

## NPN SILICON POWER TRANSISTOR ARRAY LOW SPEED SWITCHING USE (DARLINGTON TRANSISTOR) INDUSTRIAL USE

### DESCRIPTION

The μPA1456 is NPN silicon epitaxial Darlington Power Transistor Array that built in 4 circuits designed for driving solenoid, relay, lamp and so on.

### FEATURES

- Easy mount by 0.1 inch of terminal interval.
- High  $h_{FE}$  for Darlington Transistor.

### ORDERING INFORMATION

Part Number	Package	Quality Grade
μPA1456H	10 Pin SIP	Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25\text{ }^\circ\text{C}$ )

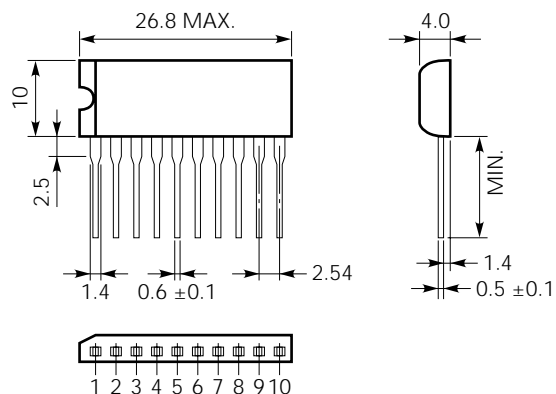
Collector to Base Voltage	$V_{CBO}$	150	V
Collector to Emitter Voltage	$V_{CEO}$	100	V
Emitter to Base Voltage	$V_{EBO}$	7	V
Collector Current (DC)	$I_{C(DC)}$	±5	A/unit
Collector Current (pulse)	$I_{C(pulse)^*}$	±10	A/unit
Base Current (DC)	$I_{B(DC)}$	0.5	A/unit
Total Power Dissipation	$PT_1^{**}$	3.5	W
Total Power Dissipation	$PT_2^{***}$	28	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*  $PW \leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 10\ \%$

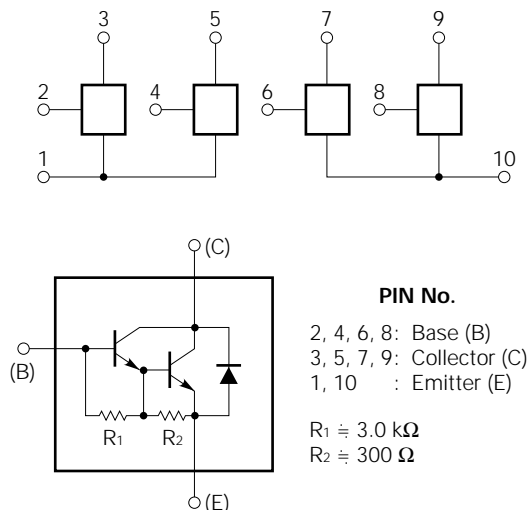
\*\* 4 Circuits,  $T_a = 25\text{ }^\circ\text{C}$

\*\*\* 4 Circuits,  $T_c = 25\text{ }^\circ\text{C}$

### PACKAGE DIMENSION (in millimeters)



### CONNECTION DIAGRAM



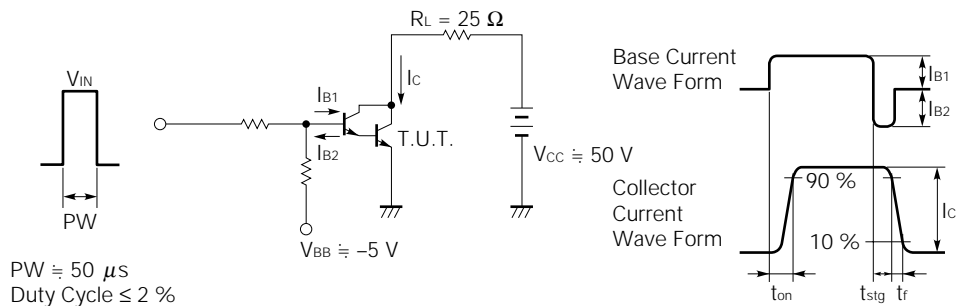
The information in this document is subject to change without notice.

**ELECTRICAL CHARACTERISTICS (Ta = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Leakage Current	$I_{CBO}$			10	μA	$V_{CB} = 100\text{ V}, I_E = 0$
Emitter Leakage Current	$I_{EBO}$			10	mA	$V_{EB} = 5\text{ V}, I_C = 0$
DC Current Gain	$h_{FE1}$ *	2000	7000	20000	—	$V_{CE} = 2\text{ V}, I_C = 2\text{ A}$
DC Current Gain	$h_{FE2}$ *	500	3000		—	$V_{CE} = 2\text{ V}, I_C = 4\text{ A}$
Collector Saturation Voltage	$V_{CE(sat)}$ *		0.9	1.5	V	$I_C = 2\text{ A}, I_B = 2\text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}$ *		1.6	2	V	$I_C = 2\text{ A}, I_B = 2\text{ mA}$
Turn On Time	$t_{on}$		1		μs	$I_C = 2\text{ A}$
Storage Time	$t_{stg}$		3		μs	$I_{B1} = -I_{B2} = 2\text{ mA}$
Fall Time	$t_f$		1		μs	$V_{CC} \cong 50\text{ V}, R_L \cong 25\ \Omega$
						See test circuit

