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OptiMOS™-5 Power-Transistor

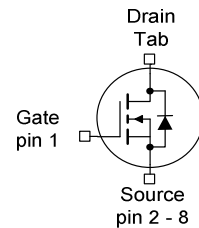
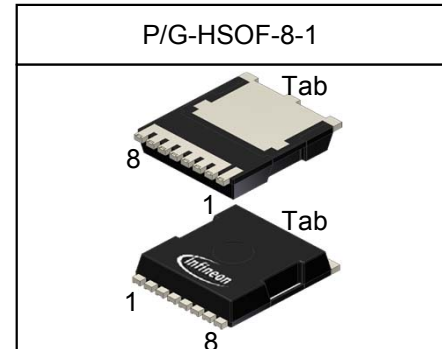
Features

- N-channel - Enhancement mode
- AEC qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green product (RoHS compliant)
- Ultra low Rds(on)
- 100% Avalanche tested

| Type | Package | Marking |
|------------------|--------------|---------|
| IAUT260N10S5N019 | P/G-HSOF-8-1 | 5N10019 |

Product Summary

| | | |
|--------------|-----|----|
| V_{DS} | 100 | V |
| $R_{DS(on)}$ | 1.9 | mΩ |
| I_D | 260 | A |


Maximum ratings, at $T_j=25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|--|----------------|--|--------------|------|
| Continuous drain current | I_D | $T_C=25\text{ °C}$, $V_{GS}=10\text{V}$ | 260 | A |
| | | $T_C=100\text{ °C}$, $V_{GS}=10\text{ V}^{1)}$ | 197 | |
| Pulsed drain current ¹⁾ | $I_{D,pulse}$ | $T_C=25\text{ °C}$ | 1040 | |
| Avalanche energy, single pulse ¹⁾ | E_{AS} | $I_D=130\text{ A}$ | 400 | mJ |
| Avalanche current, single pulse | I_{AS} | - | 260 | A |
| Gate source voltage | V_{GS} | - | ±20 | V |
| Power dissipation | P_{tot} | $T_C=25\text{ °C}$ | 300 | W |
| Operating and storage temperature | T_j, T_{stg} | - | -55 ... +175 | °C |
| IEC climatic category; DIN IEC 68-1 | - | - | 55/175/56 | |

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|------------|------------|--------|------|------|------|
| | | | min. | typ. | max. | |
| Thermal characteristics¹⁾ | | | | | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | - | 0.5 | K/W |

Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified
Static characteristics

| | | | | | | |
|----------------------------------|---------------|---|-----|-----|-----|---------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$ | 100 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}$, $I_D=210\text{ }\mu\text{A}$ | 2.2 | 3.0 | 3.8 | |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ | - | 0.1 | 1 | μA |
| | | $V_{DS}=50\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=85\text{ °C}^{1)}$ | - | 1 | 20 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$ | - | - | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=6\text{ V}$, $I_D=75\text{ A}$ | - | 2.0 | 2.5 | m Ω |
| | | $V_{GS}=10\text{ V}$, $I_D=100\text{ A}$ | - | 1.6 | 1.9 | |

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

Dynamic characteristics¹⁾

| | | | | | | |
|------------------------------|--------------|--|---|------|-------|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=50\text{ V},$ $f=1\text{ MHz}$ | - | 9100 | 11830 | pF |
| Output capacitance | C_{oss} | | - | 1462 | 1900 | |
| Reverse transfer capacitance | C_{rss} | | - | 61 | 92 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=50\text{ V}, V_{GS}=10\text{ V},$ $I_D=100\text{ A}, R_G=3.5\ \Omega$ | - | 21 | - | ns |
| Rise time | t_r | | - | 11 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 49 | - | |
| Fall time | t_f | | - | 38 | - | |

Gate Charge Characteristics¹⁾

| | | | | | | |
|-----------------------|---------------|---|---|-----|-----|----|
| Gate to source charge | Q_{gs} | $V_{DD}=50\text{ V}, I_D=100\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$ | - | 41 | 54 | nC |
| Gate to drain charge | Q_{gd} | | - | 28 | 42 | |
| Gate charge total | Q_g | | - | 128 | 166 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 4.8 | - | V |

