

**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>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25^\circ\text{C}$<br>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 125^\circ\text{C}$ | $I_{DSS}$     | -<br>- | 0.1<br>10 | 1<br>100 | $\mu\text{A}$ |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$                                                                                                                | $I_{GSS}$     | -      | 10        | 100      |               |
| Drain-Source on-resistance<br>$V_{GS} = 10\text{ V}$ , $I_D = 4.5\text{ A}$                                                                                                                  | $R_{DS(on)}$  | -      | 0.5       | 0.6      | $\Omega$      |

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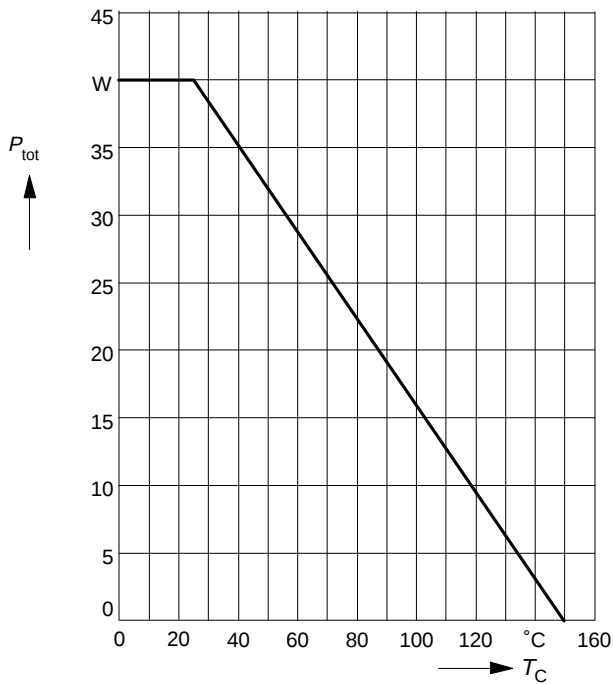
| Parameter                                                                                                                  | Symbol       | Values |      |      | Unit |
|----------------------------------------------------------------------------------------------------------------------------|--------------|--------|------|------|------|
|                                                                                                                            |              | min.   | typ. | max. |      |
| Dynamic Characteristics                                                                                                    |              |        |      |      |      |
| Transconductance<br>$V_{DS} \geq 2 * I_D * R_{DS(on)max}$ , $I_D = 4.5\text{ A}$                                           | $g_{fs}$     | 3      | 4.2  | -    | 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>$R_{GS} = 50\text{ }\Omega$  | $t_{d(on)}$  | -      | 10   | 15   | ns   |
| Rise time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\text{ }\Omega$           | $t_r$        | -      | 40   | 60   |      |
| Turn-off delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\text{ }\Omega$ | $t_{d(off)}$ | -      | 55   | 75   |      |
| Fall time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\text{ }\Omega$           | $t_f$        | -      | 30   | 40   |      |

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| Parameter                                                                                          | Symbol   | Values |      |      | Unit          |
|----------------------------------------------------------------------------------------------------|----------|--------|------|------|---------------|
|                                                                                                    |          | min.   | typ. | max. |               |
| Reverse Diode                                                                                      |          |        |      |      |               |
| Inverse diode continuous forward current<br>$T_C = 25\text{ }^{\circ}\text{C}$                     | $I_S$    | -      | -    | 5.5  | A             |
| Inverse diode direct current,pulsed<br>$T_C = 25\text{ }^{\circ}\text{C}$                          | $I_{SM}$ | -      | -    | 22   |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}$ , $I_F = 14\text{ A}$                       | $V_{SD}$ | -      | 1.3  | 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  | -    | $\mu\text{C}$ |

