

OptiMOS™ Power-Transistor
Features

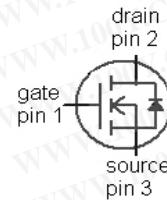
- Low gate charge for fast switching applications
- N-channel enhancement - normal level
- 175 °C operating temperature
- Avalanche rated
- Pb-free lead plating, RoHS compliant
- Halogen-free according to IEC61249-2-21


Product Summary

| | | |
|-----------------------------|-----|----|
| V_{DS} | 60 | V |
| $R_{DS(on),max}$ SMDversion | 7.7 | mΩ |
| I_D | 80 | A |

勝特力材料 886-3-5753170
勝特力电子(上海) 86-21-34970699
勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

| Type | IPB080N06N G | IPP080N06N G |
|----------------|--------------|--------------|
| | | |
| Package | P-TO263-3-2 | P-TO220-3-1 |
| Marking | 080N06N | 080N06N |


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

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|----------------|----------------------------------------------------------------------------------------------------------|-------------|-------------------|
| Continuous drain current | I_D | $T_C=25\text{ °C}^{1)}$ | 80 | A |
| | | $T_C=100\text{ °C}$ | 76 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_C=25\text{ °C}^{2)}$ | 320 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=80\text{ A}, R_{GS}=25\text{ Ω}$ | 448 | mJ |
| Reverse diode dv/dt | dv/dt | $I_D=80\text{ A}, V_{DS}=48\text{ V},$ $di/dt=200\text{ A}/\mu\text{s},$ $T_{j,max}=175\text{ °C}$ | 6 | kV/ μs |
| Gate source voltage | V_{GS} | | ± 20 | V |
| Power dissipation | P_{tot} | $T_C=25\text{ °C}$ | 214 | W |
| Operating and storage temperature | T_j, T_{stg} | | -55 ... 175 | °C |
| IEC climatic category; DIN IEC 68-1 | | | 55/175/56 | |

¹⁾ Current is limited by bondwire; with an $R_{thJC}=0.7\text{ K/W}$ the chip is able to carry 107 A.

²⁾ See figure 3

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

Thermal characteristics

| | | | | | | |
|-------------------------------------|------------|----------------------------------------------|---|---|-----|-----|
| Thermal resistance, junction - case | R_{thJC} | | - | - | 0.7 | K/W |
| SMD version, device on PCB | R_{thJA} | minimal footprint | - | - | 62 | |
| | | 6 cm ² cooling area ³⁾ | - | - | 40 | |

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

| | | | | | | |
|----------------------------------|---------------|------------------------------------------------------------|-----|------|-----|---------------|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{ V}, I_D=1\text{ mA}$ | 60 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=150\text{ }\mu\text{A}$ | 2.1 | 3.0 | 4 | |
| Zero gate voltage drain current | I_{DSS} | $V_{DS}=60\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$ | - | 0.01 | 1 | μA |
| | | $V_{DS}=60\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}$ | - | 1 | 100 | |
| Gate-source leakage current | I_{GSS} | $V_{GS}=20\text{ V}, V_{DS}=60\text{ V}$ | - | 1 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}=10\text{ V}, I_D=80\text{ A},$ | - | 6.5 | 8 | m Ω |
| | | $V_{GS}=10\text{ V}, I_D=80\text{ A},$ SMD version | - | 6.2 | 7.7 | |
| Gate resistance | R_G | | - | 1.5 | - | Ω |
| Transconductance | g_{fs} | $ V_{DS} >2 I_D R_{DS(on)max},$ $I_D=80\text{ A}$ | 47 | 94 | - | S |

³⁾ 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.

