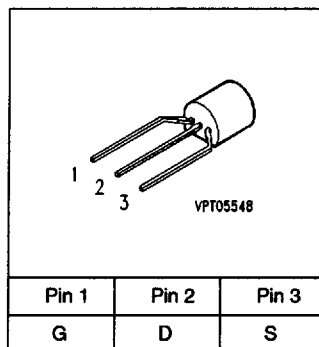


SIPMOS® Small-Signal Transistor

- N channel
- Enhancement mode
- Logic Level
- $V_{GS(th)} = 0.8...2.0V$



Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Marking
BSS 89	240 V	0.3 A	$6\ \Omega$	TO-92	SS89

Type	Ordering Code	Tape and Reel Information
BSS 89	Q62702-S519	E6288
BSS 89	Q62702-S619	E6296
BSS 89	Q62702-S385	E6325

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain source voltage	V_{DS}	240	V
Drain-gate voltage	V_{DGR}	240	
$R_{GS} = 20\ k\Omega$		± 20	
Gate source voltage	V_{GS}	Class 1	
ESD Sensitivity (HBM) as per MIL-STD 883			
Continuous drain current	I_D	0.3	A
$T_A = 25\ ^\circ C$			
DC drain current, pulsed	I_{Dpuls}	1.2	W
$T_A = 25\ ^\circ C$			
Power dissipation	P_{tot}	1	
$T_A = 25\ ^\circ C$			

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Maximum Ratings

Parameter	Symbol	Values	Unit
Chip or operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip to ambient air ¹⁾	R_{thJA}	≤ 125	K/W
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$, $T_j = 25^\circ\text{C}$	$V_{(BR)DSS}$	240	-	-	V
Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$	$V_{GS(th)}$	0.8	1.5	2	
Zero gate voltage drain current $V_{DS} = 240\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25^\circ\text{C}$ $V_{DS} = 240\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125^\circ\text{C}$ $V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25^\circ\text{C}$	I_{DSS}	- - -	0.1 10 -	1 100 0.2	μA
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	10	100	
Drain-Source on-state resistance $V_{GS} = 10\text{ V}$, $I_D = 0.3\text{ A}$ $V_{GS} = 4.5\text{ V}$, $I_D = 0.3\text{ A}$	$R_{DS(on)}$	- -	4.5 5.3	6 10	Ω

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Dynamic Characteristics

Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 0.3\text{ A}$	g_{fs}	0.14	0.33	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	115	155	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	15	25	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	8	12	
Turn-on delay time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 0.28\text{ A}$ $R_G = 50\ \Omega$	$t_{d(on)}$	-	5	8	ns
Rise time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 0.28\text{ A}$ $R_G = 50\ \Omega$	t_r	-	10	15	
Turn-off delay time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 0.28\text{ A}$ $R_G = 50\ \Omega$	$t_{d(off)}$	-	30	40	
Fall time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 0.28\text{ A}$ $R_G = 50\ \Omega$	t_f	-	20	27	

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

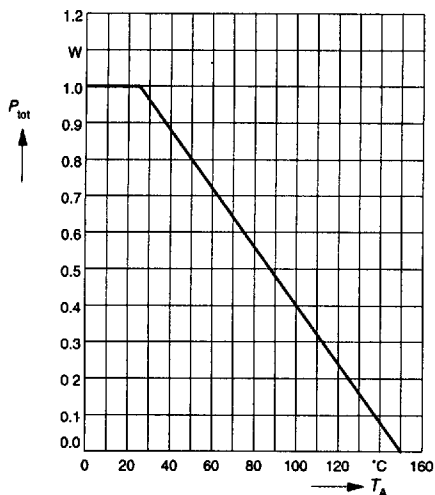
Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Reverse Diode

Inverse diode continuous forward current $T_A = 25^\circ\text{C}$	I_S	-	-	0.3	A
Inverse diode direct current, pulsed $T_A = 25^\circ\text{C}$	I_{SM}	-	-	1.2	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 0.6\text{ A}$	V_{SD}	-	0.9	1.4	V

