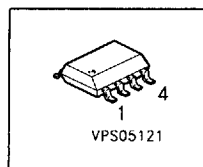
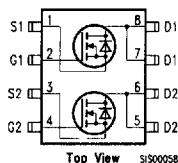


**Preliminary Data**
**SIPMOS® Small-Signal-Transistor**
**Features**

- Dual N Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- dv/dt rated

**Product Summary**

|                                  |              |      |          |
|----------------------------------|--------------|------|----------|
| Drain source voltage             | $V_{DS}$     | 60   | V        |
| Drain-Source on-state resistance | $R_{DS(on)}$ | 0.15 | $\Omega$ |
| Continuous drain current         | $I_D$        | 2.6  | A        |



| Type     | Package | Ordering Code |
|----------|---------|---------------|
| BSO 615N | SO 8    | Q67041-S2843  |

**Maximum Ratings, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

| Parameter   | Symbol       | Value        | Unit              |
|---|--------------|--------------|-------------------|
| Continuous drain current, <i>one channel active</i>   | $I_D$        | 2.6          | A                 |
| Pulsed drain current, <i>one channel active</i><br>$T_A = 25\text{ }^\circ\text{C}$   | $I_{Dpulse}$ | 10.4         |                   |
| Avalanche energy, single pulse<br>$I_D = 2.6\text{ A}$ , $V_{DD} = 25\text{ V}$ , $R_{GS} = 25\text{ }\Omega$   | $E_{AS}$     | 60           | mJ                |
| Avalanche current, periodic limited by $T_{jmax}$   | $I_{AR}$     | 2.6          | A                 |
| Avalanche energy, periodic limited by $T_{jmax}$  | $E_{AR}$     | 0.18         | mJ                |
| Reverse diode dv/dt<br>$I_S = 2.6\text{ A}$ , $V_{DS} = 40\text{ V}$ , $di/dt = 200\text{ A}/\mu\text{s}$ ,<br>$T_{jmax} = 150\text{ }^\circ\text{C}$ | dv/dt        | 6            | kV/ $\mu\text{s}$ |
| Gate source voltage   | $V_{GS}$     | $\pm 20$     | V                 |
| Power dissipation, <i>one channel active</i><br>$T_A = 25\text{ }^\circ\text{C}$  | $P_{tot}$    | 2            | W                 |
| Operating temperature   | $T_j$        | -55 ... +150 | $^\circ\text{C}$  |
| Storage temperature   | $T_{stg}$    | -55 ... +150 |                   |
| IEC climatic category; DIN IEC 68-1   |              | 55/150/56    |                   |

**8235605 0132883 110**

**Thermal Characteristics**

| Parameter   | Symbol       | Values |      |      | Unit |
|---|--------------|--------|------|------|------|
|   |              | min.   | typ. | max. |      |
| <b>Characteristics</b>  |              |        |      |      |      |
| Thermal resistance, junction - soldering point                                | $R_{thJS}$   | -      | -    | 35   | K/W  |
| Thermal resistance @ 10 sec., min. footprint                                  | $R_{th(JA)}$ | -      | -    | 100  |      |
| Thermal resistance @ 10 sec.,<br>6 cm <sup>2</sup> cooling area <sup>1)</sup> | $R_{th(JA)}$ | -      | -    | 62.5 |      |

**Electrical Characteristics, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

| Parameter  | Symbol        | Values |           |          | Unit          |
|--|---------------|--------|-----------|----------|---------------|
|  |               | min.   | typ.      | max.     |               |
| <b>Static Characteristics</b>  |               |        |           |          |               |
| Drain- source breakdown voltage<br>$V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$  | $V_{(BR)DSS}$ | 60     | -         | -        | V             |
| Gate threshold voltage, $V_{GS} = V_{DS}$<br>$I_D = 20\text{ }\mu\text{A}$   | $V_{GS(th)}$  | 1.2    | 1.6       | 2        |               |
| Zero gate voltage drain current<br>$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25\text{ }^\circ\text{C}$<br>$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 150\text{ }^\circ\text{C}$ | $I_{DSS}$     | -      | 0.1<br>10 | 1<br>100 | $\mu\text{A}$ |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$  | $I_{GSS}$     | -      | 10        | 100      |               |
| Drain-Source on-state resistance<br>$V_{GS} = 4.5\text{ V}$ , $I_D = 2.6\text{ A}$   | $R_{DS(on)}$  | -      | 0.12      | 0.15     | $\Omega$      |

