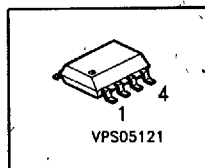
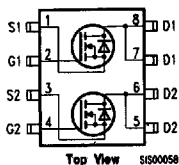


Preliminary Data
SIPMOS® Small-Signal-Transistor
Features

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

Product Summary

Drain source voltage	V_{DS}	60	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.12	Ω
Continuous drain current	I_D	3.1	A



Type	Package	Ordering Code
BSO 615NV	SO 8	Q67041-S2844

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

Parameter	Symbol	Value	Unit
Continuous drain current, <i>one channel active</i>	I_D	3.1	A
Pulsed drain current, <i>one channel active</i> $T_A = 25^\circ\text{C}$	I_{Dpulse}	12.4	
Avalanche energy, single pulse $I_D = 3.1\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\ \Omega$	E_{AS}	60	mJ
Avalanche current, periodic limited by T_{jmax}	I_{AR}	3.1	A
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.2	mJ
Reverse diode dv/dt $I_S = 3.1\text{ A}$, $V_{DS} = 20\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 150^\circ\text{C}$	dv/dt	6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation, <i>one channel active</i> $T_A = 25^\circ\text{C}$	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	

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Thermal Characteristics

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

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 20\text{ }\mu\text{A}$	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current $V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ }^{\circ}\text{C}$ $V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 150\text{ }^{\circ}\text{C}$	I_{DSS}	-	0.1 10	1 100	μA
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	10	100	
Drain-Source on-state resistance $V_{GS} = 10\text{ V}$, $I_D = 3.1\text{ A}$	$R_{DS(on)}$	-	0.09	0.12	Ω

¹ Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Transconductance $V_{DS} \leq I_D \cdot R_{DS(on)max}$, $I_D = 3.1 \text{ A}$	g_{fs}	2.5	5.8	-	S
Input capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$	C_{iss}	-	275	340	pF
Output capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$	C_{oss}	-	90	120	
Reverse transfer capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$	C_{rss}	-	50	65	
Turn-on delay time $V_{DD} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.1 \text{ A}$, $R_G = 33 \Omega$	$t_{d(on)}$	-	11	17	ns
Rise time $V_{DD} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.1 \text{ A}$, $R_G = 33 \Omega$	t_r	-	25	40	
Turn-off delay time $V_{DD} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.1 \text{ A}$, $R_G = 33 \Omega$	$t_{d(off)}$	-	25	40	
Fall time $V_{DD} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.1 \text{ A}$, $R_G = 33 \Omega$	t_f	-	35	55	

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

Parameter at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate charge at threshold $V_{DD} = 40\text{ V}$, $I_D = 0.1\text{ A}$, $V_{GS} = 1\text{ V}$	$Q_{G(th)}$	-	0.25	0.3	nC
Gate charge at $V_{gs}=7V$ $V_{DD} = 40\text{ V}$, $I_D = 3.1\text{ A}$, $V_{GS} = 0\text{ to }7\text{ V}$	$Q_{g(7)}$	-	7.4	9.3	nC
Gate charge total $V_{DD} = 40\text{ V}$, $I_D = 3.1\text{ A}$, $V_{GS} = 0\text{ to }10\text{ V}$	Q_g	-	9.7	12	
Gate plateau voltage $V_{DD} = 40\text{ V}$, $I_D = 3.1\text{ A}$	$V_{(plateau)}$	-	4.7	-	V

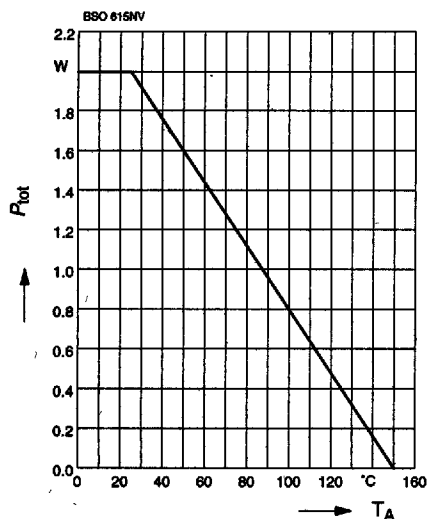
Reverse Diode

Inverse diode continuous forward current $T_A = 25\text{ }^{\circ}\text{C}$	I_S	-	-	3.1	A
Inverse diode direct current, pulsed $T_A = 25\text{ }^{\circ}\text{C}$	I_{SM}	-	-	12.4	
Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = 6.2\text{ A}$	V_{SD}	-	0.95	1.2	V
Reverse recovery time $V_R = 30\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	45	56	ns
Reverse recovery charge $V_R = 30\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.08	0.12	μC

