

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

### Thermal characteristics<sup>2)</sup>

|                                     |            |                                             |   |     |     |     |
|-------------------------------------|------------|---------------------------------------------|---|-----|-----|-----|
| Thermal resistance, junction - case | $R_{thJC}$ | -                                           | - | -   | 2.5 | K/W |
| SMD version, device on PCB          | $R_{thJA}$ | minimal footprint                           | - | 100 | -   |     |
|                                     |            | 6cm <sup>2</sup> cooling area <sup>3)</sup> | - | 60  | -   |     |

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

#### Static characteristics

|                                                |               |                                                      |     |      |     |            |
|------------------------------------------------|---------------|------------------------------------------------------|-----|------|-----|------------|
| Drain-source breakdown voltage                 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=1mA$                                 | 100 | -    | -   | V          |
| Gate threshold voltage                         | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=25\mu A$                         | 1.1 | 1.6  | 2.1 |            |
| Zero gate voltage drain current <sup>4)</sup>  | $I_{DSS}$     | $V_{DS}=100V, V_{GS}=0V, T_j=25^\circ\text{C}$       | -   | 0.01 | 1   | $\mu A$    |
|                                                |               | $V_{DS}=100V, V_{GS}=0V, T_j=125^\circ\text{C}^{2)}$ | -   | 1    | 100 |            |
| Gate-source leakage current <sup>4)</sup>      | $I_{GSS}$     | $V_{GS}=16V, V_{DS}=0V$                              | -   | -    | 100 | nA         |
| Drain-source on-state resistance <sup>4)</sup> | $R_{DS(on)}$  | $V_{GS}=4.5V, I_D=10A$                               | -   | 24   | 28  | m $\Omega$ |
|                                                |               | $V_{GS}=10V, I_D=17A$                                | -   | 20   | 22  |            |

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

### Dynamic characteristics<sup>2)</sup>

|                                            |              |                                                      |   |      |      |    |
|--------------------------------------------|--------------|------------------------------------------------------|---|------|------|----|
| Input capacitance <sup>4)</sup>            | $C_{iss}$    | $V_{GS}=0V, V_{DS}=25V,$<br>$f=1MHz$                 | - | 1350 | 1755 | pF |
| Output capacitance <sup>4)</sup>           | $C_{oss}$    |                                                      | - | 450  | 585  |    |
| Reverse transfer capacitance <sup>4)</sup> | $C_{rss}$    |                                                      | - | 42   | 84   |    |
| Turn-on delay time                         | $t_{d(on)}$  | $V_{DD}=50V, V_{GS}=10V,$<br>$I_D=20A, R_G=11\Omega$ | - | 5    | -    | ns |
| Rise time                                  | $t_r$        |                                                      | - | 3    | -    |    |
| Turn-off delay time                        | $t_{d(off)}$ |                                                      | - | 30   | -    |    |
| Fall time                                  | $t_f$        |                                                      | - | 18   | -    |    |

### Gate Charge Characteristics<sup>2, 4)</sup>

|                       |               |                                                      |   |     |     |    |
|-----------------------|---------------|------------------------------------------------------|---|-----|-----|----|
| Gate to source charge | $Q_{gs}$      | $V_{DD}=80V, I_D=20A,$<br>$V_{GS}=0 \text{ to } 10V$ | - | 4.3 | 5.6 | nC |
| Gate to drain charge  | $Q_{gd}$      |                                                      | - | 4.8 | 9.6 |    |
| Gate charge total     | $Q_g$         |                                                      | - | 21  | 27  |    |
| Gate plateau voltage  | $V_{plateau}$ |                                                      | - | 3.2 | -   | V  |

### Reverse Diode

|                                                                      |               |                                             |   |     |     |    |
|----------------------------------------------------------------------|---------------|---------------------------------------------|---|-----|-----|----|
| Diode continuous forward current <sup>2)</sup><br>one channel active | $I_S$         | $T_C=25^\circ C$                            | - | -   | 20  | A  |
| Diode pulse current <sup>2)</sup><br>one channel active              | $I_{S,pulse}$ |                                             | - | -   | 80  |    |
| Diode forward voltage                                                | $V_{SD}$      | $V_{GS}=0V, I_F=17A,$<br>$T_J=25^\circ C$   | - | 1.0 | 1.3 | V  |
| Reverse recovery time <sup>2)</sup>                                  | $t_{rr}$      | $V_R=50V, I_F=I_S,$<br>$di_F/dt=100A/\mu s$ | - | 55  | -   | ns |
| Reverse recovery charge <sup>2, 4)</sup>                             | $Q_{rr}$      |                                             | - | 100 | -   | nC |