<sup>1</sup> Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70 $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

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**Electrical Characteristics**

| Parameter   | Symbol       | Values |      |      | Unit |
|---|--------------|--------|------|------|------|
|   |              | min.   | typ. | max. |      |
| <b>Characteristics</b>  |              |        |      |      |      |
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 2.6$ A               | $g_{fs}$     | 2.4    | 5.5  | -    | S    |
| Input capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz                               | $C_{iss}$    | -      | 300  | 380  | pF   |
| Output capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz                              | $C_{oss}$    | -      | 90   | 120  |      |
| Reverse transfer capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz                    | $C_{rss}$    | -      | 50   | 65   |      |
| Turn-on delay time<br>$V_{DD} = 30$ V, $V_{GS} = 4.5$ V, $I_D = 2.6$ A,<br>$R_G = 16$ $\Omega$  | $t_{d(on)}$  | -      | 12   | 20   | ns   |
| Rise time<br>$V_{DD} = 30$ V, $V_{GS} = 4.5$ V, $I_D = 2.6$ A,<br>$R_G = 16$ $\Omega$           | $t_r$        | -      | 15   | 25   |      |
| Turn-off delay time<br>$V_{DD} = 30$ V, $V_{GS} = 4.5$ V, $I_D = 2.6$ A,<br>$R_G = 16$ $\Omega$ | $t_{d(off)}$ | -      | 20   | 30   |      |
| Fall time<br>$V_{DD} = 30$ V, $V_{GS} = 4.5$ V, $I_D = 2.6$ A,<br>$R_G = 16$ $\Omega$           | $t_f$        | -      | 15   | 25   |      |

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**Electrical Characteristics, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

| Parameter<br>at $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified  | Symbol          | Values |      |      | Unit |
|--|-----------------|--------|------|------|------|
|  |                 | min.   | typ. | max. |      |
| <b>Dynamic Characteristics</b>   |                 |        |      |      |      |
| Gate charge at threshold<br>$V_{DD} = 40\text{ V}$ , $I_D = 0.1\text{ A}$ , $V_{GS} = 1\text{ V}$                      | $Q_{G(th)}$     | -      | 0.4  | 0.6  | nC   |
| Gate charge at $V_{gs}=5\text{V}$<br>$V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$ , $V_{GS} = 0\text{ to }5\text{ V}$ | $Q_{G(5)}$      | -      | 7    | 10   |      |
| Gate charge total<br>$V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$ , $V_{GS} = 0\text{ to }10\text{ V}$                | $Q_g$           | -      | 14   | 20   | nC   |
| Gate plateau voltage<br>$V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$  | $V_{(plateau)}$ | -      | 3.6  | -    | V    |

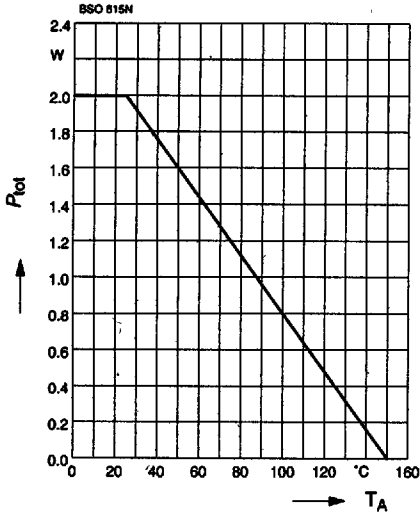
**Reverse Diode**

|   |          |   |      |      |               |
|---|----------|---|------|------|---------------|
| Inverse diode continuous forward current<br>$T_A = 25\text{ }^\circ\text{C}$                        | $I_S$    | - | -    | 2.6  | A             |
| Inverse diode direct current,pulsed<br>$T_A = 25\text{ }^\circ\text{C}$                             | $I_{SM}$ | - | -    | 10.4 |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}$ , $I_F = 5.2\text{ A}$                       | $V_{SD}$ | - | 0.95 | 1.2  | V             |
| Reverse recovery time<br>$V_R = 30\text{ V}$ , $I_F = I_S$ , $di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | - | 50   | 75   | ns            |
| Reverse recovery charge<br>$V_R = 30\text{ V}$ , $I_F = I_S$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | - | 0.1  | 0.15 | $\mu\text{C}$ |

