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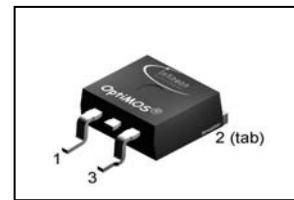


OptiMOS[®] Power-Transistor
Features

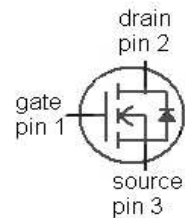
- N-channel Logic Level - Enhancement mode
- Automotive AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- **Green package (lead free)**
- Ultra low Rds(on)
- 100% Avalanche tested

Product Summary

| | | |
|------------------|------|----|
| V_{DS} | 75 | V |
| $R_{DS(on),max}$ | 20.5 | mΩ |
| I_D | 30 | A |

PG-TO252-3-11


| Type | Package | Marking |
|----------------|---------------|---------|
| IPD30N08S2L-21 | PG-TO252-3-11 | 2N08L21 |


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

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|-------------------|--|--------------|------|
| Continuous drain current | I_D | $T_C=25\text{ °C}$, $V_{GS}=10\text{ V}^{1)}$ | 30 | A |
| | | $T_C=100\text{ °C}$, $V_{GS}=10\text{ V}^{2)}$ | 30 | |
| Pulsed drain current ²⁾ | $I_{D,pulse}$ | $T_C=25\text{ °C}$ | 120 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=30\text{ A}$ | 240 | mJ |
| Gate source voltage | V_{GS} | | ±20 | V |
| Power dissipation | P_{tot} | $T_C=25\text{ °C}$ | 136 | 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 characteristics²⁾ | | | | | | |
| Thermal resistance, junction - case | R_{thJC} | | - | - | 1.1 | K/W |
| Thermal resistance, junction - ambient, leaded | R_{thJA} | | - | - | 100 | |
| SMD version, device on PCB | R_{thJA} | minimal footprint | - | - | 75 | |
| | | 6 cm ² cooling area ³⁾ | - | - | 50 | |

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

| | | | | | | |
|----------------------------------|---------------|---|-----|------|------|---------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=1\text{ mA}$ | 75 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=80\text{ }\mu\text{A}$ | 1.2 | 1.6 | 2.0 | |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=75\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ | - | 0.01 | 1 | μA |
| | | $V_{DS}=75\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}^{2)}$ | - | 1 | 100 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$ | - | 1 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=4.5\text{ V}, I_D=25\text{ A}$ | - | 20.6 | 26 | m Ω |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=10\text{ V}, I_D=25\text{ A}$ | - | 15.9 | 20.5 | |

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

Dynamic characteristics²⁾

| | | | | | | |
|------------------------------|--------------|---|---|------|---|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$ | - | 1650 | - | pF |
| Output capacitance | C_{oss} | | - | 400 | - | |
| Reverse transfer capacitance | C_{rss} | | - | 190 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=40\text{ V}, V_{GS}=10\text{ V},$ $I_D=30\text{ A}, R_G=3.9\ \Omega$ | - | 9 | - | ns |
| Rise time | t_r | | - | 30 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 44 | - | |
| Fall time | t_f | | - | 11 | - | |

Gate Charge Characteristics²⁾

| | | | | | | |
|-----------------------|---------------|--|---|-----|-----|----|
| Gate to source charge | Q_{gs} | $V_{DD}=60\text{ V}, I_D=30\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$ | - | 6 | 6.8 | nC |
| Gate to drain charge | Q_{gd} | | - | 22 | 32 | |
| Gate charge total | Q_g | | - | 56 | 72 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 3.5 | - | V |

Reverse Diode

| | | | | | | |
|--|---------------|---|---|-----|-----|----|
| Diode continuous forward current ²⁾ | I_S | $T_C=25\text{ }^\circ\text{C}$ | - | - | 30 | A |
| Diode pulse current ²⁾ | $I_{S,pulse}$ | | - | - | 120 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=30\text{ A},$ $T_J=25\text{ }^\circ\text{C}$ | - | 0.9 | 1.3 | V |
| Reverse recovery time ²⁾ | t_{rr} | $V_R=40\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 50 | - | ns |
| Reverse recovery charge ²⁾ | Q_{rr} | $V_R=40\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 120 | - | nC |

