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INTERNATIONAL STANDARD

AMENDMENT 1

Semiconductor devices –
Part 5-4: Optoelectronic devices – Semiconductor lasers

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SEMICONDUCTOR DEVICES –

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AMENDMENT 1

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Amendment 1 to IEC 60747-5-4:2022 has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices.

The text of this Amendment is based on the following documents:

Draft	Report on voting
47E/819/CDV	47E/841/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

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- reconfirmed,
- withdrawn, or
- revised.

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3.4.2 Output and current characteristics

3.4.2.1
output power, <of a semiconductor laser>

Delete the source.

3.4.3 Noise characteristics (of a semiconductor laser)

3.4.3.1
relative intensity noise
RIN
$R(f)$

Replace the existing definition, formula and note with the following new definition, formula and note, and delete the source.

ratio of the radiant power mean square fluctuation to the square of the mean radiant power, normalized to a frequency band of unit width

$$R(f) = \frac{\left\langle \Delta P(f)^2 \right\rangle}{\langle P \rangle^2} \cdot \frac{1}{\Delta f}$$

where Δf is the noise equivalent bandwidth

Note 1 to entry: The relative intensity noise as defined above is strictly "spectral relative intensity noise", but usually simplify referred to as RIN.

Table 1 – Electrical and optical characteristics

Replace, in Table 1, in the row for "Relative intensity noise", in the column of conditions for relative intensity noise, the existing text "P, f_0, Δf_N specified*" with the following new text "*P, f_0, Δf specified*".*

Characteristics	Conditions at T_{amb} or T_{case} = 25 °C, unless otherwise stated	Symbol	Specifications		
			Required	Options [a]	Requirement
Forward voltage	I_F or P specified	V_F	×		max.
Threshold current		I_{TH}	×		min. and max.
Output power at threshold	I_{TH}	P_{TH}	×		max.
Forward current above threshold	P specified	ΔI_F	×		max.
Forward current above threshold at T_{case} max or T_{amb} max	P specified, $T = T_{case}$ max or T_{amb} max	ΔI_F	×		max.
Differential output power efficiency	P or ΔI_F specified	η_d	×		min. and max.
Peak emission wavelength	ΔI_F or P specified	λ_p	×		min. and max.
Central wavelength	ΔI_F or P specified	λ_c	×		min. and max.
Spectral bandwidth	ΔI_F or P specified	$\Delta\lambda$	×		min. and max.
or: RMS spectral bandwidth	ΔI_F or P specified	$\Delta\lambda_{rms}$	×		min. and max.
or: Number of longitudinal modes within a specified bandwidth and mode spacing in the wavelength domain	ΔI_F or P specified Bandwidth specified	n_m s_m	× ×		min. and max. min. and max.
Spectral linewidth	ΔI_F or P specified	$\Delta\lambda_L$		×	max.
Side-mode suppression ratio	ΔI_F or P specified	SMSR		×	min.
Divergence angles [b, c]	ΔI_F or P specified	$\theta\sigma$		×	min.
or: Half-intensity angle in two specified planes [c]	ΔI_F or P specified reference planes specified	$\theta_{1/2}$ (1) [d] $\theta_{1/2}$ (2) [e]		× ×	max.
or: 1/e^2-intensity angle in two specified planes [c]	ΔI_F or P specified reference planes specified	θ_{1/e^2} (1) [d] θ_{1/e^2} (2) [e]		× ×	max.
Misalignment angle	ΔI_F or P specified	$\Delta\theta$		×	max.
Half-intensity width at the facet of laser diode	ΔI_F or P specified, reference axes specified	$D_{1/2}$ (x) [d] $D_{1/2}$ (y) [e]		× ×	min. and max.
or: 1/e^2-intensity width at the facet of laser diode	ΔI_F or P specified, reference axes specified	D_{1/e^2} (x) [d] D_{1/e^2} (y) [e]		× ×	min. and max.
Astigmatic difference [f]	ΔI_F or P specified, reference axes specified	d_A		×	max.
Rise time and fall time	Bias conditions (ΔI_F or ΔP) specified	t_r, t_f		×	max.
or: Turn-on time and turn-off time	Input pulse current, width and duty specified	t_{on}, t_{off}		×	max.
Small-signal cut-off frequency	ΔI_F or P specified	f_c		×	min.
Relative intensity noise	P, f_0, Δf specified	$R(f)$		×	max.
Carrier-to-noise ratio	P, f_o, Δf, f_m specified, modulation format specified	C/N		×	max.