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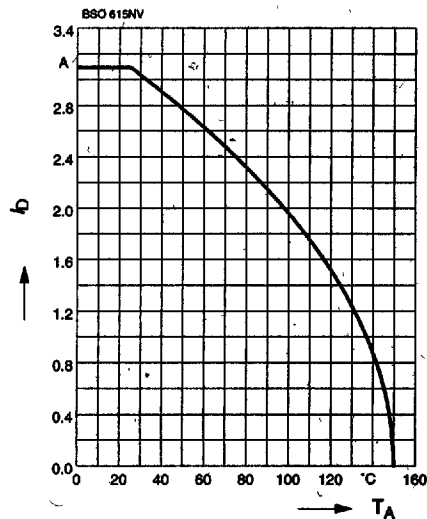
Power Dissipation

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



Drain current

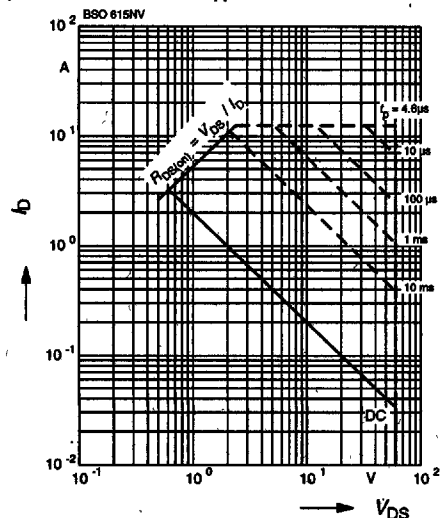
$$I_D = f(T_A)$$



Safe operating area

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

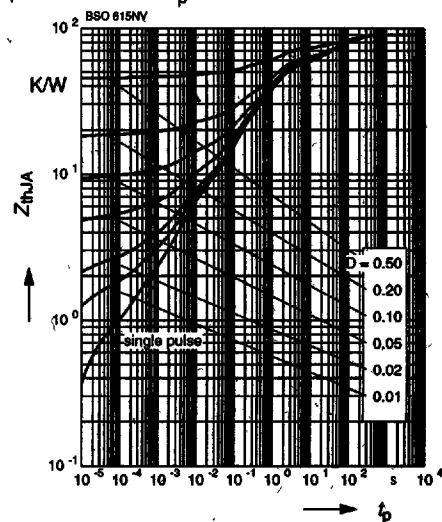
parameter : $D = 0$, $T_A = 25^\circ\text{C}$