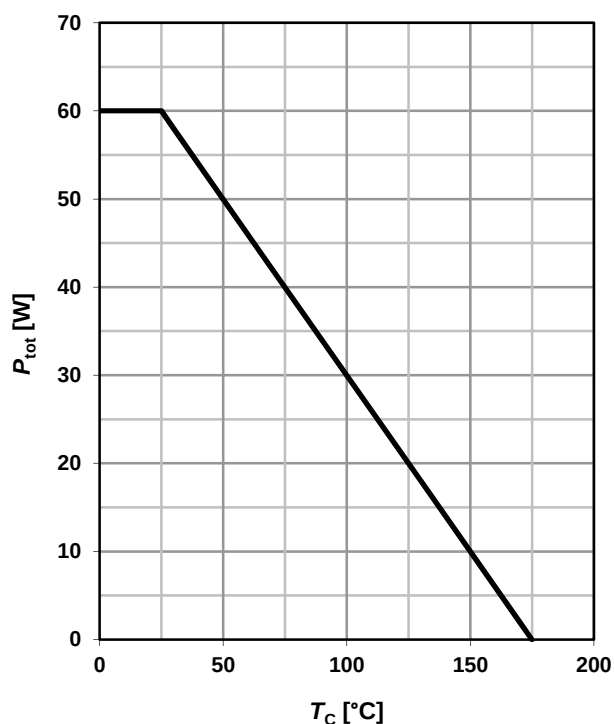
<sup>1)</sup> Current is limited by bondwire; with an  $R_{thJC} = 2.5K/W$  the chip is able to carry 36A at 25°C.

<sup>2)</sup> Specified by design. Not subject to production test.

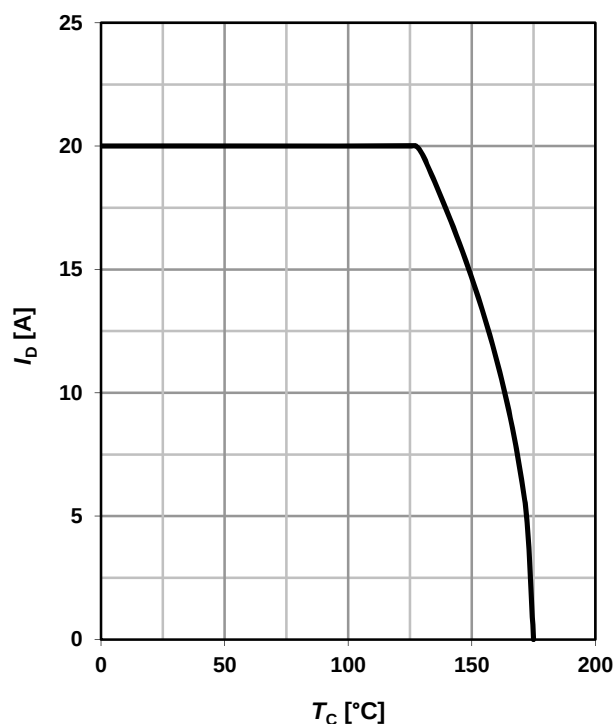
<sup>3)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

