

## **SOT-563 Plastic-Encapsulate Transistors**

### **EMF24**      Dual Transistors (NPN+NPN)

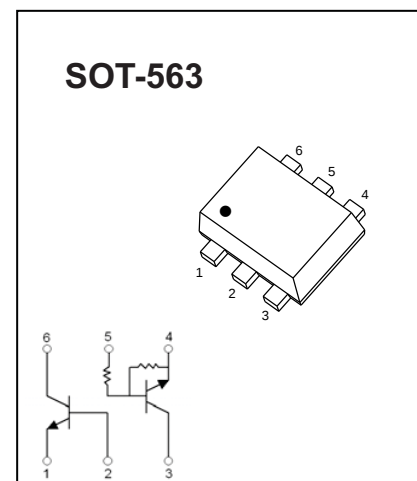
#### **FEATURES**

- 2SC4617 and DTC114E are housed independently in a package
- Power management circuit
- Power switching circuit in a single package
- Mounting cost and area can be cut in half

#### **MARKING: F24**

#### **TR1 MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)**

| Symbol    | Parameter                     | Value   | Units              |
|-----------|-------------------------------|---------|--------------------|
| $V_{CBO}$ | Collector-Base Voltage        | 60      | V                  |
| $V_{CEO}$ | Collector-Emitter Voltage     | 50      | V                  |
| $V_{EBO}$ | Emitter-Base Voltage          | 7       | V                  |
| $I_C$     | Collector Current -Continuous | 150     | mA                 |
| $P_C$     | Collector Power Dissipation   | 150     | mW                 |
| $T_J$     | Junction Temperature          | 150     | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage Temperature           | -55-150 | $^{\circ}\text{C}$ |



#### **TR1 ELECTRICAL CHARACTERISTICS ( $T_a=25^{\circ}\text{C}$ unless otherwise specified)**

| Parameter                            | Symbol        | Test conditions                                      | Min | Typ | Max | Unit          |
|--------------------------------------|---------------|------------------------------------------------------|-----|-----|-----|---------------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=50\mu\text{A}, I_E=0$                           | 60  |     |     | V             |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=1\text{mA}, I_B=0$                              | 50  |     |     | V             |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=50\mu\text{A}, I_C=0$                           | 7   |     |     | V             |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=60\text{V}, I_E=0$                           |     |     | 0.1 | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=7\text{V}, I_C=0$                            |     |     | 0.1 | $\mu\text{A}$ |
| DC current gain                      | $h_{FE}$      | $V_{CE}=6\text{V}, I_C=1\text{mA}$                   | 180 |     | 390 |               |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=50\text{mA}, I_B=5\text{mA}$                    |     |     | 0.4 | V             |
| Transition frequency                 | $f_T$         | $V_{CE}=12\text{V}, I_C=2\text{mA}, f=100\text{MHz}$ |     | 180 |     | MHz           |
| Collector output capacitance         | $C_{ob}$      | $V_{CB}=12\text{V}, I_E=0, f=1\text{MHz}$            |     |     | 3.5 | pF            |