Transient thermal impedance

$$Z_{thJA} = f(t_p)$$

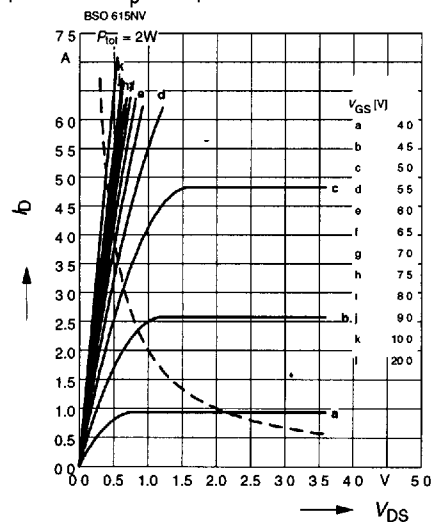
parameter : $D = t_p/T$



Typ. output characteristics

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

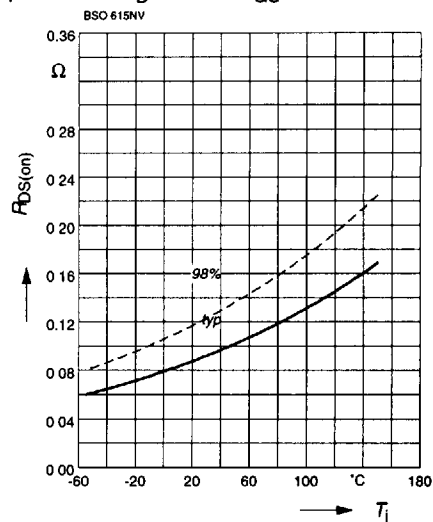
parameter: $t_p = 80 \mu s$



Drain-source on-resistance

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

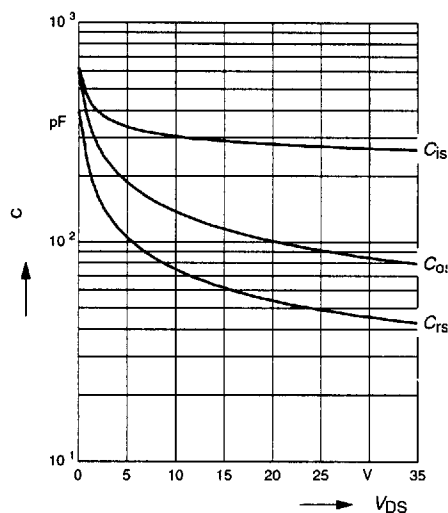
parameter: $I_D = 3.1 A$, $V_{GS} = 10 V$



Typ. capacitances

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

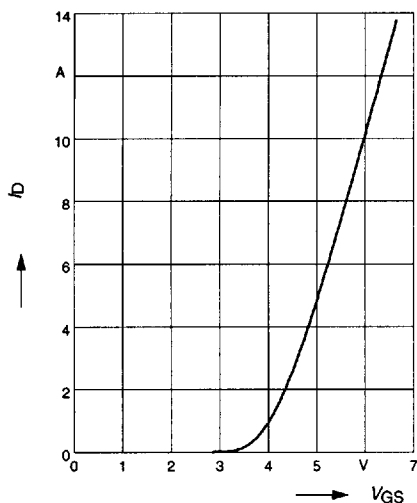
parameter: $V_{GS} = 0 V$, $f = 1 MHz$



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

parameter: $t_p = 80 \mu s$

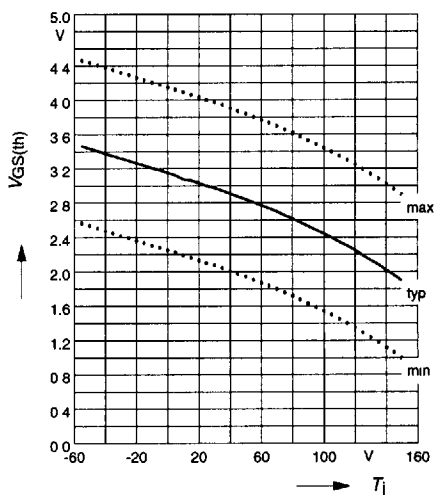
$V_{DS} \geq 2 \times I_D \times R_{DS(on) \max}$



Gate threshold voltage

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

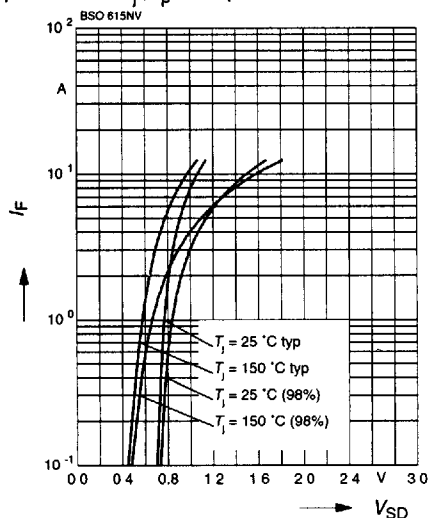
parameter: $V_{GS} = V_{DS}$, $I_D = 20 \mu A$