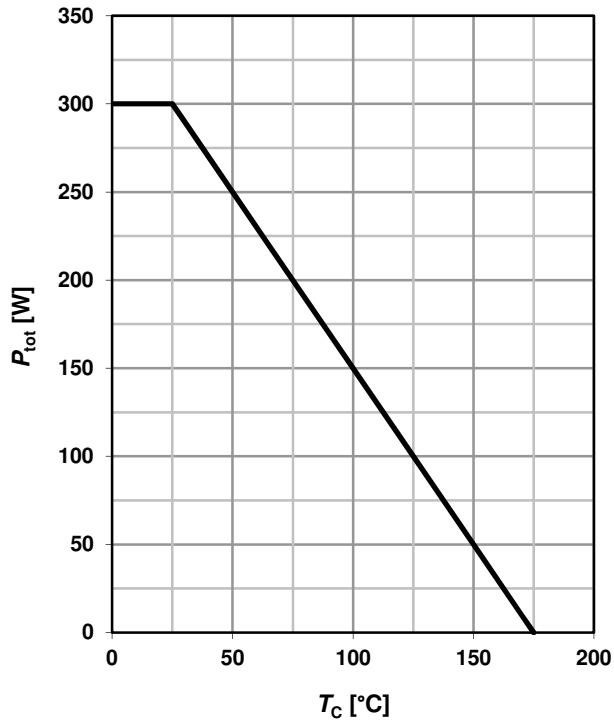
Reverse Diode

| | | | | | | |
|--|---------------|---|---|-----|------|----|
| Diode continuous forward current ¹⁾ | I_S | $T_C=25\text{ }^\circ\text{C}$ | - | - | 260 | A |
| Diode pulse current ¹⁾ | $I_{S,pulse}$ | | - | - | 1040 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=100\text{ A},$ $T_J=25\text{ }^\circ\text{C}$ | - | 0.9 | 1.3 | V |
| Reverse recovery time ¹⁾ | t_{rr} | $V_R=50\text{ V}, I_F=50\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 80 | - | ns |
| Reverse recovery charge ¹⁾ | Q_{rr} | | - | 180 | - | nC |

¹⁾ Defined by design. Not subject to production test.