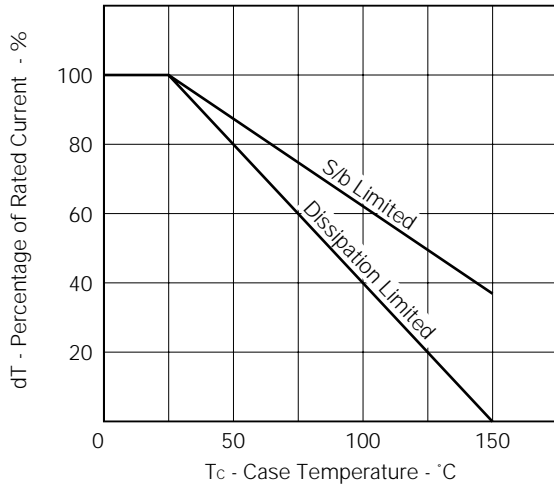
\*  $PW \leq 350\ \mu s$ , Duty Cycle  $\leq 2\%$  / pulsed

**SWITCHING TIME TEST CIRCUIT**

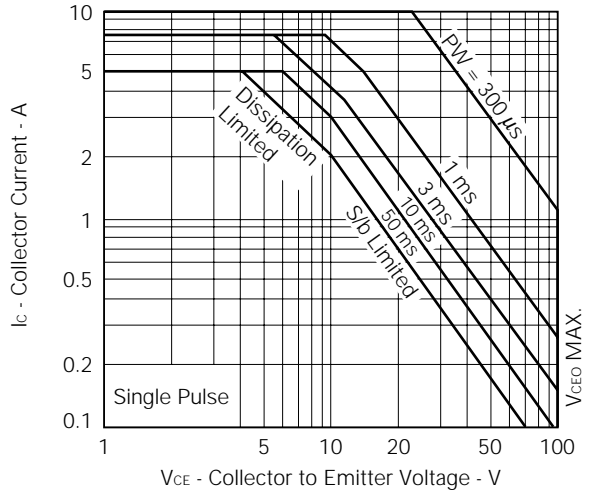


TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

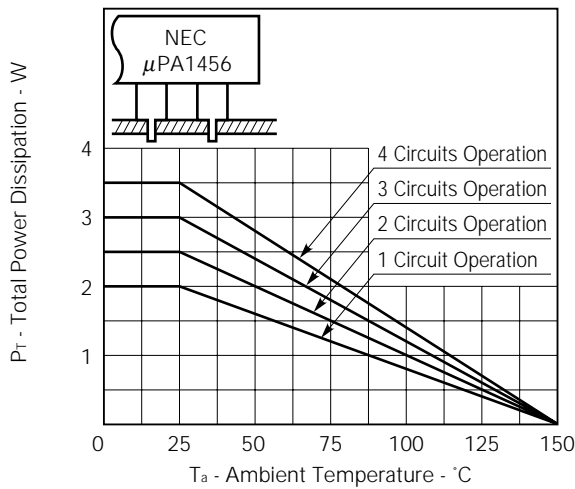
DERATING CURVE OF SAFE OPERATING AREA



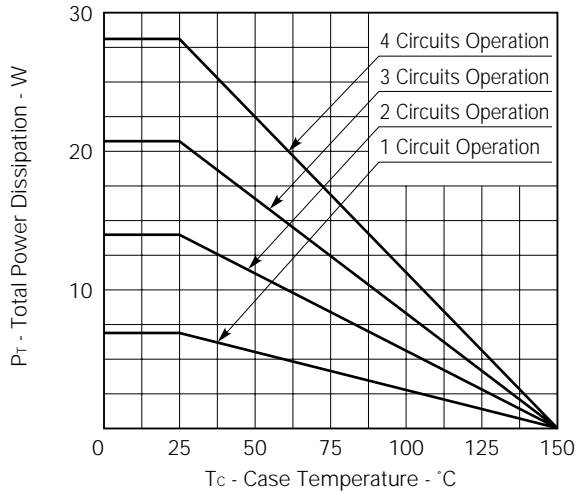
SAFE OPERATING AREA



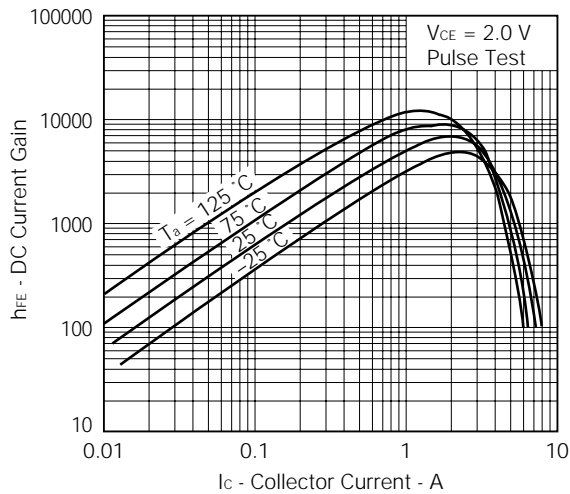
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