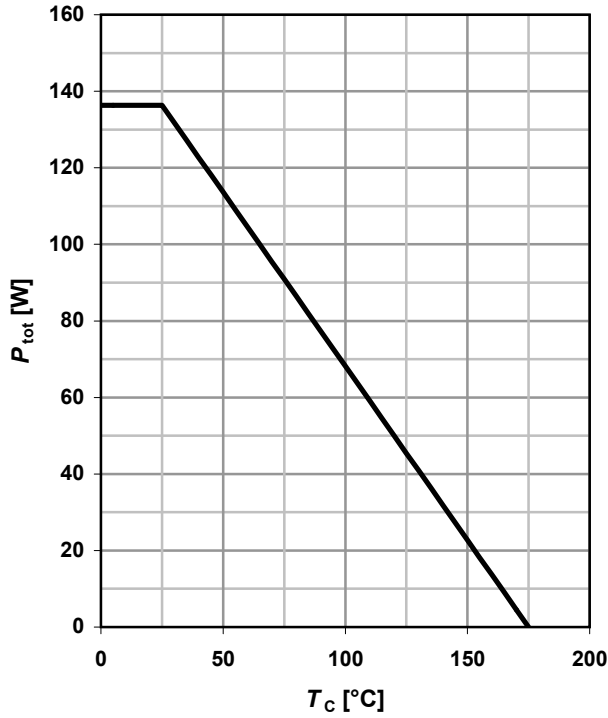
¹⁾ Current limited by bondwire; with an $R_{thJC} = 1.1\text{ K/W}$ the chip is able to carry $I_D = 54\text{ A}$ at 25°C , for detailed information see app.-note ANPS071E available at www.infineon.com/optimos

²⁾ Defined by design. Not subject to production test.

³⁾ Device on $40\text{ mm} \times 40\text{ mm} \times 1.5\text{ mm}$ epoxy PCB FR4 with 6 cm^2 (one layer, $70\ \mu\text{m}$ thick) copper area for drain connection. PCB is vertical in still air.