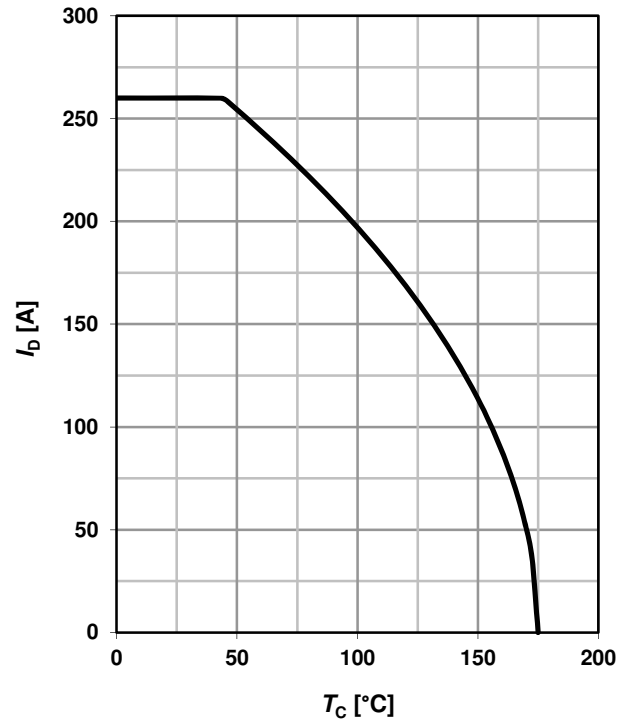
1 Power dissipation

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



2 Drain current

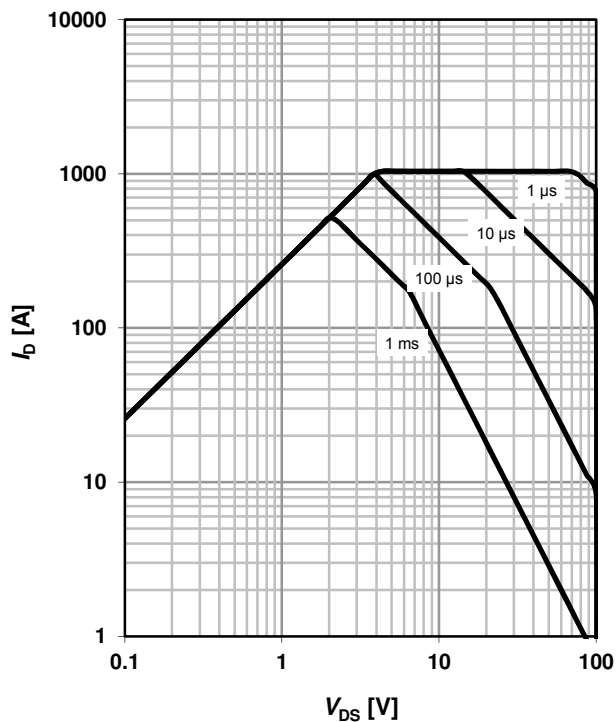
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{\text{DS}}); T_C = 25 \text{ °C}; D = 0$$

