



DTD743E series

NPN 200mA 30V Digital Transistors (Bias Resistor Built-in Transistors)

Datasheet

| Parameter | Value |
|---------------|---------------|
| V_{CC} | 30V |
| $I_{C(MAX.)}$ | 200mA |
| R_1 | 4.7k Ω |
| R_2 | 4.7k Ω |

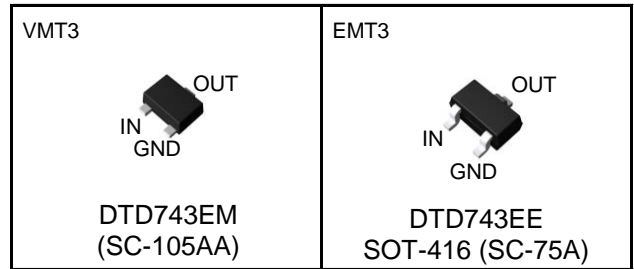
●Features

- 1) Built-In Biasing Resistors, $R_1 = R_2 = 4.7k\Omega$.
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 3) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 4) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 5) Complementary PNP Types :DTB743E series
- 6) Lead Free/RoHS Compliant.

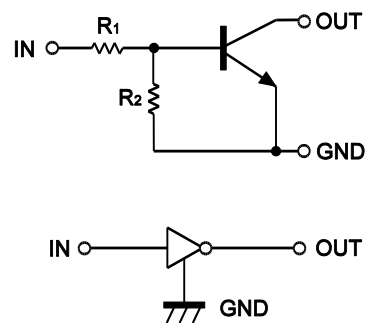
●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

●Outline



●Inner circuit



●Packaging specifications

| Part No. | Package | Package size (mm) | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit (pcs) | Marking |
|----------|---------|-------------------|-------------|----------------|-----------------|---------------------------|---------|
| DTD743EM | VMT3 | 1212 | T2L | 180 | 8 | 8,000 | M23 |
| DTD743EE | EMT3 | 1616 | TL | 180 | 8 | 3,000 | M23 |

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Values | Unit |
|------------------------------|--------------------|-------------|------|
| Supply voltage | V_{CC} | 30 | V |
| Input voltage | V_{IN} | -10 to +20 | V |
| Collector current | $I_{C(MAX.)}^{*1}$ | 200 | mA |
| Power dissipation | P_D^{*2} | 150 | mW |
| Junction temperature | T_j | 150 | °C |
| Range of storage temperature | T_{stg} | -55 to +150 | °C |

●Electrical characteristics(Ta = 25°C)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--------------|--|------|------|------|------------|
| Input voltage | $V_{I(off)}$ | $V_{CC} = 5V, I_O = 100\mu A$ | - | - | 0.5 | V |
| | $V_{I(on)}$ | $V_O = 0.3V, I_O = 20mA$ | 2.5 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O / I_I = 50mA / 2.5mA$ | - | 0.07 | 0.3 | V |
| Input current | I_I | $V_I = 5V$ | - | - | 1.4 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = 30V, V_I = 0V$ | - | - | 0.5 | μA |
| DC current gain | G_I | $V_O = 2V, I_O = 100mA$ | 115 | - | - | - |
| Input resistance | R_1 | - | 3.29 | 4.7 | 6.11 | k Ω |
| Resistance ratio | R_2/R_1 | - | 0.8 | 1 | 1.2 | - |
| Transition frequency | f_T^{*1} | $V_{CE} = 10V, I_E = -5mA, f = 100MHz$ | - | 260 | - | MHz |

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference footprint

●Electrical characteristic curves(Ta = 25°C)

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

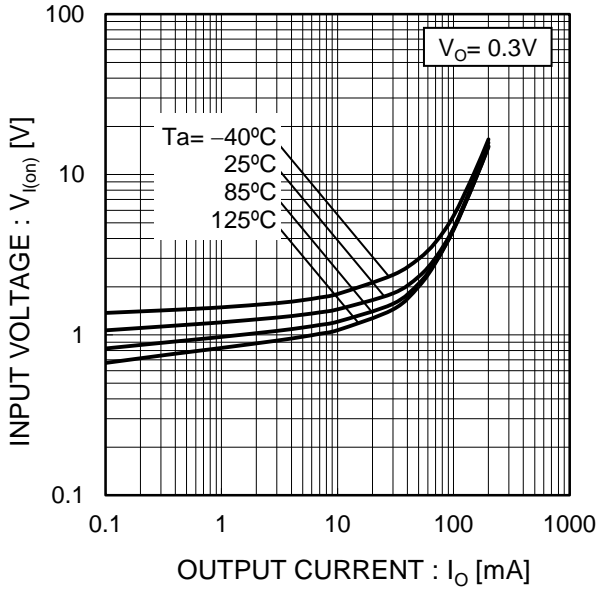


Fig.2 Output current vs. input voltage (OFF characteristics)

