

JIS

JAPANESE INDUSTRIAL STANDARD

**Measuring of minority-carrier
lifetime in silicon single
crystal by photoconductive
decay method**

JIS H 0604—1995

Translated and Published

by

Japanese Standards Association

Printed in Japan

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Measuring of minority-carrier lifetime in silicon single crystal by photoconductive decay method H 0604-1995

1. Scope This Japanese Industrial Standard specifies the measurement of minority-carrier bulk recombination lifetime (hereafter, referred to as bulk lifetime or τ_B) in silicon single crystal by d.c. photoconductive decay method.

The single crystal to be measured shall have a homogeneous composition, of which the resistivity shall be at least $1\ \Omega\cdot\text{cm}$.

2. Specimen

2.1 Specimen crystal and its shape The specimen shall be a single crystal, and its shape shall be four types of prisms as given in Table 1.

Table 1 Size of specimen

Unit: cm

Type of specimen	Length l	Section $a \times b$
1	5	0.5×0.5
2	5	1.0×1.0
3	8	1.5×1.5
4	8	2.0×2.0

2.2 Measurable bulk lifetime The measurable bulk lifetime shall conform to $\frac{1}{\tau_B} \geq \frac{R_s}{2}$ concerning the surface recombination rate R_s as given in Table 3.

The maximum measurable values of the bulk lifetime τ_B for various specimens are given in Table 2.

Table 2. Maximum measurable values of bulk lifetime

Unit: μs

Conductive type of specimen	Class of specimen			
	1	2	3	4
Type p	710	2800	6300	11000
Type n	2000	7900	18000	31000