

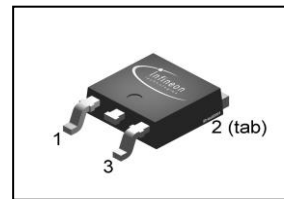
OptiMOS®-T Power-Transistor

Product Summary

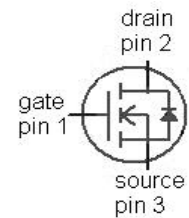
| | | |
|------------------|-----|------------|
| V_{DS} | 120 | V |
| $R_{DS(on),max}$ | 31 | m Ω |
| I_D | 30 | A |

Features

- OptiMOS™ - power MOSFET for automotive applications
- N-channel - Enhancement mode
- Automotive AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green product (RoHS compliant)
- 100% Avalanche tested

PG-TO252-3-11


| Type | Package | Marking |
|----------------|---------------|---------|
| IPD30N12S3L-31 | PG-TO252-3-11 | 3N12L31 |


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

| Parameter | Symbol | Conditions | Value | Unit |
|--|----------------|---|--------------|------------------|
| Continuous drain current | I_D | $T_C=25^\circ\text{C}, V_{GS}=10\text{V}$ | 30 | A |
| | | $T_C=100^\circ\text{C}, V_{GS}=10\text{V}^{1)}$ | 20 | |
| Pulsed drain current ¹⁾ | $I_{D,pulse}$ | $T_C=25^\circ\text{C}$ | 120 | |
| Avalanche energy, single pulse ¹⁾ | E_{AS} | $I_D=15\text{A}$ | 138 | mJ |
| Avalanche current, single pulse | I_{AS} | - | 30 | A |
| Gate source voltage | V_{GS} | - | ± 20 | V |
| Power dissipation | P_{tot} | $T_C=25^\circ\text{C}$ | 57 | W |
| Operating and storage temperature | T_j, T_{stg} | - | -55 ... +175 | $^\circ\text{C}$ |

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|------------|--|--------|------|------|------|
| | | | min. | typ. | max. | |
| Thermal characteristics¹⁾ | | | | | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | - | 2.6 | K/W |
| SMD version, device on PCB | R_{thJA} | minimal footprint | - | - | 62 | |
| | | 6 cm ² cooling area ²⁾ | - | - | 40 | |

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

Static characteristics

| | | | | | | |
|----------------------------------|---------------|--|-----|------|-----|---------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=1\text{mA}$ | 120 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=29\mu\text{A}$ | 1.2 | 1.7 | 2.4 | |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=120V, V_{GS}=0V, T_j=25^\circ\text{C}$ | - | 0.01 | 0.1 | μA |
| | | $V_{DS}=120V, V_{GS}=0V, T_j=125^\circ\text{C}^{1)}$ | - | 1 | 10 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=20V, V_{DS}=0V$ | - | - | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=30A$ | - | 32 | 42 | m Ω |
| | | $V_{GS}=10V, I_D=30A$ | - | 26 | 31 | |

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

Dynamic characteristics¹⁾

| | | | | | | |
|------------------------------|--------------|---|---|------|------|----|
| Input capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=25V,$ $f=1MHz$ | - | 1520 | 1976 | pF |
| Output capacitance | C_{oss} | | - | 380 | 494 | |
| Reverse transfer capacitance | C_{rss} | | - | 45 | 68 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=20V, V_{GS}=10V,$ $I_D=30A, R_G=3.5\Omega$ | - | 6 | - | ns |
| Rise time | t_r | | - | 4 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 18 | - | |
| Fall time | t_f | | - | 3 | - | |

Gate Charge Characteristics¹⁾

| | | | | | | |
|-----------------------|---------------|---|---|-----|----|----|
| Gate to source charge | Q_{gs} | $V_{DD}=96V, I_D=30A,$ $V_{GS}=0$ to 10V | - | 5 | 7 | nC |
| Gate to drain charge | Q_{gd} | | - | 4 | 6 | |
| Gate charge total | Q_g | | - | 24 | 31 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 3.7 | - | V |

