

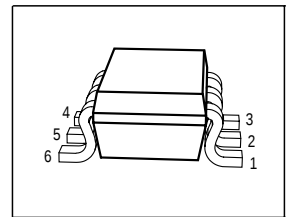
## OptiMOS®-P Small-Signal-Transistor Feature

- P-Channel
- Enhancement mode
- Logic Level
- 150°C operating temperature
- Avalanche rated
- dv/dt rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen free according to IEC61249-2-21

## Product Summary

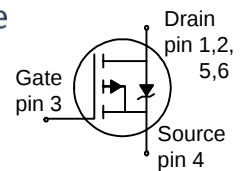
|              |      |    |
|--------------|------|----|
| $V_{DS}$     | -30  | V  |
| $R_{DS(on)}$ | 43   | mΩ |
| $I_D$        | -5.5 | A  |

PG-TSOP-6-1



Halogen-Free

| Type     | Package     | Tape and reel     | Marking |
|----------|-------------|-------------------|---------|
| BSL307SP | PG-TSOP-6-1 | H6327: 3000pcs/r. | sPC     |



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

| Parameter                                                                                                                               | Symbol                | Value        | Unit              |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|-------------------|
| Continuous drain current<br>$T_A=25^\circ\text{C}$<br>$T_A=70^\circ\text{C}$                                                            | $I_D$                 | -5.5<br>-4.4 | A                 |
| Pulsed drain current<br>$T_A=25^\circ\text{C}$                                                                                          | $I_{D \text{ puls}}$  | -22          |                   |
| Avalanche energy, single pulse<br>$I_D=-5.5 \text{ A}$ , $V_{DD}=-25\text{V}$ , $R_{GS}=25\Omega$                                       | $E_{AS}$              | 44           | mJ                |
| Reverse diode dv/dt<br>$I_S=-5.5\text{A}$ , $V_{DS}=24\text{V}$ , $di/dt=200\text{A}/\mu\text{s}$ , $T_{j\text{max}}=150^\circ\text{C}$ | dv/dt                 | -6           | kV/ $\mu\text{s}$ |
| Gate source voltage                                                                                                                     | $V_{GS}$              | $\pm 20$     | V                 |
| Power dissipation<br>$T_A=25^\circ\text{C}$                                                                                             | $P_{\text{tot}}$      | 2            | W                 |
| Operating and storage temperature                                                                                                       | $T_j, T_{\text{stg}}$ | -55... +150  | $^\circ\text{C}$  |
| IEC climatic category; DIN IEC 68-1                                                                                                     |                       | 55/150/56    |                   |
| ESD Class<br>JESD22-A114-HBM                                                                                                            |                       | Class 1a     |                   |

### Thermal Characteristics

| Parameter                                      | Symbol     | Values |      |      | Unit |
|------------------------------------------------|------------|--------|------|------|------|
|                                                |            | min.   | typ. | max. |      |
| Characteristics                                |            |        |      |      |      |
| Thermal resistance, junction - soldering point | $R_{thJS}$ | -      | -    | 50   | K/W  |
| SMD version, device on PCB:                    | $R_{thJA}$ |        |      |      |      |
| @ min. footprint                               |            | -      | -    | 230  |      |
| @ 6 cm <sup>2</sup> cooling area <sup>1)</sup> |            | -      | -    | 62.5 |      |

### 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<br>$V_{GS}=0, I_D=-250\mu A$                                                              | $V_{(BR)DSS}$ | -30    | -           | -          | V          |
| Gate threshold voltage, $V_{GS} = V_{DS}$<br>$I_D=-40\mu A$                                                              | $V_{GS(th)}$  | -1     | -1.5        | -2         |            |
| Zero gate voltage drain current<br>$V_{DS}=-30V, V_{GS}=0, T_j=25^{\circ}C$<br>$V_{DS}=-30V, V_{GS}=0, T_j=150^{\circ}C$ | $I_{DSS}$     | -<br>- | -0.1<br>-10 | -1<br>-100 | $\mu A$    |
| Gate-source leakage current<br>$V_{GS}=-20V, V_{DS}=0$                                                                   | $I_{GSS}$     | -      | -10         | -100       |            |
| Drain-source on-state resistance<br>$V_{GS}=-4.5V, I_D=-4.2A$                                                            | $R_{DS(on)}$  | -      | 52          | 74         | m $\Omega$ |
| Drain-source on-state resistance<br>$V_{GS}=-10V, I_D=-5.5A$                                                             | $R_{DS(on)}$  | -      | 31          | 43         |            |

<sup>1)</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air;  $t \leq 5$  sec.