Power dissipation

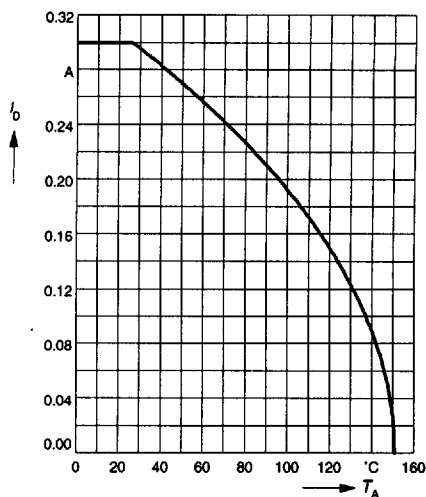
$$P_{\text{tot}} = f(T_A)$$



Drain current

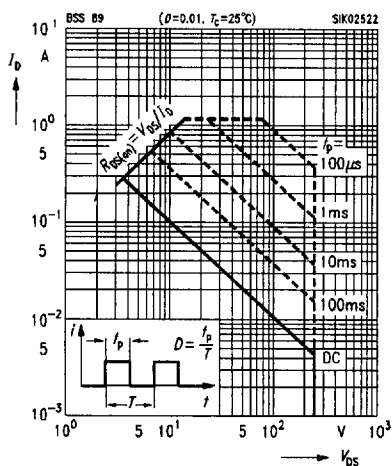
$$I_D = f(T_A)$$

parameter: $V_{GS} \geq 10 \text{ V}$



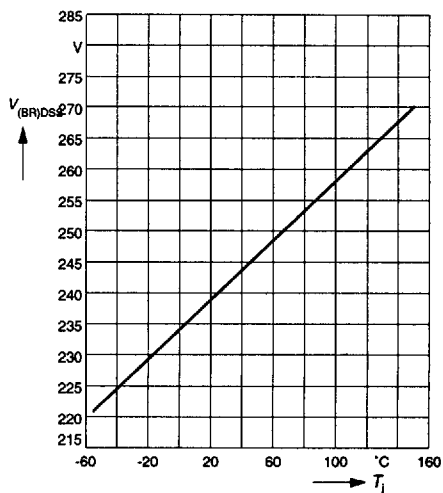
Safe operating area $I_D = f(V_{DS})$

parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Drain-source breakdown voltage