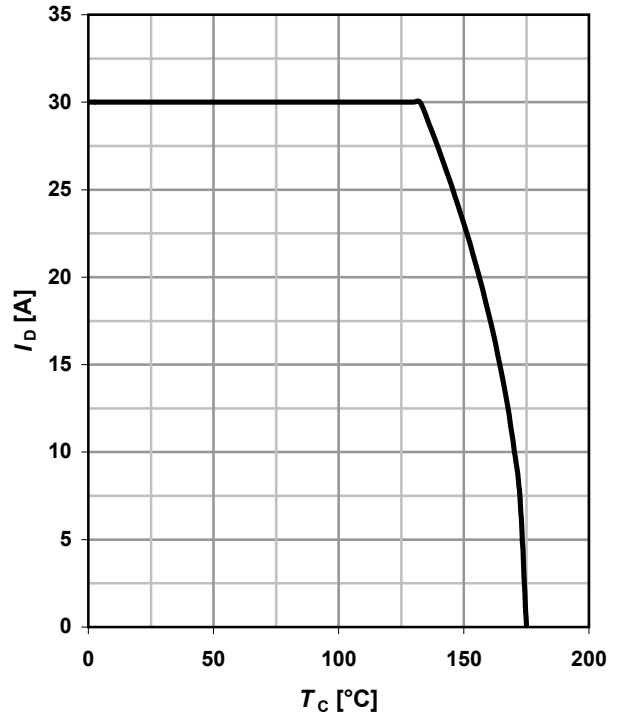
1 Power dissipation

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



2 Drain current

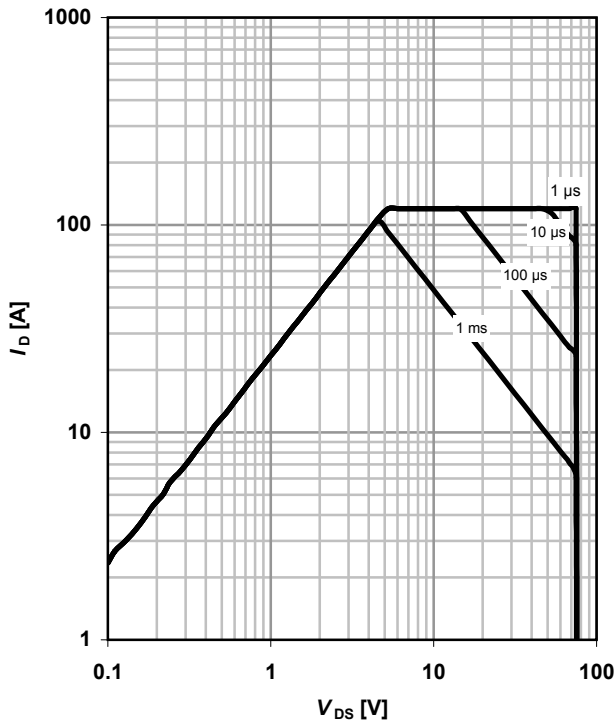
$I_D = f(T_C); V_{GS} \geq 10\text{ V}$



3 Safe operating area

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

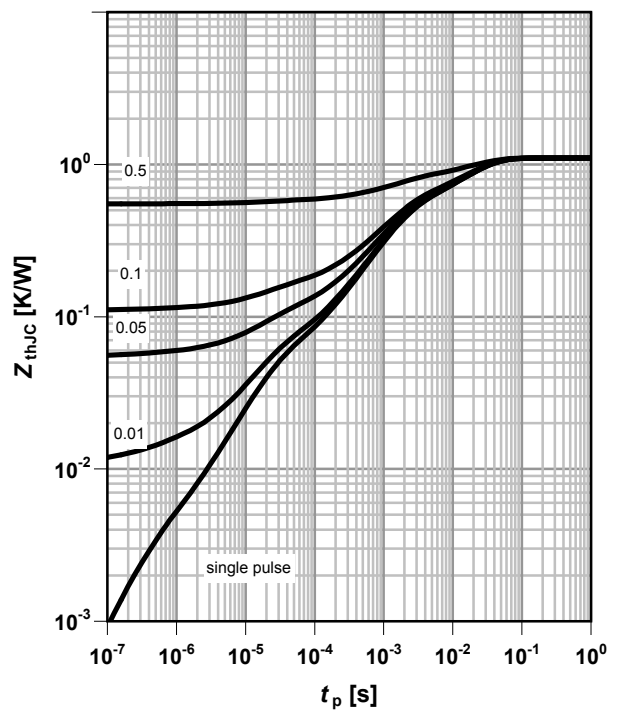
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

