NEC

# SILICON TRANSISTOR ARRAY

# μPA1437

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

### DESCRIPTION

The μPA1437 is PNP 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 |
|---|---|---|
| μPA1437H | 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 ˚C)

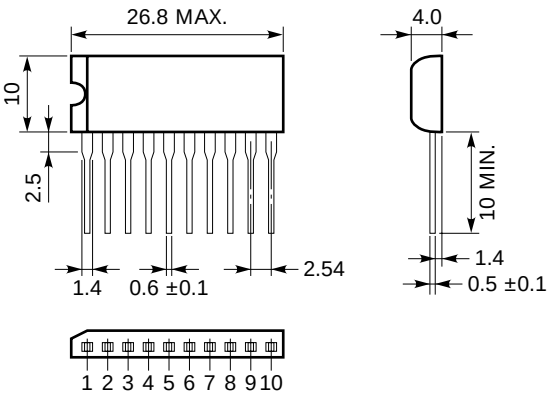
| | | | |
|---|---|---|---|
| Collector to Base Voltage | $V_{CBO}$ | –100 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | –100 | V |
| Emitter to Base Voltage | $V_{EBO}$ | –7 | V |
| Collector Current (DC) | $I_{C(DC)}$ | ∓3 | A/unit |
| Collector Current (pulse) | $I_{C(pulse)}$* | ∓6 | A/unit |
| Base Current (DC) | $I_{B(DC)}$ | –0.3 | A/unit |
| Total Power Dissipation | $P_{T1}$** | 3.5 | W |
| Total Power Dissipation | $P_{T2}$*** | 28 | W |
| Junction Temperature | $T_j$ | 150 | ˚C |
| Storage Temperature | $T_{stg}$ | –55 to +150 | ˚C |

* PW ≤ 300 μs, Duty Cycle ≤ 10 %

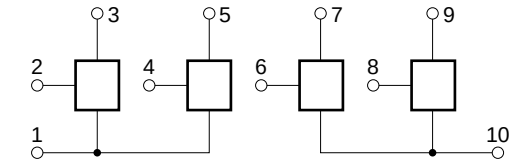
** 4 Circuits, $T_a$ = 25 ˚C

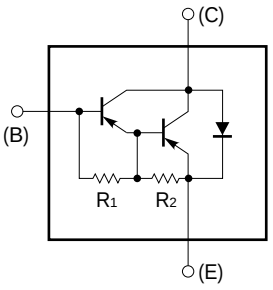
*** 4 Circuits, $T_c$ = 25 ˚C

### PACKAGE DIMENSION
### (in millimeters)




### CONNECTION DIAGRAM




**PIN No.**

2, 4, 6, 8: Base (B)
3, 5, 7, 9: Collector (C)
1, 10 : Emitter (E)

$R_1 \fallingdotseq 8.3\ k\Omega$
$R_2 \fallingdotseq 600\ \Omega$

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

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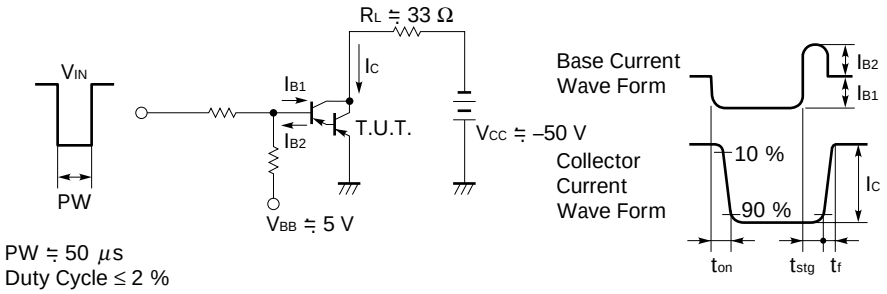
## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Collector to Emitter Sustaining Voltage | $V_{CEO(SUS)}$ | –100 | | | V | $I_C$ = –1.5 A, $I_B$ = –1.5 mA, L = 1 mH |
| Collector Leakage Current | $I_{CBO}$ | | | –10 | μA | $V_{CB}$ = –100 V, $I_E$ = 0 |
| Emitter Leakage Current | $I_{EBO}$ | | | –1 | mA | $V_{EB}$ = –5 V, $I_C$ = 0 |
| DC Current Gain | $h_{FE1}$ * | 1000 | | | — | $V_{CE}$ = –2 V, $I_C$ = –0.5 A |
| DC Current Gain | $h_{FE2}$ * | 2000 | | 20000 | — | $V_{CE}$ = –2 V, $I_C$ = –1.5 A |
| Collector Saturation Voltage | $V_{CE(sat)}$ * | | –0.9 | –1.2 | V | $I_C$ = –1.5 A, $I_B$ = –1.5 mA |
| Base Saturation Voltage | $V_{BE(sat)}$ * | | –1.5 | –2 | V | $I_C$ = –1.5 A, $I_B$ = –1.5 mA |
| Turn On Time | $t_{on}$ | | 1 | | μs | $I_C$ = –1.5 A<br>$I_{B1}$ = –$I_{B2}$ = –1.5 mA<br>$V_{CC}$ ≒ 50 V, $R_L$ ≒ 33 Ω<br>See test circuit |
| Storage Time | $t_{stg}$ | | 3 | | μs | |
| Fall Time | $t_f$ | | 1 | | μs | |