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

Dynamic characteristics

| | | | | | | |
|------------------------------|--------------|---------------------------------------------------------------------------------|---|------|------|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=30\text{ V},$ $f=1\text{ MHz}$ | - | 2600 | 3500 | pF |
| Output capacitance | C_{oss} | | - | 660 | 880 | |
| Reverse transfer capacitance | C_{rss} | | - | 160 | 240 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=30\text{ V}, V_{GS}=10\text{ V},$ $I_D=80\text{ A}, R_G=3.3\ \Omega$ | - | 14 | 20 | ns |
| Rise time | t_r | | - | 15 | 23 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 32 | 50 | |
| Fall time | t_f | | - | 14 | 20 | |

Gate Charge Characteristics⁴⁾

| | | | | | | |
|--------------------------|---------------|----------------------------------------------------------------------------|---|-----|----|----|
| Gate to source charge | Q_{gs} | $V_{DD}=30\text{ V}, I_D=80\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$ | - | 14 | 19 | nC |
| Gate charge at threshold | $Q_{g(th)}$ | | - | 8 | 10 | |
| Gate to drain charge | Q_{gd} | | - | 29 | 43 | |
| Switching charge | Q_{sw} | | - | 35 | 52 | |
| Gate charge total | Q_g | | - | 70 | 93 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 5.4 | - | V |
| Output charge | Q_{oss} | $V_{DD}=30\text{ V}, V_{GS}=0\text{ V}$ | | 26 | 35 | |

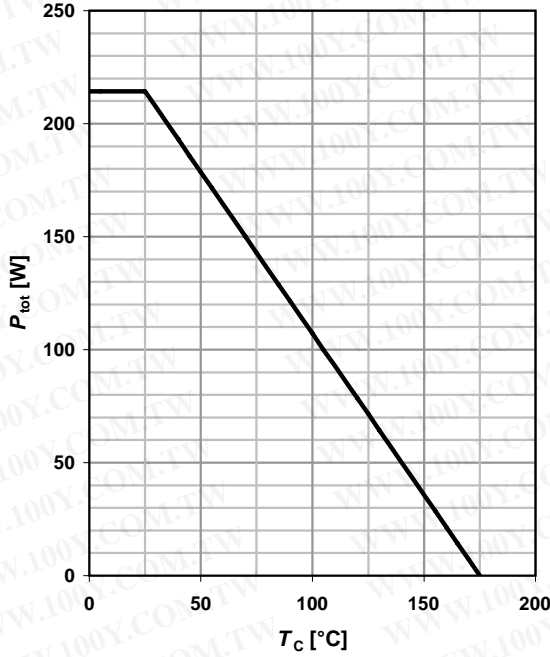
Reverse Diode

| | | | | | | |
|----------------------------------|---------------|-------------------------------------------------------------------------|---|------|-----|----|
| Diode continuous forward current | I_S | $T_C=25\text{ }^\circ\text{C}$ | - | - | 80 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | 320 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=80\text{ A},$ $T_j=25\text{ }^\circ\text{C}$ | - | 0.91 | 1.3 | V |
| Reverse recovery time | t_{rr} | $V_R=30\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 53 | 65 | ns |
| Reverse recovery charge | Q_{rr} | | - | 85 | 110 | |