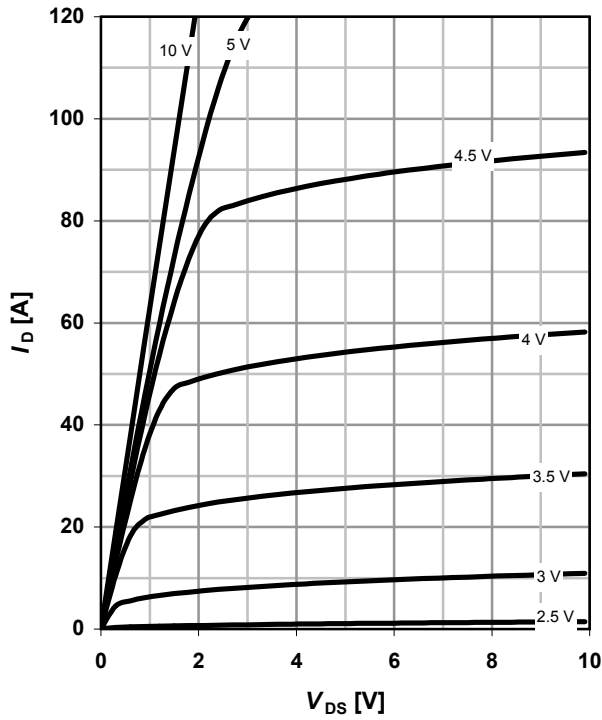
parameter: $D = t_p/T$



5 Typ. output characteristics

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

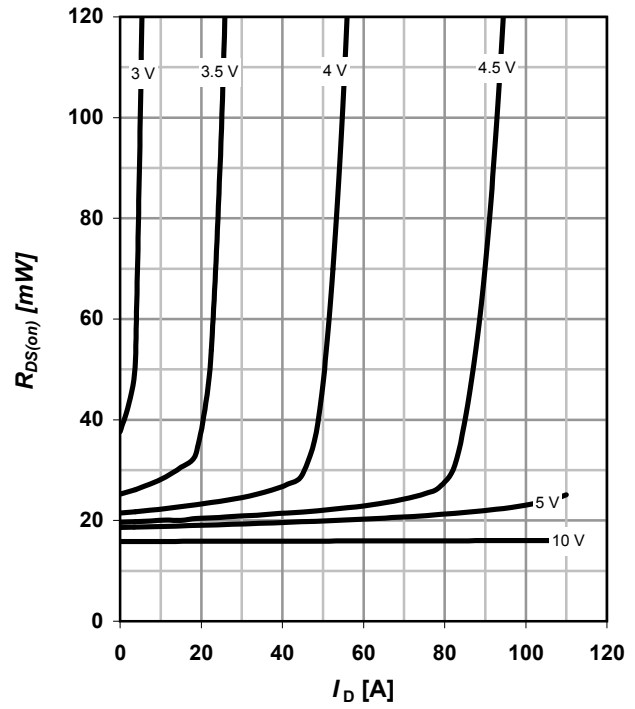
parameter: V_{GS}



6 Typ. drain-source on-state resistance

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

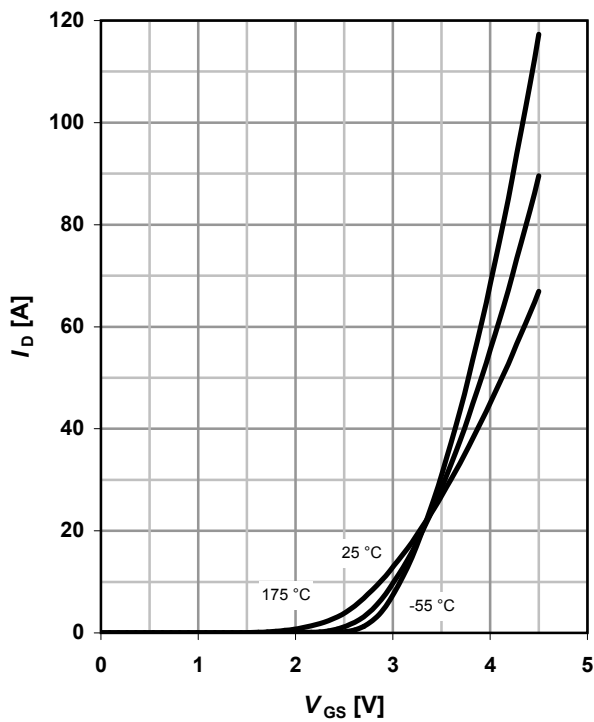
parameter: V_{GS}



7 Typ. transfer characteristics