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

| Parameter | Symbol | Conditions | Values |      |      | Unit |
|-----------|--------|------------|--------|------|------|------|
|           |        |            | min.   | typ. | max. |      |

### Dynamic Characteristics

|                              |              |                                                                            |     |      |      |    |
|------------------------------|--------------|----------------------------------------------------------------------------|-----|------|------|----|
| Transconductance             | $g_{fs}$     | $ V_{DS}  \geq 2 \cdot  I_D  \cdot R_{DS(on)max}$<br>$I_D = -4.4\text{A}$  | 4.7 | 9.4  | -    | S  |
| Input capacitance            | $C_{iss}$    | $V_{GS}=0, V_{DS}=-25\text{V},$<br>$f=1\text{MHz}$                         | -   | 805  | -    | pF |
| Output capacitance           | $C_{oss}$    |                                                                            | -   | 234  | -    |    |
| Reverse transfer capacitance | $C_{rss}$    |                                                                            | -   | 195  | -    |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=-15\text{V}, V_{GS}=-10\text{V},$<br>$I_D=-1\text{A}, R_G=6\Omega$ | -   | 7.3  | 11   | ns |
| Rise time                    | $t_r$        |                                                                            | -   | 8.4  | 12.6 |    |
| Turn-off delay time          | $t_{d(off)}$ |                                                                            | -   | 36.4 | 55   |    |
| Fall time                    | $t_f$        |                                                                            | -   | 29   | 44   |    |

### Gate Charge Characteristics

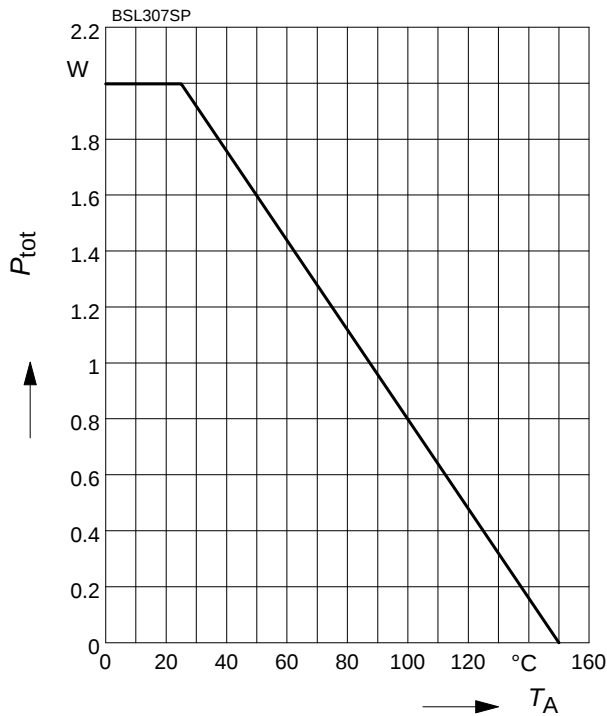
|                       |                 |                                                                               |   |       |       |    |
|-----------------------|-----------------|-------------------------------------------------------------------------------|---|-------|-------|----|
| Gate to source charge | $Q_{gs}$        | $V_{DD}=-24\text{V}, I_D=-5.5\text{A}$                                        | - | -2    | -2.5  | nC |
| Gate to drain charge  | $Q_{gd}$        |                                                                               | - | -8.2  | -12.3 |    |
| Gate charge total     | $Q_g$           | $V_{DD}=-24\text{V}, I_D=-5.5\text{A},$<br>$V_{GS}=0 \text{ to } -10\text{V}$ | - | -23.4 | -29   |    |
| Gate plateau voltage  | $V_{(plateau)}$ | $V_{DD}=-24\text{V}, I_D=-5.5\text{A}$                                        | - | -2.8  | -     | V  |

