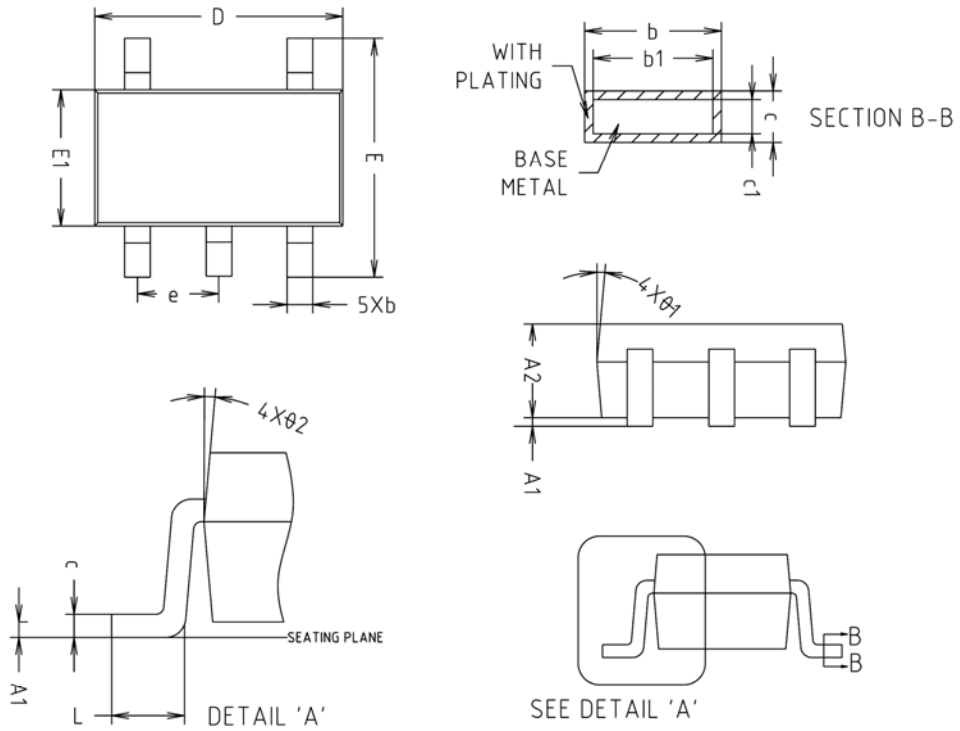
Ch1 : SHDN, 5V/Div

Ch2 : I_{OUT}, 50mA/Div

Fig.9 Power Dissipation vs T_A

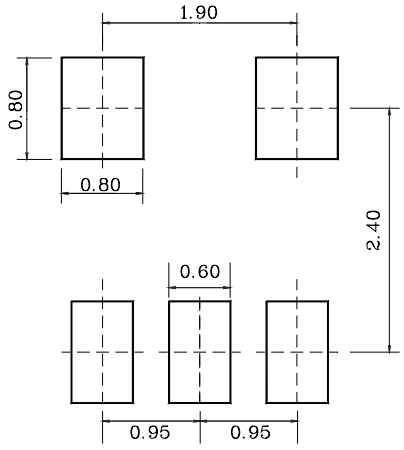


SOT-25 Outline Dimension(mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A1	0.000	0.050	0.100	
A2	1.000	1.100	1.200	
b	-	0.400	0.450	
b1	-	0.375	0.425	
c	0.110	0.150	0.190	
c1	0.085	0.125	0.165	
D	2.800	2.900	3.000	
E	2.600	2.800	3.000	
E1	1.500	1.600	1.700	
e	0.930	0.950	0.970	
L	0.400	-	-	
θ1	5° REF			
θ2	5° REF			

※ Recommend PCB solder land [Unit: mm]



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