<sup>4)</sup> Per channel

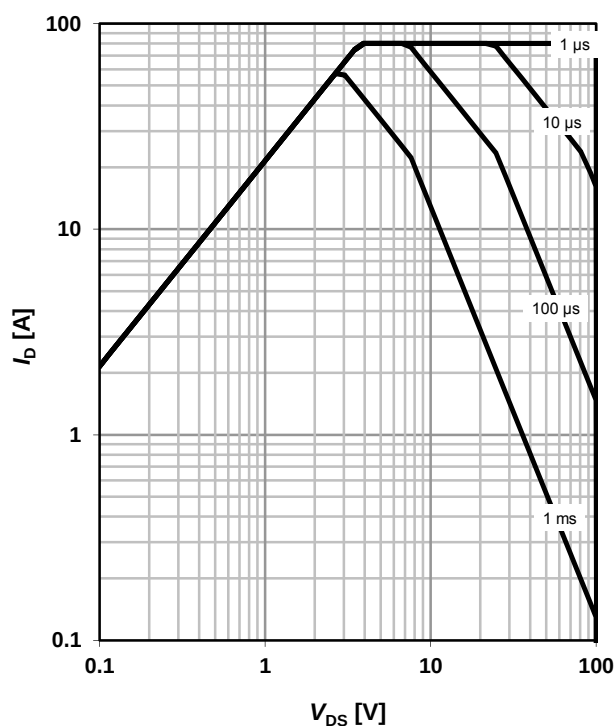
### 1 Power dissipation

 $P_{\text{tot}} = f(T_C); V_{\text{GS}} \geq 6V; \text{one channel active}$ 


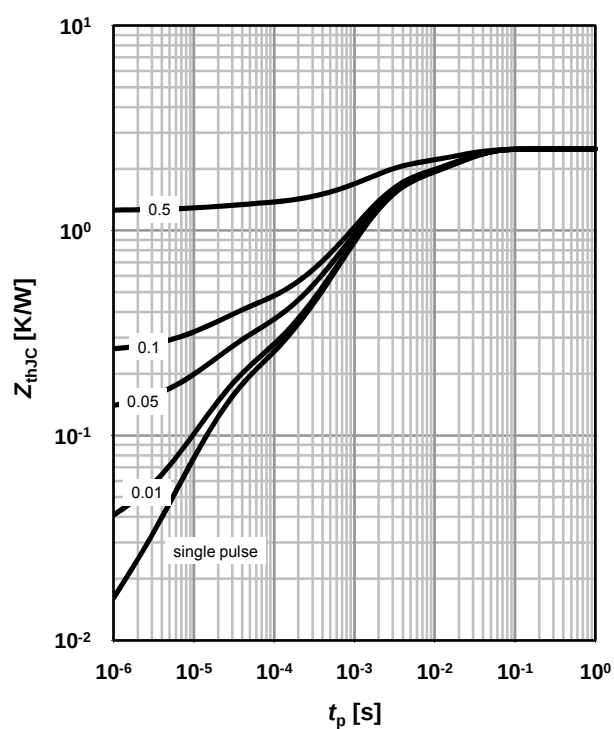
### 2 Drain current

 $I_D = f(T_C); V_{\text{GS}} \geq 6V; \text{one channel active}$ 


### 3 Safe operating area

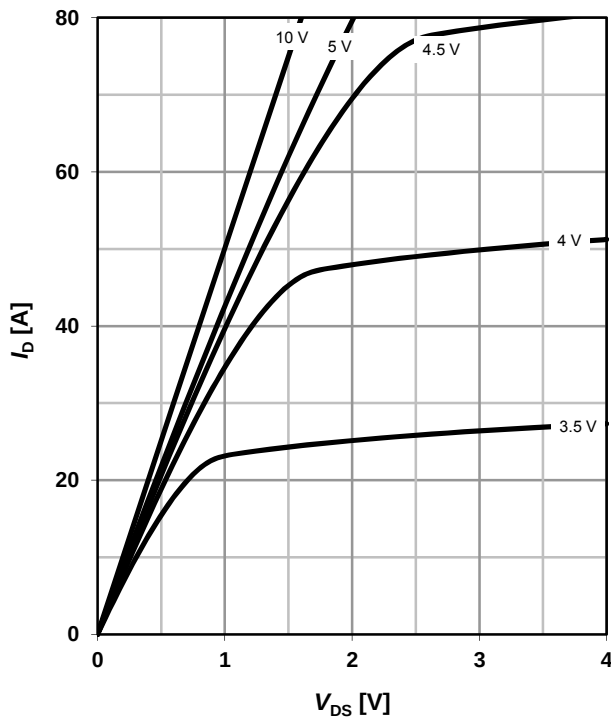
 $I_D = f(V_{\text{DS}}); T_C = 25^\circ\text{C}; D = 0; \text{one channel active}$   
parameter:  $t_p$ 