Reverse Diode

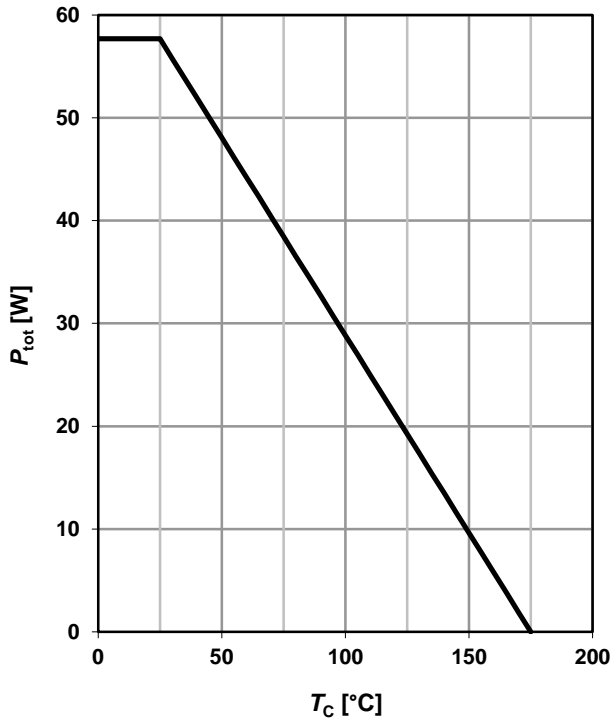
| | | | | | | |
|--|---------------|---|-----|-----|-----|----|
| Diode continuous forward current ¹⁾ | I_S | $T_C=25^\circ C$ | - | - | 30 | A |
| Diode pulse current ¹⁾ | $I_{S,pulse}$ | | - | - | 120 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0V, I_F=30A,$ $T_j=25^\circ C$ | 0.6 | 1 | 1.2 | V |
| Reverse recovery time ¹⁾ | t_{rr} | $V_R=60V, I_F=I_S,$ $di_F/dt=100A/\mu s$ | - | 72 | - | ns |
| Reverse recovery charge ¹⁾ | Q_{rr} | | - | 150 | - | |

