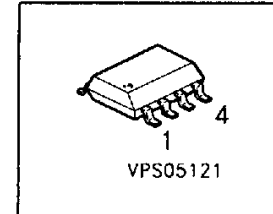
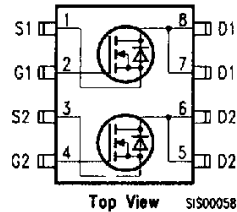


**Preliminary Data**
**SIPMOS® Small-Signal-Transistor**
**Features**

- 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> $T_A = 25\text{ }^\circ\text{C}$	$I_{Dpulse}$	10.4	
Avalanche energy, single pulse $I_D = 2.6\text{ A}$ , $V_{DD} = 25\text{ V}$ , $R_{GS} = 25\ \Omega$	$E_{AS}$	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 $dv/dt$ $I_S = 2.6\text{ A}$ , $V_{DS} = 40\text{ V}$ , $di/dt = 200\text{ A}/\mu\text{s}$ , $T_{jmax} = 150\text{ }^\circ\text{C}$	$dv/dt$	6	kV/ $\mu\text{s}$
Gate source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation, <i>one channel active</i> $T_A = 25\text{ }^\circ\text{C}$	$P_{tot}$	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	

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**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., 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 $V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$	$V_{(BR)DSS}$	60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 20\text{ }\mu\text{A}$	$V_{GS(th)}$	1.2	1.6	2	
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	$\mu\text{A}$
Gate-source leakage current $V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	-	10	100	
Drain-Source on-state resistance $V_{GS} = 4.5\text{ V}$ , $I_D = 2.6\text{ A}$	$R_{DS(on)}$	-	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 $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 2.6 \text{ A}$	$g_{fs}$	2.4	5.5	-	S
Input capacitance $V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{iss}$	-	300	380	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 $V_{DD} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 2.6 \text{ A}$ , $R_G = 16 \Omega$	$t_{d(on)}$	-	12	20	ns
Rise time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 2.6 \text{ A}$ , $R_G = 16 \Omega$	$t_r$	-	15	25	
Turn-off delay time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 2.6 \text{ A}$ , $R_G = 16 \Omega$	$t_{d(off)}$	-	20	30	
Fall time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 2.6 \text{ A}$ , $R_G = 16 \Omega$	$t_f$	-	15	25	

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

Parameter 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 $V_{DD} = 40\text{ V}$ , $I_D = 0.1\text{ A}$ , $V_{GS} = 1\text{ V}$	$Q_{G(th)}$	-	0.4	0.6	nC
Gate charge at $V_{GS}=5\text{ V}$ $V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$ , $V_{GS} = 0\text{ to }5\text{ V}$	$Q_{g(5)}$	-	7	10	
Gate charge total $V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$ , $V_{GS} = 0\text{ to }10\text{ V}$	$Q_g$	-	14	20	nC
Gate plateau voltage $V_{DD} = 40\text{ V}$ , $I_D = 2.6\text{ A}$	$V_{(plateau)}$	-	3.6	-	V

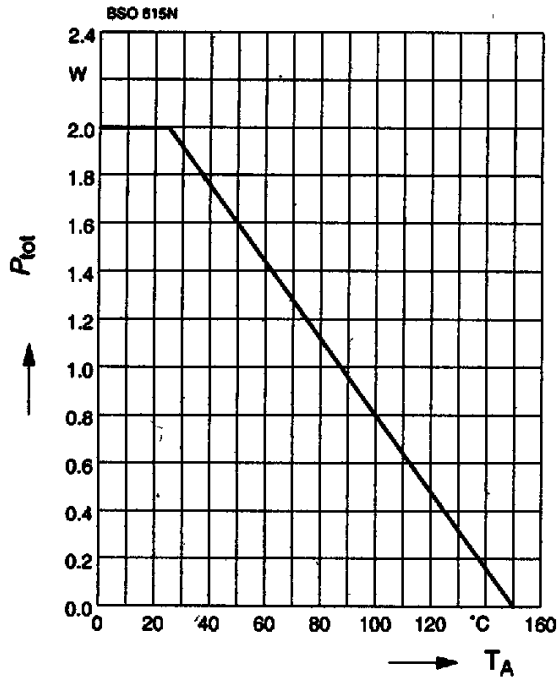
**Reverse Diode**

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

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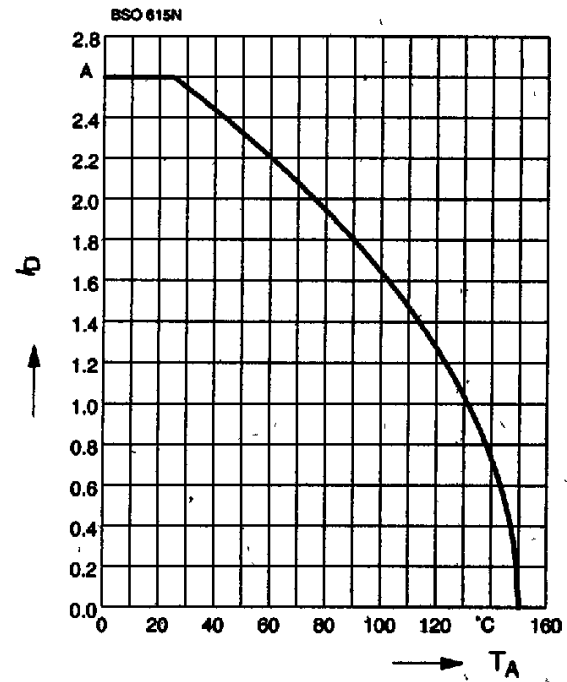
**Power Dissipation**

