

# Infrared LED

## L9437

LED emitting collimated light for optical encoder

L9437 is an infrared LED developed for optical encoders. By improving the aspherical lens used with the previous type L8506, we have achieved an even more highly collimated beam of near infrared light. The lead pin of L9437 has no step piece that is usually formed at the lead base brazed to the package, thus eliminating the restriction in printed circuit board design.

### Features

- Collimated light beam
- Uniform light spot
- Narrow directivity:  $\pm 5^\circ$
- High-speed response: 40 MHz Typ.
- High reliability

### Applications

- Optical encoder

#### ■ Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

Parameter	Symbol	Condition	Value	Unit
Reverse voltage	VR		5	V
Forward current	IF		80	mA
Forward current reduction rate	-		0.67	mA/°C
Pulse forward current	IFP	Pulse width=10 $\mu$ s Duty ratio=1 %	0.5	A
Pulse forward current reduction rate	-		4.2	mA/°C
Power dissipation	P		150	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-40 to +100	°C

#### ■ Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak emission wavelength	$\lambda_p$	IF=30 mA	840	870	900	nm
Spectral half width	$\Delta\lambda$	IF=30 mA	-	45	-	nm
Optical output *1	Pe	IF=30 mA	1.25	1.6	-	mW
Forward voltage	VF	IF=30 mA	-	1.5	1.65	V
Reverse current	IR	VR=5 V	-	-	5	$\mu$ A
Light spot size *2	Bw	IF=30 mA	4.0 *3	4.3	-	mm
Cut-off frequency *4	fc	IF=30 mA $\pm$ 4 mAp-p	25	40	-	MHz

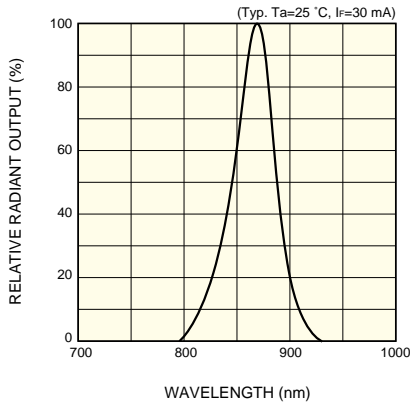
\*1: Measured with a photodiode (active area:  $\phi 8$  mm) installed 25 mm away from LED stem undersurface.

\*2: Full width at half maximum of beam spot measured with an image sensor installed 13 mm away from LED stem undersurface.

\*3: Reference value

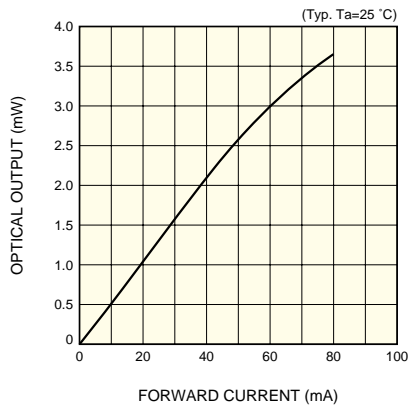
\*4: Frequency at which the optical output drops by -3 dB from that at 100 kHz.

■ Emission spectrum



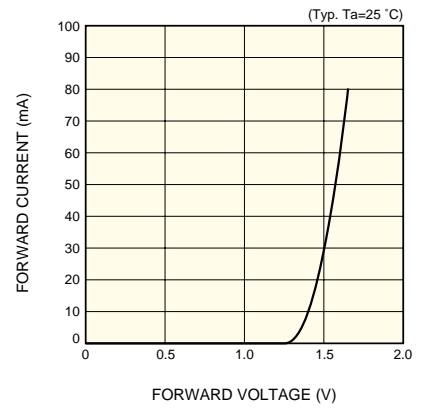
KLEDB0218EA

■ Optical output vs. forward current



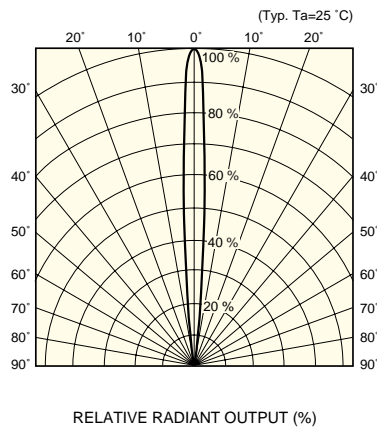
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■ Forward current vs. forward voltage



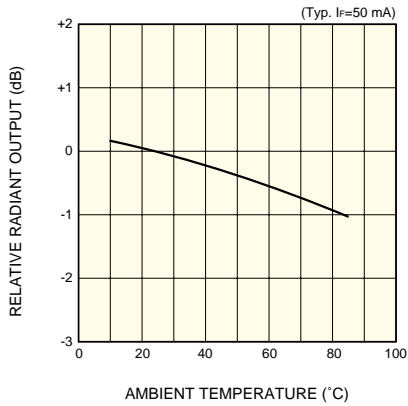
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■ Directivity



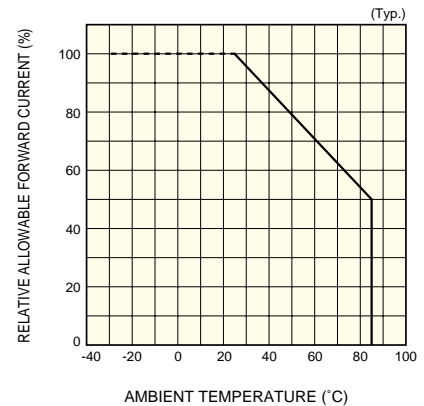
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■ Radiant output vs. ambient temperature



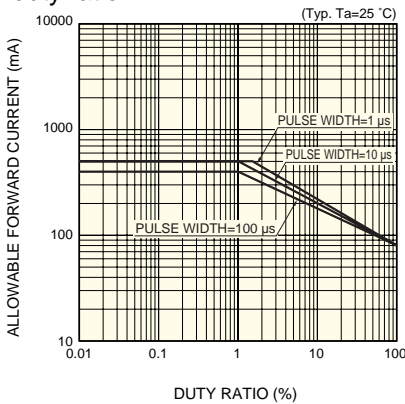
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■ Allowable forward current vs. ambient temperature



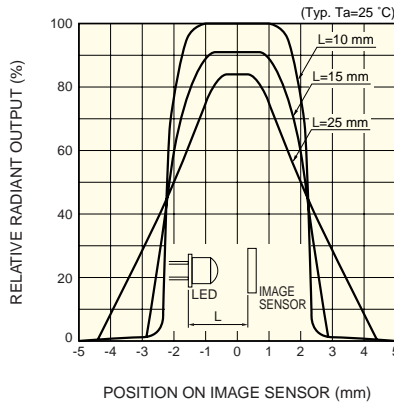
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■ Allowable forward current vs. duty ratio



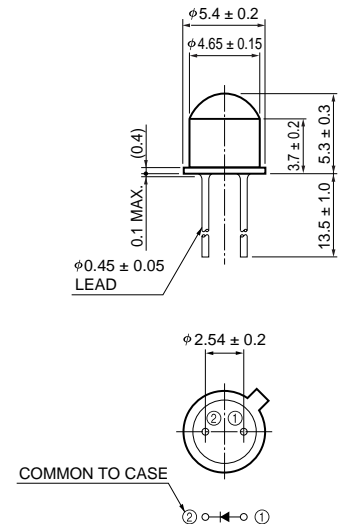
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■ Light intensity distribution



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■ Dimensional outline (unit: mm)



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Cat. No. KLED1045E03  
Aug. 2007 DN