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

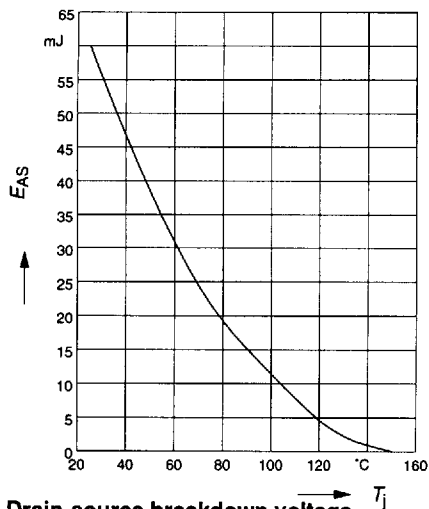
parameter: T_j , $t_p = 80 \mu s$



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

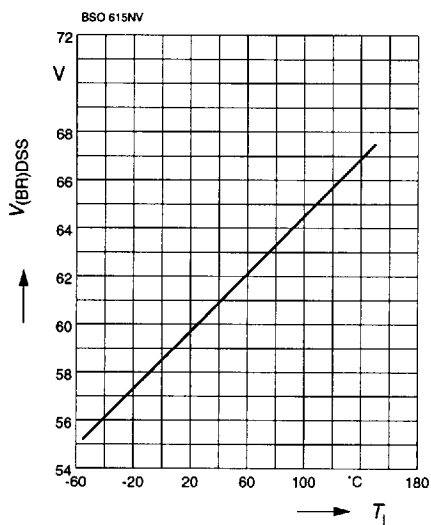
parameter: $I_D = 3.1 \text{ A}$, $V_{DD} = 25 \text{ V}$

$R_{GS} = 25 \Omega$



Drain-source breakdown voltage

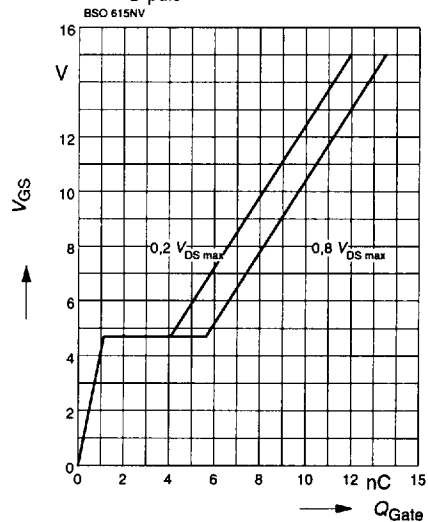
$V_{(BR)DSS} = f(T_j)$



Typ. gate charge

$V_{GS} = f(Q_{Gate})$

parameter: $I_D \text{ puls} = 3.1 \text{ A}$



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Gehäusemaßbilder

(Maße in mm, wenn nicht anders angegeben)

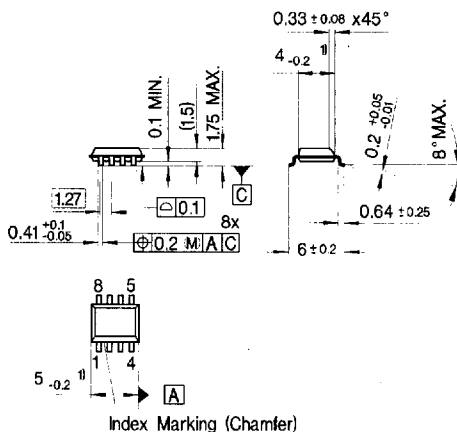
Package Outlines

(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

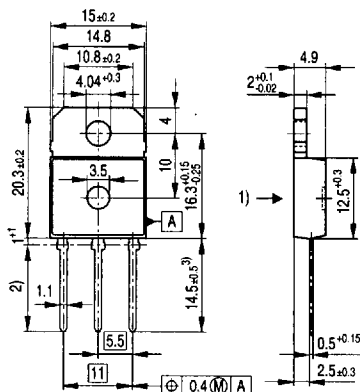
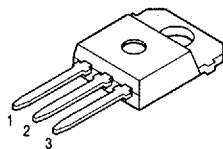
Bild 16

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

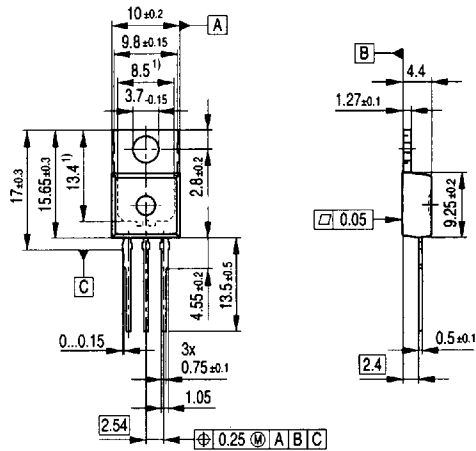
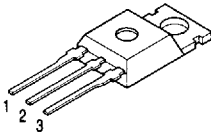
GPT05156

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.