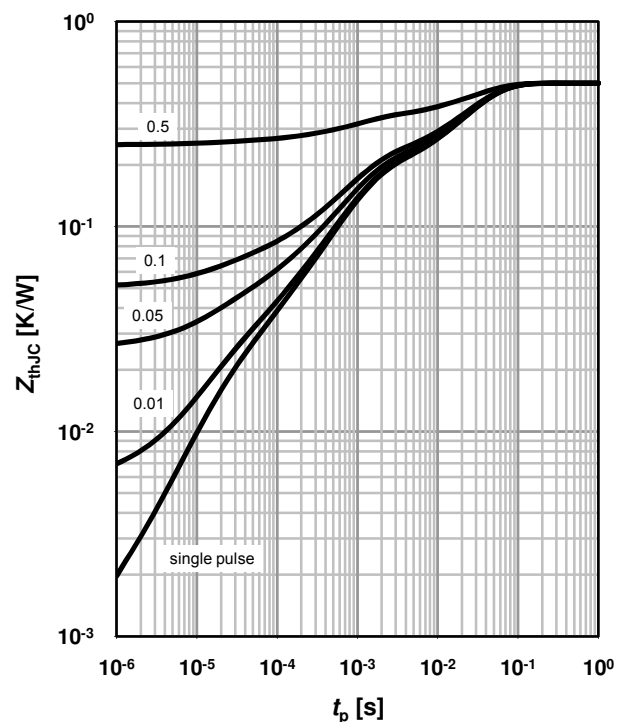
parameter: t_p



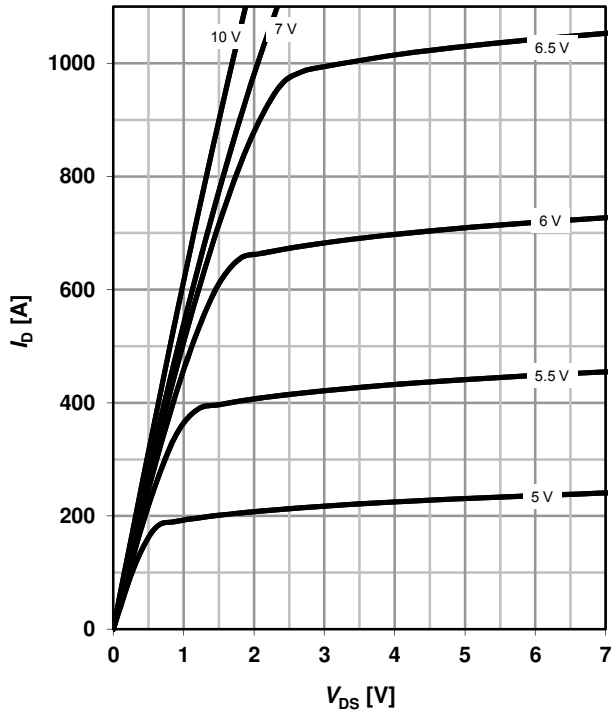
4 Max. transient thermal impedance

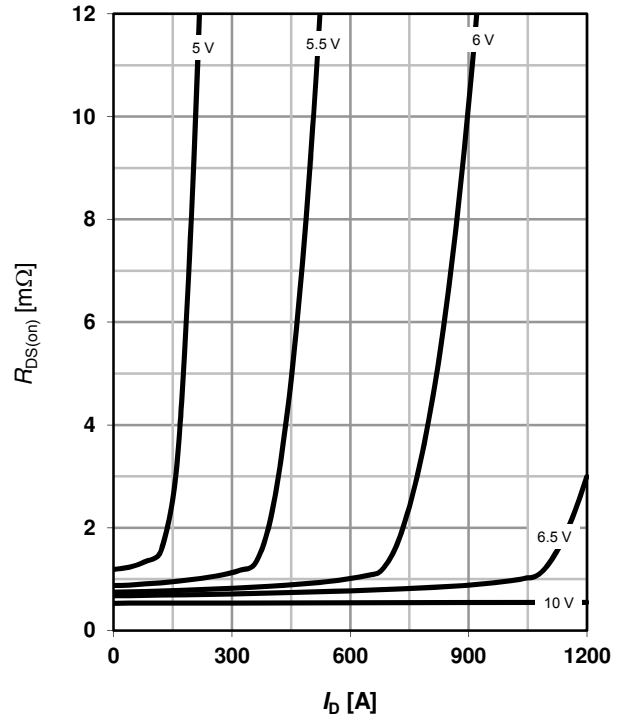
$$Z_{\text{thJC}} = f(t_p)$$

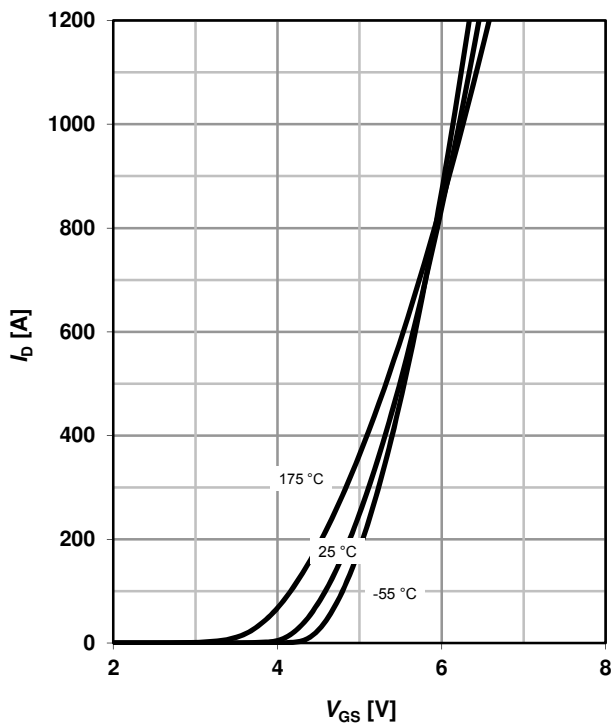
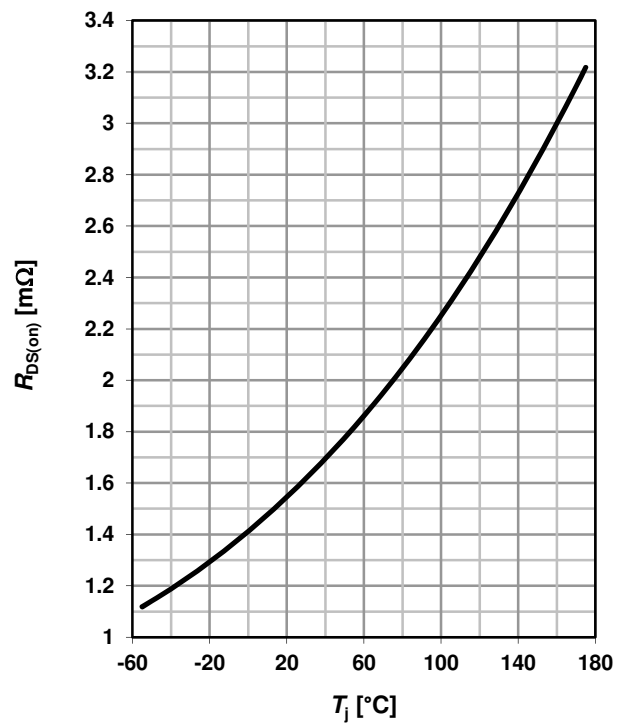
parameter: $D = t_p/T$



