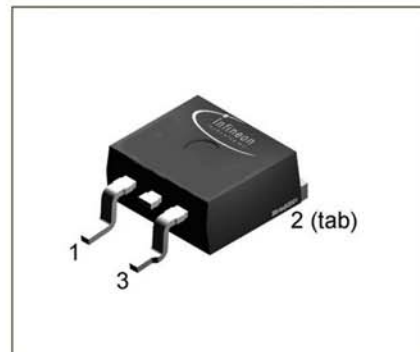


## BUZ 32 L3045A BUZ 32 SMD

### SIPMOS<sup>®</sup> Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- Pb-free lead plating; RoHS compliant



| Pin 1 | Pin 2 | Pin 3 |
|-------|-------|-------|
| G     | D     | S     |

| Type       | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package            | Pb-free |
|------------|----------|-------|--------------|--------------------|---------|
| BUZ 32 SMD | 200 V    | 9.5 A | 0.4 $\Omega$ | D <sup>2</sup> PAK | Yes     |

### Maximum Ratings

| Parameter                                                                                                                                                     | Symbol      | Values        | Unit             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|------------------|
| Continuous drain current<br>$T_C = 29^\circ\text{C}$                                                                                                          | $I_D$       | 9.5           | A                |
| Pulsed drain current<br>$T_C = 25^\circ\text{C}$                                                                                                              | $I_{Dpuls}$ | 38            |                  |
| Avalanche current, limited by $T_{jmax}$                                                                                                                      | $I_{AR}$    | 9.5           |                  |
| Avalanche energy, periodic limited by $T_{jmax}$                                                                                                              | $E_{AR}$    | 6.5           | mJ               |
| Avalanche energy, single pulse<br>$I_D = 9.5\text{ A}$ , $V_{DD} = 50\text{ V}$ , $R_{GS} = 25\text{ }\Omega$<br>$L = 2\text{ mH}$ , $T_j = 25^\circ\text{C}$ | $E_{AS}$    | 120           |                  |
| Gate source voltage                                                                                                                                           | $V_{GS}$    | $\pm 20$      | V                |
| Power dissipation<br>$T_C = 25^\circ\text{C}$                                                                                                                 | $P_{tot}$   | 75            | W                |
| Operating temperature                                                                                                                                         | $T_j$       | -55 ... + 150 | $^\circ\text{C}$ |
| Storage temperature                                                                                                                                           | $T_{stg}$   | -55 ... + 150 |                  |
| Thermal resistance, chip case                                                                                                                                 | $R_{thJC}$  | $\leq 1.67$   | K/W              |
| Thermal resistance, chip to ambient                                                                                                                           | $R_{thJA}$  | 75            |                  |
| 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<br>$V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$ , $T_j = 25^\circ\text{C}$  | $V_{(BR)DSS}$ | 200 | -   | -   | V             |
| Gate threshold voltage<br>$V_{GS}=V_{DS}$ , $I_D = 1\text{ mA}$                                               | $V_{GS(th)}$  | 2.1 | 3   | 4   |               |
| Zero gate voltage drain current<br>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25^\circ\text{C}$ | $I_{DSS}$     | -   | 0.1 | 1   | $\mu\text{A}$ |
| $V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 125^\circ\text{C}$                                   |               | -   | 10  | 100 |               |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$                                 | $I_{GSS}$     | -   | 10  | 100 | nA            |
| Drain-Source on-resistance<br>$V_{GS} = 10\text{ V}$ , $I_D = 6\text{ A}$                                     | $R_{DS(on)}$  | -   | 0.3 | 0.4 | $\Omega$      |

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

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

**Dynamic Characteristics**

|                                                                                                                      |              |   |     |     |    |
|----------------------------------------------------------------------------------------------------------------------|--------------|---|-----|-----|----|
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 6\text{ A}$                               | $g_{fs}$     | 3 | 4.6 | -   | S  |
| Input capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                             | $C_{iss}$    | - | 400 | 530 | pF |
| Output capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                            | $C_{oss}$    | - | 85  | 130 |    |
| Reverse transfer capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                  | $C_{rss}$    | - | 45  | 70  |    |
| Turn-on delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$  | $t_{d(on)}$  | - | 10  | 15  | ns |
| Rise time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_r$        | - | 40  | 60  |    |
| Turn-off delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$ | $t_{d(off)}$ | - | 55  | 75  |    |
| Fall time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_f$        | - | 30  | 40  |    |