* PW ≤ 350 μs, Duty Cycle ≤ 2 % / pulsed

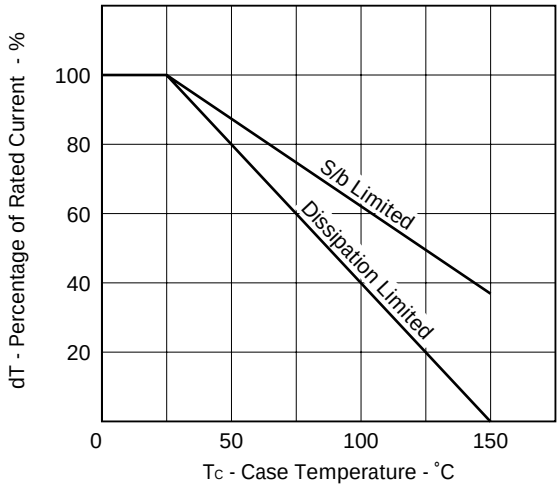
## SWITCHING TIME TEST CIRCUIT



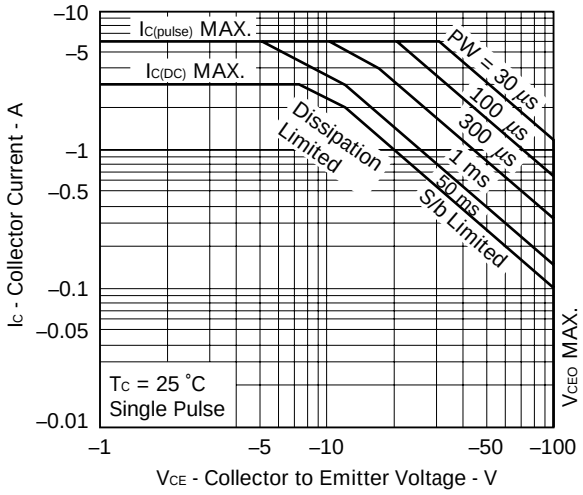

PW ≒ 50 μs
Duty Cycle ≤ 2 %

## TYPICAL CHARACTERISTICS ($T_a$ = 25 ˚C)

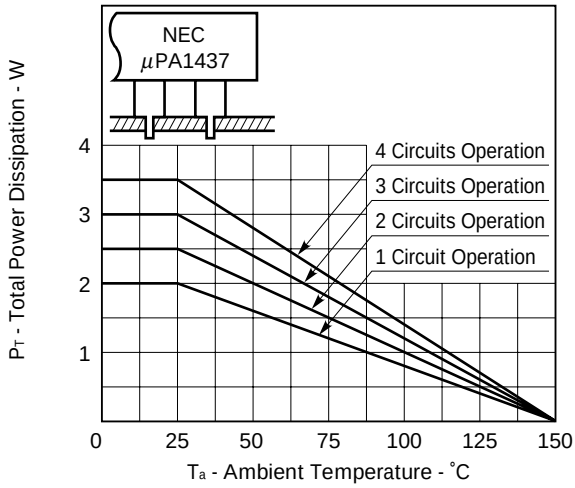
DERATING CURVE OF SAFE OPERATING AREA



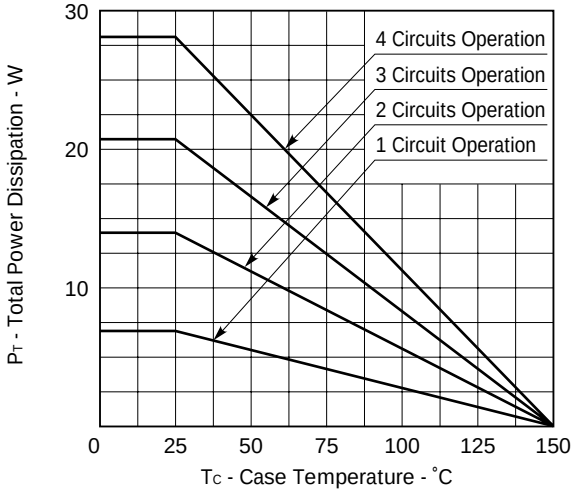

SAFE OPERATING AREA



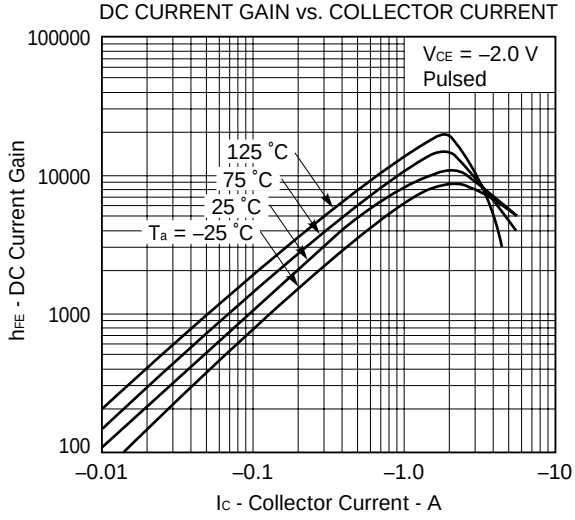

TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