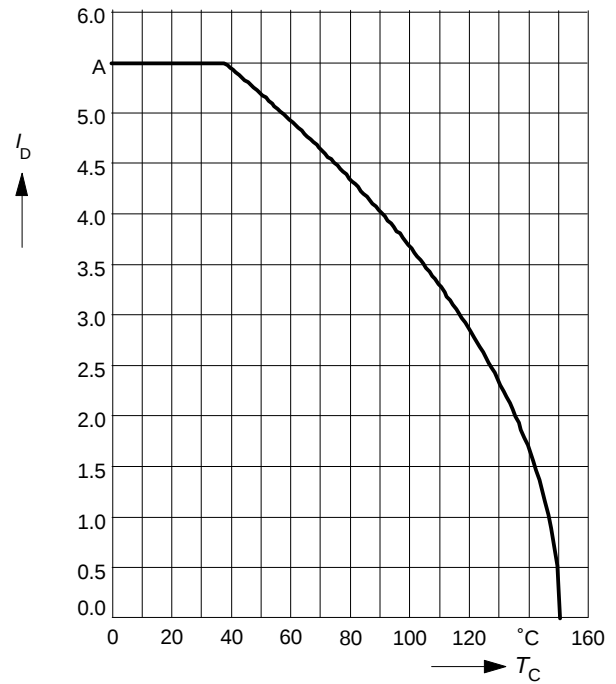
**Power dissipation**

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


**Drain current**

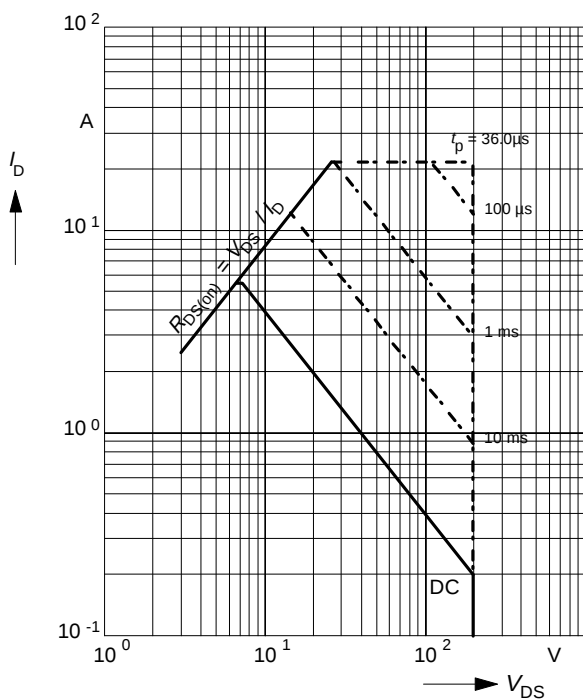
$$I_D = f(T_C)$$

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


**Safe operating area**

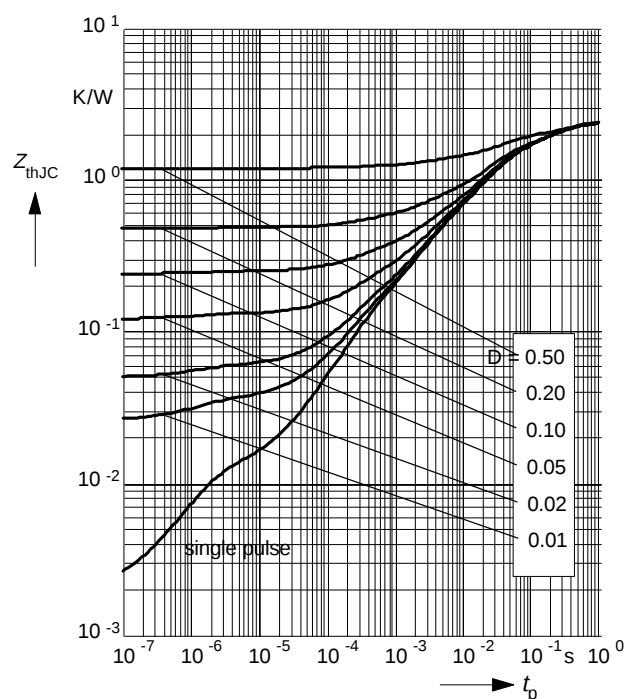
$$I_D = f(V_{DS})$$

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