### 4 Max. transient thermal impedance

 $Z_{\text{thJC}} = f(t_p)$   
parameter:  $D = t_p/T$ 


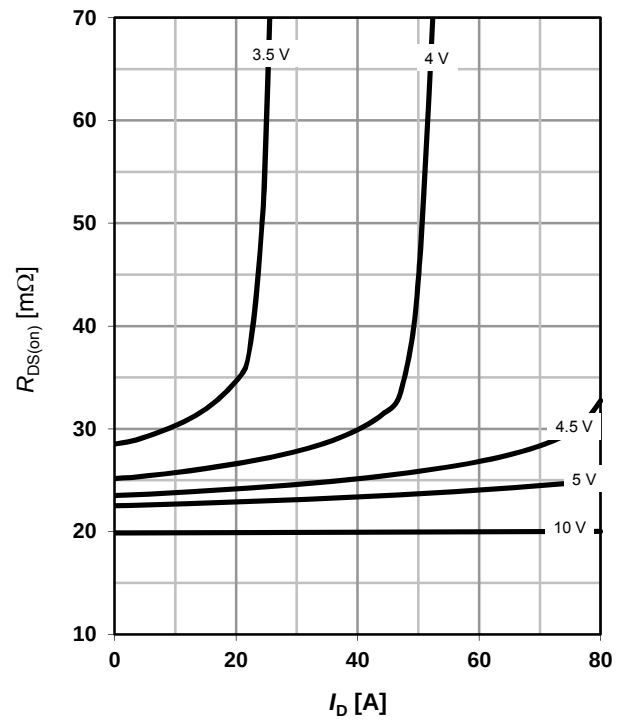
### 5 Typ. output characteristics<sup>5)</sup>

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

parameter:  $V_{GS}$ 


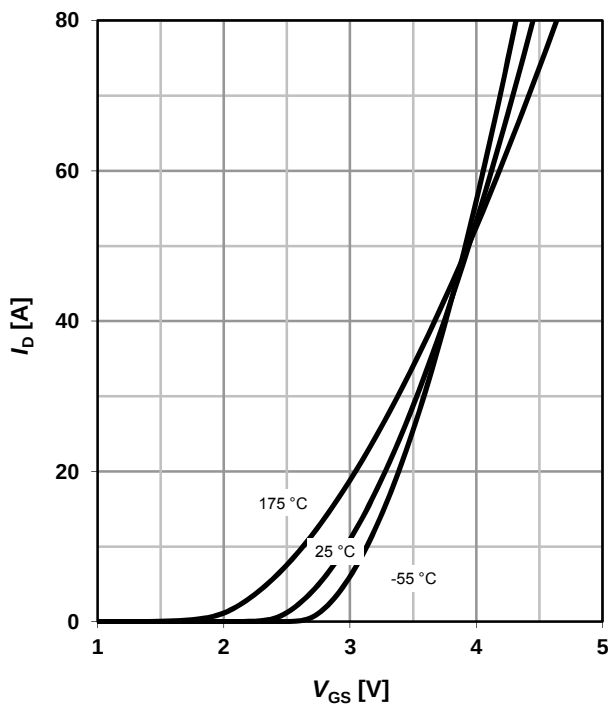
### 6 Typ. drain-source on-state resistance<sup>5)</sup>