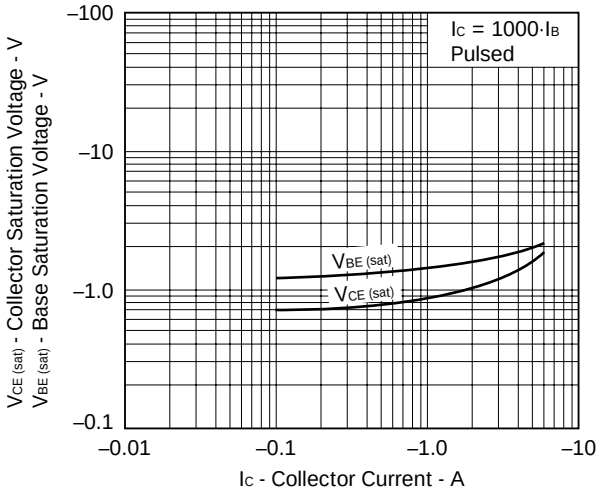

TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



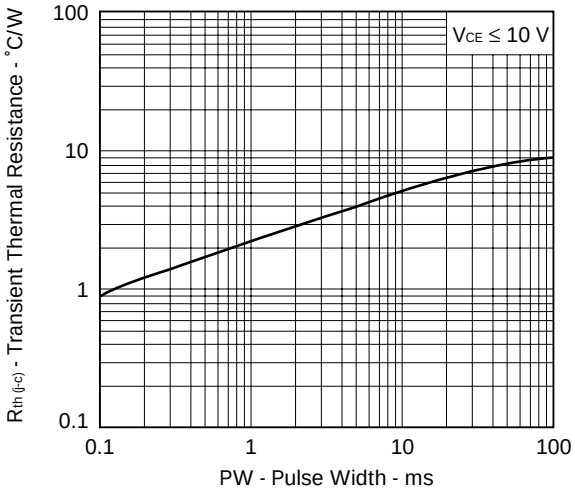

DC CURRENT GAIN vs. COLLECTOR CURRENT



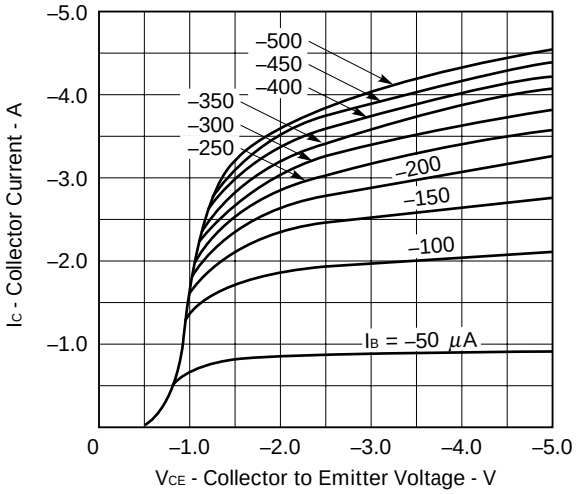

BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



TRANSIENT THERMAL RESISTANCE




COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



## 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]**



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