**Transient thermal impedance**

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

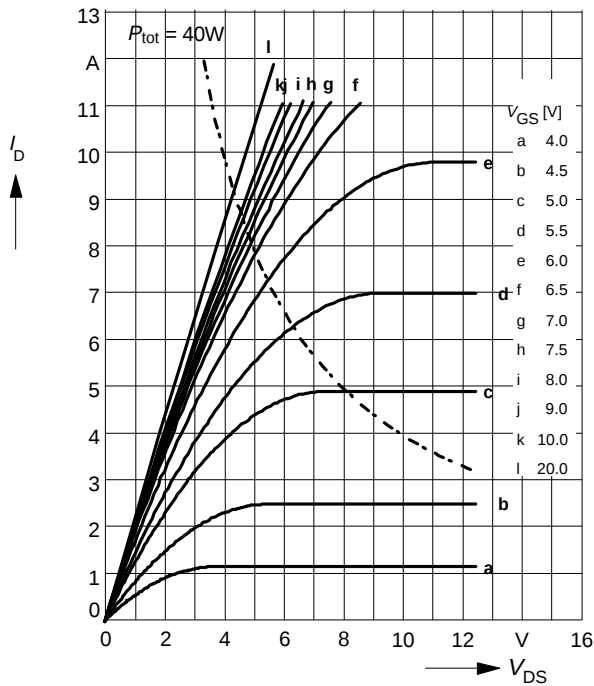
parameter:  $D = t_p / T$



**Typ. output characteristics**

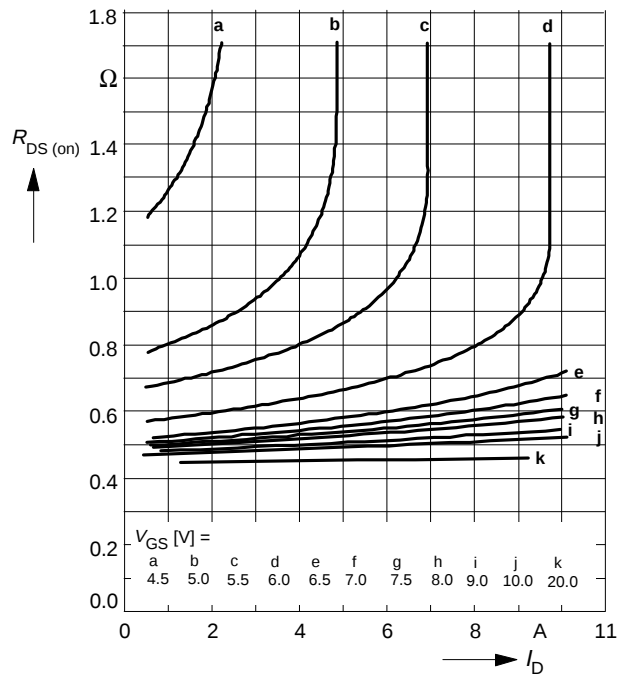
$$I_D = f(V_{DS})$$

parameter:  $t_p = 80 \mu s$


**Typ. drain-source on-resistance**

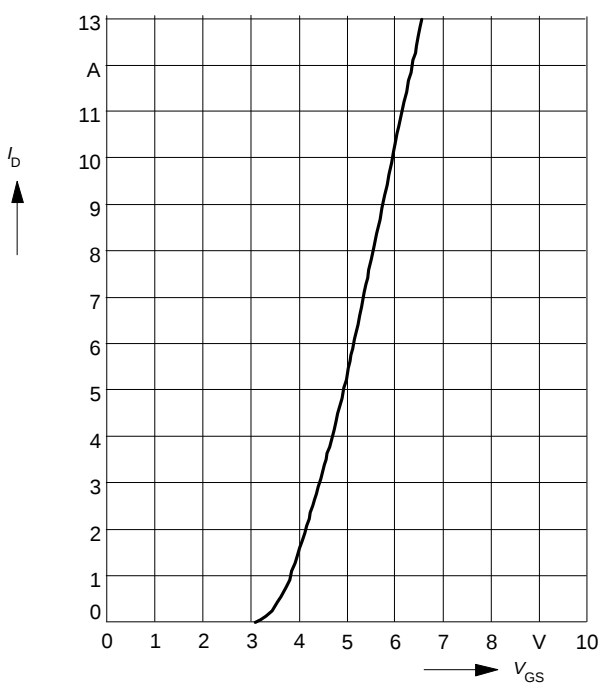
$$R_{DS(on)} = f(I_D)$$

