

N-CHANNEL SILICON POWER MOS-FET

■ Features

- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- Avalanche-proof

■ Applications

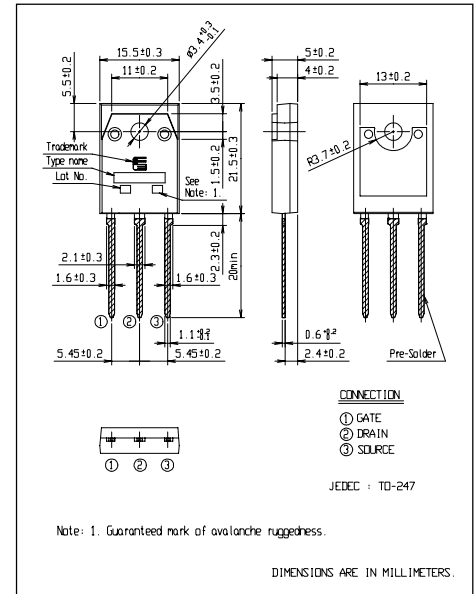
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

■ Maximum ratings and characteristic Absolute maximum ratings

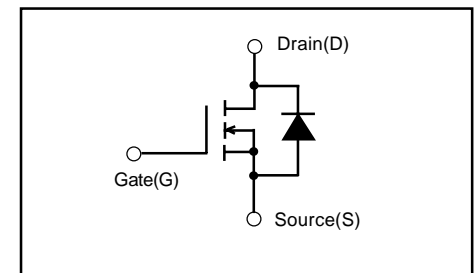
● (T_c=25°C unless otherwise specified)

| Item | Symbol | Rating | Unit |
|---|-------------------------------------|---------------------|------|
| Drain-source voltage | V _{DS} | 400 | V |
| Continuous drain current | I _D | ±23 | A |
| Pulsed drain current | I _{D(puls)} | ±92 | A |
| Gate-source voltage | V _{GS} | ±30 | V |
| Repetitive or non-repetitive | IAR *2 | 23 | A |
| Maximum Avalanche Energy | EAV *1 | 545 | mJ |
| Max. power dissipation | P _D | 295 | W |
| Operating and storage temperature range | T _{ch} T _{stg} | +150 -55 to +150 | °C |