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



**Drain current**

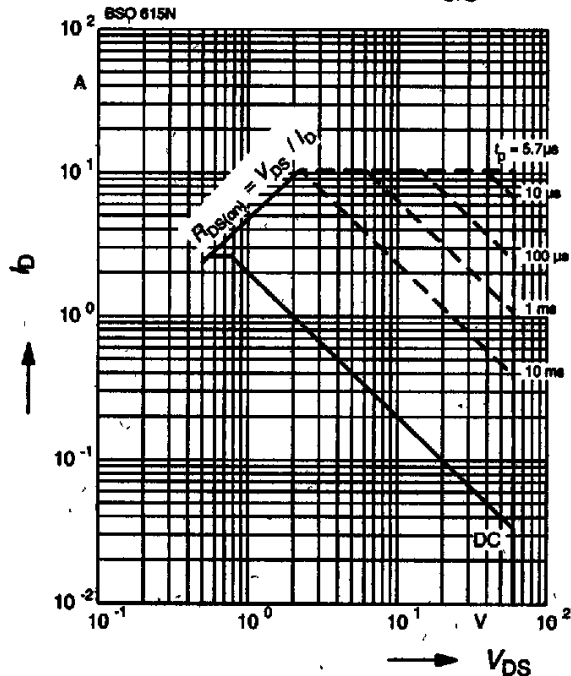
$I_D = f(T_A), V_{GS} = 4,5 V$



**Safe operating area**

$I_D = f(V_{DS})$

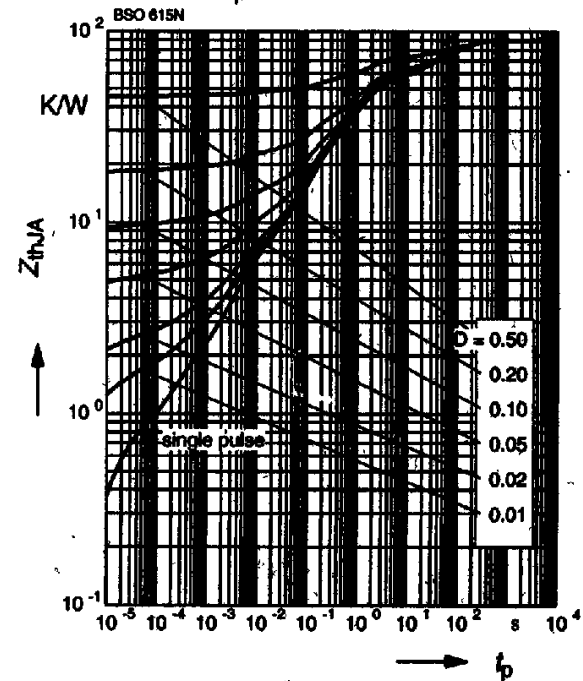
parameter :  $D = 0, T_A = 25 °C, V_{GS} = 4,5 V$



**Transient thermal impedance**

$Z_{thJA} = f(t_p)$

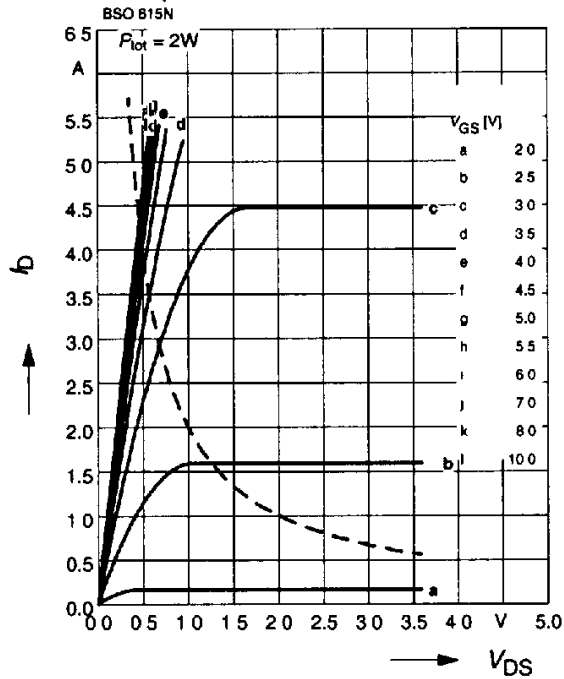
parameter :  $D = t_p/T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