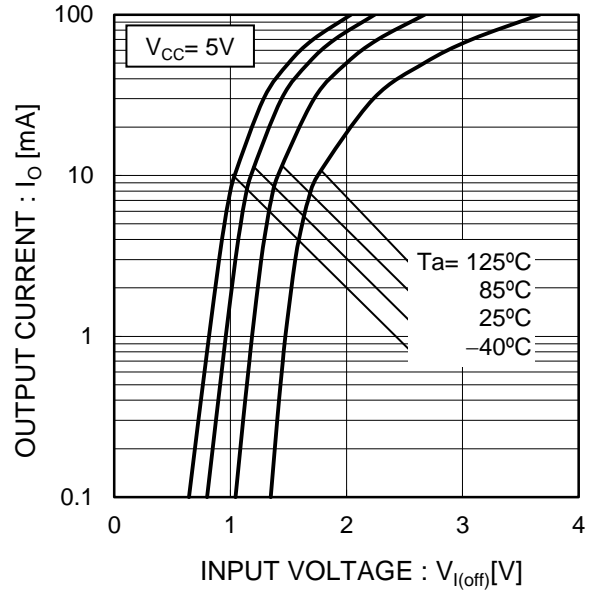


Fig.3 Output current vs. output voltage

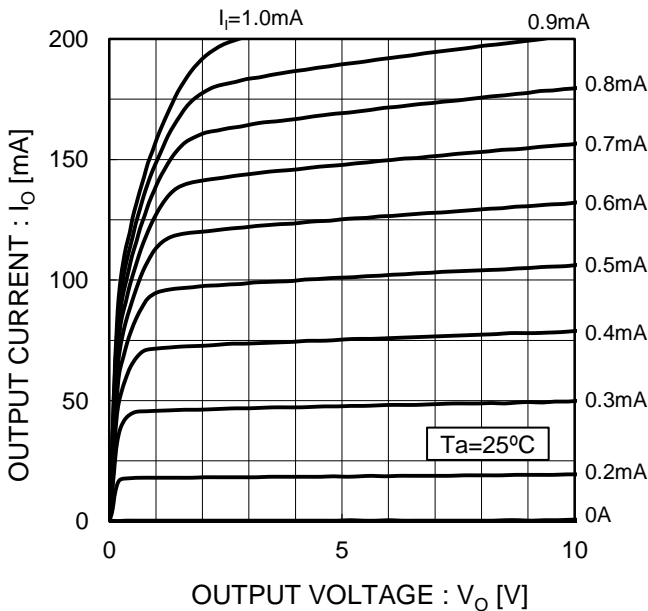
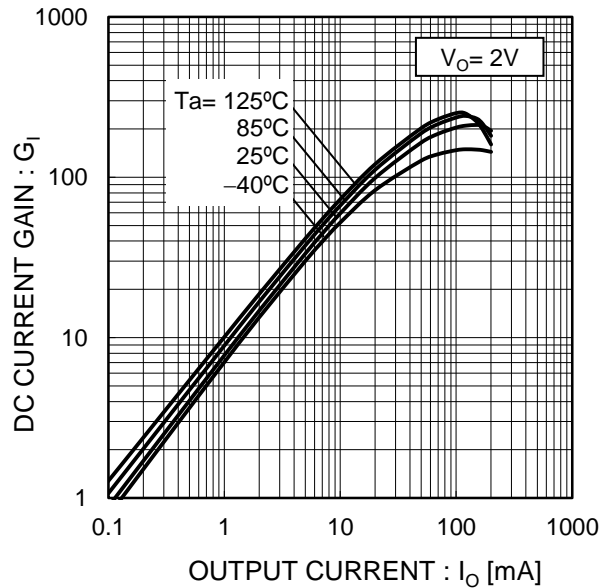
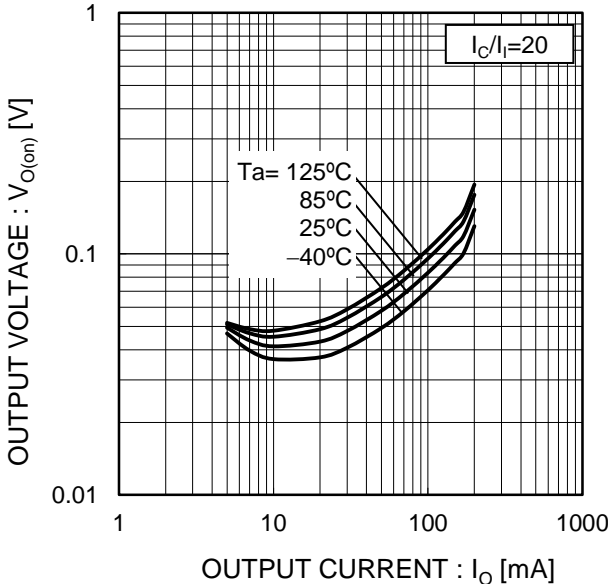