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

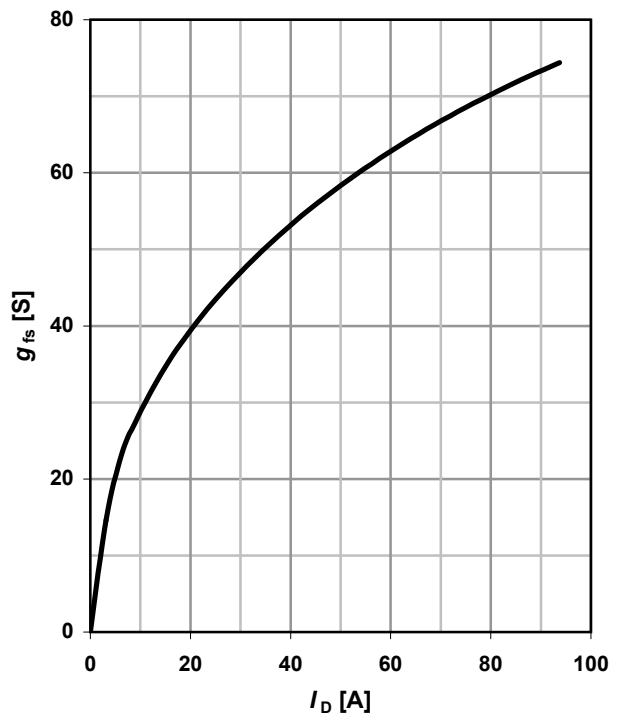
parameter: T_j



8 Typ. Forward transconductance

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

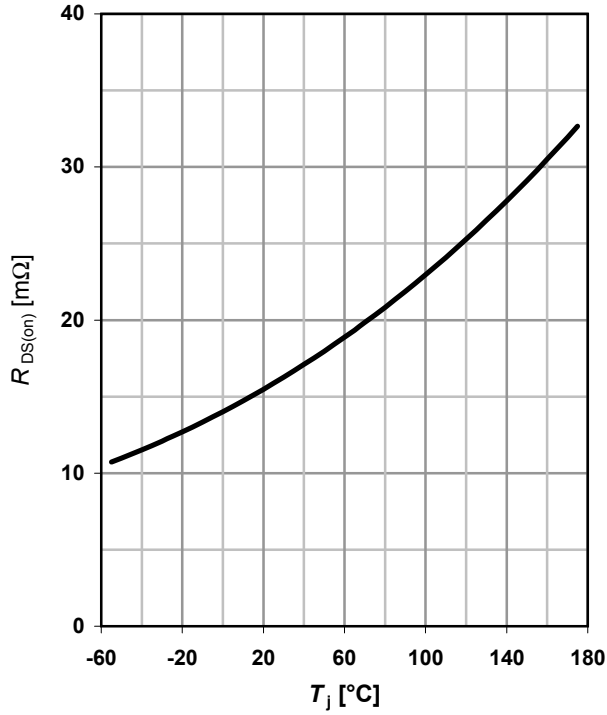
parameter: g_{fs}



9 Typ. Drain-source on-state resistance

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

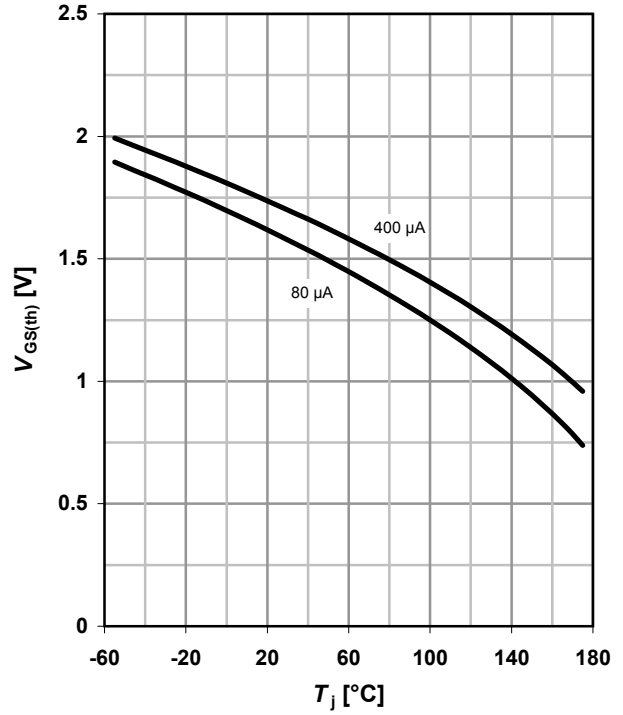
parameter: $I_D = 25\text{ A}$; $V_{GS} = 10\text{ V}$