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

²⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

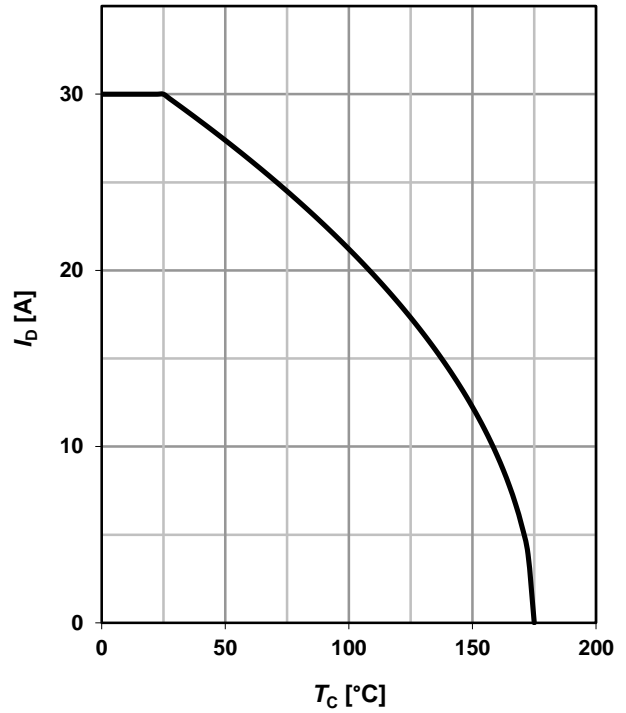
1 Power dissipation

$P_{tot} = f(T_C); V_{GS} = 10\text{ V}$



2 Drain current

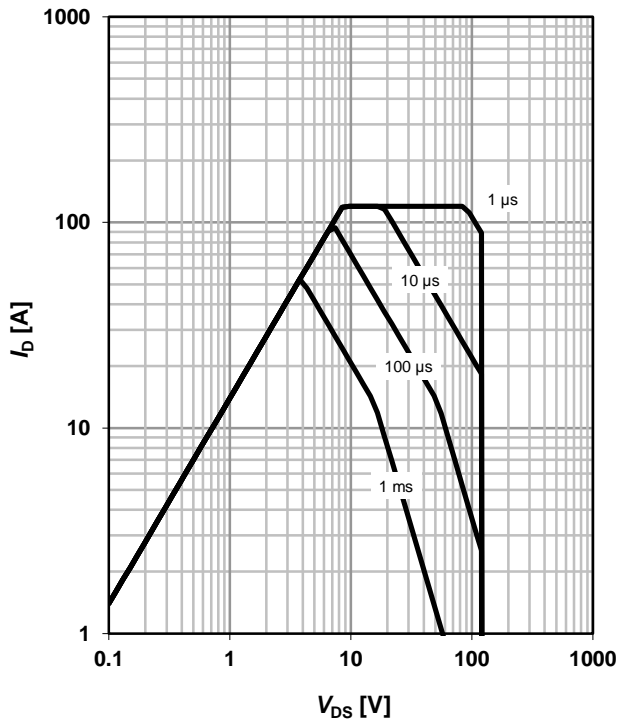
$I_D = f(T_C); V_{GS} = 10\text{ V}$



3 Safe operating area