parameter:  $V_{GS}$


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

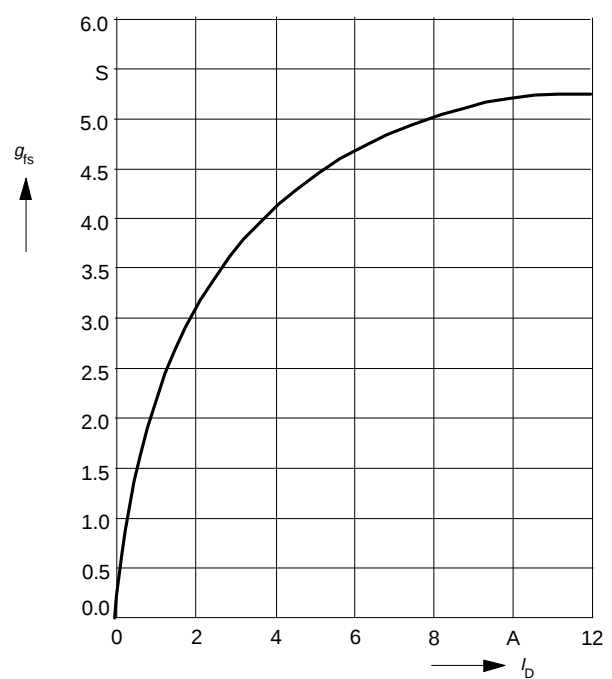
parameter:  $t_p = 80 \mu s$

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


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

parameter:  $t_p = 80 \mu s$ ,

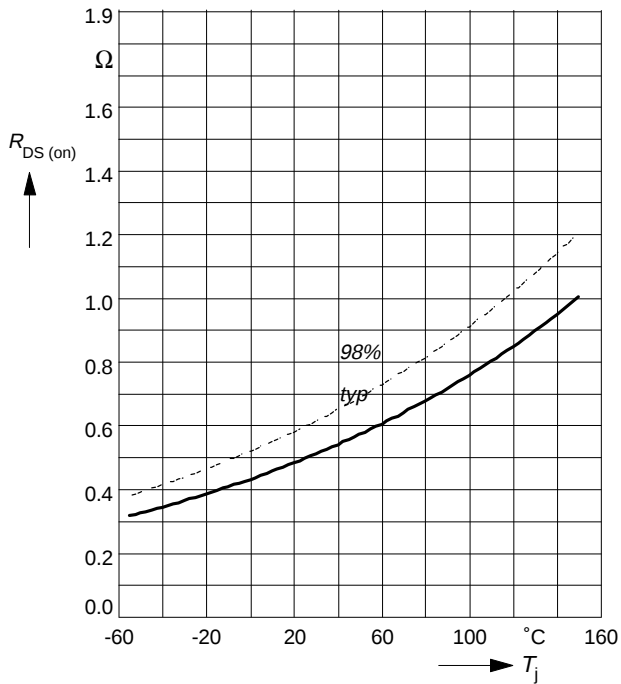
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