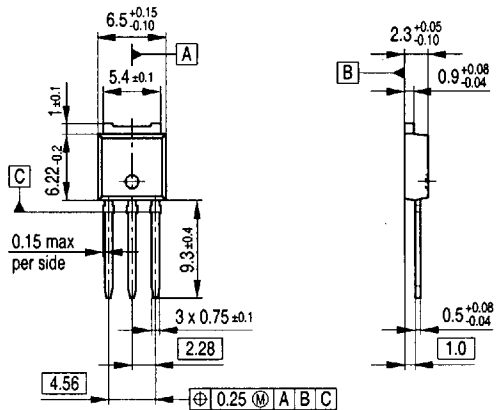
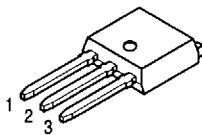
GPT05155

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

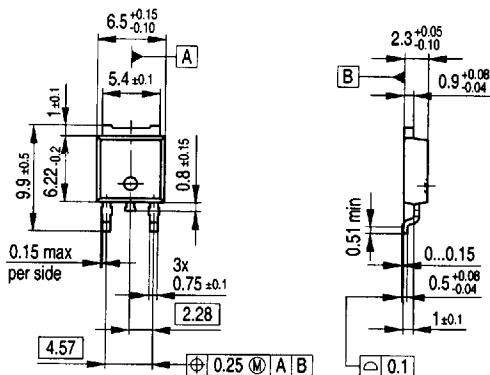
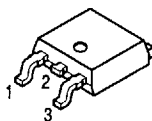
Bild 19

Figure 19

P-TO252-3-1

Gewicht etwa 0.38 g

Approx. weight 0.38 g



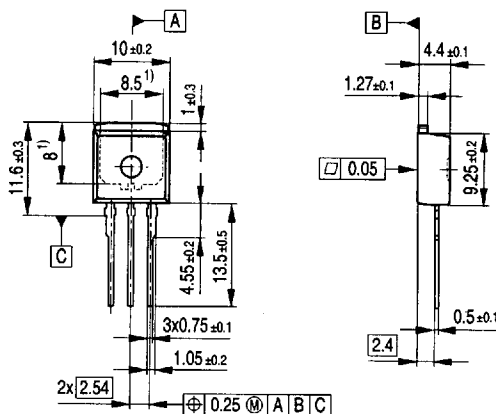
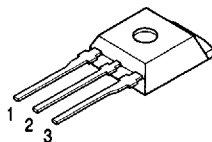
All metal surfaces tin plated, except area of cut.

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

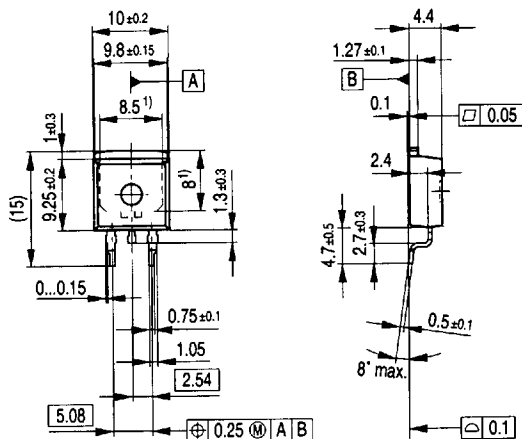
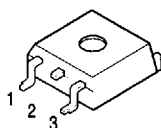
Bild 21