5 Typ. output characteristics
 $I_D = f(V_{DS}); T_j = 25\text{ °C}$

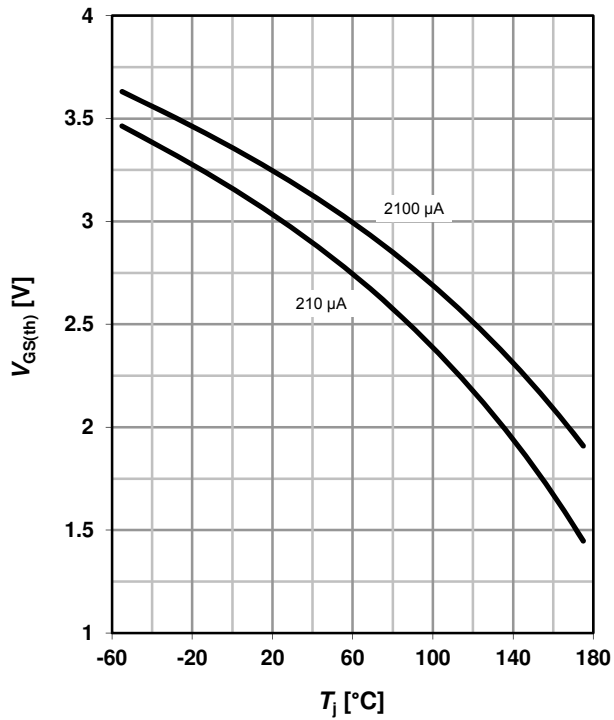
 parameter: V_{GS}

6 Typ. drain-source on-state resistance
 $R_{DS(on)} = f(I_D); T_j = 25\text{ °C}$

 parameter: V_{GS}

7 Typ. transfer characteristics
 $I_D = f(V_{GS}); V_{DS} = 6\text{ V}$

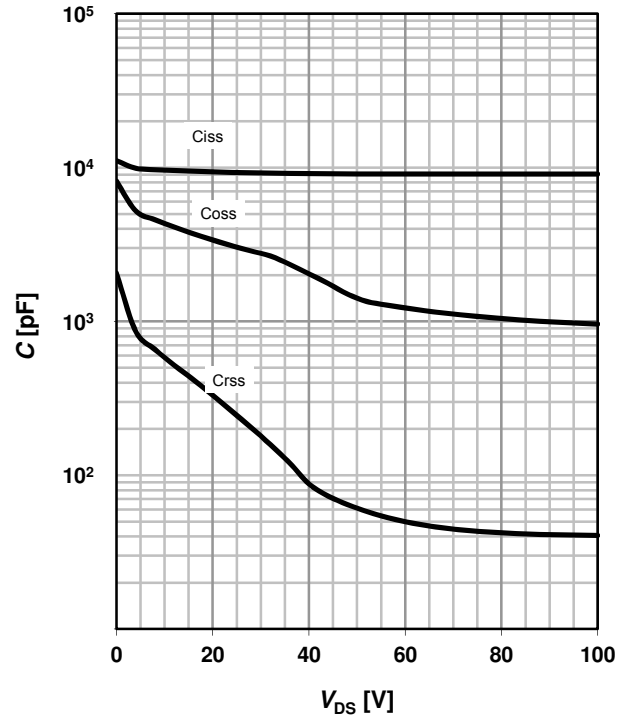
 parameter: T_j

8 Typ. drain-source on-state resistance
 $R_{DS(on)} = f(T_j); I_D = 100\text{ A}; V_{GS} = 10\text{ V}$


9 Typ. gate threshold voltage

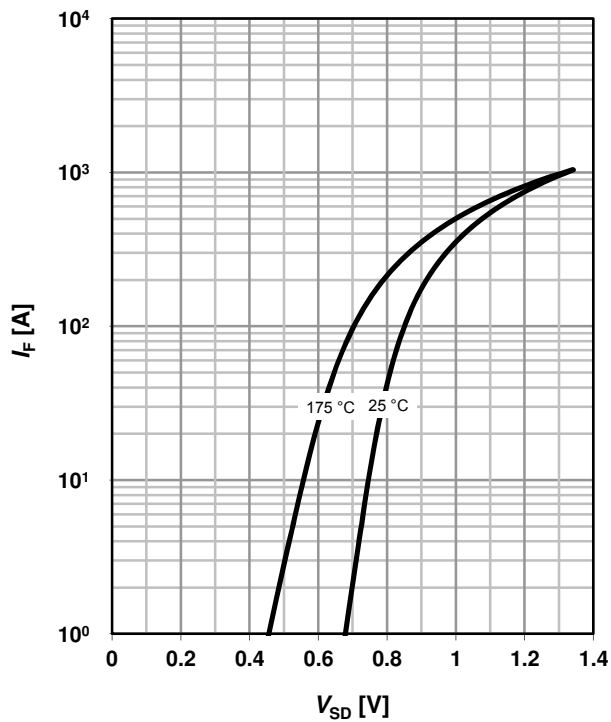
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