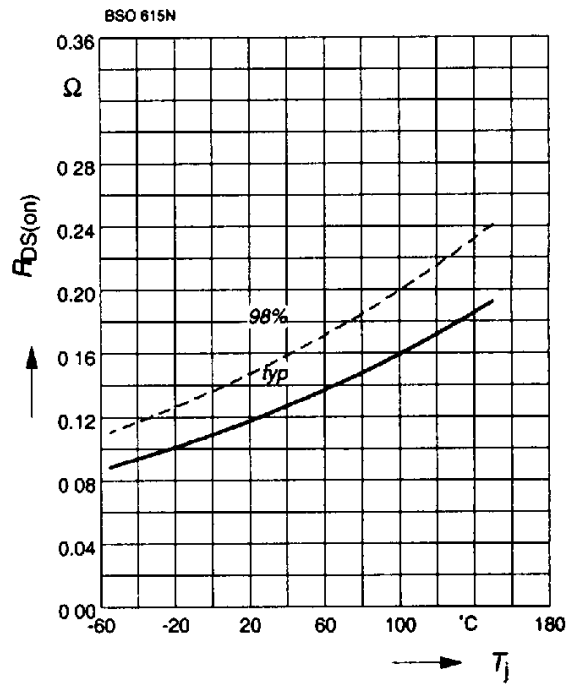
parameter:  $t_p = 80 \mu s$



**Drain-source on-resistance**

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

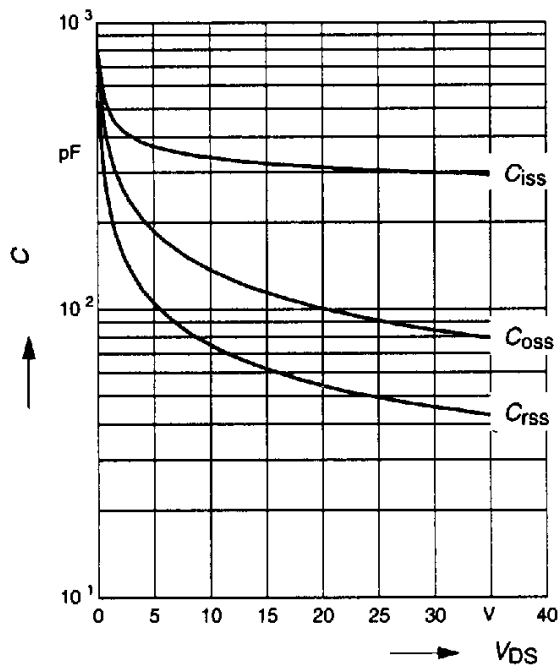
parameter:  $I_D = 2.6 A, V_{GS} = 4.5 V$



**Typ. capacitances**

$C = f(V_{DS})$

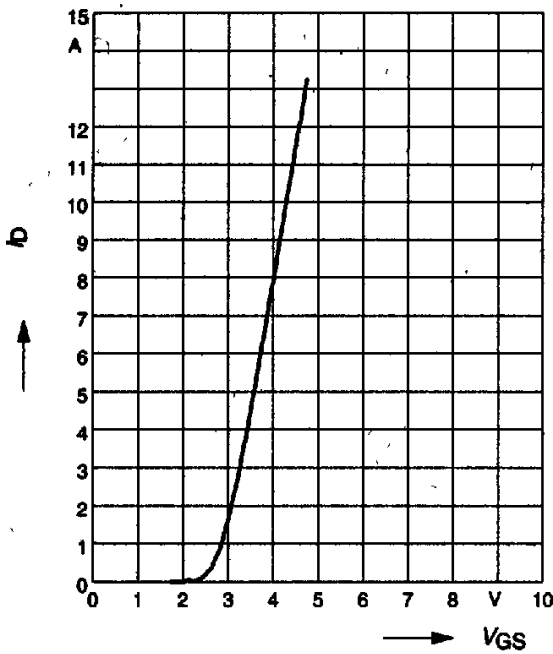
parameter:  $V_{GS} = 0 V, f = 1 MHz$



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

parameter:  $t_p = 80 \mu s$

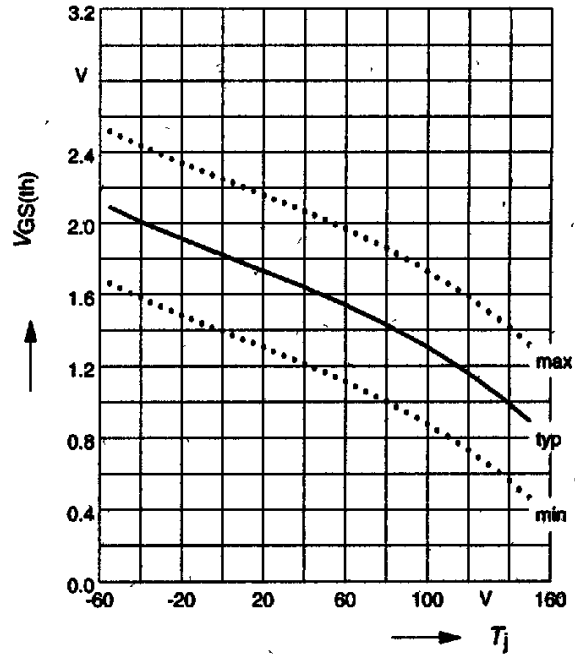
$V_{DS} \geq 2 \times I_D \times R_{DS(on) \max}$