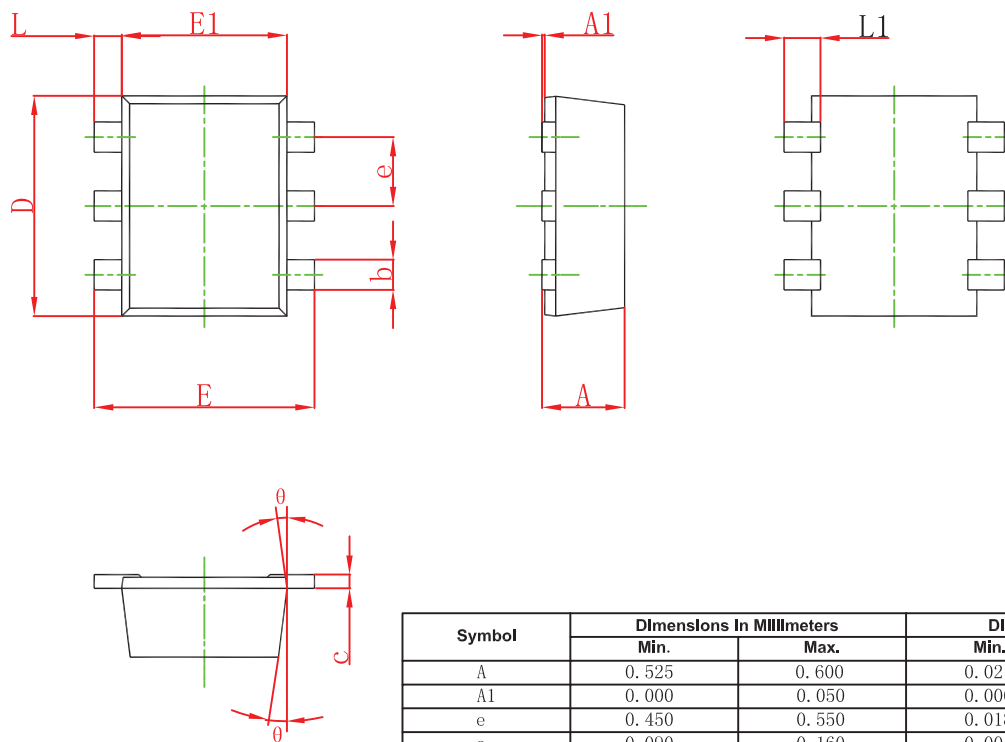
**DTr2 Maximum ratings (Ta=25°C)**

| Parameter            | Symbol       | Limits  | Unit |
|----------------------|--------------|---------|------|
| Supply voltage       | $V_{CC}$     | 50      | V    |
| Input voltage        | $V_{IN}$     | -10~40  | V    |
| Output current       | $I_O$        | 50      | mA   |
|                      | $I_{C(MAX)}$ | 100     |      |
| Power dissipation    | $P_C$        | 150     | mW   |
| Junction temperature | $T_j$        | 150     | °C   |
| Storage temperature  | $T_{stg}$    | -55~150 | °C   |

**DTr2 Electrical characteristics (Ta=25°C)**

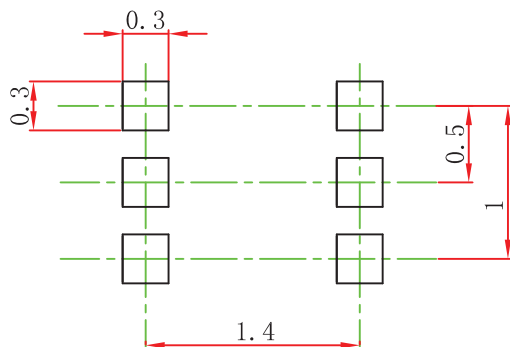
| Parameter            | Symbol       | Min. | Typ | Max. | Unit       | Conditions                   |
|----------------------|--------------|------|-----|------|------------|------------------------------|
| Input voltage        | $V_{I(off)}$ | 0.5  |     |      | V          | $V_{CC}=5V, I_O=100\mu A$    |
|                      | $V_{I(on)}$  |      |     | 3    |            | $V_O=0.3V, I_O=10mA$         |
| Output voltage       | $V_{O(on)}$  |      |     | 0.3  | V          | $I_O/I_I=10mA/0.5mA$         |
| Input current        | $I_I$        |      |     | 0.88 | mA         | $V_I=5V$                     |
| Output current       | $I_{O(off)}$ |      |     | 0.5  | $\mu A$    | $V_{CC}=50V, V_I=0$          |
| DC current gain      | $G_I$        | 30   |     |      |            | $V_O=5V, I_O=5mA$            |
| Input resistance     | $R_I$        | 7    | 10  | 13   | K $\Omega$ |                              |
| Resistance ratio     | $R_2/R_1$    | 0.8  | 1   | 1.2  |            |                              |
| Transition frequency | $f_T$        |      | 250 |      | MHz        | $V_O=10V, I_O=5mA, f=100MHz$ |

## SOT-563 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.525                     | 0.600 | 0.021                | 0.024 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| e      | 0.450                     | 0.550 | 0.018                | 0.022 |
| c      | 0.090                     | 0.160 | 0.004                | 0.006 |
| D      | 1.500                     | 1.700 | 0.059                | 0.067 |
| b      | 0.170                     | 0.270 | 0.007                | 0.011 |
| E1     | 1.100                     | 1.300 | 0.043                | 0.051 |
| E      | 1.500                     | 1.700 | 0.059                | 0.067 |
| L      | 0.100                     | 0.300 | 0.004                | 0.012 |
| L1     | 0.200                     | 0.400 | 0.008                | 0.016 |
| θ      | 7° REF.                   |       | 7° REF.              |       |