**■ 8235605 0132886 92T ■**

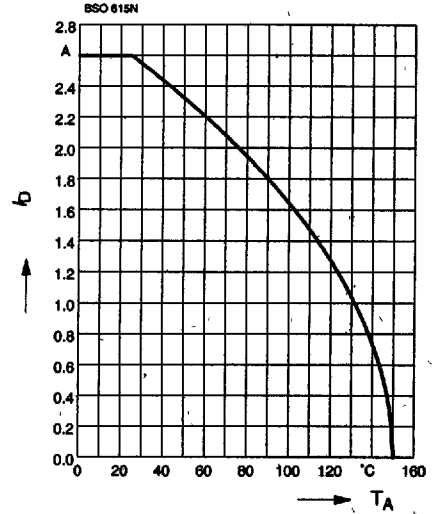
**Power Dissipation**

$P_{tot} = f(T_A), V_{GS} = 4,5 V$



**Drain current**

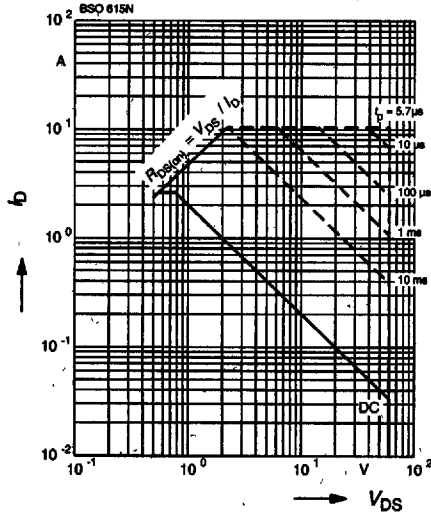
$I_D = f(T_A), V_{GS} = 4,5 V$



**Safe operating area**

$I_D = f(V_{DS})$

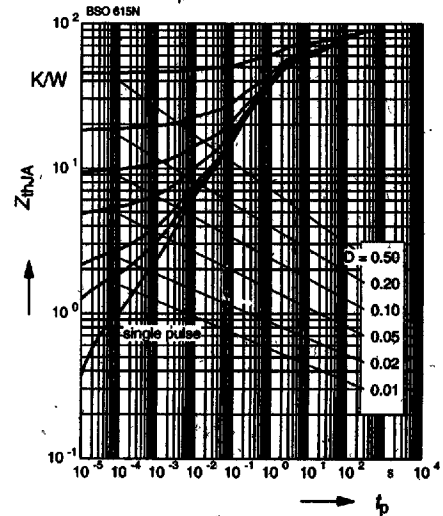
parameter :  $D = 0, T_A = 25 ^\circ C, V_{GS} = 4,5 V$



**Transient thermal impedance**

$Z_{thJA} = f(t_p)$

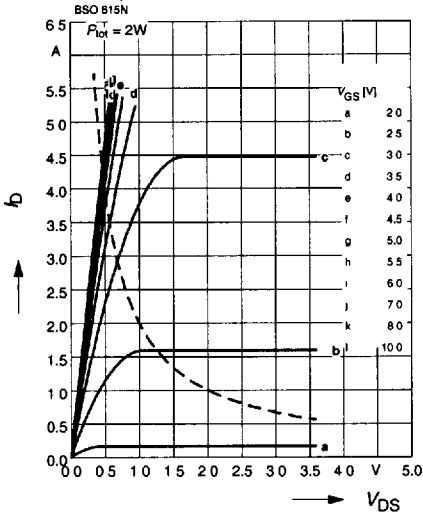
parameter :  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