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

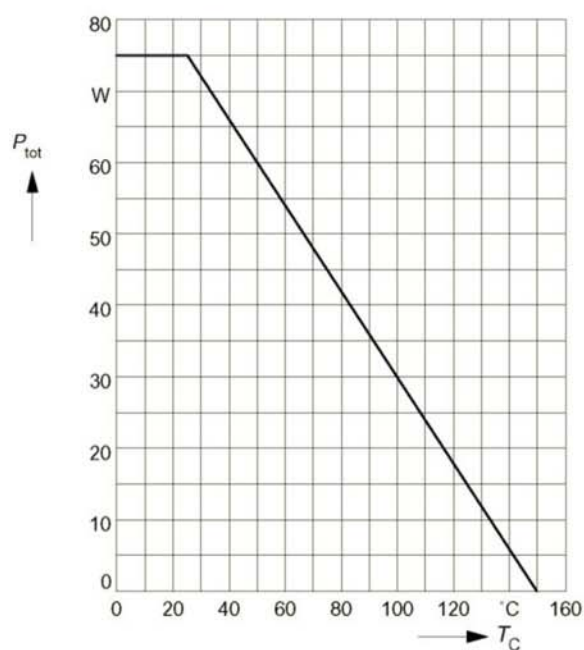
| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

#### Reverse Diode

|                                                                                                |          |   |     |     |               |
|------------------------------------------------------------------------------------------------|----------|---|-----|-----|---------------|
| Inverse diode continuous forward current<br>$T_C = 25^\circ\text{C}$                           | $I_S$    | - | -   | 9.5 | A             |
| Inverse diode direct current, pulsed<br>$T_C = 25^\circ\text{C}$                               | $I_{SM}$ | - | -   | 38  |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 19\text{ A}$                      | $V_{SD}$ | - | 1.4 | 1.7 | V             |
| Reverse recovery time<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | - | 200 | -   | ns            |
| Reverse recovery charge<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | - | 0.6 | -   | $\mu\text{C}$ |