$$V_{(BR)DS} = f(T_J)$$

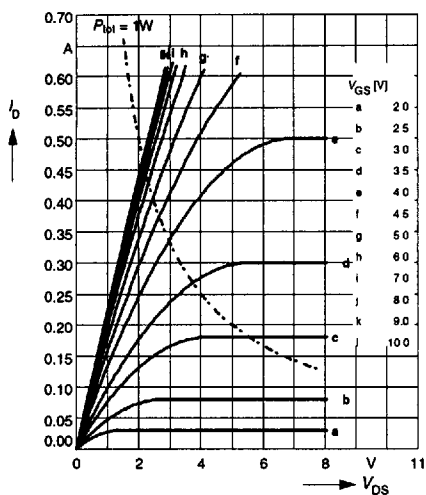


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Typ. output characteristics

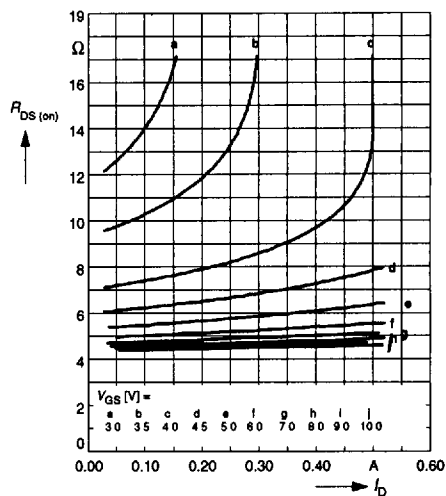
$$I_D = f(V_{DS})$$

parameter: $t_p = 80 \mu s$


Typ. drain-source on-resistance

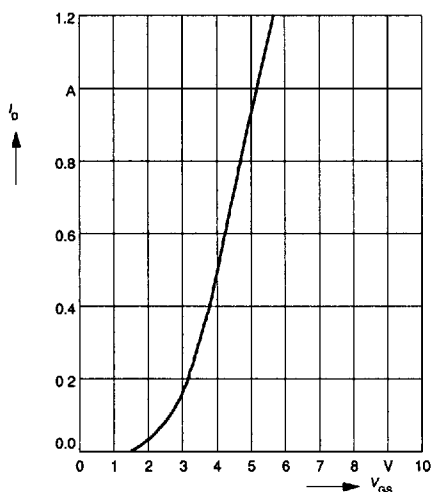
$$R_{DS(on)} = f(I_D)$$

parameter: $t_p = 80 \mu s$, $T_j = 25^\circ C$


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

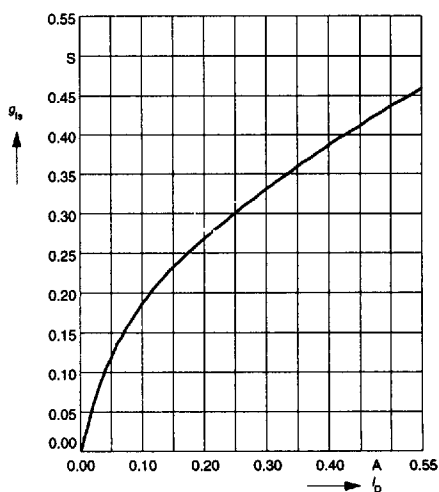
parameter: $t_p = 80 \mu s$

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


Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80 \mu s$,

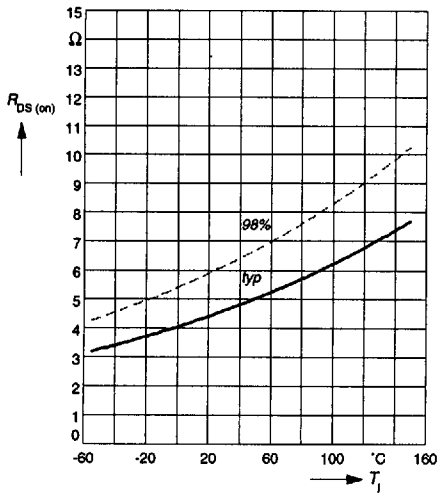
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Drain-source on-resistance

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

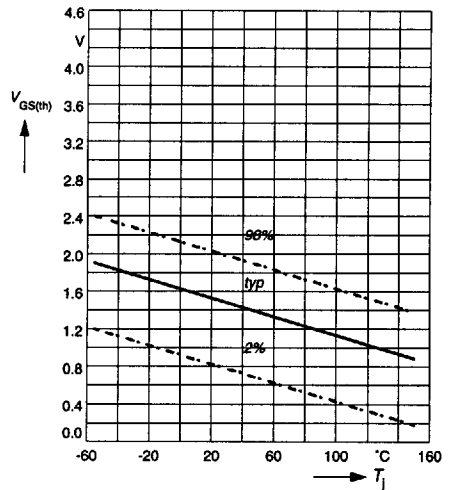
parameter: $I_D = 0.3 \text{ A}$, $V_{GS} = 10 \text{ V}$



Gate threshold voltage

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

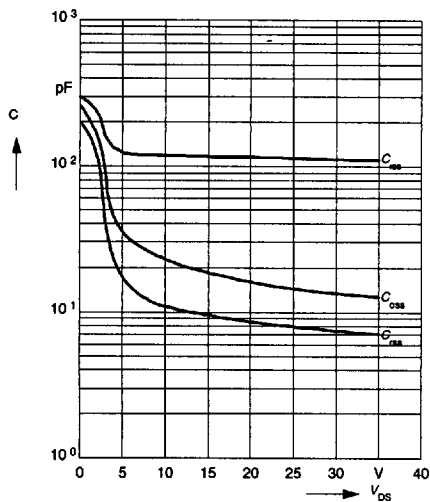
parameter: $V_{GS} = V_{DS}$, $I_D = 1 \text{ mA}$