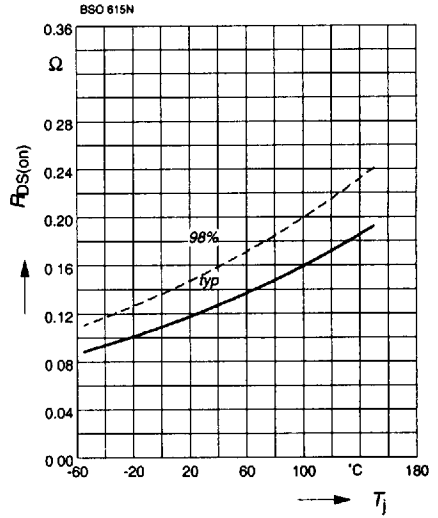
parameter:  $t_p = 80 \mu s$



**Drain-source on-resistance**

$R_{DS(on)} = f(T_j)$

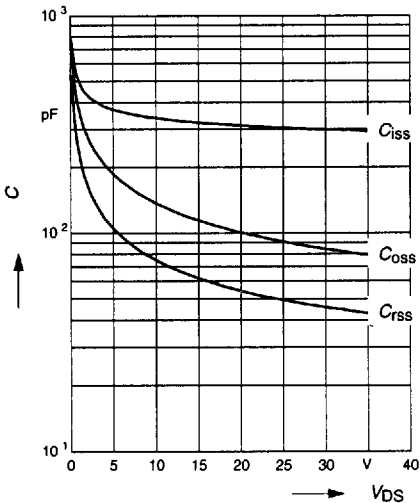
parameter:  $I_D = 2.6 A, V_{GS} = 4.5 V$



**Typ. capacitances**

$C = f(V_{DS})$

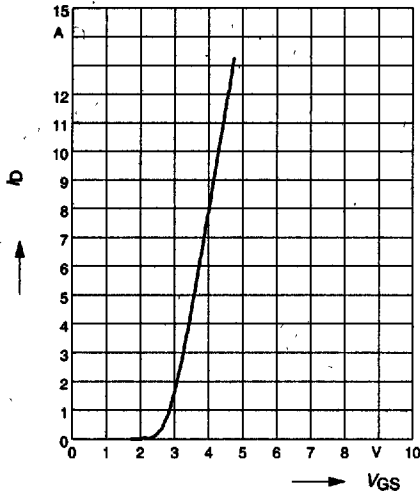
parameter:  $V_{GS} = 0 V, f = 1 MHz$



**Typ. transfer characteristics  $I_D = f(V_{GS})$**

parameter:  $t_p = 80 \mu s$

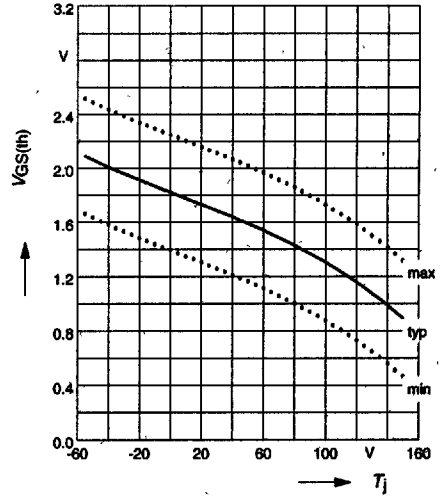
$V_{DS} \geq 2 \times I_D \times R_{DS(on) \max}$



**Gate threshold voltage**

$V_{GS(th)} = f(T_j)$

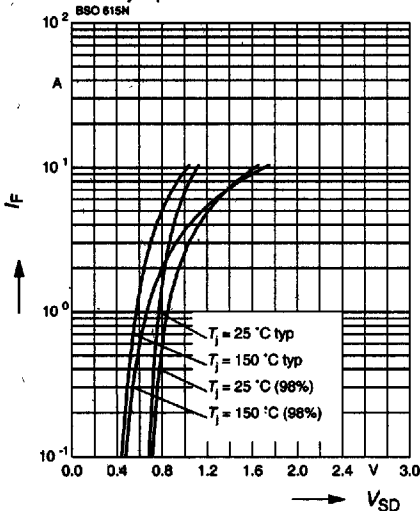
parameter:  $V_{GS} = V_{DS}$ ;  $I_D = 20 \mu A$