Fig.4 DC current gain vs. output current

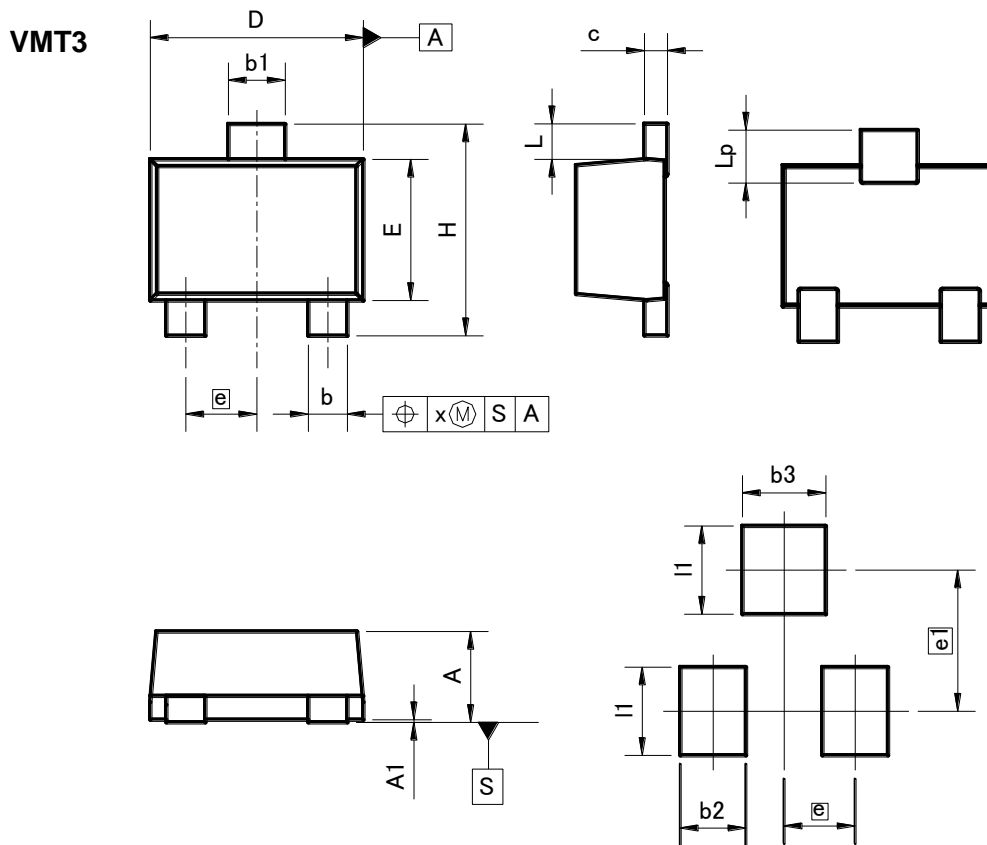


●Electrical characteristic curves(Ta = 25°C)

Fig.5 Output voltage vs. output current



●Dimensions (Unit : mm)