**Drain-source on-resistance**

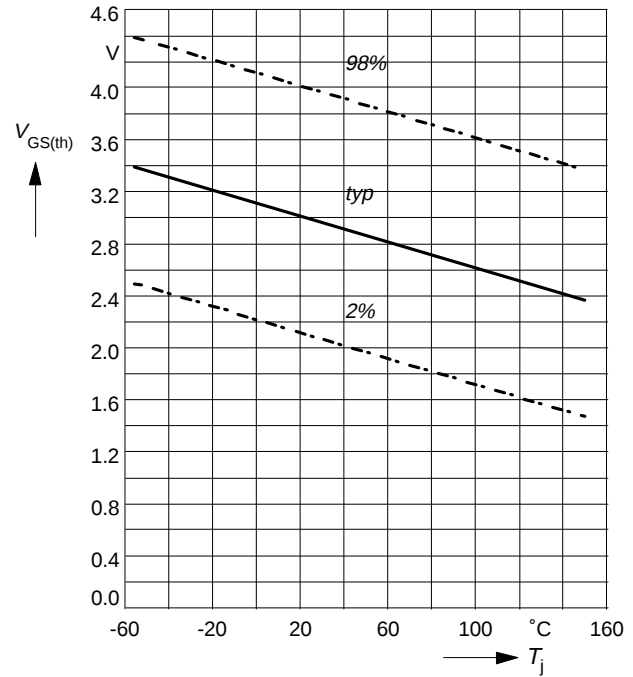
$$R_{DS(on)} = f(T_j)$$

parameter:  $I_D = 4.5 \text{ A}$ ,  $V_{GS} = 10 \text{ V}$


**Gate threshold voltage**

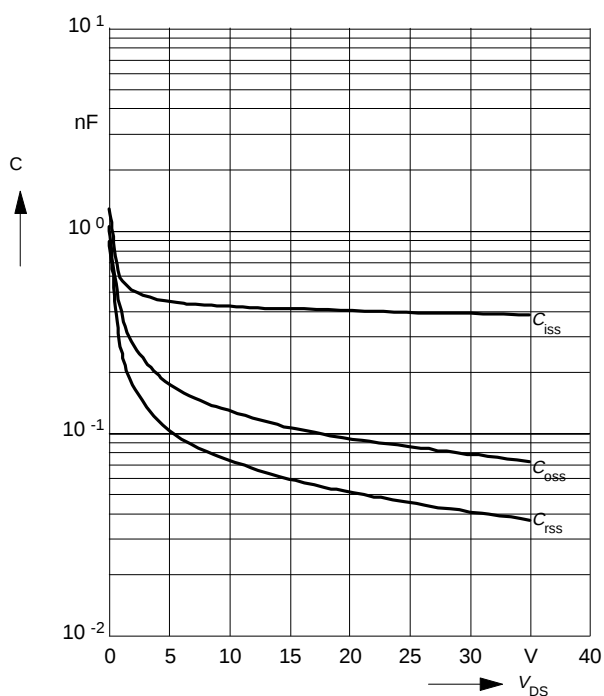
$$V_{GS(th)} = f(T_j)$$

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


**Typ. capacitances**

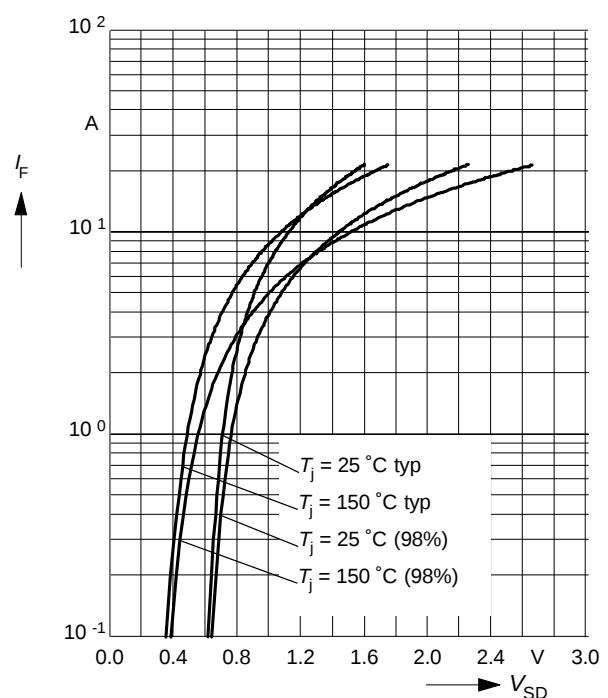
$$C = f(V_{DS})$$

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

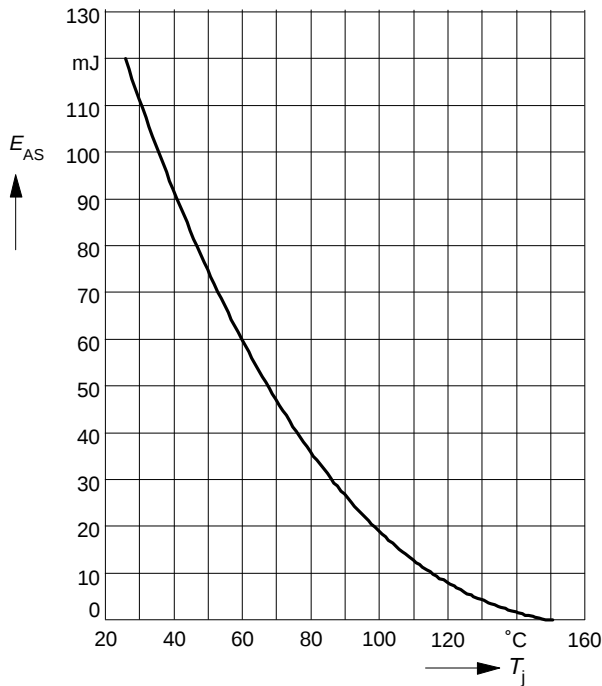