**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

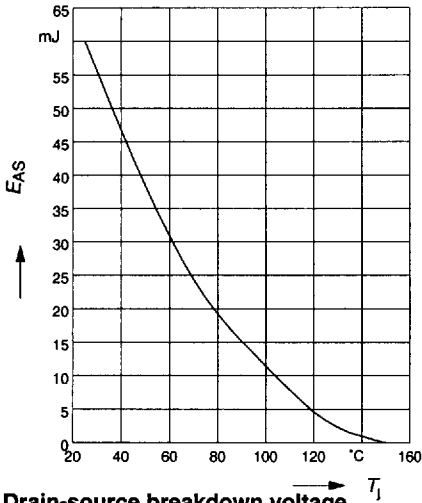
parameter:  $T_j, t_p = 80 \mu s$



**Avalanche Energy  $E_{AS} = f(T_j)$**

parameter:  $I_D = 2.6 \text{ A}$ ,  $V_{DD} = 25 \text{ V}$

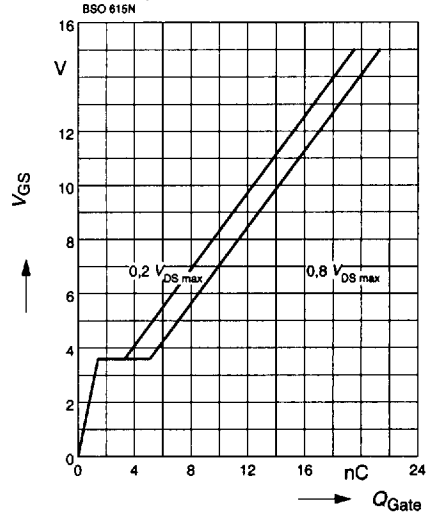
$R_{GS} = 25 \Omega$



**Typ. gate charge  $V_{GS} = f(Q_{Gate})$**

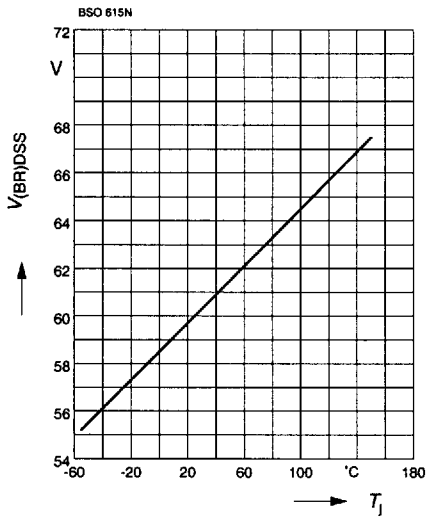
parameter:  $I_D \text{ puls} = 2.6 \text{ A}$