Typ. capacitances

$$C = f(V_{DS})$$

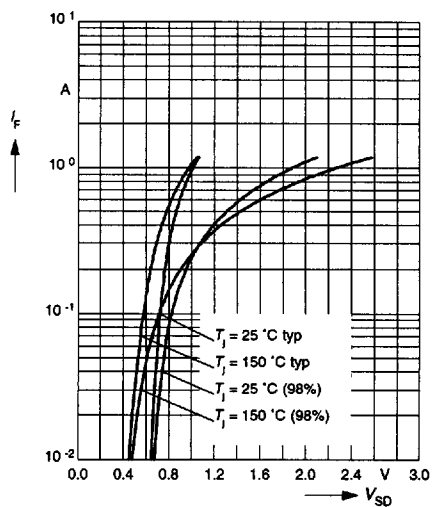
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

parameter: T_j , $t_p = 80 \mu\text{s}$



Gehäusemaßbilder

(Maße in mm, wenn nicht anders angegeben)

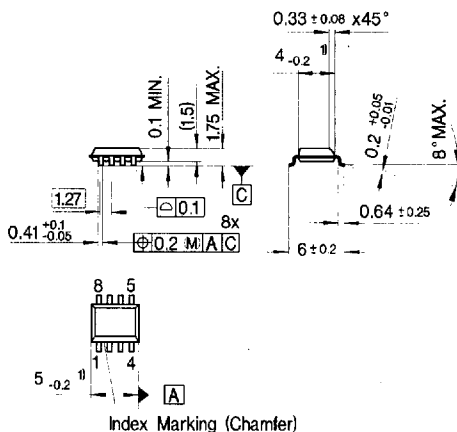
Package Outlines

(Dimensions in mm, unless otherwise specified)

P-DSO-8-6/-7

Gewicht etwa 0.15 g

Approx. weight 0.15 g



1) Does not include plastic or metal protrusion of 0.15 max. per side

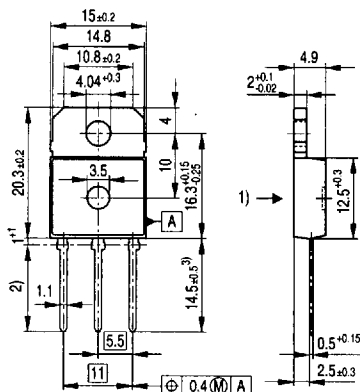
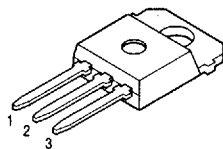
Bild 16

Figure 16

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

Gewicht etwa 4.9 g

Approx. weight 4.9 g



1) Punch direction, burr max. 0.04

2) Dip tinning

3) Max. 15.5 by dip tinning
press burr max. 0.05
radii not dimensioned max. 0.2

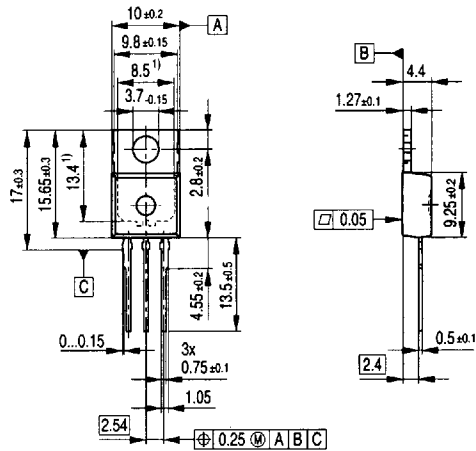
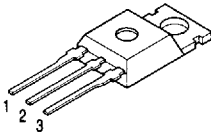
GPT05156

Bild 17

Figure 17

P-TO220-3-1

Gewicht etwa 1.8 g
Approx. weight 1.8 g



¹⁾ Typical

All metal surfaces tin plated, except area of cut.