### Reverse Diode

|                                          |          |                                                                        |   |       |      |    |
|------------------------------------------|----------|------------------------------------------------------------------------|---|-------|------|----|
| Inverse diode continuous forward current | $I_S$    | $T_A=25^\circ\text{C}$                                                 | - | -     | -5.5 | A  |
| Inverse diode direct current, pulsed     | $I_{SM}$ |                                                                        | - | -     | -22  |    |
| Inverse diode forward voltage            | $V_{SD}$ | $V_{GS}=0,  I_F  =  I_D $                                              | - | -0.88 | -1.3 | V  |
| Reverse recovery time                    | $t_{rr}$ | $V_R=-15\text{V},  I_F  =  I_D ,$<br>$di_F/dt=100\text{A}/\mu\text{s}$ | - | 16.6  | 21   | ns |
| Reverse recovery charge                  | $Q_{rr}$ |                                                                        | - | 6.2   | 7.8  | nC |

### 1 Power dissipation

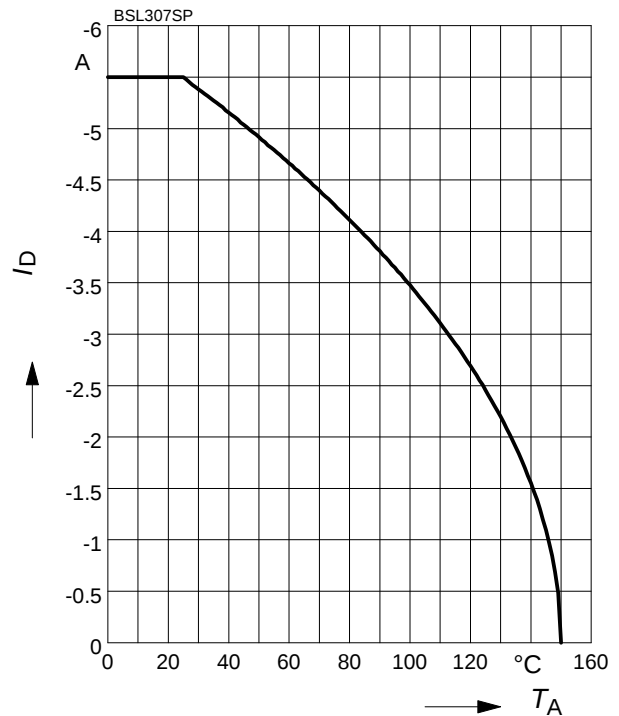
$$P_{\text{tot}} = f(T_A)$$



### 2 Drain current

$$I_D = f(T_A)$$

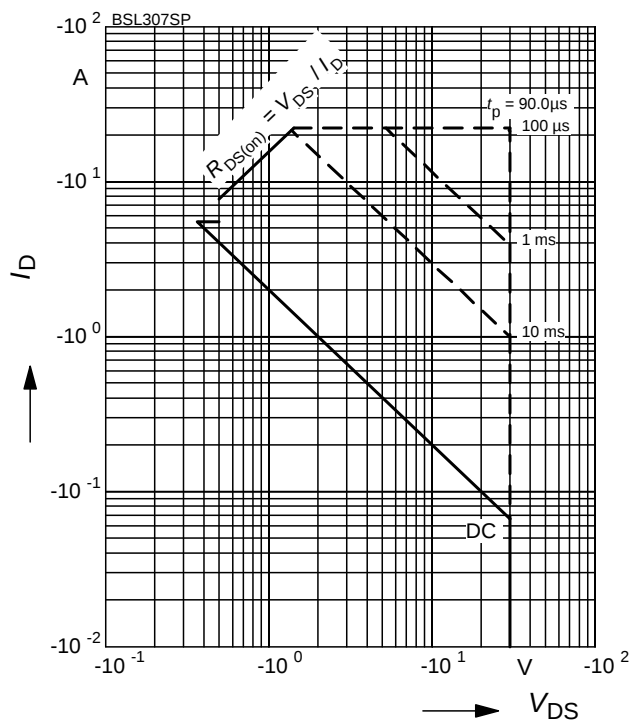
parameter:  $|V_{GS}| \geq 10 \text{ V}$