parameter:  $I_D \text{ puls} = 2.6 \text{ A}$



**Drain-source breakdown voltage  $V_{(BR)DSS} = f(T_j)$**

$V_{(BR)DSS} = f(T_j)$



8235605 0132890 350

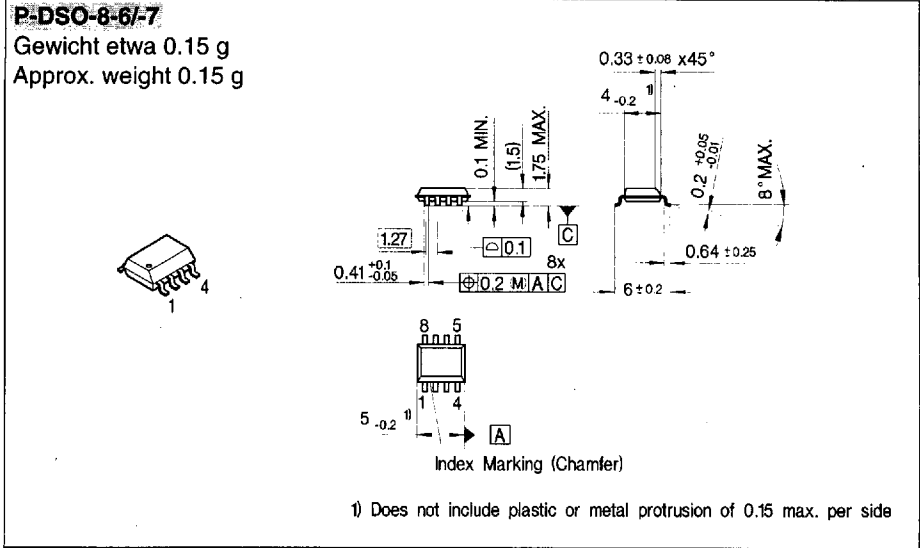


**Gehäusemaßbilder**

(Maße in mm, wenn nicht anders angegeben)

**Package Outlines**

(Dimensions in mm, unless otherwise specified)