## SOT-563 Suggested Pad Layout



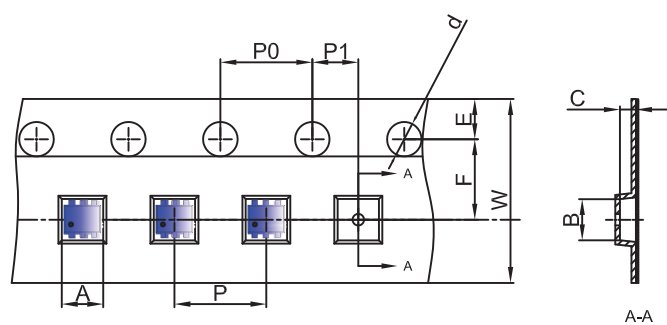
Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purposes only.

### NOTICE

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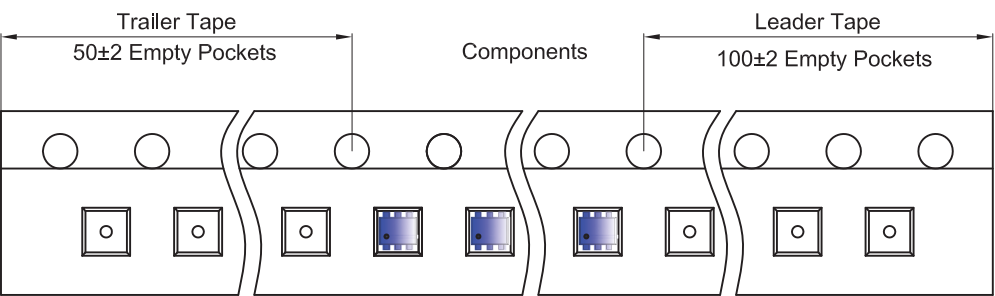
SOT-563 Embossed Carrier Tape



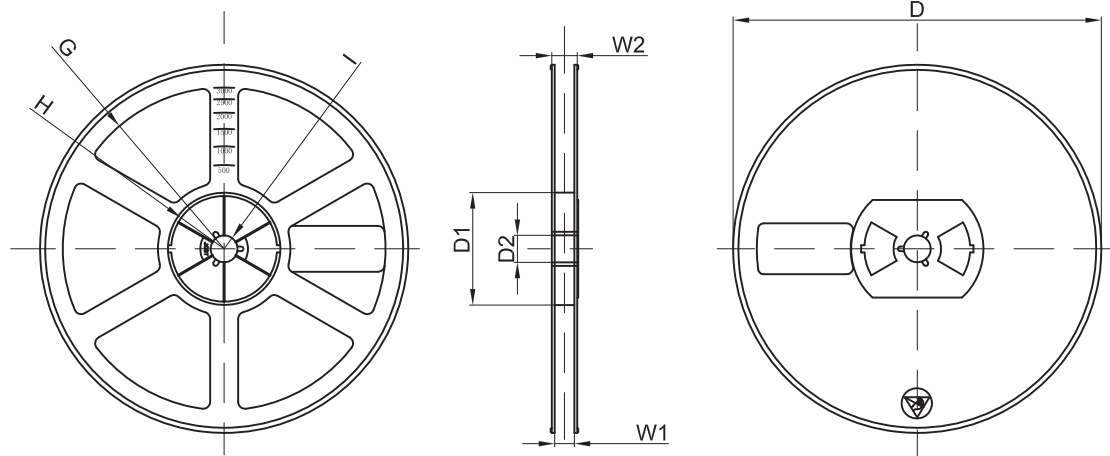
**Packaging Description:**  
SOT-563 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type                     | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-563                      | 1.78 | 1.78 | 0.69 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT-563 Tape Leader and Trailer



SOT-563 Reel



| Dimensions are in millimeter |         |       |       |        |        |       |      |       |
|------------------------------|---------|-------|-------|--------|--------|-------|------|-------|
| Reel Option                  | D       | D1    | D2    | G      | H      | I     | W1   | W2    |
| 7"Dia                        | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL     | Reel Size | Box        | Box Size(mm) | Carton      | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch    | 45,000 pcs | 203×203×195  | 180,000 pcs | 438×438×220     |          |