⁴⁾ See figure 16 for gate charge parameter definition

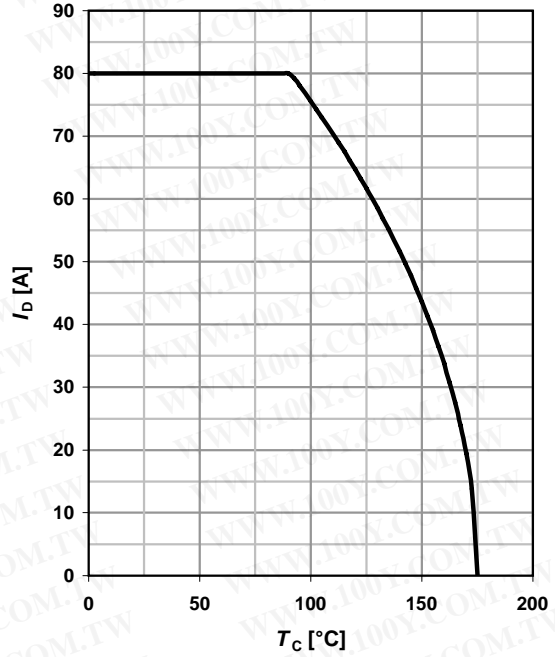
1 Power dissipation

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



2 Drain current

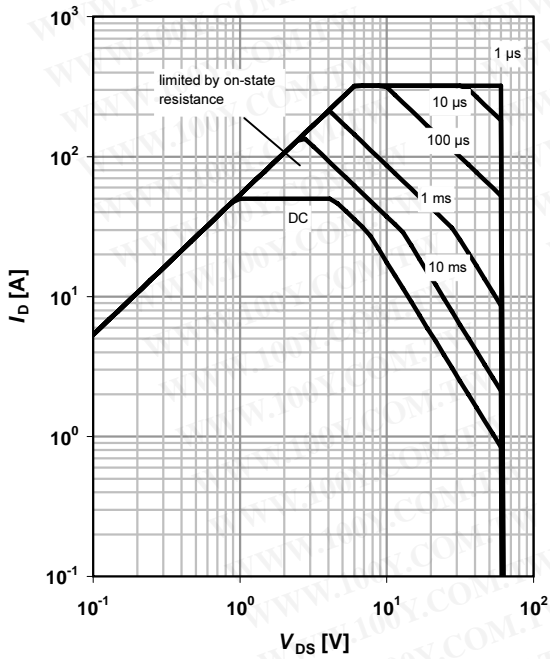
$$I_D=f(T_C); V_{GS}\geq 10\text{ V}$$



3 Safe operating area

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

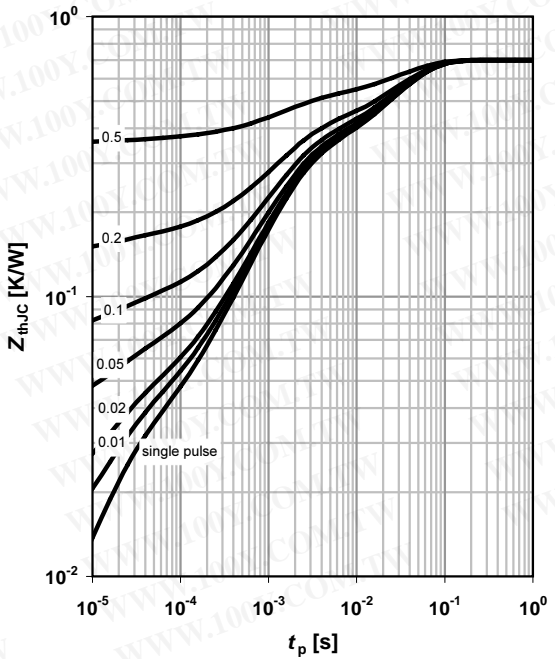
parameter: t_p



4 Max. transient thermal impedance

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

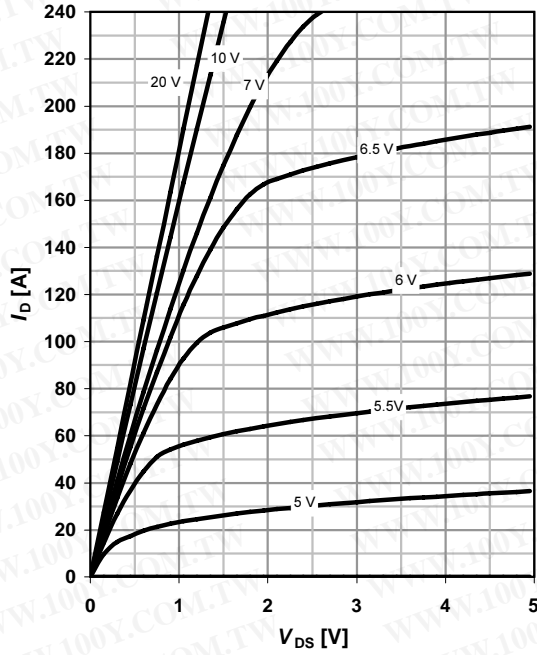