### 3 Safe operating area

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

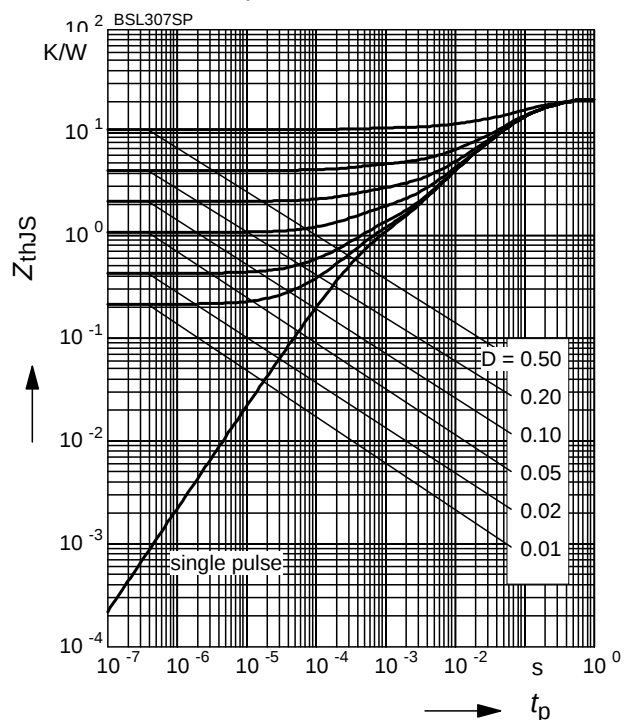
parameter:  $D = 0$ ,  $T_A = 25^\circ\text{C}$