### Power dissipation

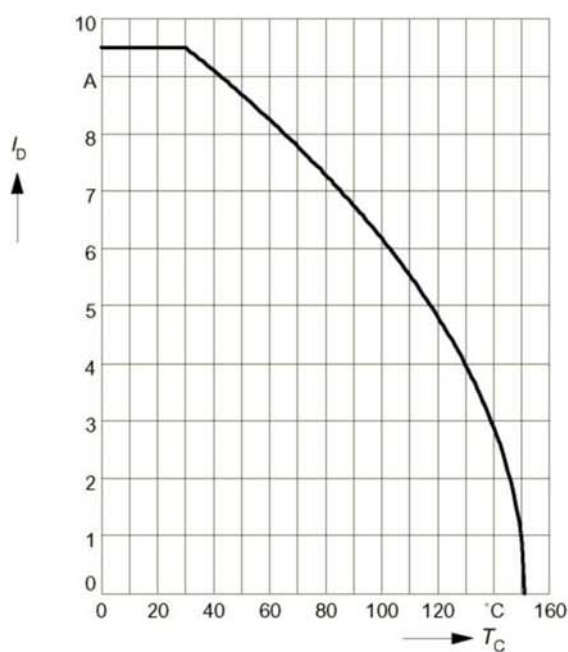
$$P_{\text{tot}} = f(T_C)$$



### Drain current

$$I_D = f(T_C)$$

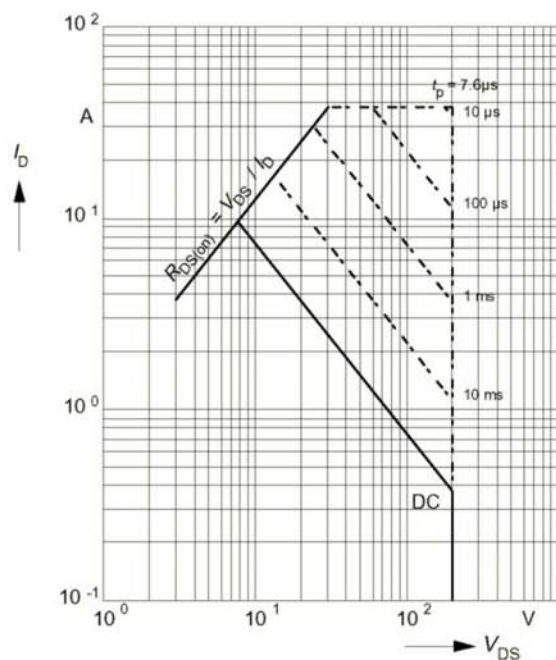
parameter:  $V_{GS} \geq 10 \text{ V}$



### Safe operating area

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

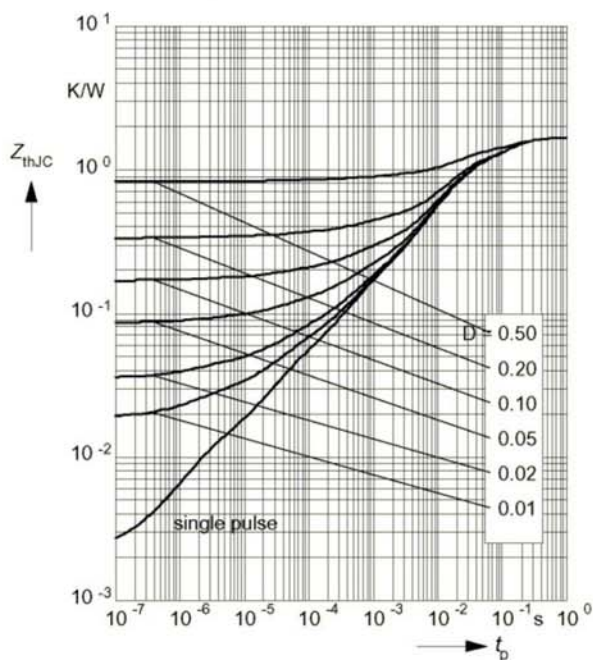
parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$