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

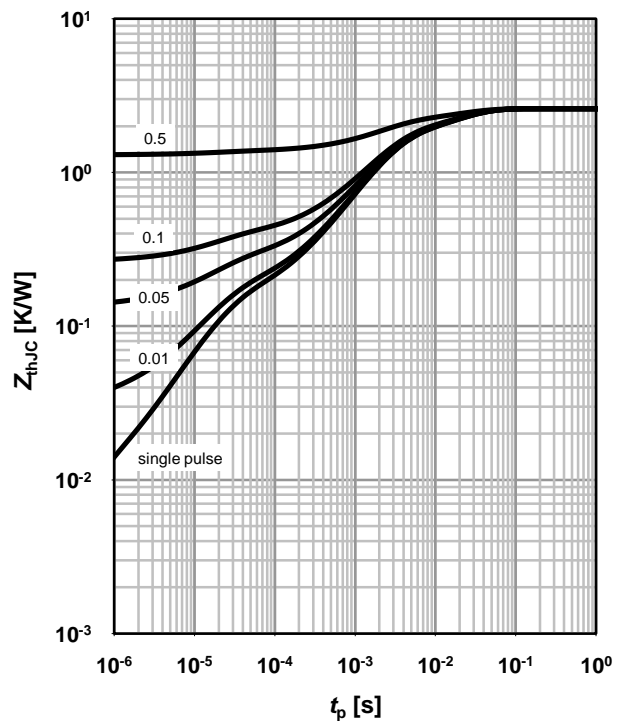
parameter: t_p



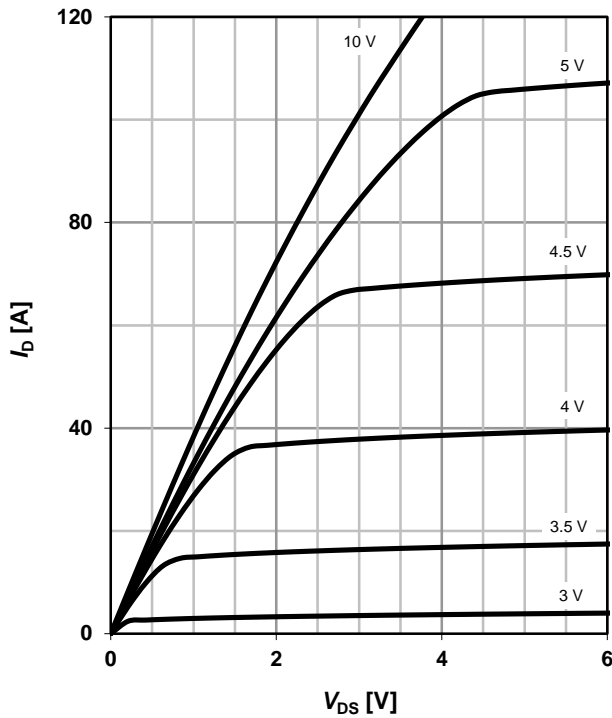
4 Max. transient thermal impedance

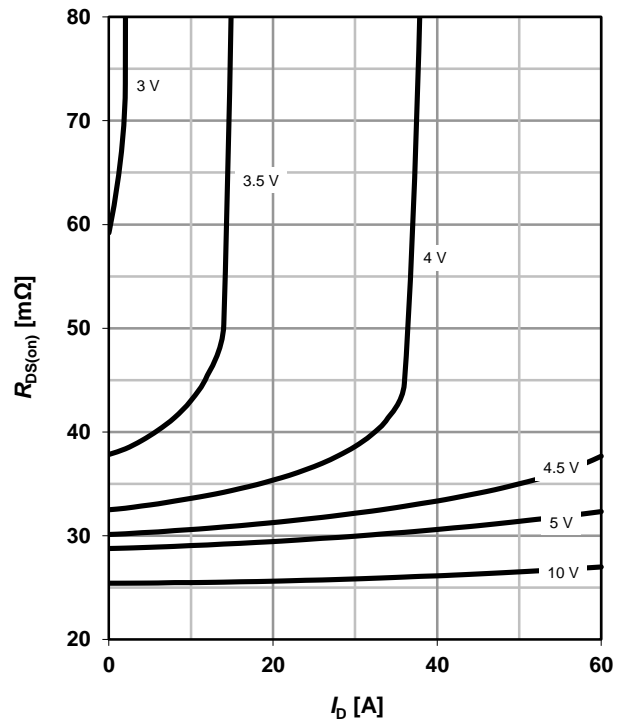
$Z_{thJC} = f(t_p)$

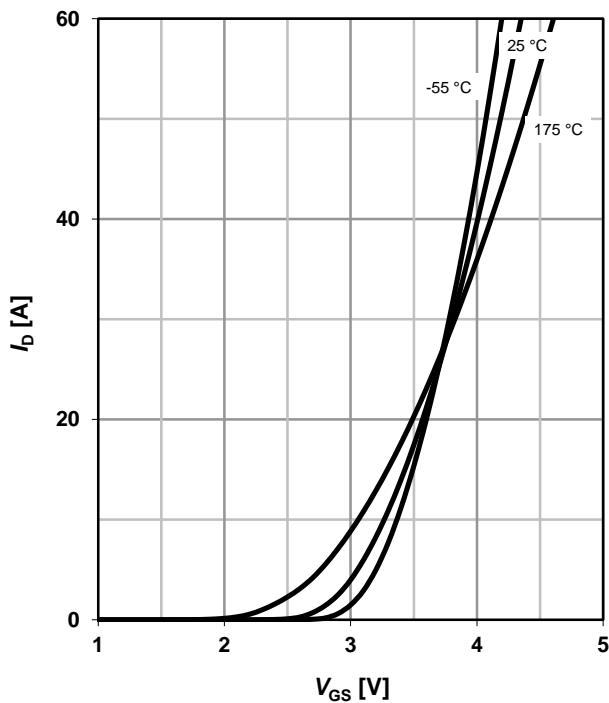
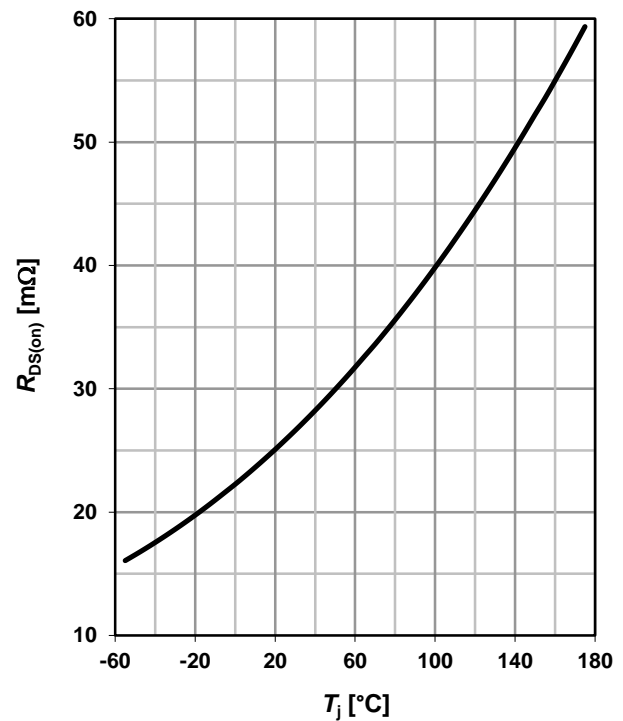
parameter: $D = t_p/T$