### 4 Transient thermal impedance

$$Z_{\text{thJS}} = f(t_p)$$

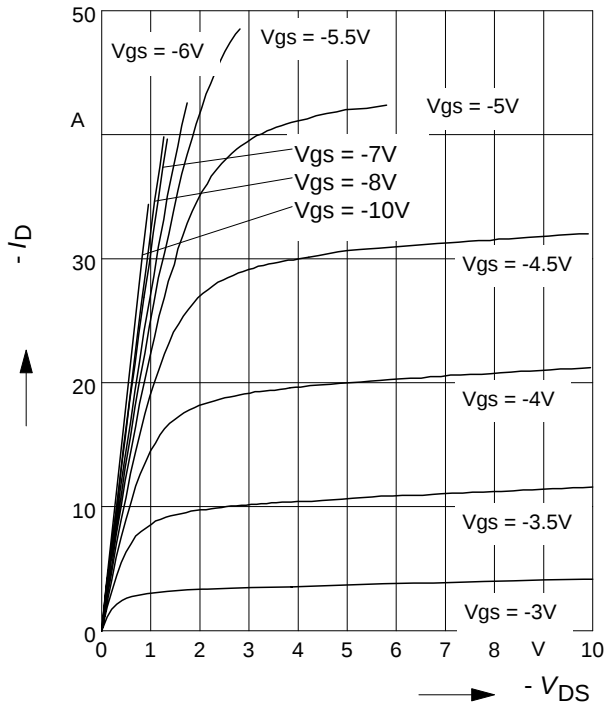
parameter:  $D = t_p/T$



### 5 Typ. output characteristic

$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

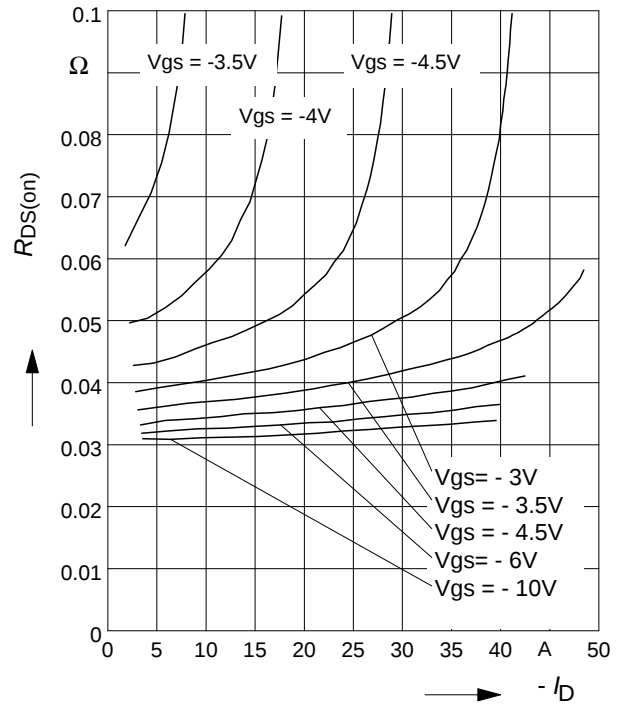
parameter:  $t_p = 80 \mu\text{s}$



### 6 Typ. drain-source on resistance

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

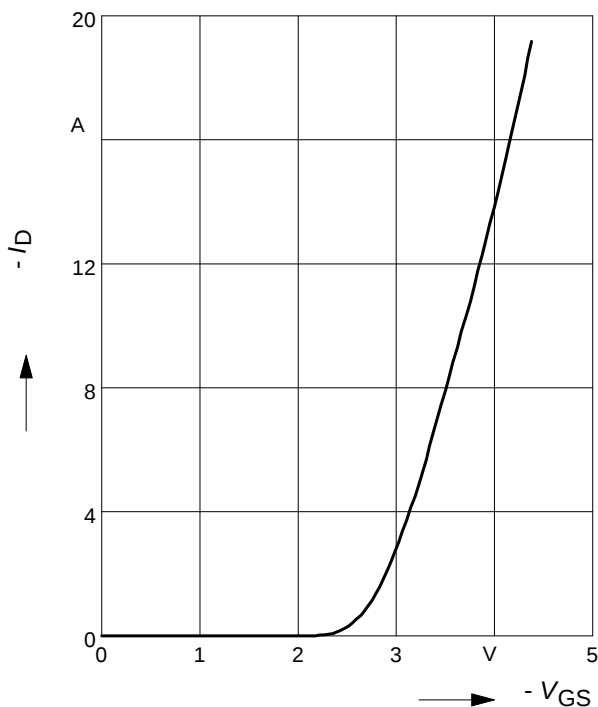
parameter:  $V_{GS}$