**Forward characteristics of reverse diode**

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

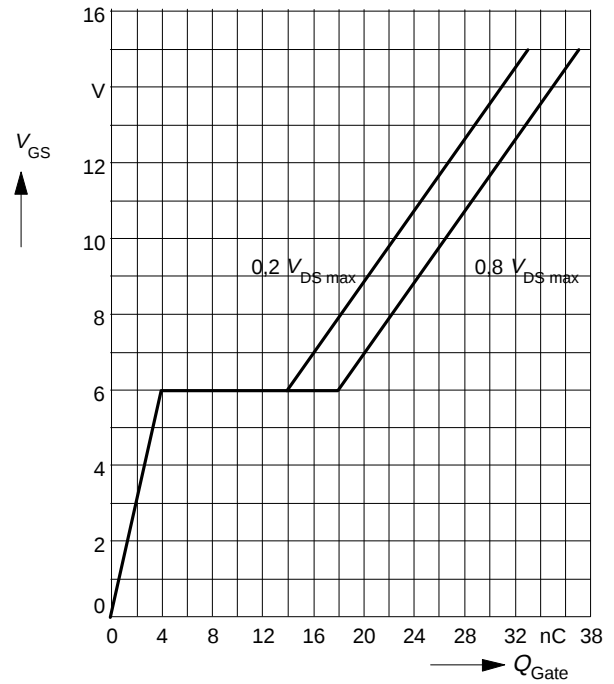
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



**Avalanche energy**  $E_{AS} = f(T_j)$   
 parameter:  $I_D = 7\text{ A}$ ,  $V_{DD} = 50\text{ V}$   
 $R_{GS} = 25\ \Omega$ ,  $L = 3.67\text{ mH}$



**Typ. gate charge**  
 $V_{GS} = f(Q_{Gate})$   
 parameter:  $I_{D\text{ puls}} = 14\text{ A}$



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