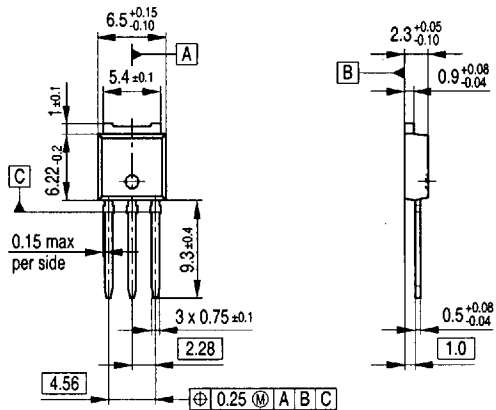
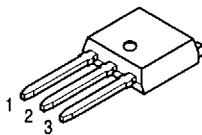
GPT05155

Bild 18

Figure 18

P-TO251-3-1

Gewicht etwa 2.0 g
Approx. weight 2.0 g



All metal surfaces tin plated, except area of cut.

GPT09060

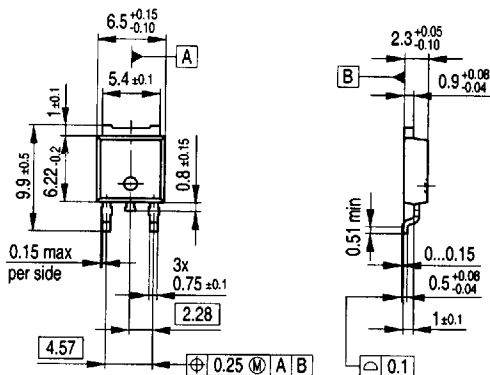
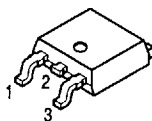
Bild 19

Figure 19

P-TO252-3-1

Gewicht etwa 0.38 g

Approx. weight 0.38 g



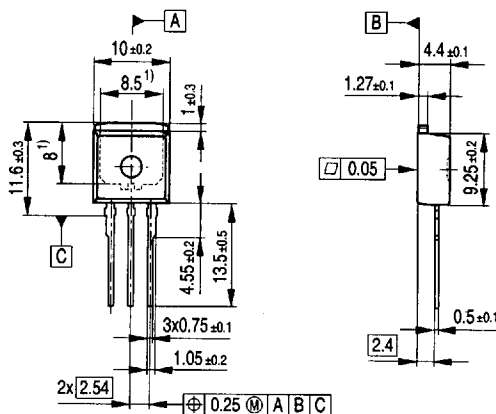
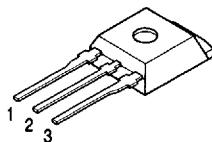
All metal surfaces tin plated, except area of cut.

GPT09051

Bild 20

Figure 20

P-TO262-3-1/I²PAK



¹⁾ Typical

Metal surface min. X = 7.25, Y = 7.35

All metal surfaces tin plated, except area of cut.

GPT09244

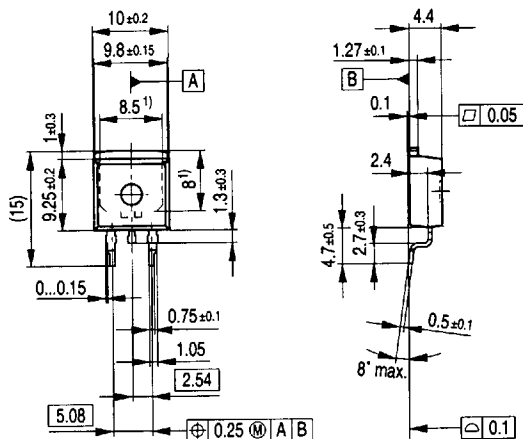
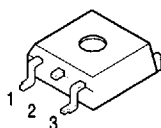
Bild 21

Figure 21

P-TO263-3-2/D²PAK

Gewicht etwa 1.38 g

Approx. weight 1.38 g



¹⁾ Typical

All metal surfaces tin plated, except area of cut.