### 7 Typ. transfer characteristics

$$I_D = f(V_{GS}); |V_{DS}| \geq 2 \times |I_D| \times R_{DS(on)max}$$

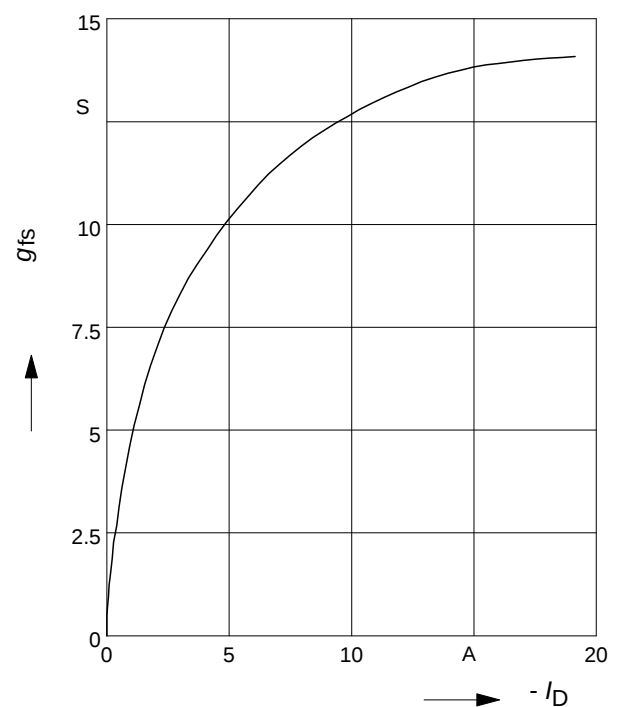
parameter:  $t_p = 80 \mu\text{s}$



### 8 Typ. forward transconductance

$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$

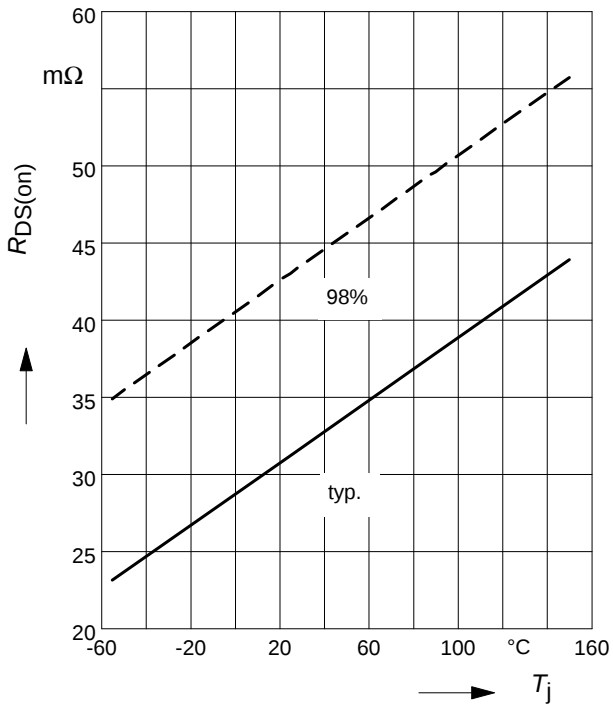
parameter:  $t_p = 80 \mu\text{s}$



### 9 Drain-source on-resistance

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

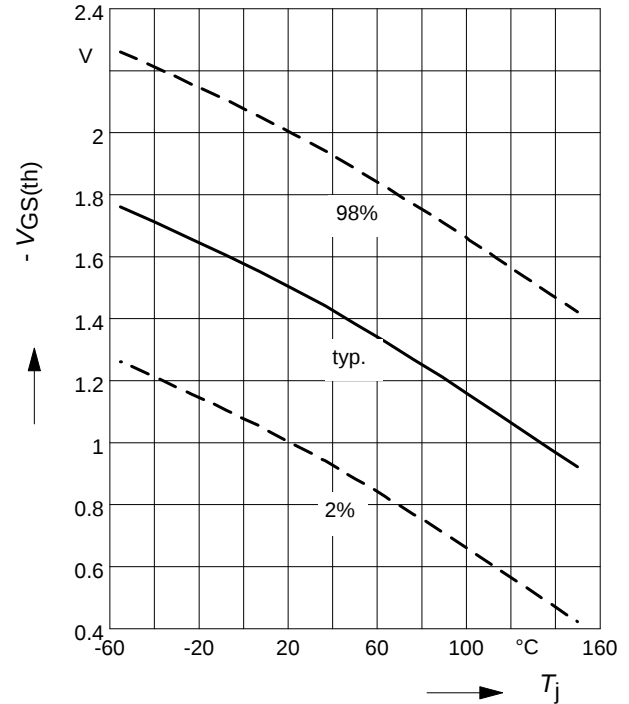
parameter:  $I_D = -5.5 \text{ A}$ ,  $V_{GS} = -10 \text{ V}$