**Gate threshold voltage  $V_{GS(th)} = f(T_j)$**

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

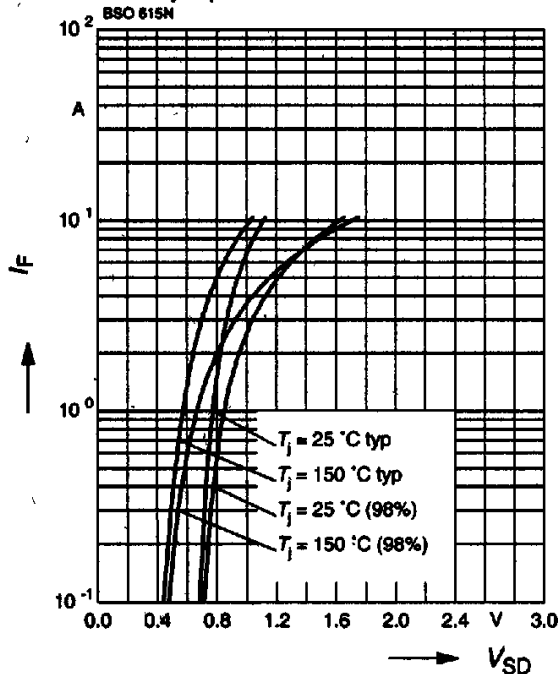
parameter:  $V_{GS} = V_{DS}, I_D = 20 \mu A$



**Forward characteristics of reverse diode  $I_F = f(V_{SD})$**

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

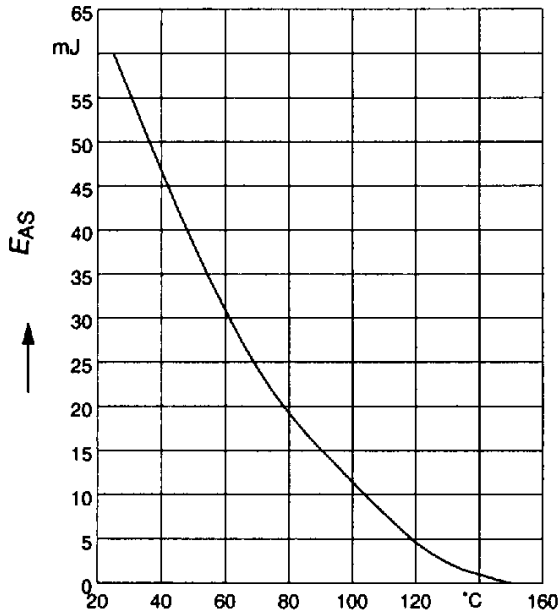
parameter:  $T_j, t_p = 80 \mu s$



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

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

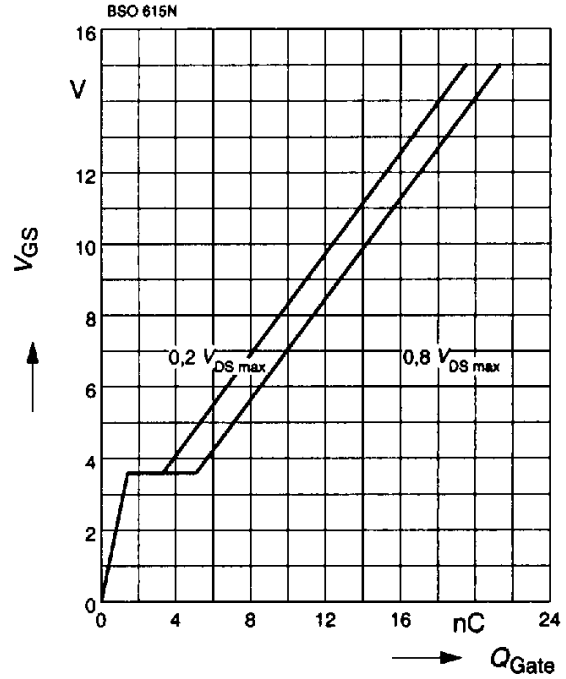
$R_{GS} = 25 \text{ } \Omega$



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

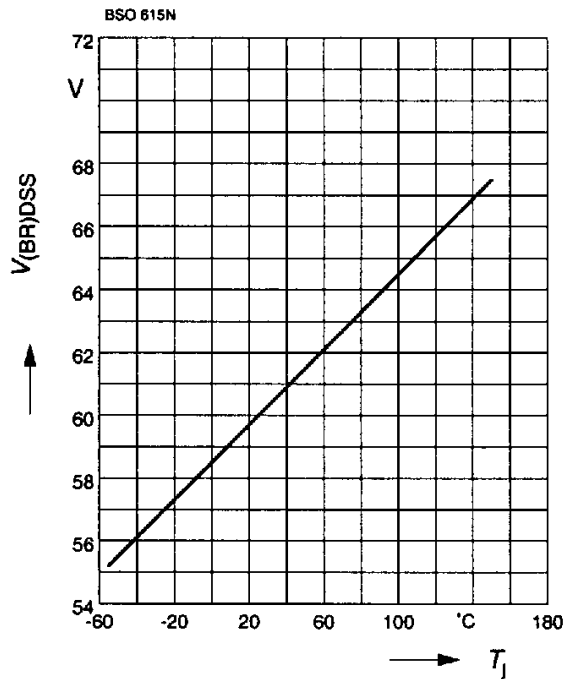
parameter:  $I_{D \text{ puls}} = 2.6 \text{ A}$