*1 L=1.89mH, V_{cc}=40V *2 T_{ch}=150°C



■ Equivalent circuit schematic



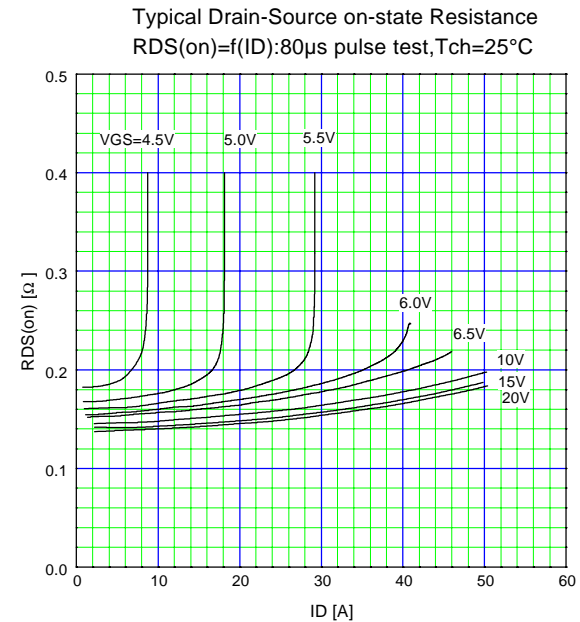
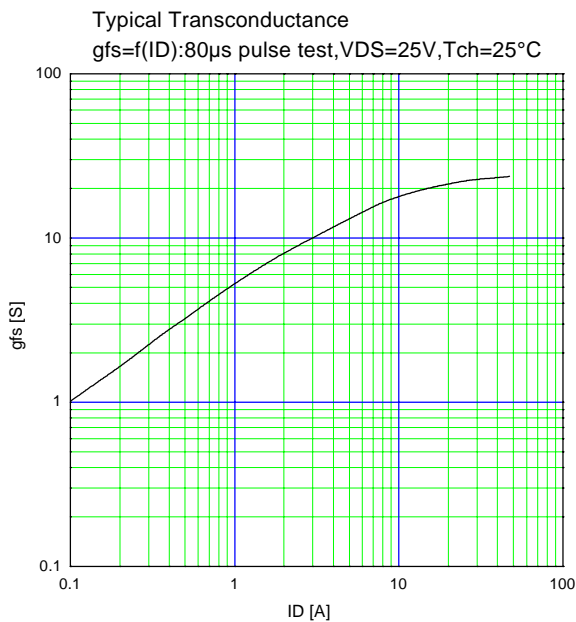
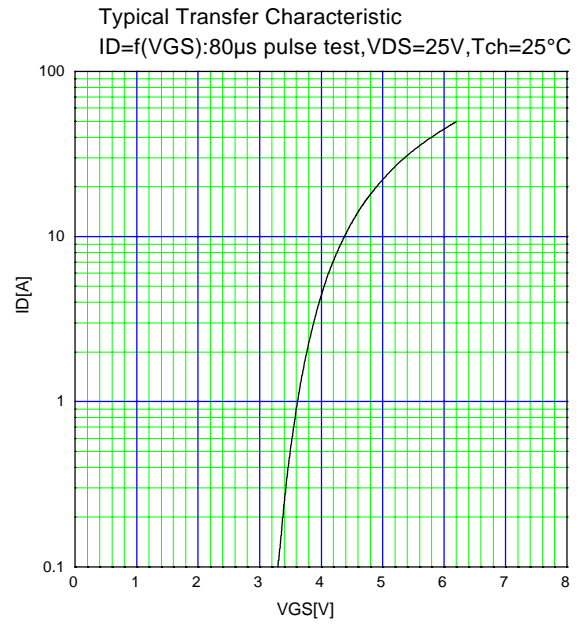
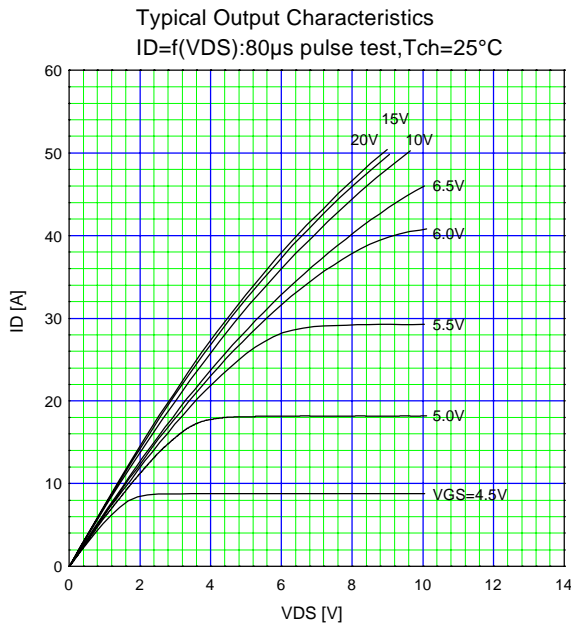
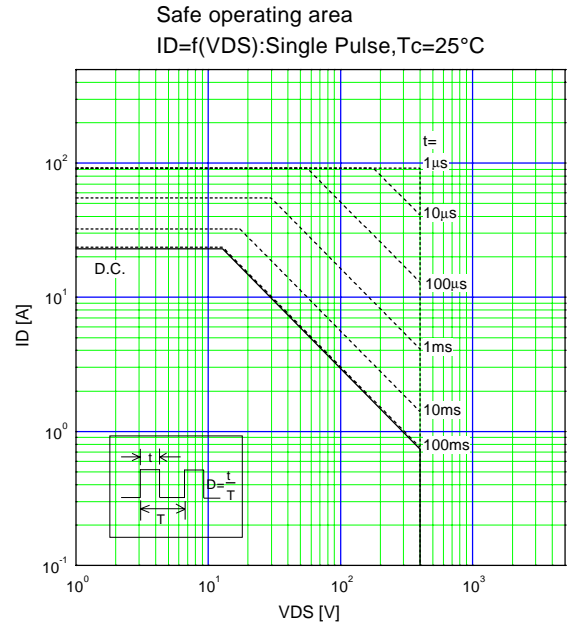
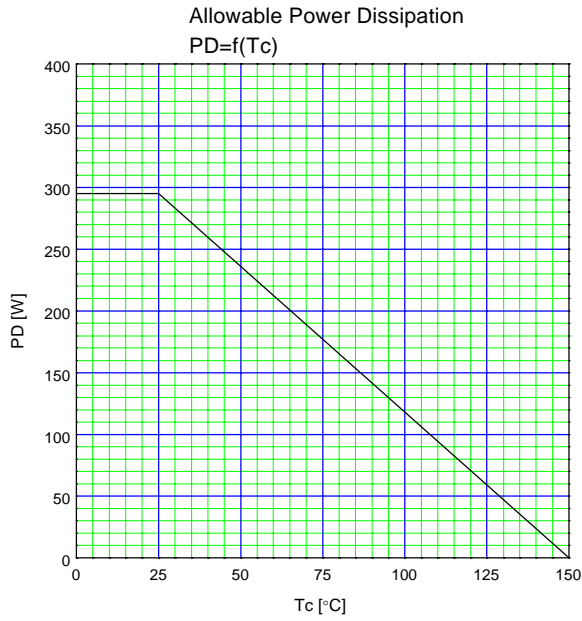
● Electrical characteristics (T_c =25°C unless otherwise specified)