GPT09085

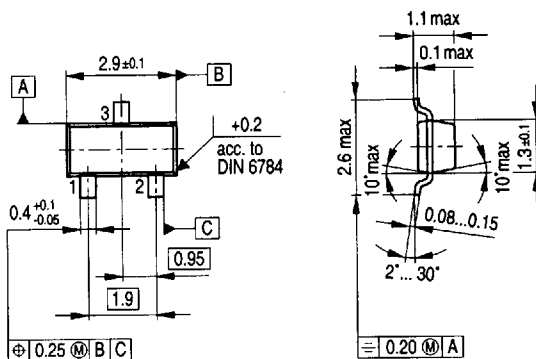
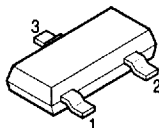
Bild 22

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

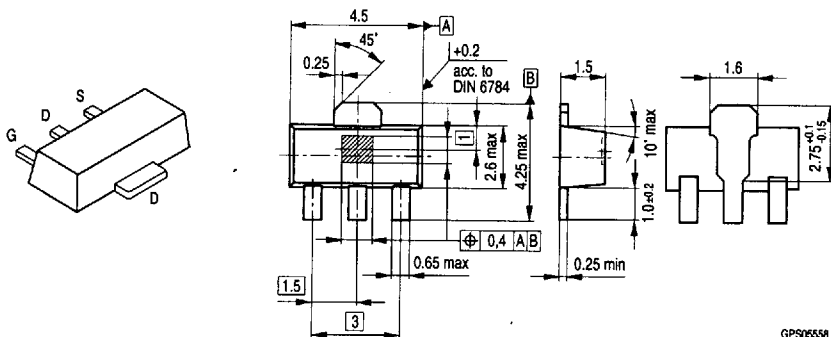


Bild 24

Figure 24

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

Gewicht etwa 0.15 g

Approx. weight 0.15 g

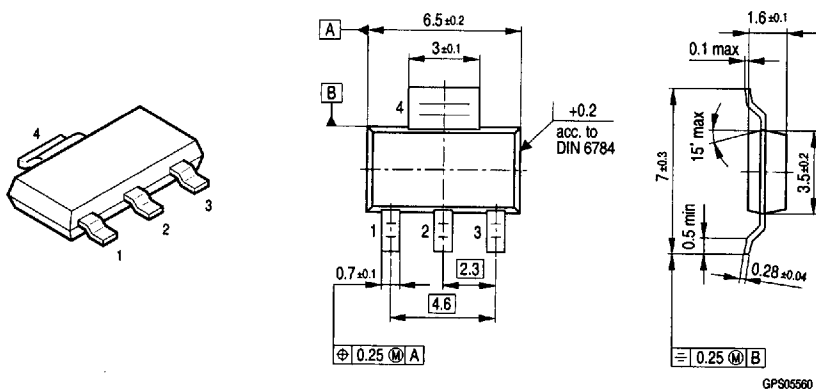


Bild 25

Figure 25

TO-92

Gewicht etwa 0.23 g

Approx. weight 0.23 g

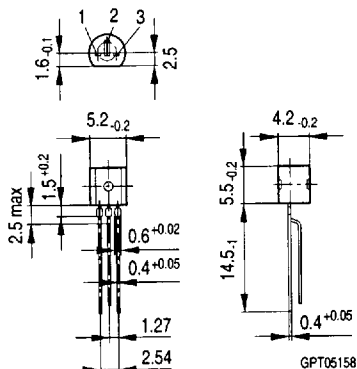
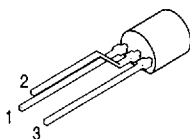


Bild 26

Figure 26

TO-92-E6288

Gewicht etwa 0.23 g

Approx. weight 0.23 g

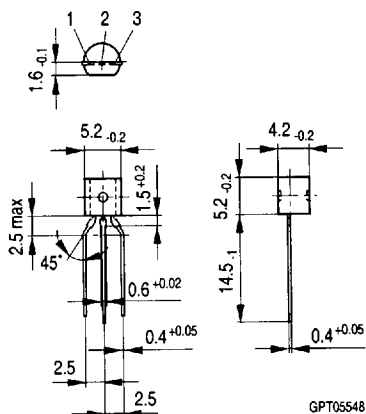
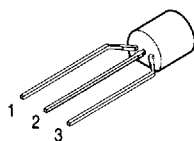


Bild 27

Figure 27

Sorts of Packing

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

SMD = Surface Mounted Device