 parameter: I_D

10 Typ. capacitances

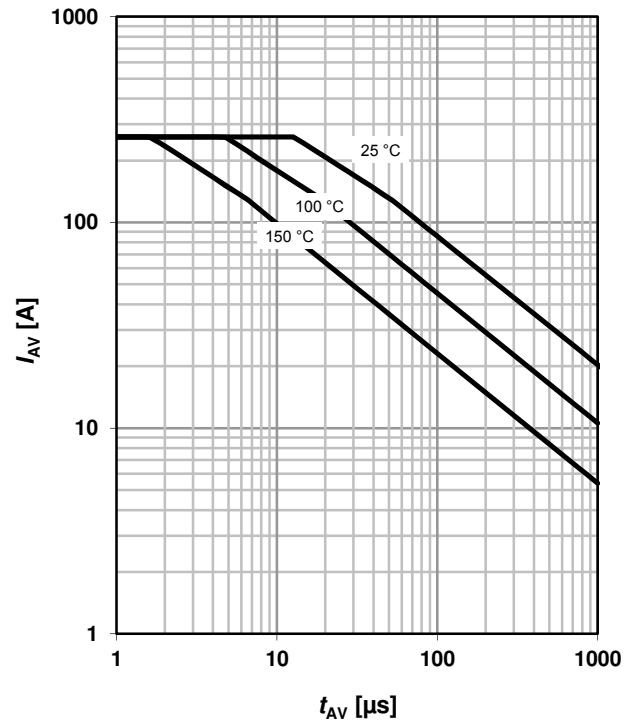
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$$