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

 parameter: V_{GS}

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

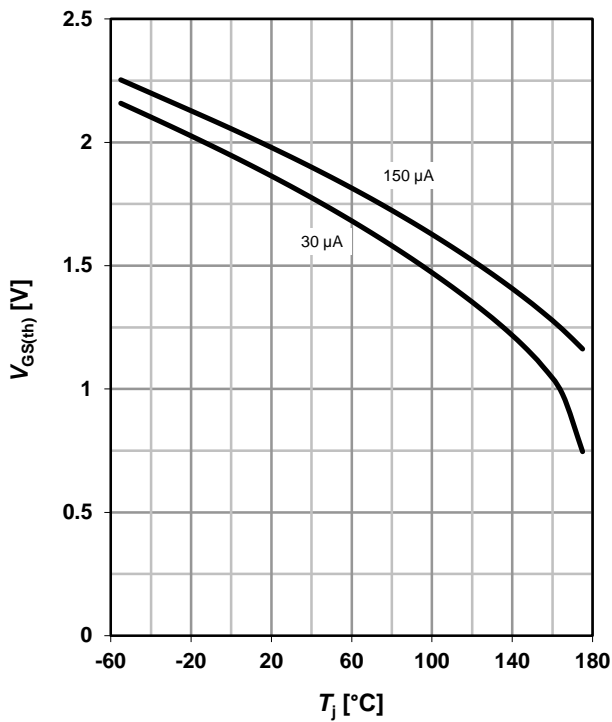
 parameter: V_{GS}

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

 parameter: T_j

8 Typ. drain-source on-state resistance
 $R_{DS(on)} = f(T_j); I_D = 30\text{ A}; V_{GS} = 10\text{ V}$


9 Typ. gate threshold voltage

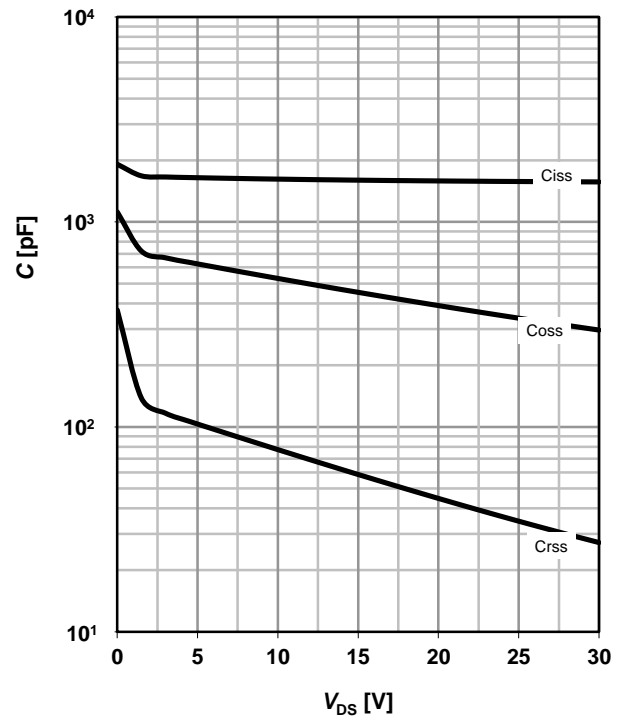
$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$

parameter: I_D



10 Typ. capacitances

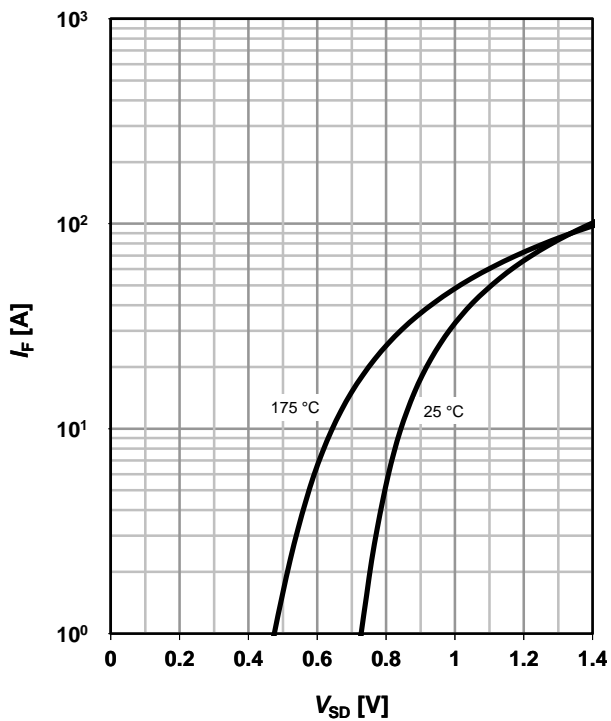
$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$