### Transient thermal impedance

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

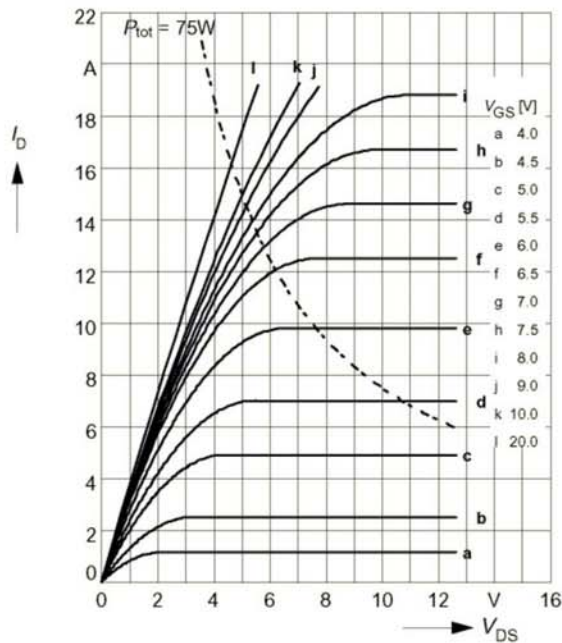
parameter:  $D = t_p / T$



### Typ. output characteristics

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

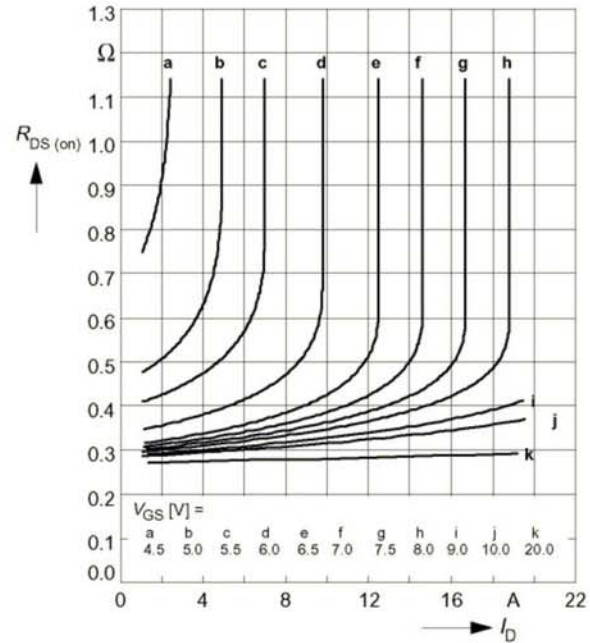
parameter:  $t_p = 80 \mu s$



### Typ. drain-source on-resistance

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

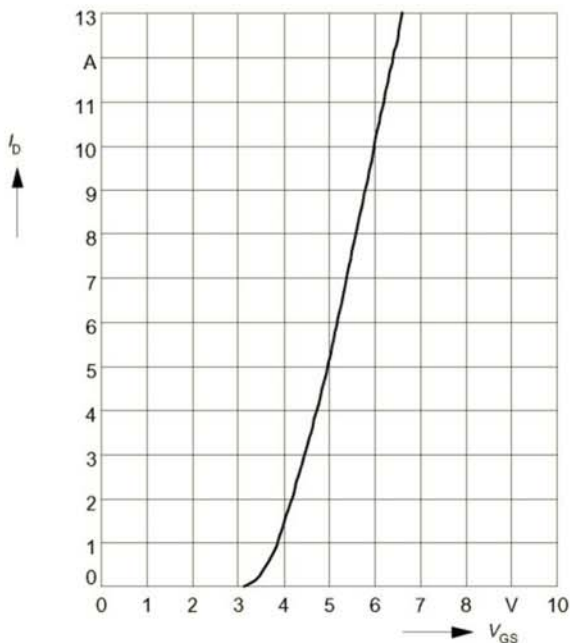
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

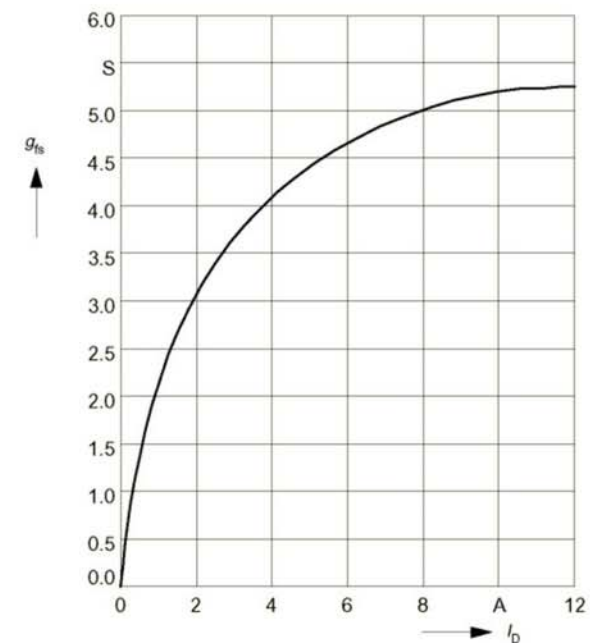
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