parameter: $D=t_p/T$



5 Typ. output characteristics

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

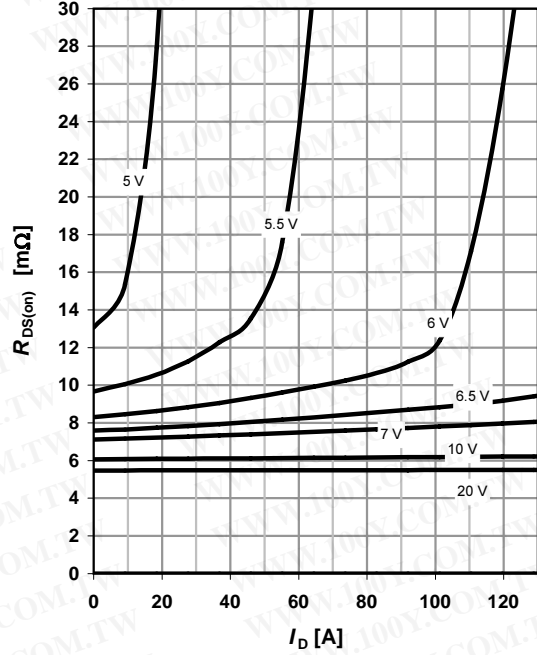
parameter: V_{GS}



6 Typ. drain-source on resistance

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

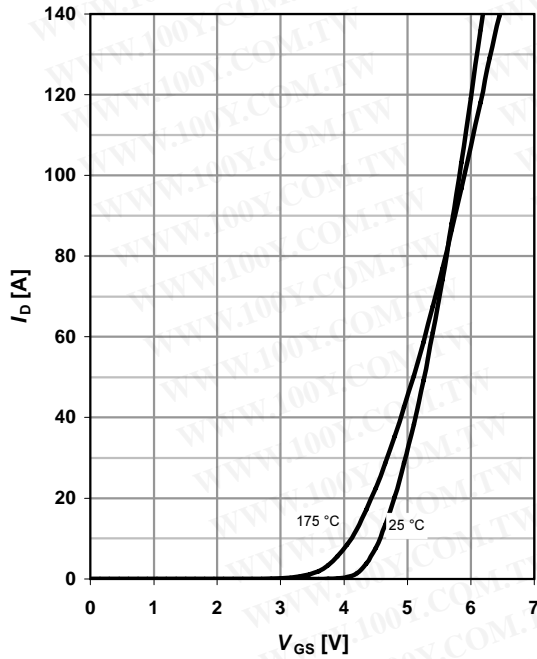
parameter: V_{GS}



7 Typ. transfer characteristics

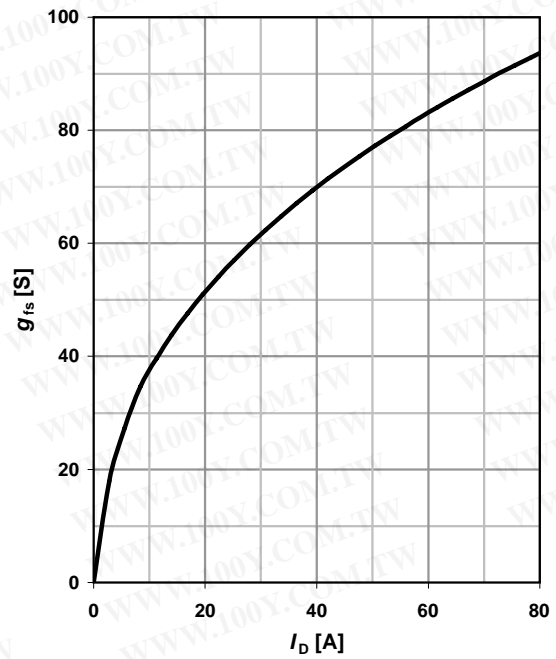
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



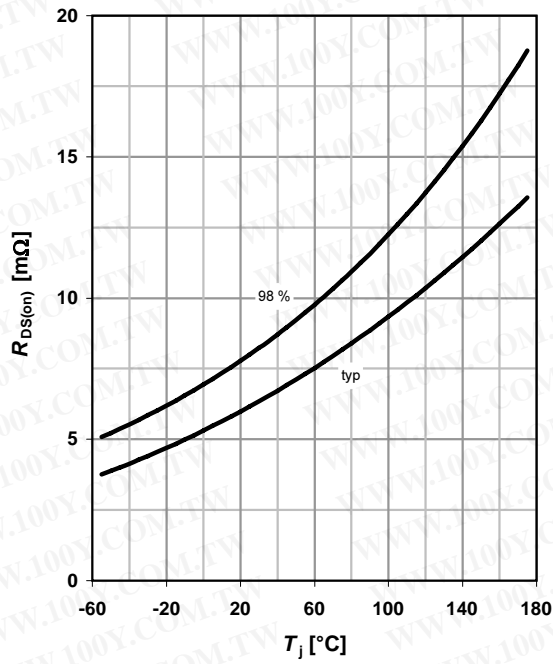
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