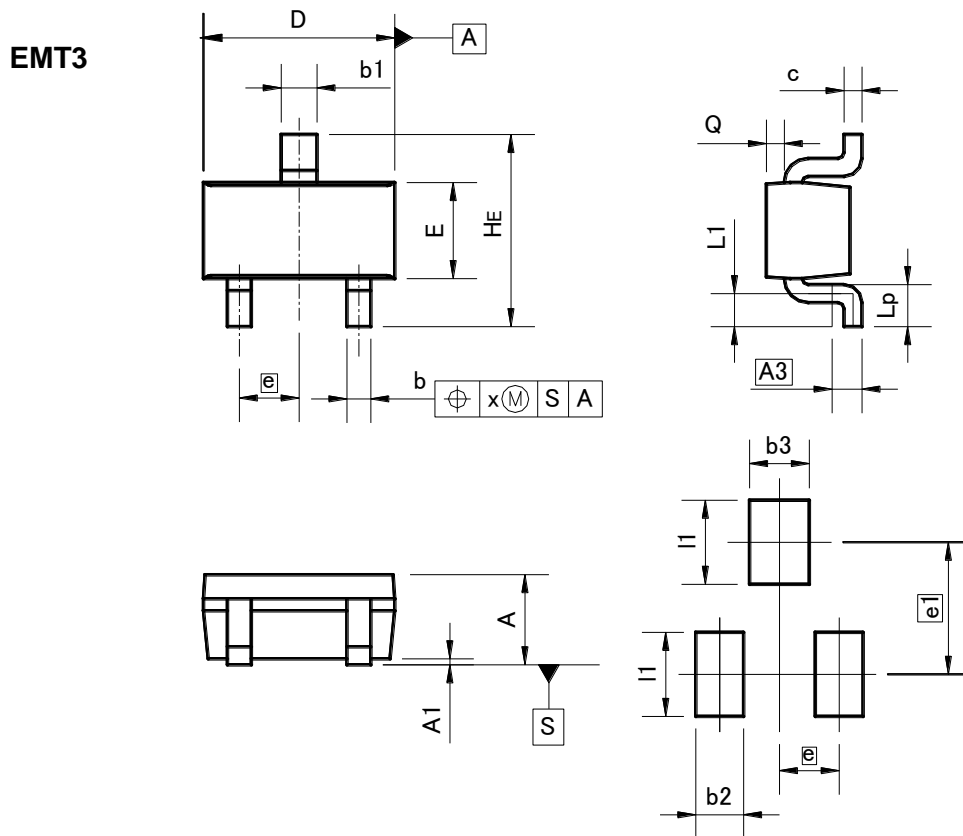
Pattern of terminal position areas

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| A1 | 0.00 | 0.10 | 0 | 0.004 |
| b | 0.17 | 0.27 | 0.007 | 0.011 |
| b1 | 0.27 | 0.37 | 0.011 | 0.015 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.10 | 1.30 | 0.043 | 0.051 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| e | 0.40 | | 0.02 | |
| HE | 1.10 | 1.30 | 0.043 | 0.051 |
| L | 0.10 | 0.30 | 0.004 | - |
| Lp | 0.20 | 0.40 | 0.008 | - |
| x | - | 0.10 | - | 0.004 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| e1 | 0.80 | | 0.03 | |
| b2 | - | 0.37 | - | 0.015 |
| b3 | - | 0.47 | - | 0.019 |
| l1 | - | 0.50 | - | 0.02 |

Dimension in mm/inches

●Dimensions (Unit : mm)



Pattern of terminal position areas

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.60 | 0.80 | 0.024 | 0.031 |
| A1 | 0.00 | 0.10 | 0 | 0.004 |
| A3 | 0.25 | | 0.01 | |
| b | 0.15 | 0.30 | 0.006 | 0.012 |
| b1 | 0.25 | 0.40 | 0.01 | 0.016 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| e | 0.50 | | 0.02 | |
| HE | 1.40 | 1.80 | 0.055 | 0.071 |
| L1 | 0.10 | - | 0.004 | - |
| Lp | 0.15 | - | 0.006 | - |
| Q | 0.05 | 0.25 | 0.002 | 0.01 |
| x | - | 0.10 | - | 0.004 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| e1 | 1.10 | | 0.04 | |
| b2 | - | 0.40 | - | 0.016 |
| b3 | - | 0.50 | - | 0.02 |
| l1 | - | 0.70 | - | 0.028 |

Dimension in mm/inches

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