**Bild 16**

**Figure 16**

**P-TO218-AA (P-TO218-2-1)**

Gewicht etwa 4.9 g  
Approx. weight 4.9 g

**Bild 17**

**Figure 17**

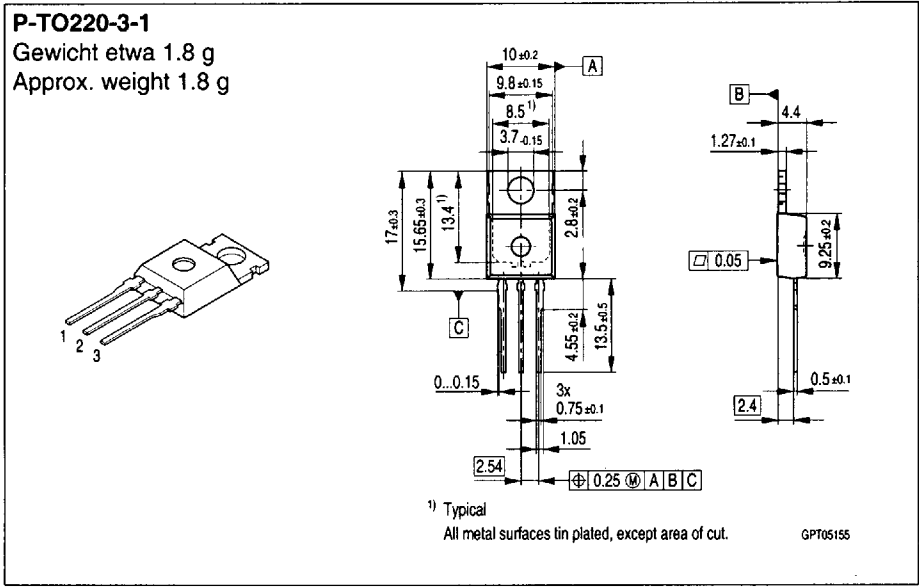


Bild 18

Figure 18

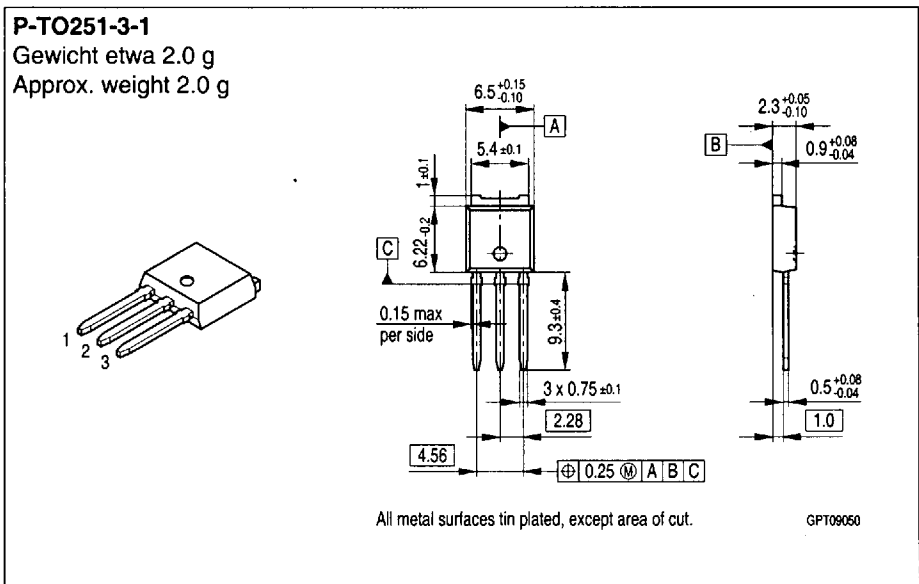
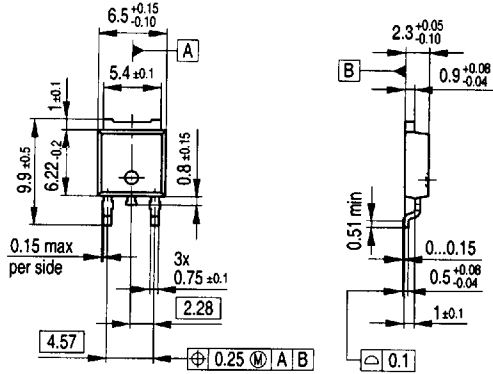
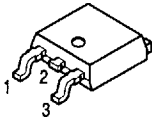


Bild 19

Figure 19

**P-TO252-3-1**

Gewicht etwa 0.38 g  
Approx. weight 0.38 g



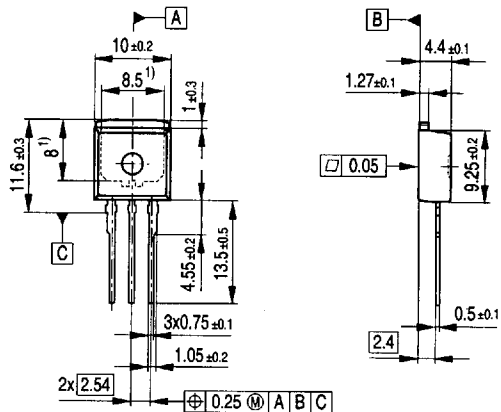
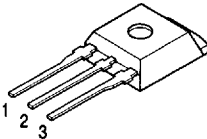
All metal surfaces tin plated, except area of cut.

GPT09051

Bild 20

Figure 20

**P-TO262-3-1/l<sup>2</sup>PAK**



1) Typical

Metal surface min. X = 7.25, Y = 7.35

All metal surfaces tin plated, except area of cut.

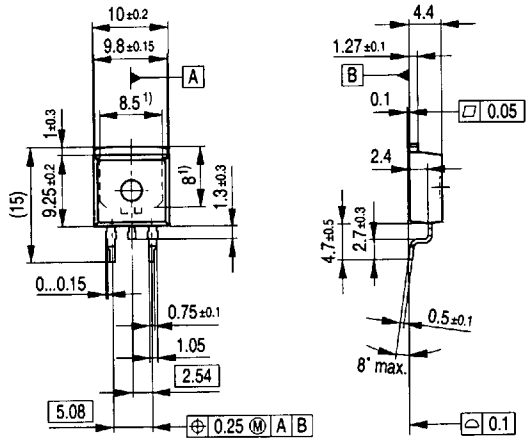
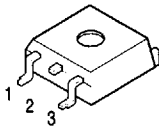
GPT09244

Bild 21

Figure 21

**P-TO263-3-2/D<sup>2</sup>PAK**

Gewicht etwa 1.38 g  
Approx. weight 1.38 g



<sup>1)</sup> Typical

All metal surfaces tin plated, except area of cut.