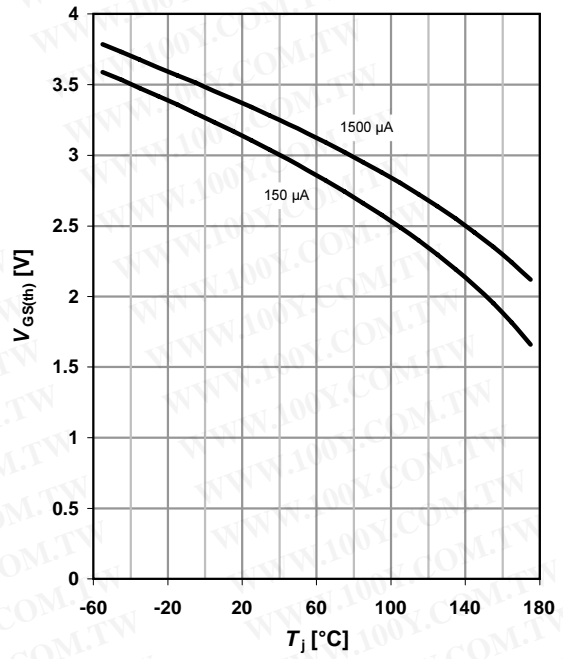
$R_{DS(on)} = f(T_j); I_D = 80 \text{ A}; V_{GS} = 10 \text{ V}$



10 Typ. gate threshold voltage

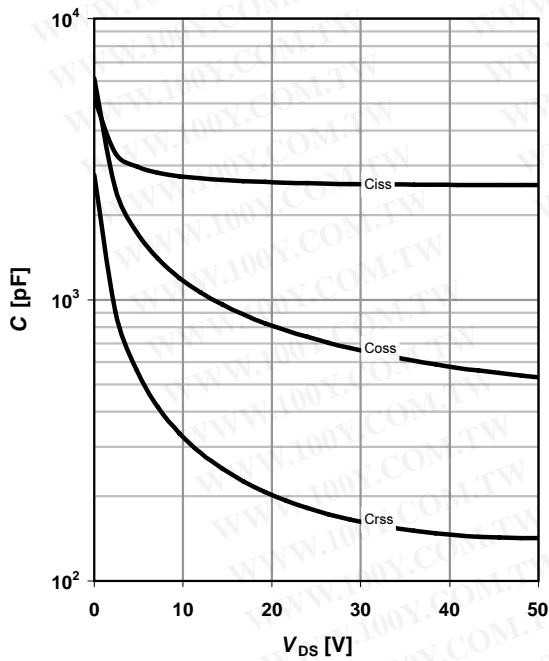
$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$

parameter: I_D



11 Typ. capacitances

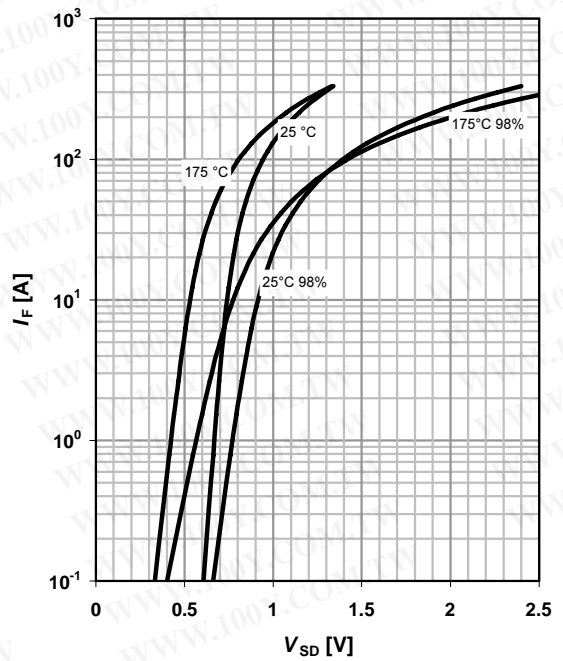
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