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units | |
|----------------------------------|----------------------|--|------------------------|------|------|-------|----|
| Drain-source breakdown voltage | V _{(BR)DSS} | I _D =1mA V _{GS} =0V | 400 | | | V | |
| Gate threshold voltage | V _{GS(th)} | I _D =1mA V _{DS} =V _{GS} | 2.5 | 3.0 | 3.5 | V | |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =400V V _{GS} =0V | T _{ch} =25°C | | 10 | 500 | μA |
| | | | T _{ch} =125°C | | 0.2 | 1.0 | mA |
| Gate-source leakage current | I _{GSS} | V _{GS} =±30V V _{DS} =0V | | 10 | 100 | nA | |
| Drain-source on-state resistance | R _{DS(on)} | I _D =11.5A V _{GS} =10V | | 0.16 | 0.2 | Ω | |
| Forward transconductance | g _{fs} | I _D =11.5A V _{DS} =25V | 8.5 | 17 | | S | |
| Input capacitance | C _{iss} | V _{DS} =25V | | 2650 | 3975 | pF | |
| Output capacitance | C _{oss} | V _{GS} =0V | | 500 | 750 | pF | |
| Reverse transfer capacitance | C _{rss} | f=1MHz | | 230 | 345 | pF | |
| Turn-on time t _{on} | td(on) | V _{CC} =300V I _D =23A | | 22 | 35 | ns | |
| | t _r | V _{GS} =10V | | 105 | 160 | | |
| Turn-off time t _{off} | td(off) | R _{GS} =10Ω | | 225 | 340 | ns | |
| | t _f | | | 120 | 180 | | |
| Total gate charge | Q _G | V _{CC} =200V | | 137 | 210 | nC | |
| Gate-Source charge | Q _{GS} | I _D =23A | | 36 | 55 | | |
| Gate-Drain charge | Q _{GD} | V _{GS} =10V | | 48 | 75 | | |
| Avalanche capability | I _{AV} | L=1.89mH T _{ch} =25°C | 23 | | | A | |
| Diode forward on-voltage | V _{SD} | I _F =2I _{DR} V _{GS} =0V T _{ch} =25°C | | 1.15 | 1.73 | V | |
| Reverse recovery time | t _{rr} | I _F =I _{DR} V _{GS} =0V | | 450 | | ns | |
| Reverse recovery charge | Q _{rr} | -di/dt=100A/μs T _{ch} =25°C | | 8.6 | | μC | |

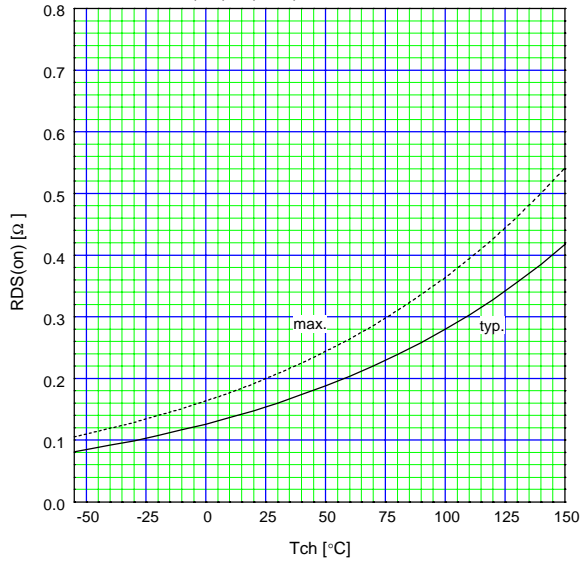
● Thermal characteristics

| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------|-----------------------|--------------------|------|------|-------|-------|
| Thermal resistance | R _{th(ch-c)} | channel to case | | | 0.424 | °C/W |
| | R _{th(ch-a)} | channel to ambient | | | 50.0 | °C/W |