10 Typ. gate threshold voltage

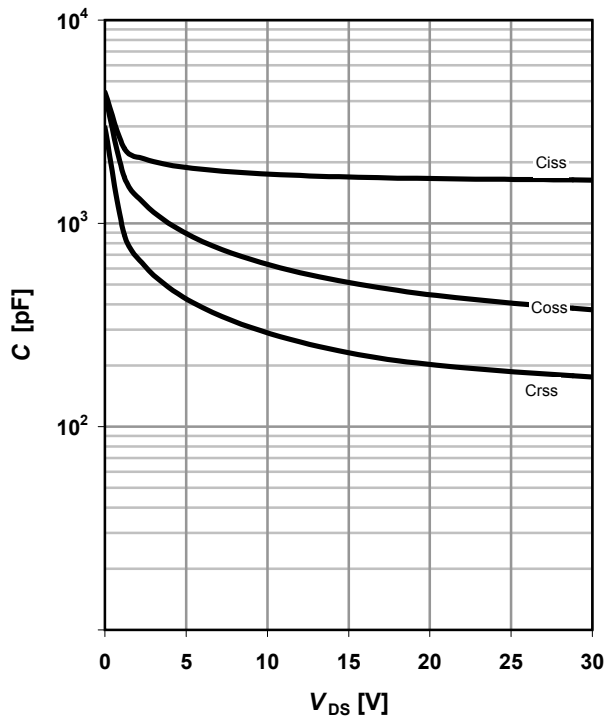
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



11 Typ. capacitances

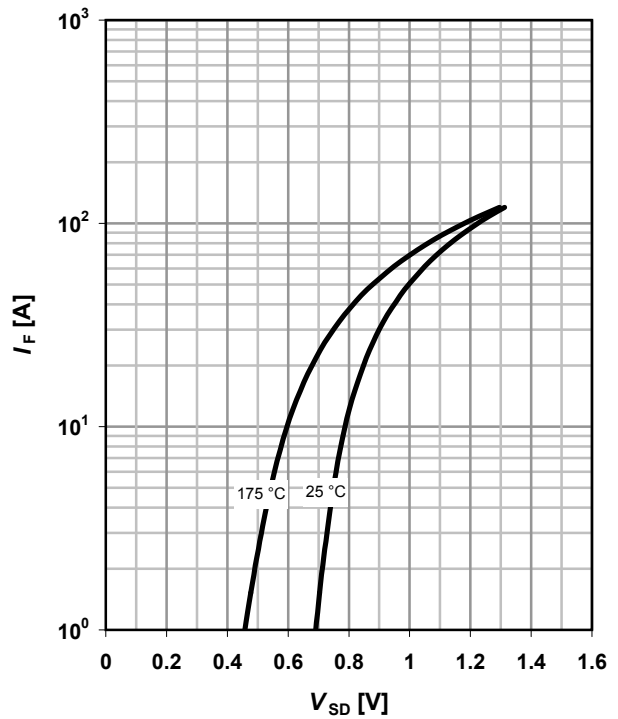
$C = f(V_{DS})$; $V_{GS} = 0\text{ V}$; $f = 1\text{ MHz}$