parameter:  $I_{D \text{ puls}} = 2.6 \text{ A}$



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

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



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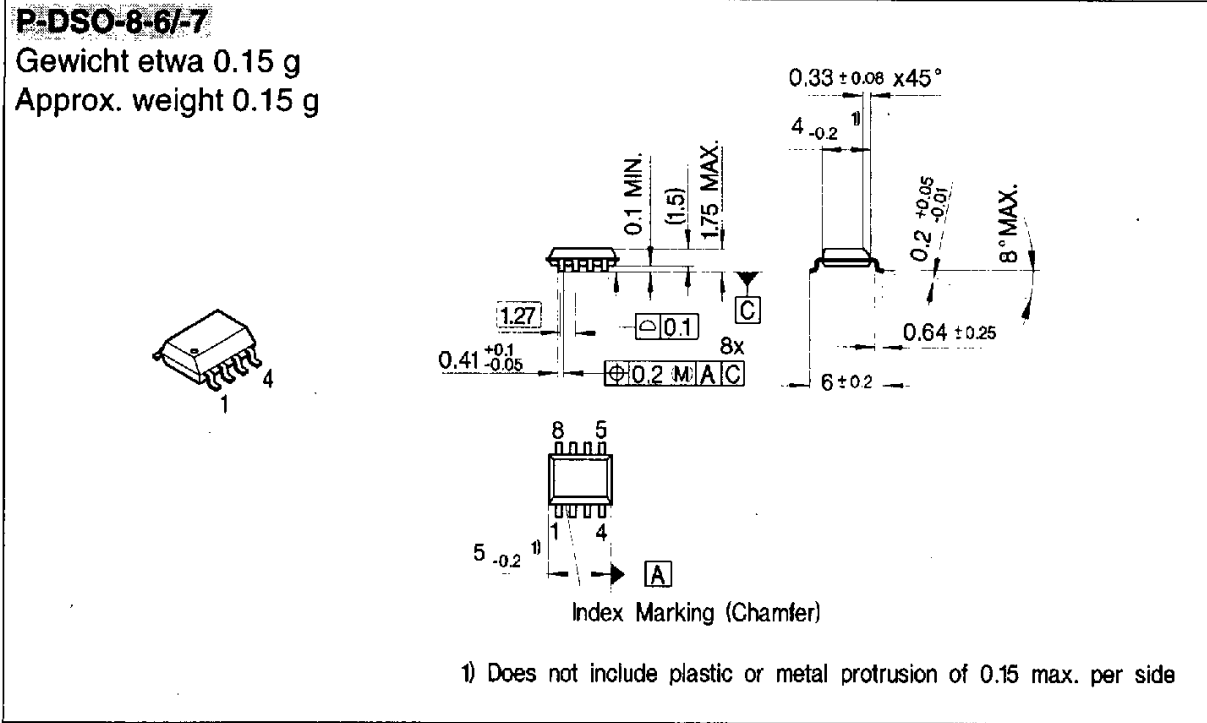


**Gehäusemaßbilder**

(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**

**P-TO220-3-1**

Gewicht etwa 1.8 g  
Approx. weight 1.8 g

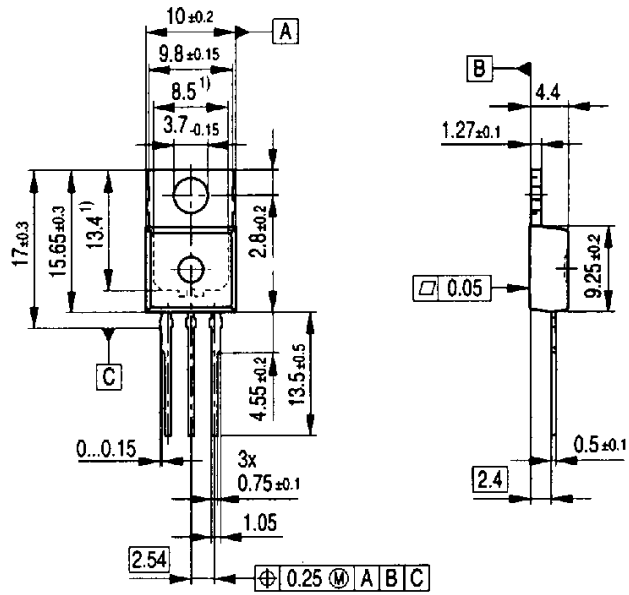
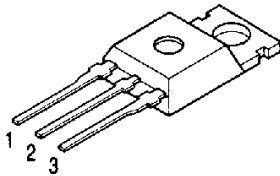


Bild 18

Figure 18

**P-TO251-3-1**

Gewicht etwa 2.0 g  
Approx. weight 2.0 g

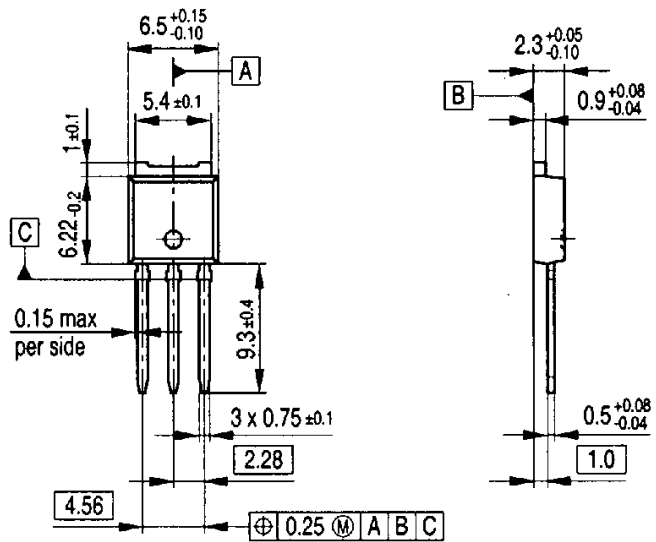
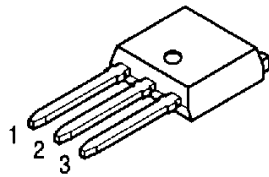