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

parameter:  $t_p = 80 \mu s$ ,

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

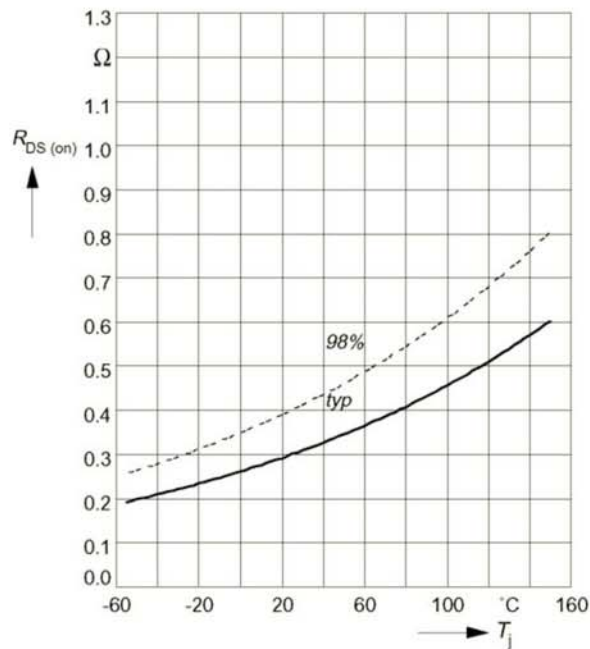




### Drain-source on-resistance

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

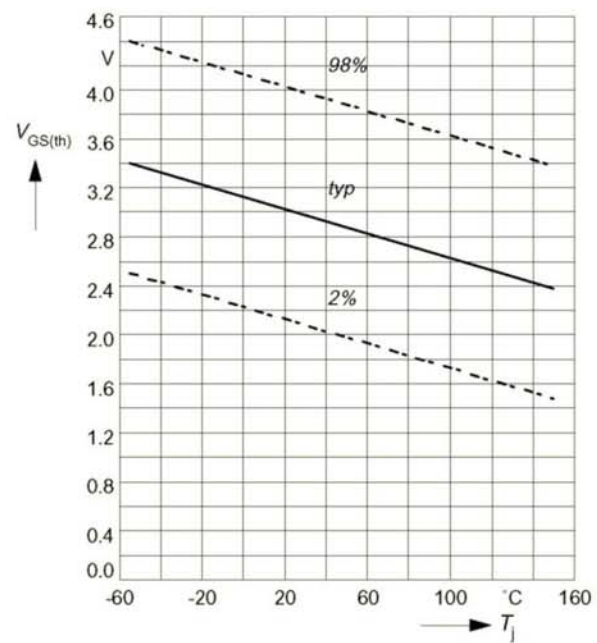
parameter:  $I_D = 6\text{ A}$ ,  $V_{GS} = 10\text{ V}$



### Gate threshold voltage

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

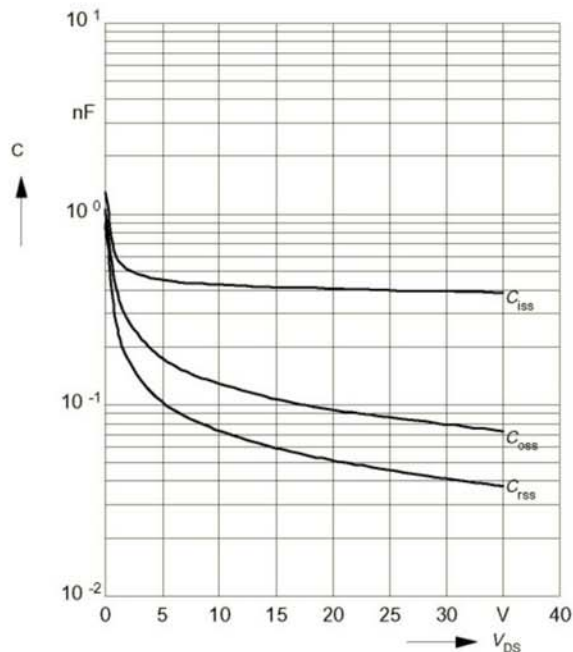
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