11 Typical forward diode characteristics

$I_F = f(V_{SD})$

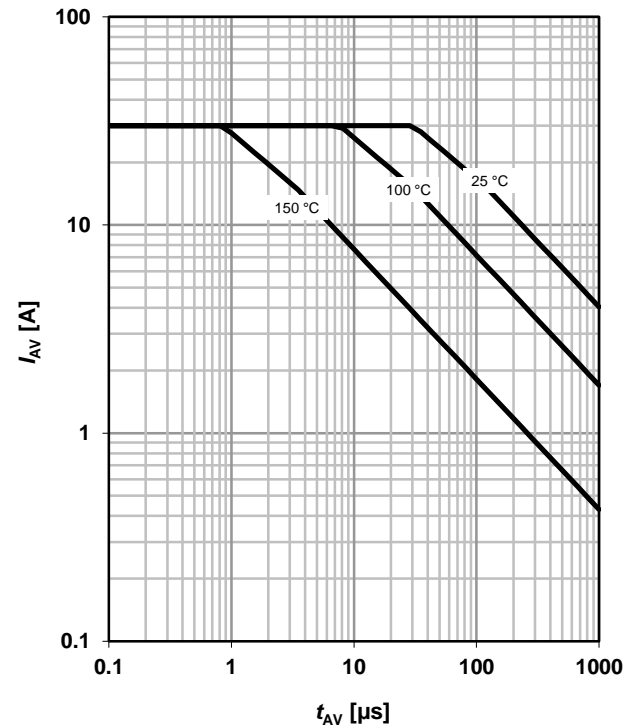
parameter: T_j



12 Typ. avalanche characteristics

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

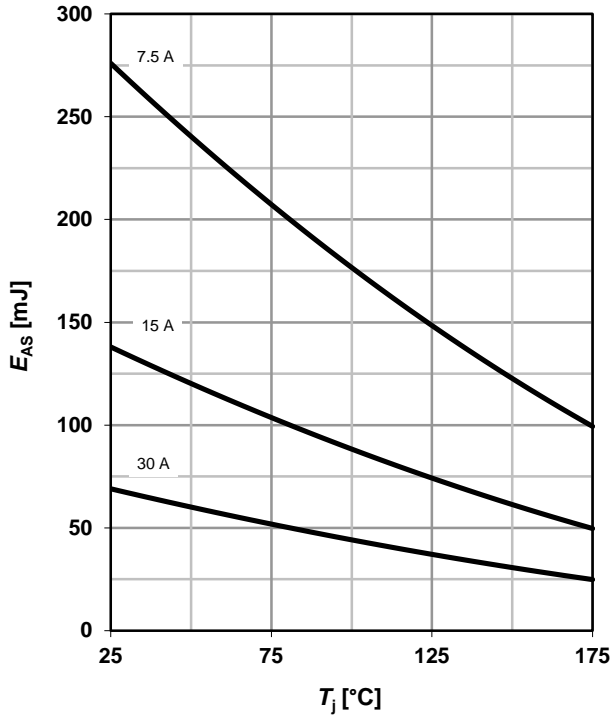
parameter: $T_{j(start)}$



13 Typical avalanche energy

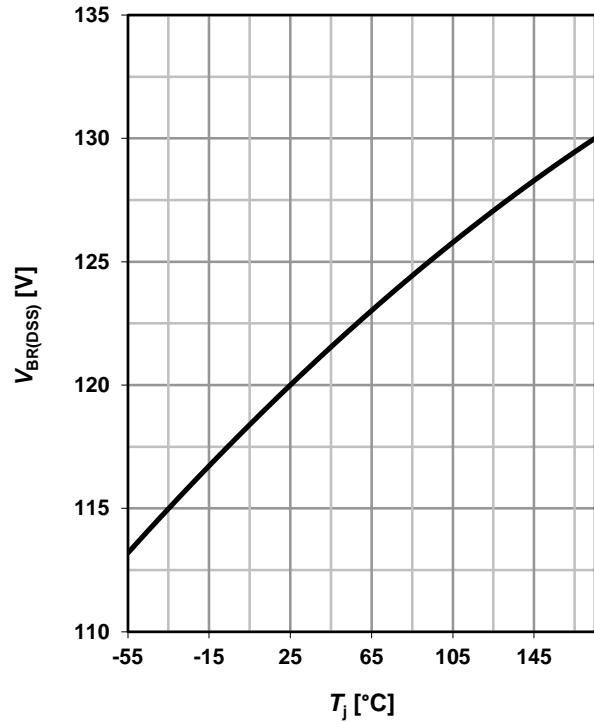
$$E_{AS} = f(T_j)$$

parameter: I_D



14 Typ. drain-source breakdown voltage

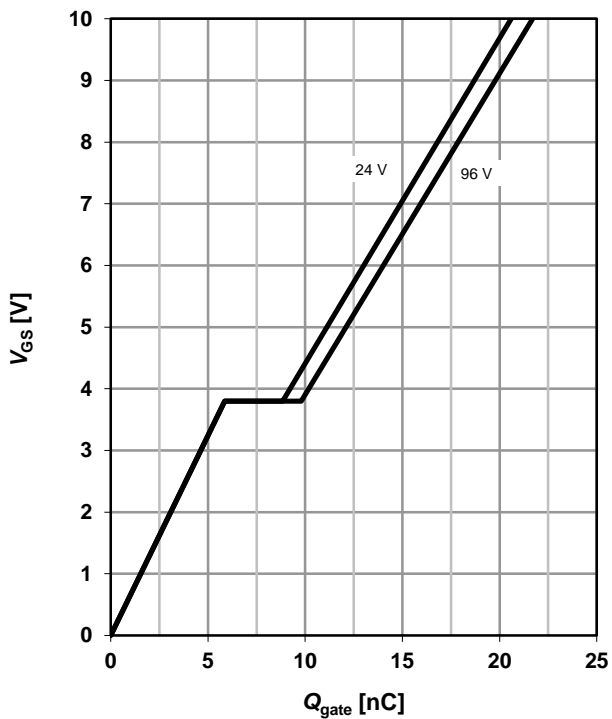
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$