12 Typical forward diode characteristics

$I_F = f(V_{SD})$

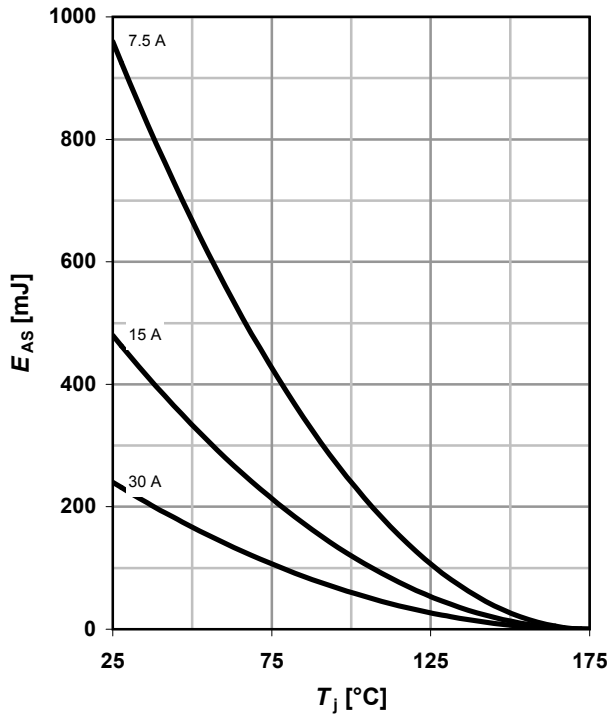
parameter: T_j



13 Typical avalanche energy

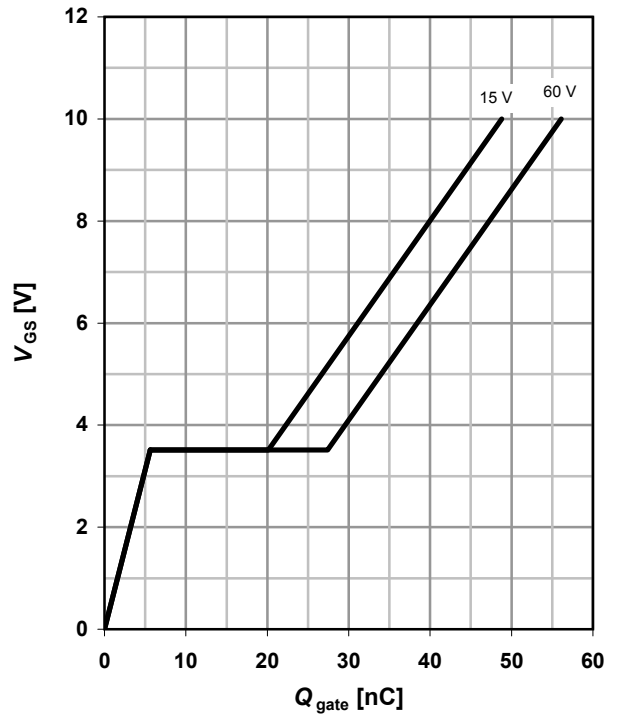
$E_{AS} = f(T_j)$

parameter: I_D



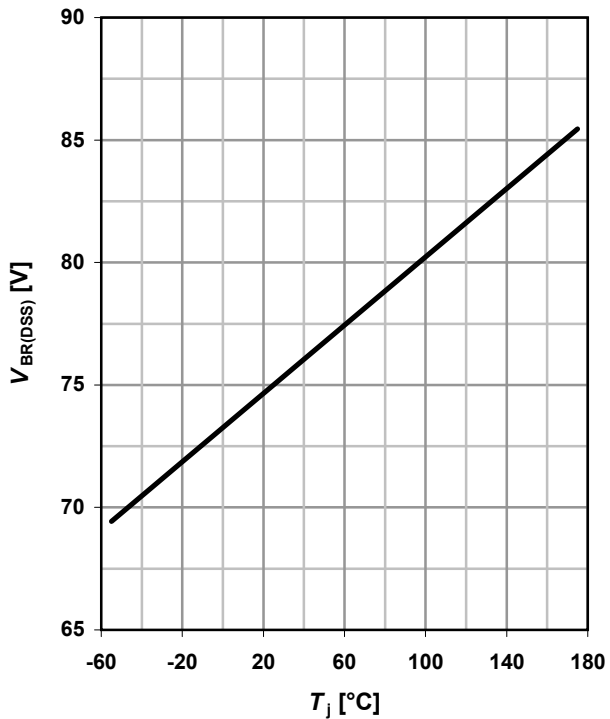
14 Typ. gate charge

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

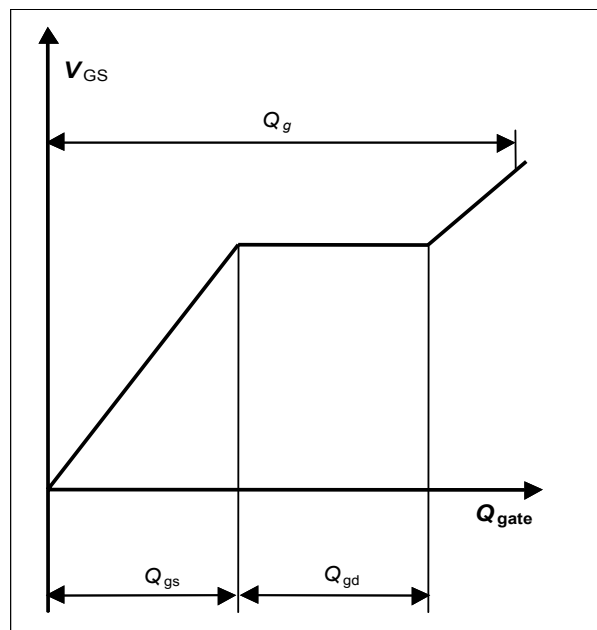


15 Typ. drain-source breakdown voltage

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



16 Gate charge waveforms



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