### Typ. capacitances

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

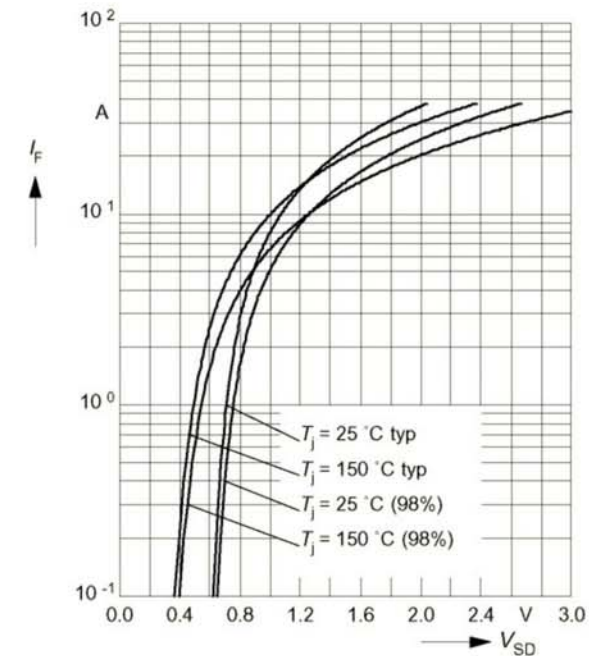
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



### Forward characteristics of reverse diode

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

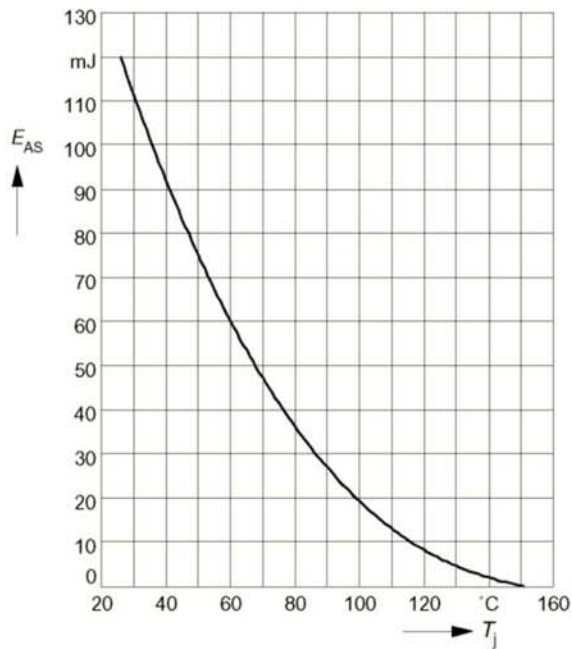
parameter:  $T_j$ ,  $t_p = 80\text{ }\mu\text{s}$



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

parameter:  $I_D = 9.5 \text{ A}$ ,  $V_{DD} = 50 \text{ V}$

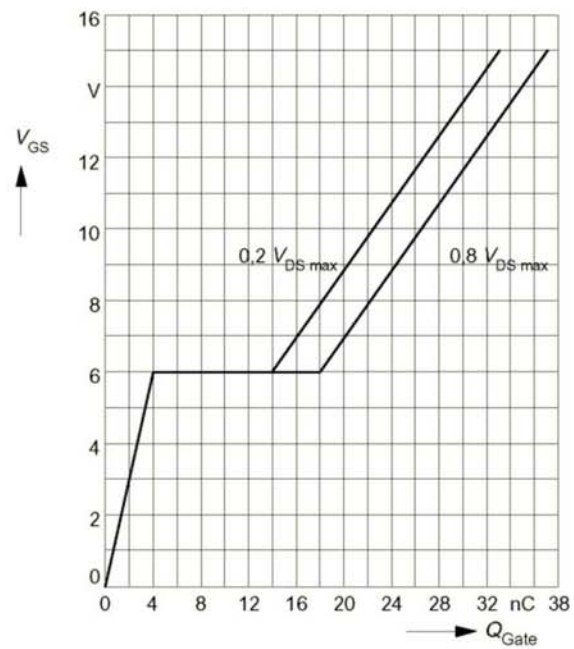
$R_{GS} = 25 \Omega$ ,  $L = 2 \text{ mH}$



**Typ. gate charge**

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

parameter:  $I_{D \text{ puls}} = 14 \text{ A}$



**Drain-source breakdown voltage**

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