11 Typical forward diode characteristics

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

 parameter: T_j

12 Typ. avalanche characteristics

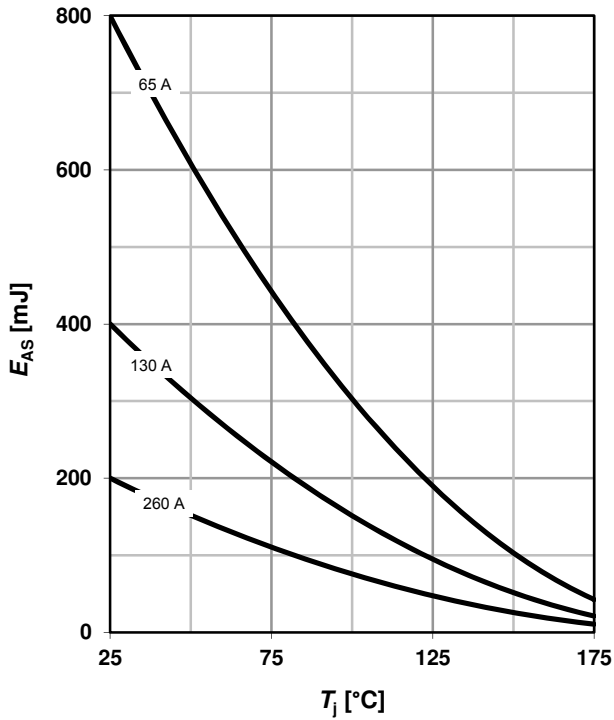
$$I_{AS} = f(t_{AV})$$

 parameter: $T_{j(start)}$


13 Typical avalanche energy

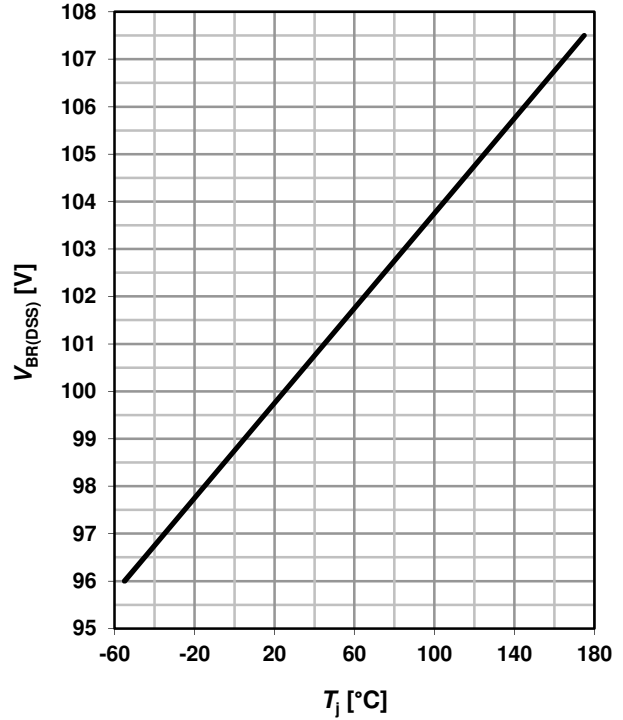
$E_{AS} = f(T_j)$

parameter: I_D



14 Drain-source breakdown voltage

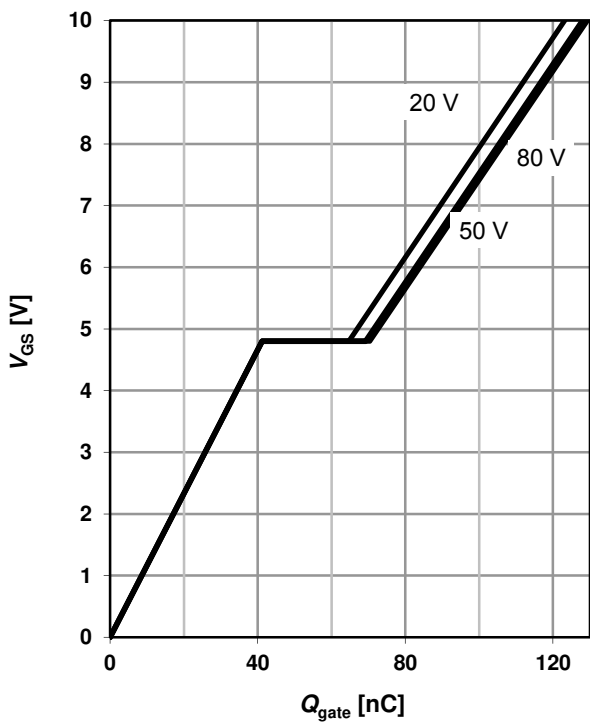
$V_{BR(DSS)} = f(T_j); I_{D_typ} = 1 \text{ mA}$



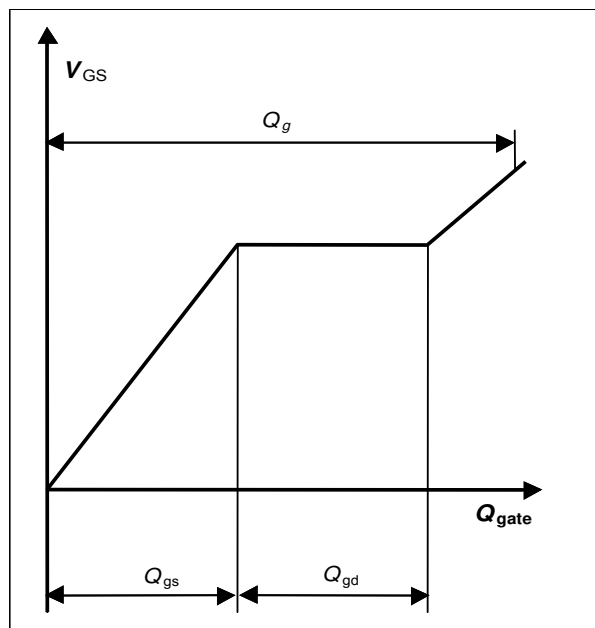
15 Typ. gate charge

$V_{GS} = f(Q_{gate}); I_D = 100 \text{ A pulsed}$

parameter: V_{DD}



16 Gate charge waveforms



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If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

Revision History

| Version | Date | Changes |
|-------------|------------|------------------|
| Version 1.0 | 2017-10-02 | Final Data Sheet |