### 10 Typ. gate threshold voltage

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

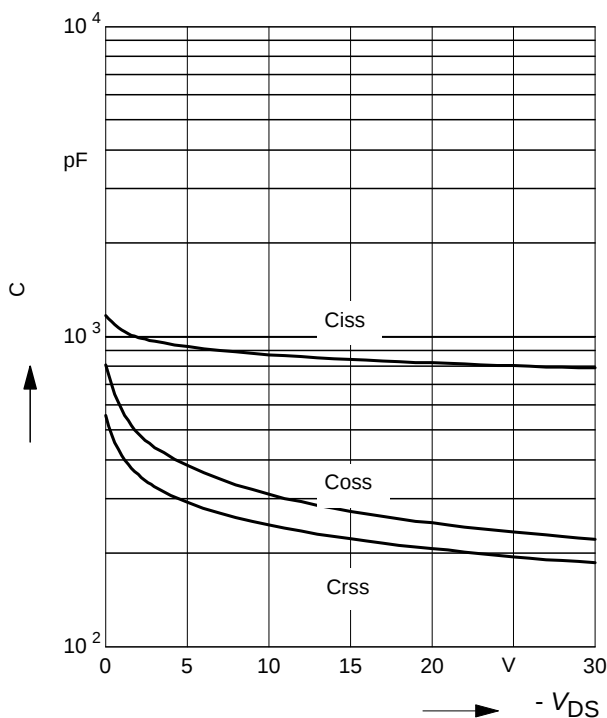
parameter:  $V_{GS} = V_{DS}$



### 11 Typ. capacitances

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

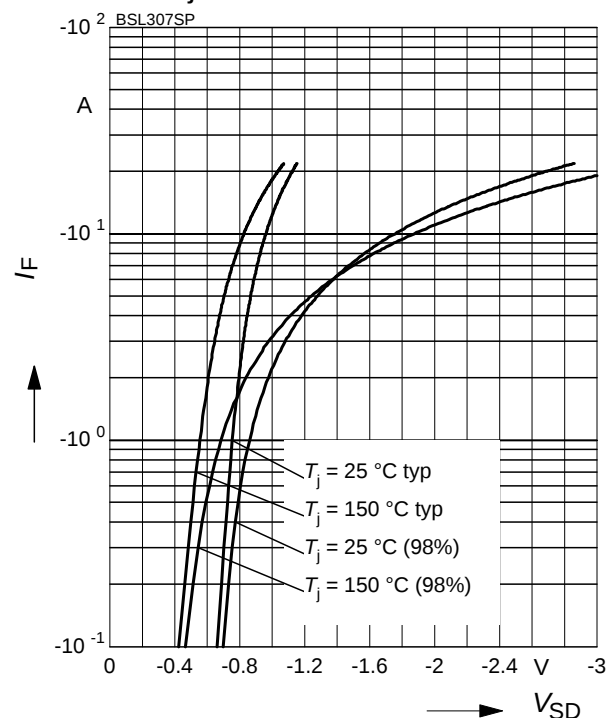
parameter:  $V_{GS}=0$ ,  $f=1 \text{ MHz}$



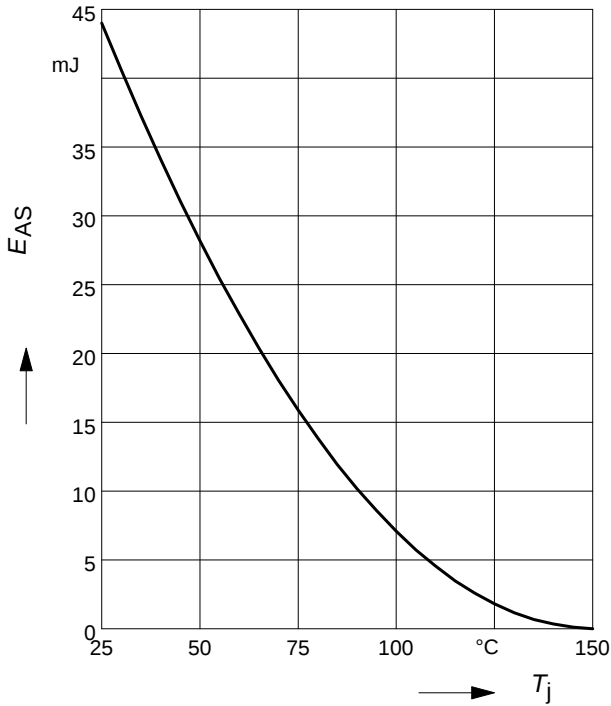
### 12 Forward character. of reverse diode