Bild 19

Figure 19

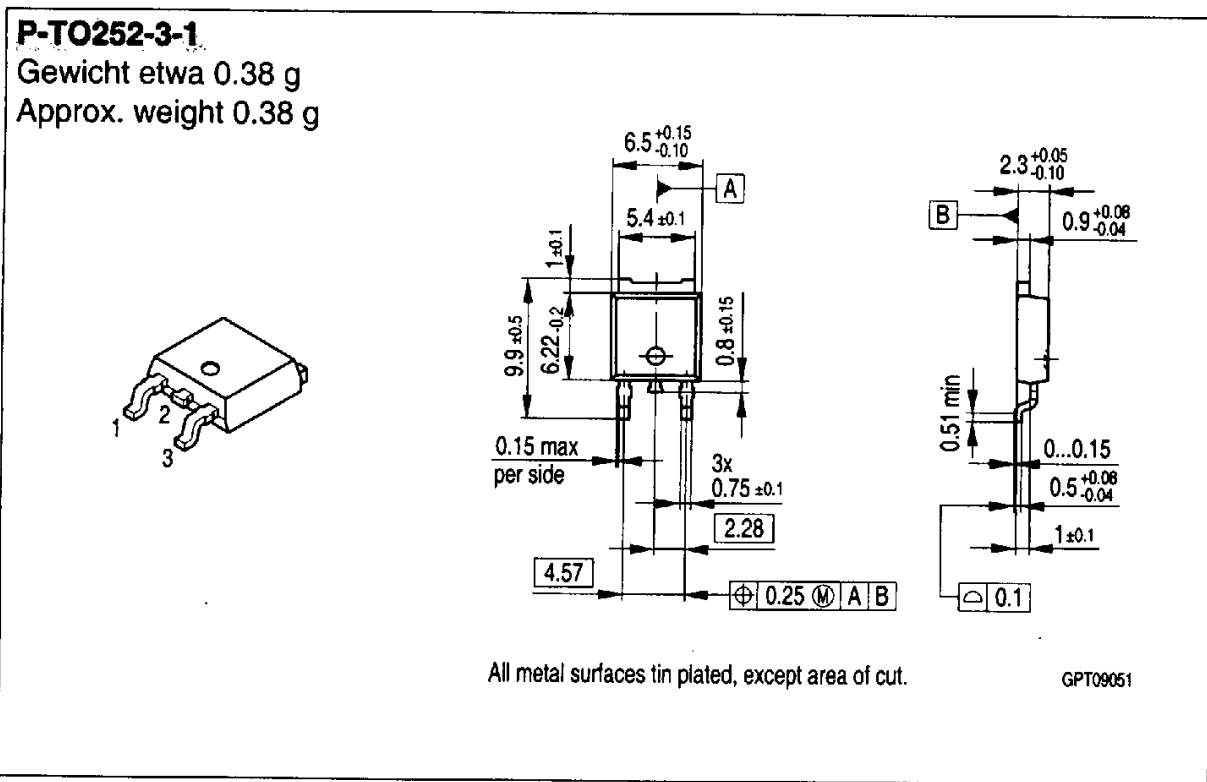


Bild 20

Figure 20

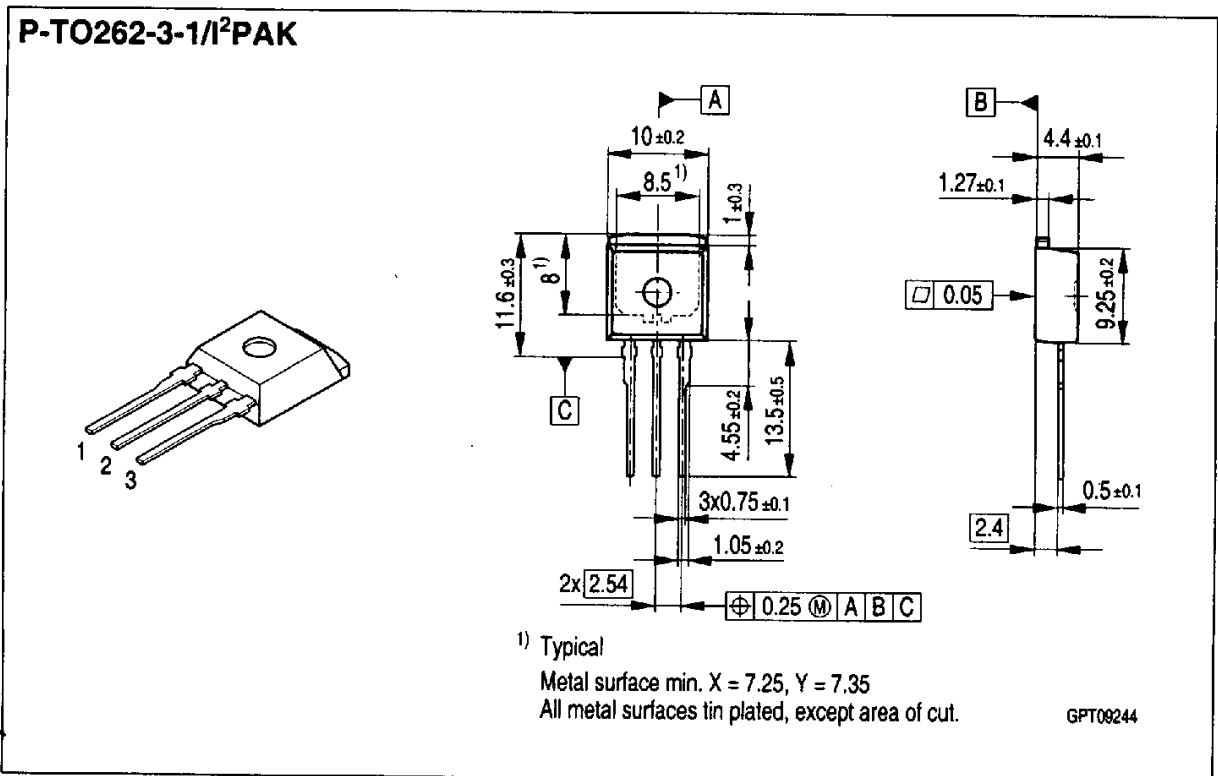
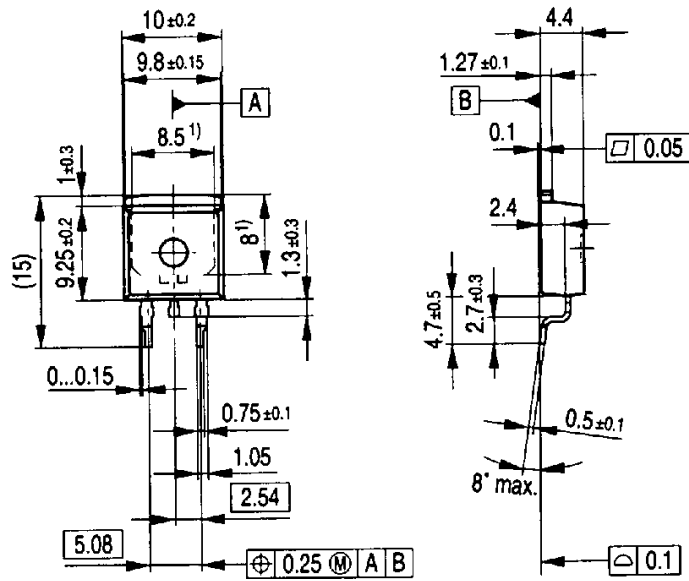