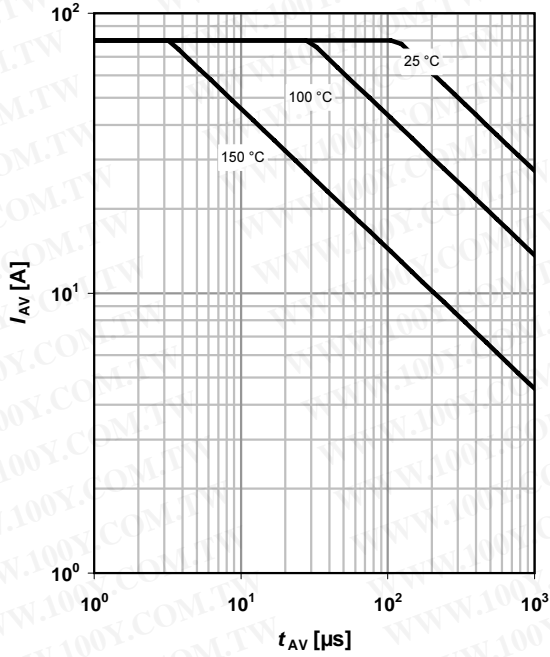
parameter: T_j



13 Avalanche characteristics

$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega$

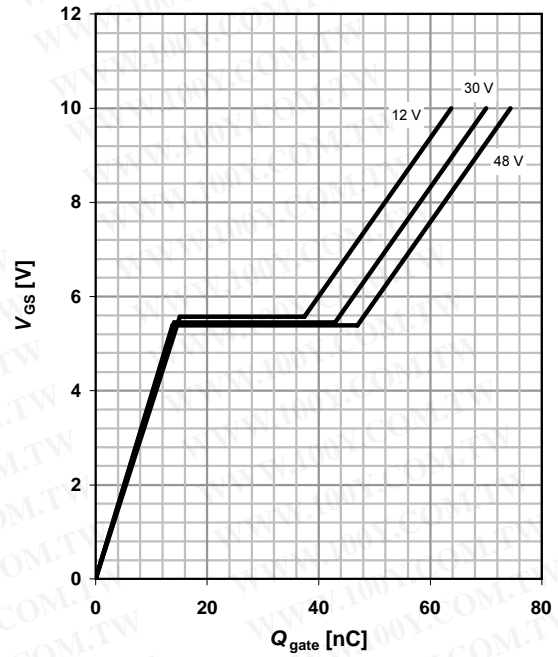
parameter: $T_{j(start)}$



14 Typ. gate charge

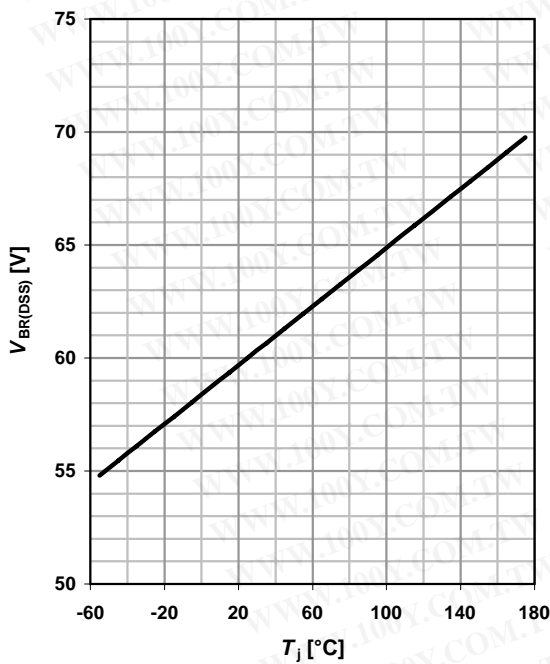
$V_{GS}=f(Q_{gate}); I_D=80 \text{ A pulsed}$