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

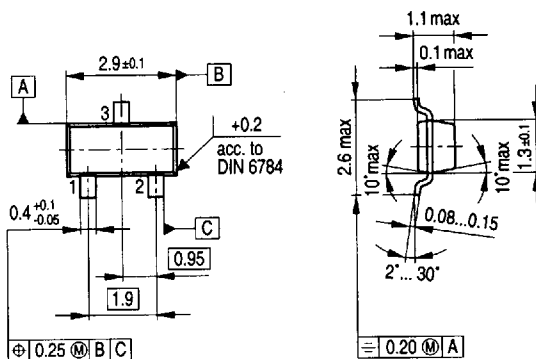
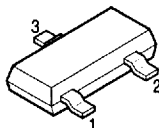
Bild 22

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

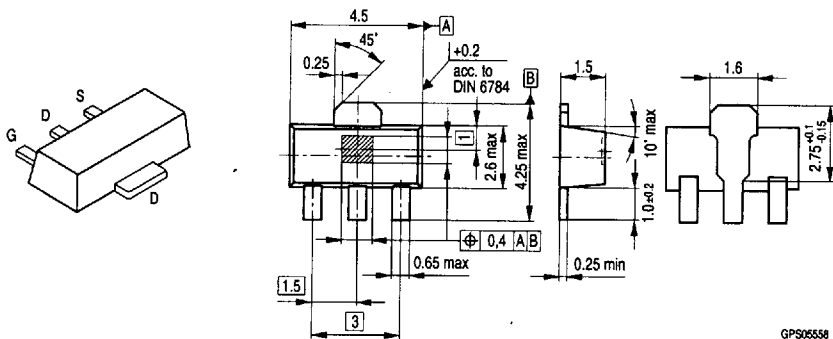


Bild 24

Figure 24

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

Gewicht etwa 0.15 g

Approx. weight 0.15 g

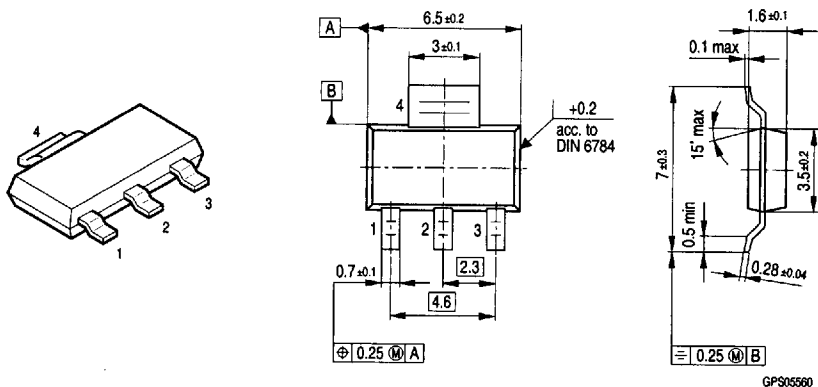


Bild 25

Figure 25

TO-92

Gewicht etwa 0.23 g

Approx. weight 0.23 g

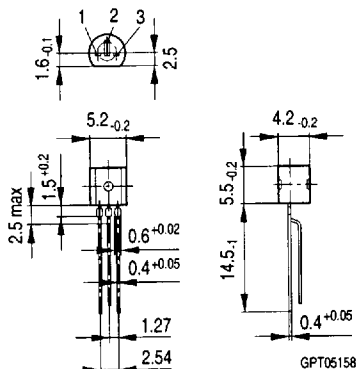
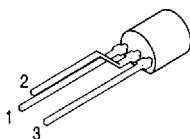


Bild 26

Figure 26

TO-92-E6288

Gewicht etwa 0.23 g

Approx. weight 0.23 g

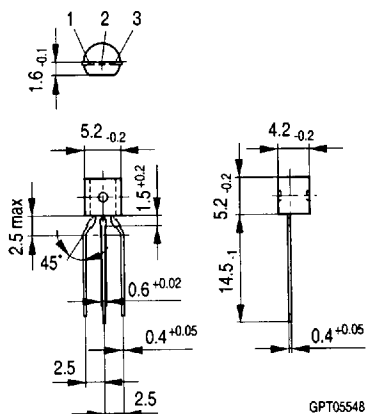
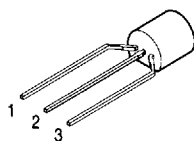


Bild 27

Figure 27

Sorts of Packing

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

SMD = Surface Mounted Device