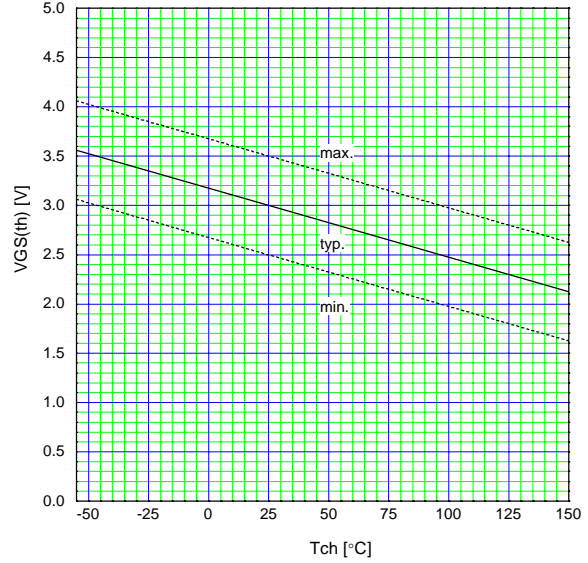
Characteristics



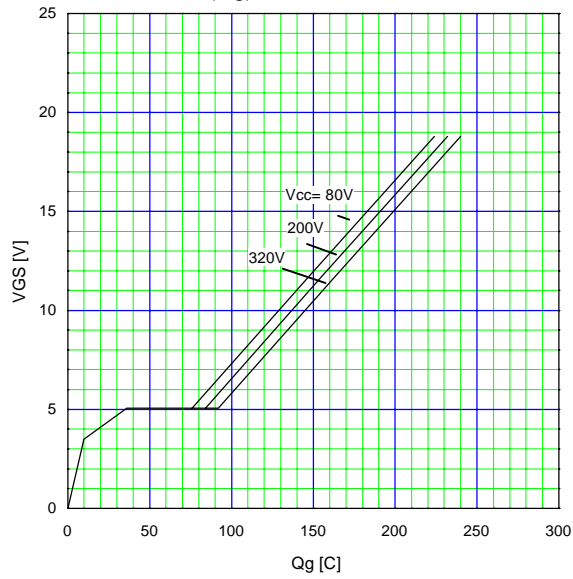
Drain-Source On-state Resistance
 $R_{DS(on)}=f(T_{ch}):I_D=11.5A, V_{GS}=10V$



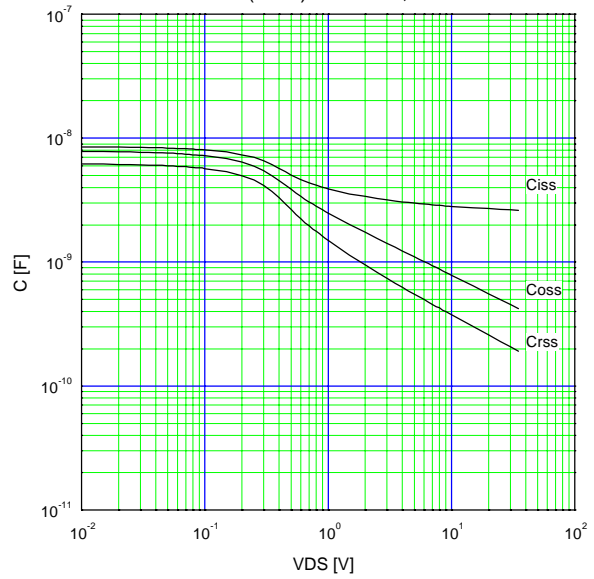
Gate Threshold Voltage vs. Tch
 $V_{GS(th)}=f(T_{ch}):V_{DS}=V_{GS}, I_D=1mA$



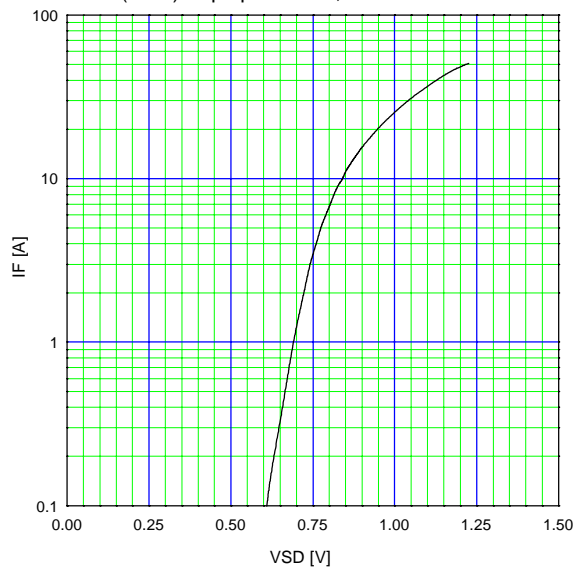
Typical Gate Charge Characteristics
 $V_{GS}=f(Q_g):I_D=23A, T_{ch}=25°C$



Typical Capacitance
 $C=f(V_{DS}):V_{GS}=0V, f=1MHz$



Typical Forward Characteristics of Reverse Diode
 $I_F=f(V_{SD}):80\mu s \text{ pulse test}, T_{ch}=25°C$



Typical Switching Characteristics vs. ID
 $t=f(I_D):V_{cc}=300V, V_{GS}=10V, R_G=10\Omega$