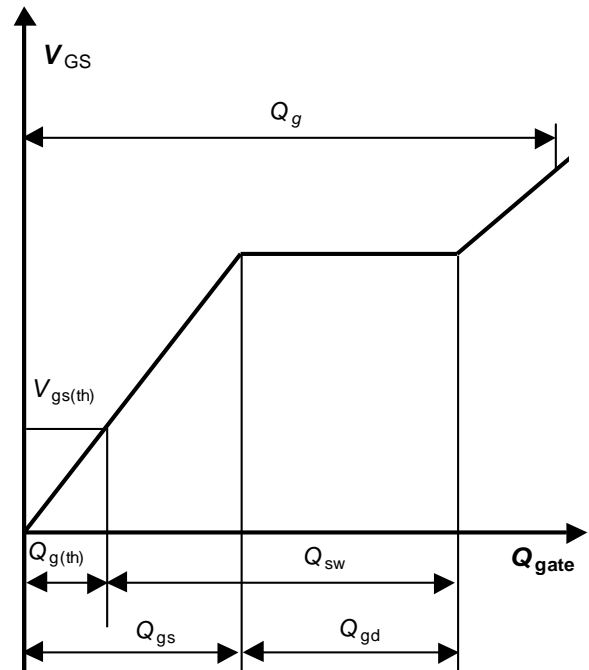
15 Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = 30 \text{ A pulsed}$$

parameter: V_{DD}



16 Gate charge waveforms



Published by
Infineon Technologies AG
81726 Munich, Germany

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Revision History

| Version | Date | Changes |
|--------------|------------|------------------|
| Revision 1.0 | 20.06.2016 | Final Data Sheet |

单击下面可查看定价，库存，交付和生命周期等信息

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