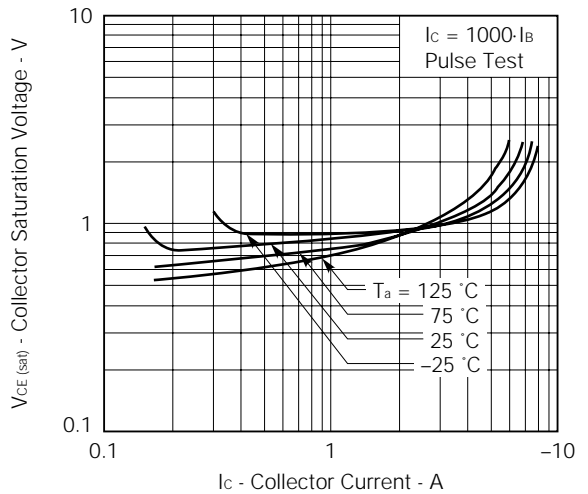
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE

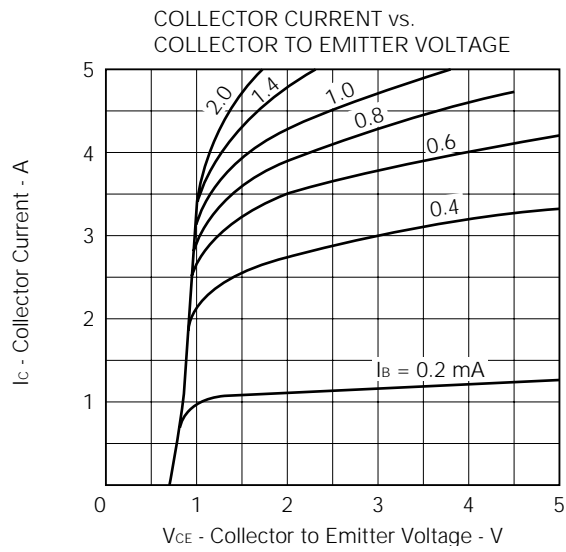
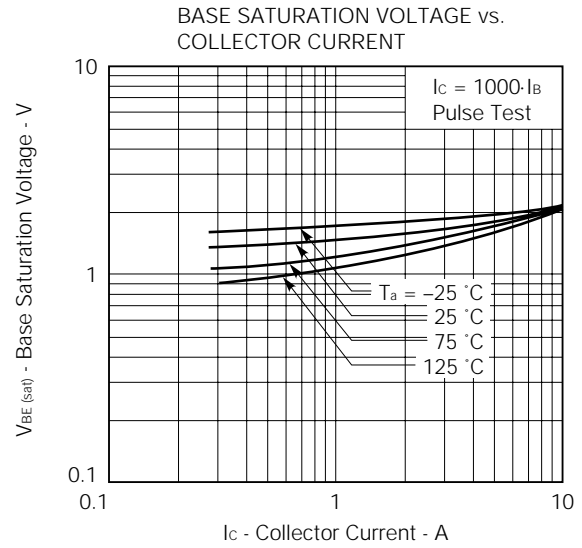
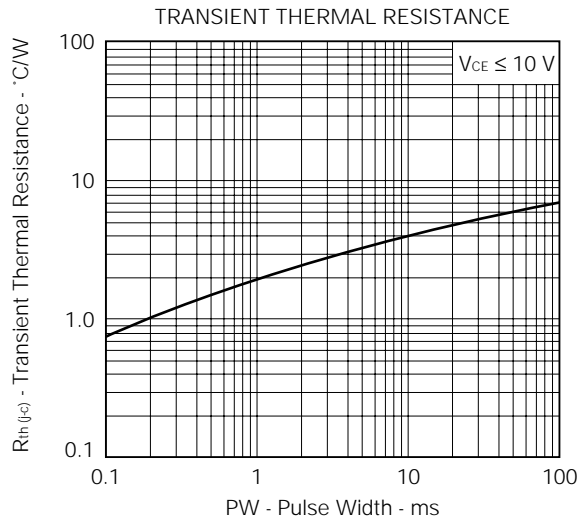


DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT





## REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134

[MEMO]

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

The devices listed in this document are not suitable for use in aerospace equipment, submarine cables, nuclear reactor control systems and life support systems. If customers intend to use NEC devices for above applications or they intend to use "Standard" quality grade NEC devices for applications not intended by NEC, please contact our sales people in advance.

Application examples recommended by NEC Corporation

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.