parameter: V_{DD}

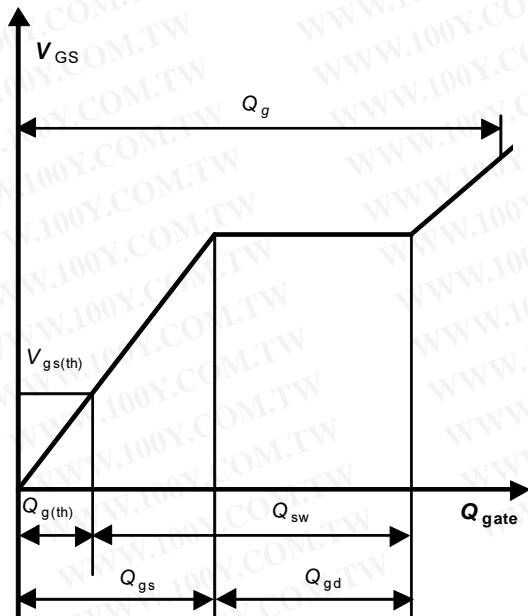


15 Drain-source breakdown voltage

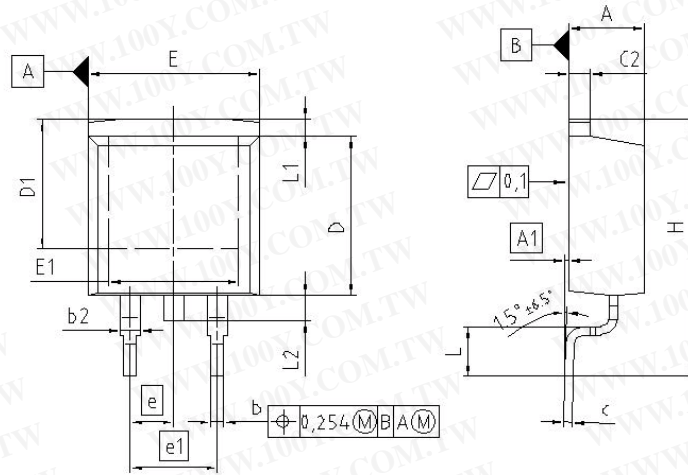
$V_{BR(DSS)}=f(T_j); I_D=1 \text{ mA}$



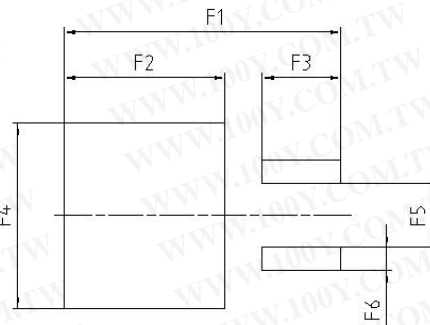
16 Gate charge waveforms



PG-TO-263 (D²-Pak)



FOOTPRINT



| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|--------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.300 | 4.572 | 0.169 | 0.180 |
| A1 | 0.000 | 0.254 | 0.000 | 0.010 |
| b | 0.650 | 0.850 | 0.026 | 0.033 |
| b2 | 0.950 | 1.321 | 0.037 | 0.052 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c2 | 0.170 | 1.400 | 0.046 | 0.055 |
| D | 8.509 | 9.450 | 0.335 | 0.372 |
| D1 | 7.100 | - | 0.280 | - |
| E | 9.800 | 10.312 | 0.386 | 0.406 |
| E1 | 6.500 | - | 0.256 | - |
| e | 2.540 | | 0.100 | |
| e1 | 5.080 | | 0.200 | |
| N | 2 | | 2 | |
| H | 14.605 | 15.875 | 0.575 | 0.625 |
| L | 2.200 | 3.000 | 0.087 | 0.118 |
| L1 | - | 1.600 | - | 0.063 |
| L2 | 1.000 | 1.778 | 0.039 | 0.070 |
| F1 | 16.050 | 16.250 | 0.632 | 0.640 |
| F2 | 9.300 | 9.500 | 0.366 | 0.374 |
| F3 | 4.500 | 4.700 | 0.177 | 0.185 |
| F4 | 10.700 | 10.900 | 0.421 | 0.429 |
| F5 | 3.630 | 3.830 | 0.143 | 0.151 |
| F6 | 1.100 | 1.300 | 0.043 | 0.051 |

REFERENCE
JEDEC TO263

SCALE
0 5 5 7.5mm

EUROPEAN PROJECTION

ISSUE DATE
12-02-2006

FILE
TO263_2