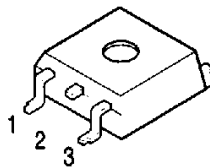


Bild 21

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.

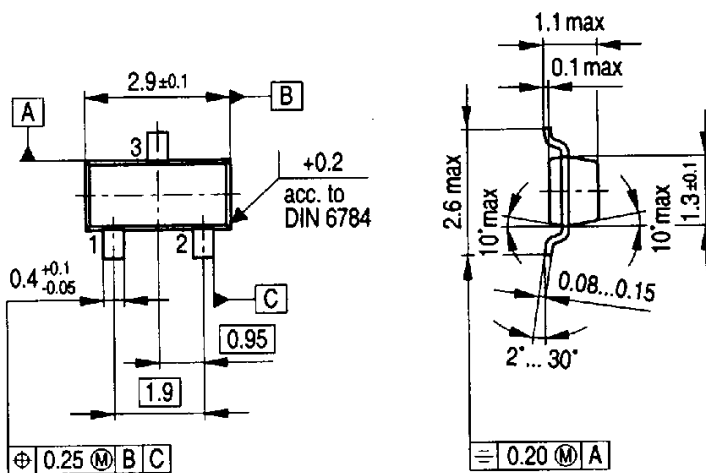
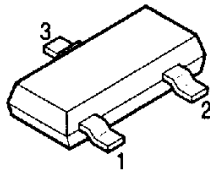
GPT09085