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

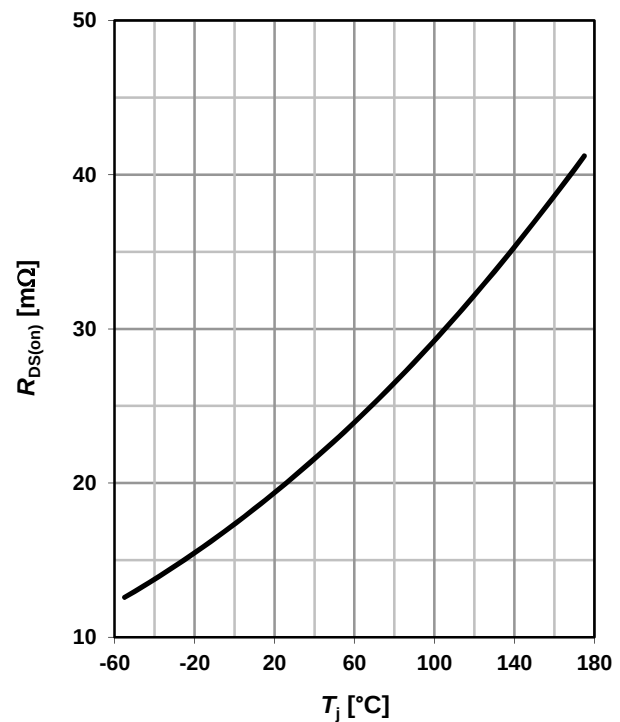
parameter:  $V_{GS}$ 


### 7 Typ. transfer characteristics<sup>5)</sup>

 $I_D = f(V_{GS}); V_{DS} = 6\text{V}$ 

parameter:  $T_j$ 


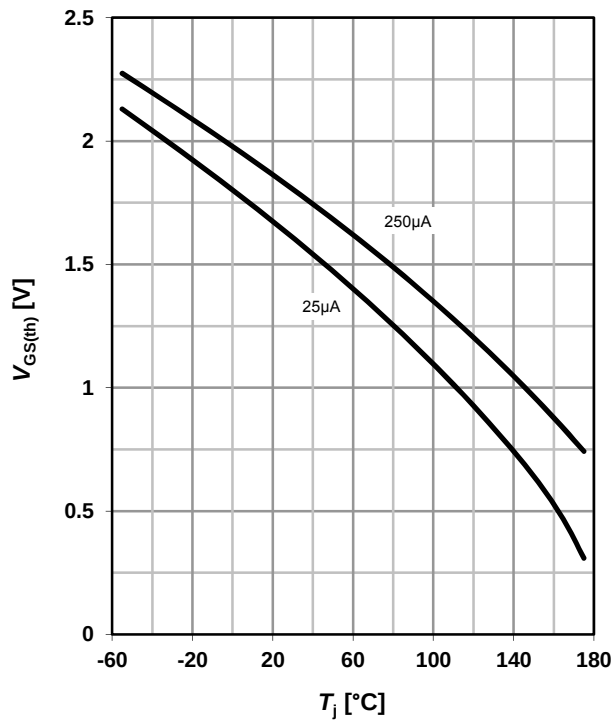
### 8 Typ. drain-source on-state resistance<sup>5)</sup>

 $R_{DS(on)} = f(T_j); I_D = 17\text{A}; V_{GS} = 10\text{V}$ 


## 9 Typ. gate threshold voltage

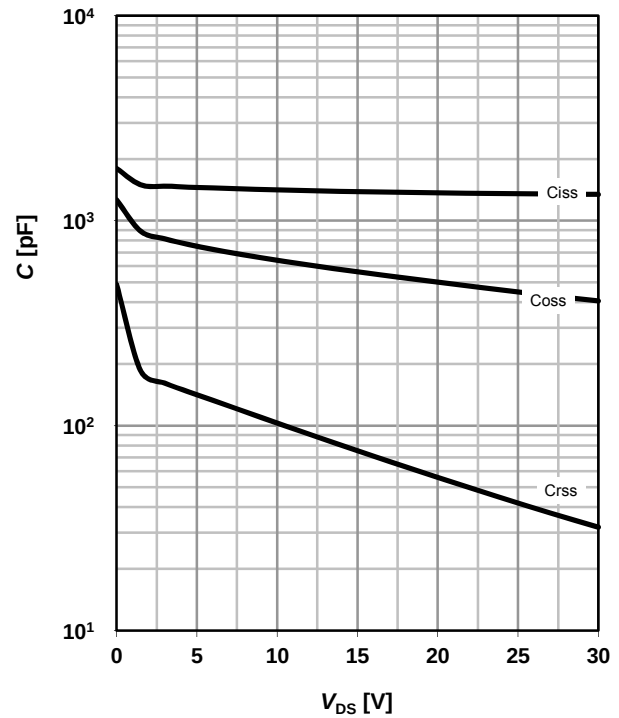
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter:  $I_D$



## 10 Typ. Capacitances<sup>5)</sup>

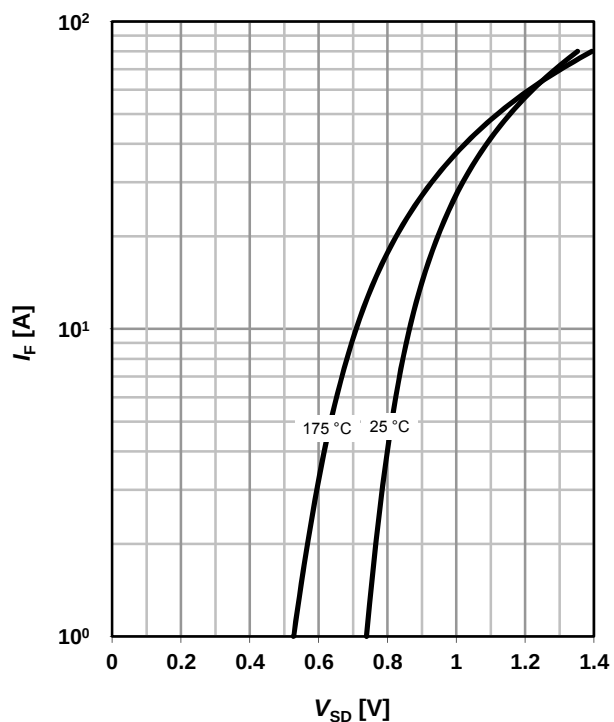
$$C = f(V_{DS}); V_{GS} = 0V; f = 1MHz$$