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

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

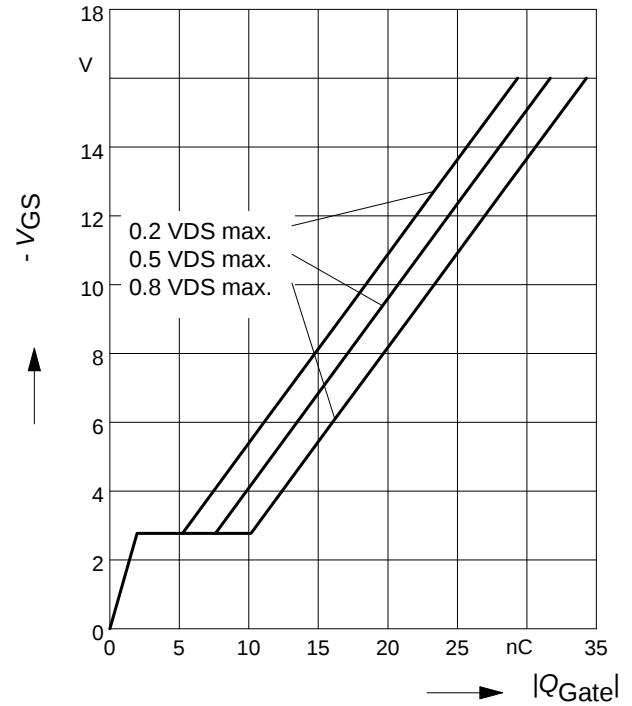


### 13 Typ. avalanche energy

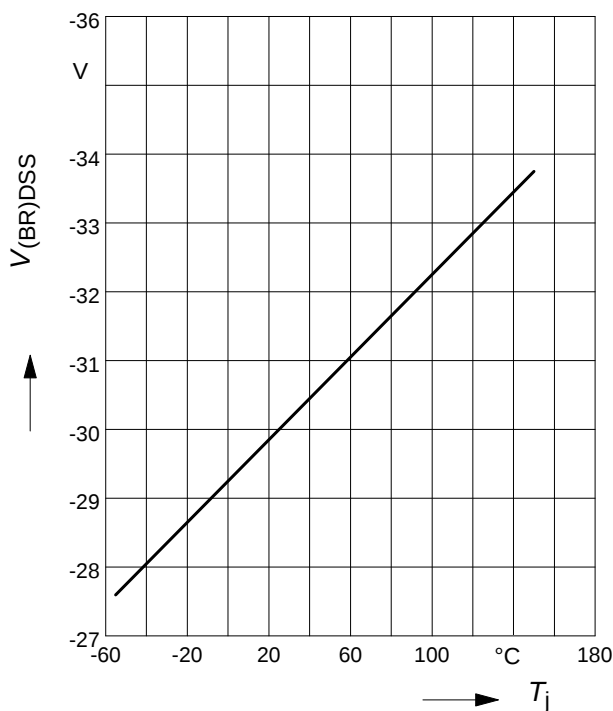
 $E_{AS} = f(T_j)$ , par.:  $I_D = -5.5 \text{ A}$ 
 $V_{DD} = -25 \text{ V}$ ,  $R_{GS} = 25 \Omega$ 


### 14 Typ. gate charge

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

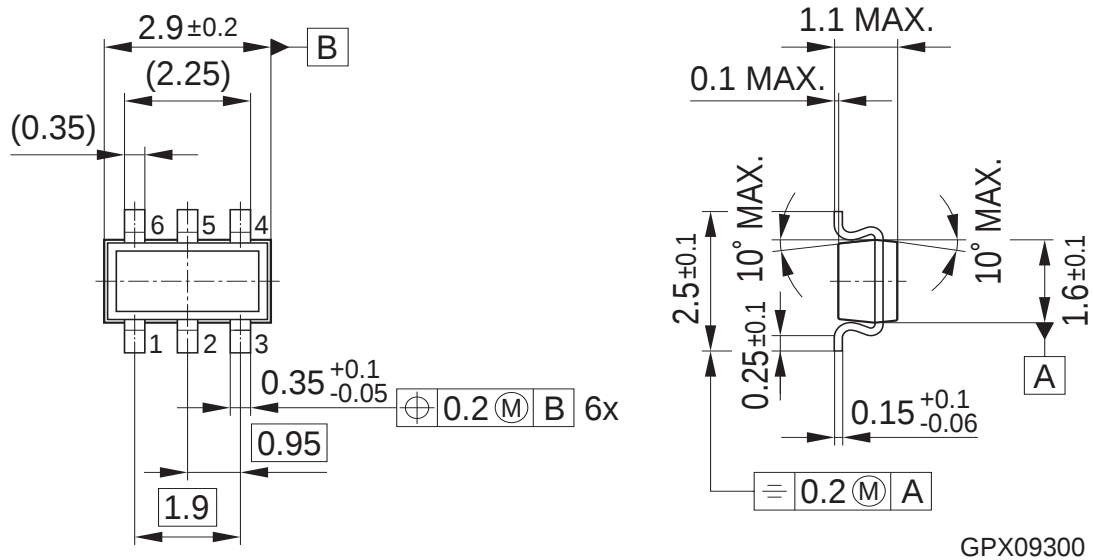
parameter:  $I_D = -5.5 \text{ A}$  pulsed


### 15 Drain-source breakdown voltage

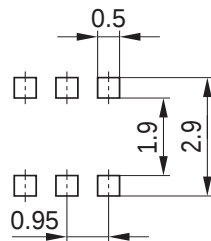
 $V_{(BR)DSS} = f(T_j)$ 


## Package Outline:

## TSOP6



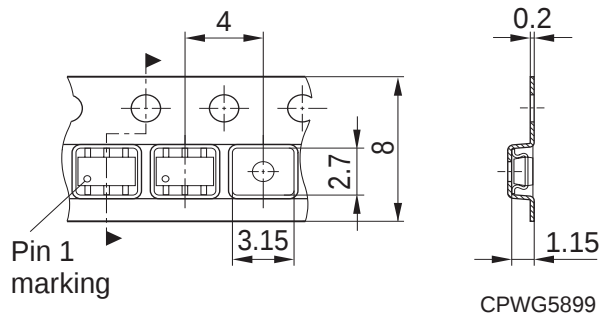
## Footprint:



Remark: Wave soldering possible dep.  
on customers process conditions

HLG09283

## Packaging:



Dimensions in mm

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