Bild 22

Figure 22

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

Gewicht etwa 0.01 g  
Approx. weight 0.01 g



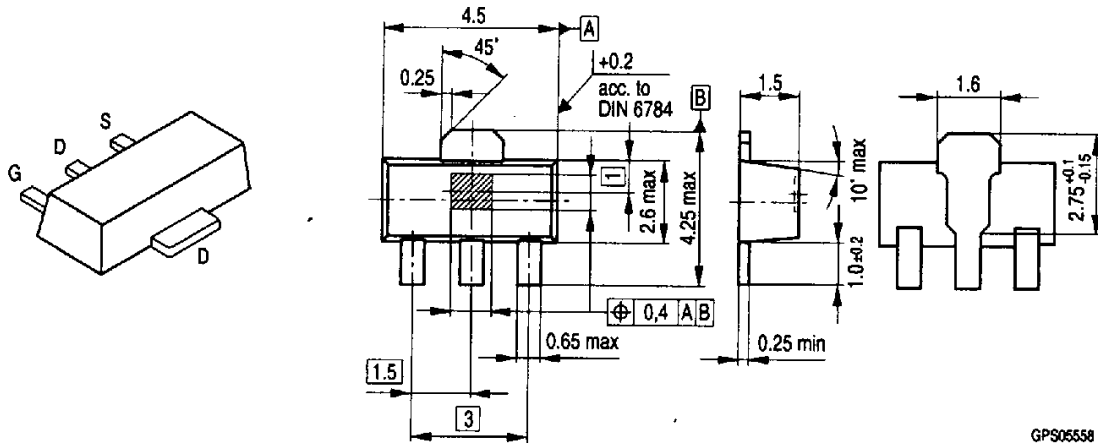
GPS05557

Bild 23

Figure 23

**SOT-89**

Gewicht etwa 0.01 g  
Approx. weight 0.01 g



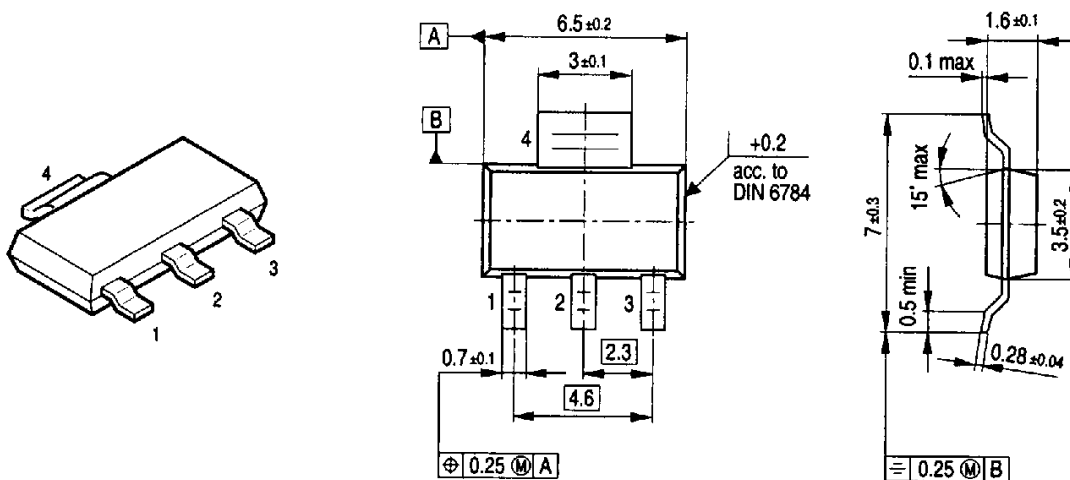
GPS05558

**Bild 24**

**Figure 24**

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

Gewicht etwa 0.15 g  
Approx. weight 0.15 g



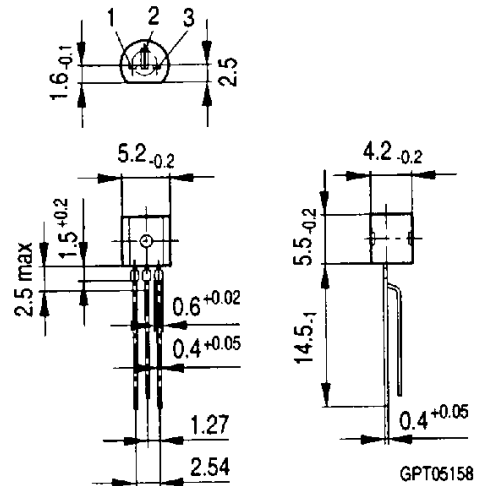
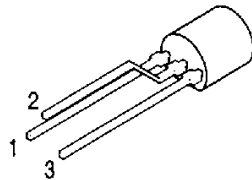
GPS05560

**Bild 25**

**Figure 25**

**TO-92**

Gewicht etwa 0.23 g  
Approx. weight 0.23 g

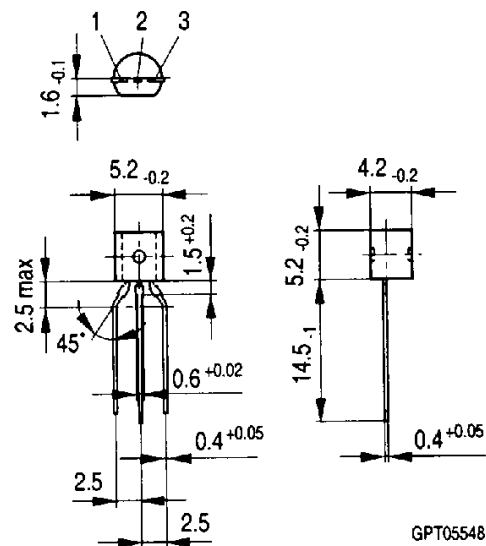
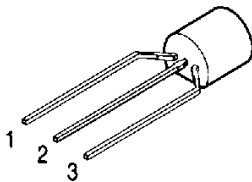


**Bild 26**

**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**