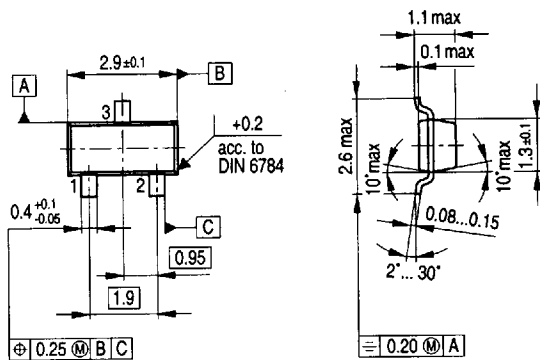
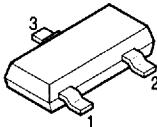
GPT09085

Bild 22

Figure 22

**SOT-23 (P-SOT23-3-1)**

Gewicht etwa 0.01 g  
Approx. weight 0.01 g



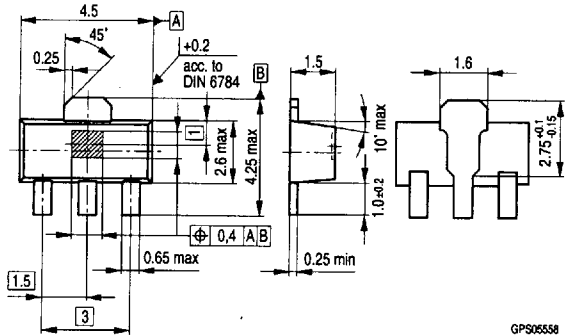
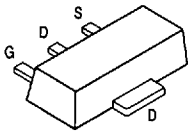
GPS05557

Bild 23

Figure 23

**SOT-89**

Gewicht etwa 0.01 g  
Approx. weight 0.01 g



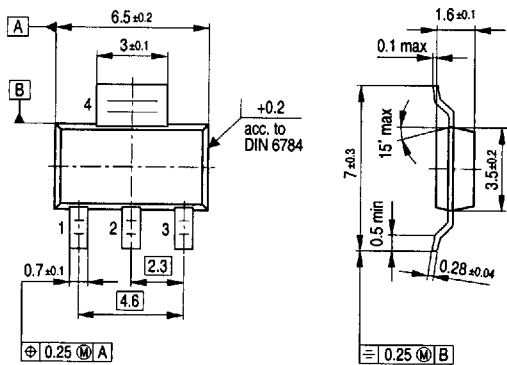
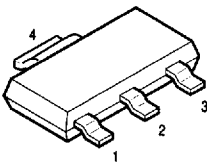
GPS06558

Bild 24

Figure 24

**SOT-223 (P-SOT223-4-1)**

Gewicht etwa 0.15 g  
Approx. weight 0.15 g



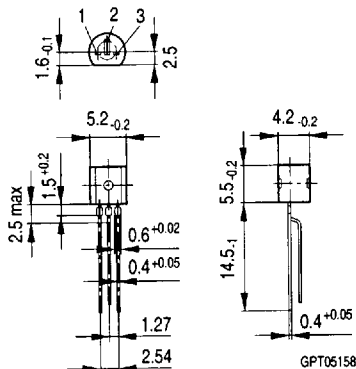
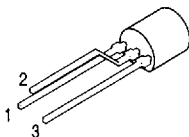
GPS05560

Bild 25

Figure 25

**TO-92**

Gewicht etwa 0.23 g  
Approx. weight 0.23 g

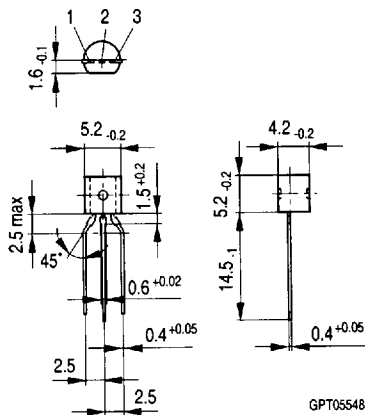
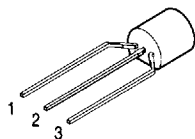


**Bild 26**

**Figure 26**

**TO-92-E6288**

Gewicht etwa 0.23 g  
Approx. weight 0.23 g



**Bild 27**

**Figure 27**

**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

**SMD = Surface Mounted Device**