## -100mA / -50V Digital transistors <br> (with built-in resistors)

## DTA115EM / DTA115EE / DTA115EUA / DTA115EKA

## - Applications

Inverter, Interface, Driver

## - Features

1)Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
2) The bias resistors consist of thin-film resistors with complete isolation to allow positive biasing of the input, and parasitic effects are almost completely eliminated.
3)Only the on/off conditions need to be set for operation, making the device design easy.
4)Higher mounting densities can be achieved.

## - Structure

PNP epitaxial planar silicon transistor (Resistor built-in type)


## Packaging specifications

|  | Package | VMT3 | EMT3 | UMT3 | SMT3 |
| :--- | :--- | :---: | :---: | :---: | :---: |
|  | Packging type | Taping | Taping | Taping | Taping |
|  | Code | T2L | TL | T106 | T146 |
| Part No. | Basic ordering unit (pieces) | 8000 | 3000 | 3000 | 3000 |
| DTA115EM | $\bigcirc$ | - | - | - |  |
| DTA115EE | - | O | - | - |  |
| DTA115EUA | - | - | O | - |  |
| DTA115EKA | - | - | - | O |  |

- Inner circuit

$R_{1}=R_{2}=100 \mathrm{k} \Omega$
- Absolute maximum ratings $\left(\mathrm{Ta}=25^{\circ} \mathrm{C}\right)$

| Parameter |  | Symbol | Limits | Unit |
| :---: | :---: | :---: | :---: | :---: |
| Supply voltage |  | Vcc | -50 | V |
| Input voltage |  | VI | -40 to +10 | V |
| Output current |  | Io | -20 | mA |
|  |  | IC (Max.) | -100 |  |
| Power dissipation | DTA115EM / DTA115EE | Pd | 150 | mW |
|  | DTA115EUA / DTA115EKA |  | 200 |  |
| Junction temperature |  | Tj | 150 | ${ }^{\circ} \mathrm{C}$ |
| Storage temperature |  | Tstg | -55 to +150 | ${ }^{\circ} \mathrm{C}$ |

- Electrical characteristics $\left(\mathrm{Ta}=25^{\circ} \mathrm{C}\right)$

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Input voltage | $\mathrm{V}_{1}$ (off) | - | - | -0.5 | V | $\mathrm{Vcc}=-5 \mathrm{~V}$, $\mathrm{lo}=-100 \mu \mathrm{~A}$ |
|  | $\mathrm{V}_{\text {I }}$ (on) | -3 | - | - |  | V o $=-0.3 \mathrm{~V}$, $\mathrm{lo}=-1 \mathrm{~mA}$ |
| Output voltage | V (on) | - | -0.1 | -0.3 | V | $\mathrm{lo}=-5 \mathrm{~mA}, \mathrm{l}=-0.25 \mathrm{~mA}$ |
| Input current | 11 | - | - | -0.15 | mA | $\mathrm{V}_{\mathrm{I}}=-5 \mathrm{~V}$ |
| Output current | lo (off) | - | - | -0.5 | $\mu \mathrm{A}$ | $\mathrm{Vcc}=-50 \mathrm{~V}, \mathrm{~V}_{\mathrm{l}}=0 \mathrm{~V}$ |
| DC current gain | GI | 82 | - | - | - | $\mathrm{lo}=-5 \mathrm{~mA}, \mathrm{~V} \mathrm{o}=-5 \mathrm{~V}$ |
| Input resistance | R1 | 70 | 100 | 130 | k $\Omega$ | - |
| Resistance ratio | $\mathrm{R}_{2} / \mathrm{R}_{1}$ | 0.8 | 1 | 1.2 | - | - |
| Transition frequency | $\mathrm{fT}^{*}$ * | - | 250 | - | MHz | Vce $=-10 \mathrm{~V}, \mathrm{l}=5 \mathrm{~mA}, \mathrm{f}=100 \mathrm{MHz}$ |

* Characteristics of built-in transistor
- Electrical characteristic curves


Fig. 1 Input voltage vs. Output current (ON characteristics)


Fig. 4 Output voltage vs. Output current


Fig. 2 Output current vs. Input voltage (OFF characteristics)


Fig. 3 DC current gain vs. Output current

## Notes

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