## 11 Typical forward diode characteristics<sup>5)</sup>

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

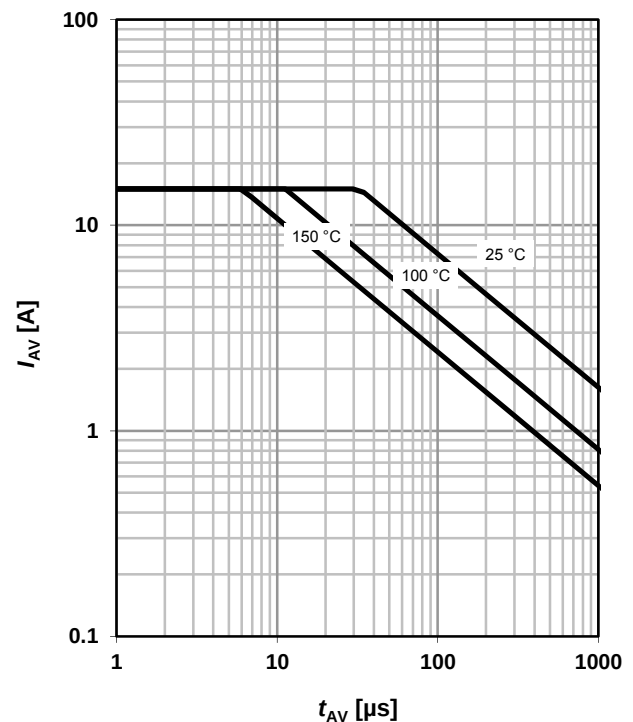
parameter:  $T_j$



## 12 Avalanche characteristics<sup>5)</sup>

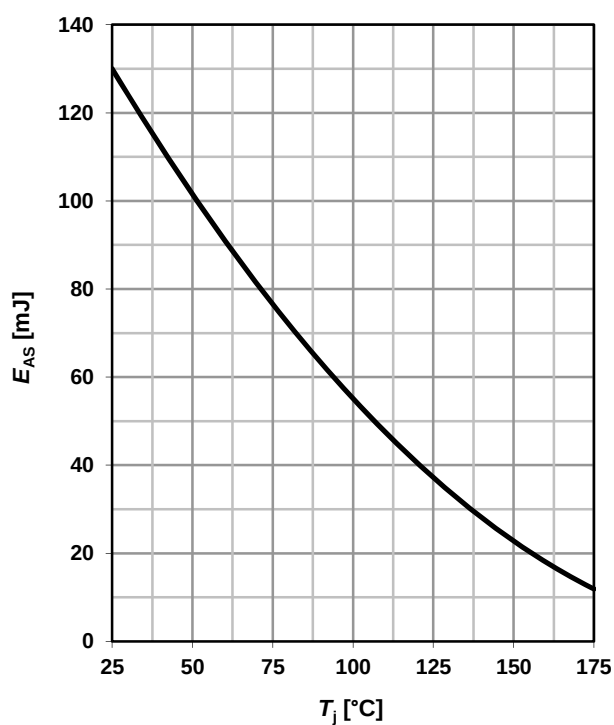
$$I_{AS} = f(t_{AV})$$

parameter:  $T_{j(start)}$



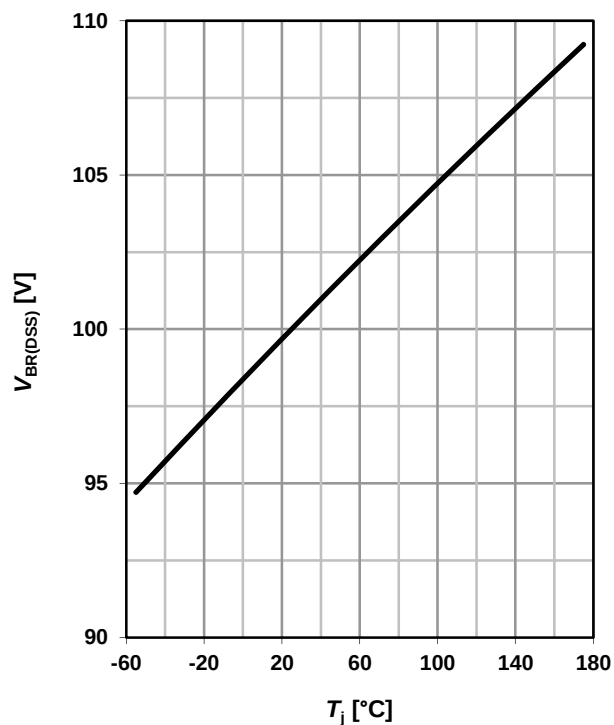
### 13 Avalanche energy<sup>5)</sup>

$$E_{AS}=f(T_j), I_D=10A$$



### 14 Drain-source breakdown voltage

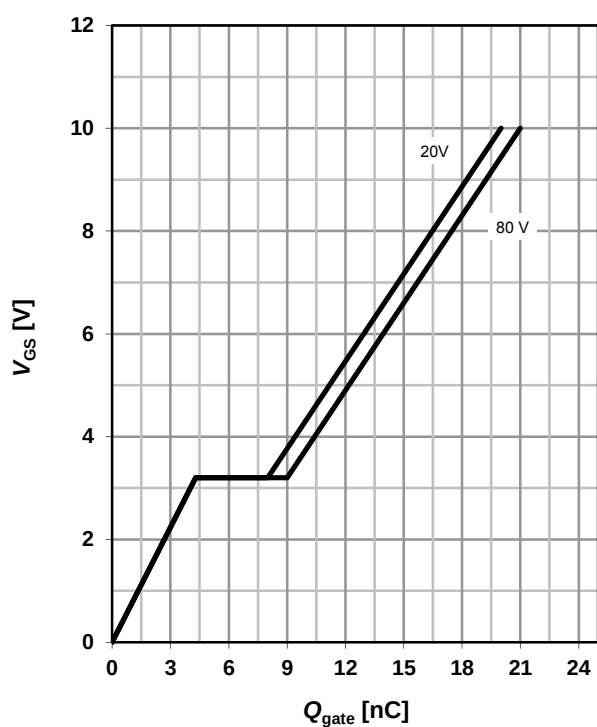
$$V_{BR(DSS)}=f(T_j); I_D=1mA$$



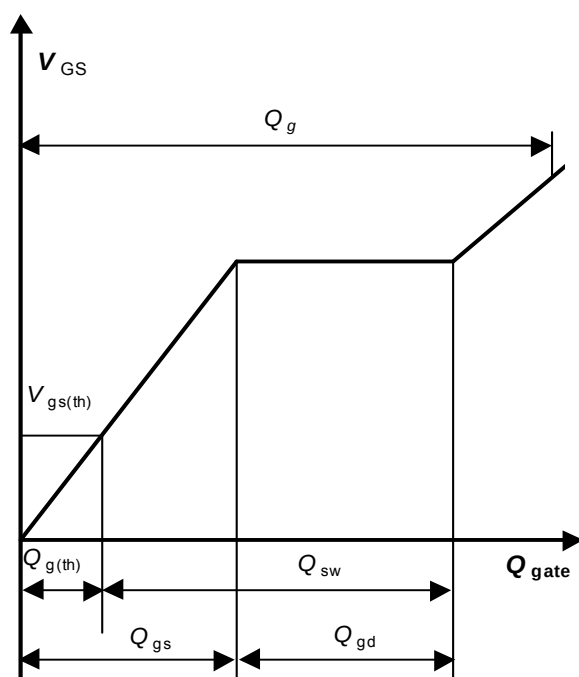
### 15 Typ. gate charge<sup>5)</sup>

$$V_{GS}=f(Q_{gate}); I_D=20A \text{ pulsed}$$

parameter:  $V_{DD}$



### 16 Gate charge waveforms



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Revision History

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| Version      | Date       | Changes          |
|--------------|------------|------------------|
| Revision 1.0 | 04.03.2013 | Final Data Sheet |
|              |            |                  |
|              |            |                  |
|              |            |                  |
|              |            |                  |