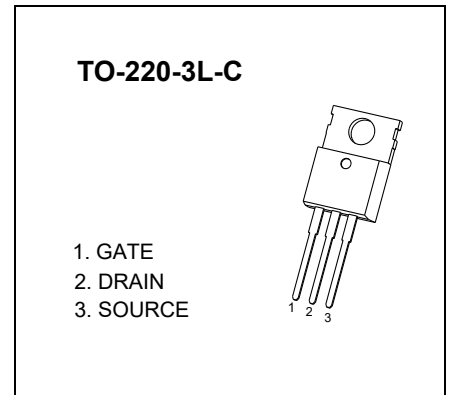




TO-220-3L-C Plastic-Encapsulate MOSFETS

CJP180SN10 N-Channel Power MOSFET

| | | |
|---------------|-----------------|-------|
| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | I_D |
| 100V | 2.5mΩ@10V | 180A |



DESCRIPTION

The CJP180SN10 uses shielded gate trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications

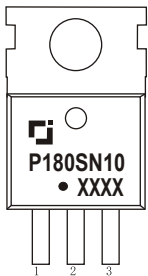
FEATURES

- Low $R_{DS(on)}$
- Low Gate Charge

APPLICATIONS

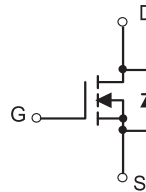
- High efficiency power supply
- Secondary synchronous rectifier

MARKING



P180SN10 = Device code
 Solid dot = Green molding compound device
 if none, the normal device
 XXXX = Code

EQUIVALENT CIRCUIT



MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|---------------------|------------|------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | $I_D^{①}$ | 180 | A |
| Pulsed Drain Current | $I_{DM}^{②}$ | 540 | A |
| Single Pulsed Avalanche Energy | $E_{AS}^{③}$ | 1200 | mJ |
| Power Dissipation | $P_D^{①}$ | 154 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | °C/W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}^{①}$ | 0.81 | °C/W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 ~ +150 | °C |

MOSFET ELECTRICAL CHARACTERISTICS

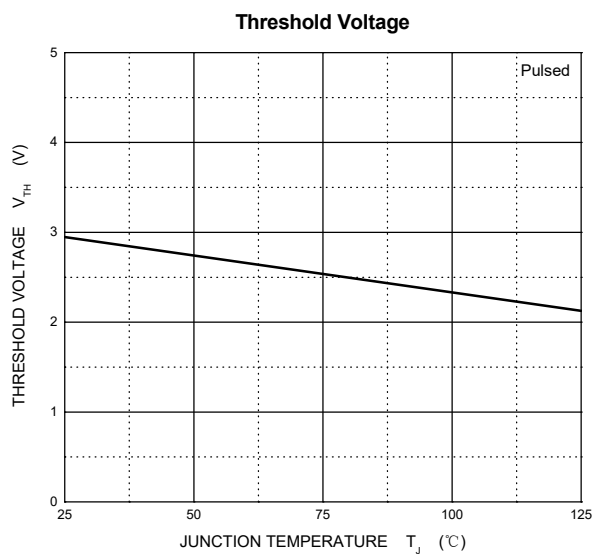
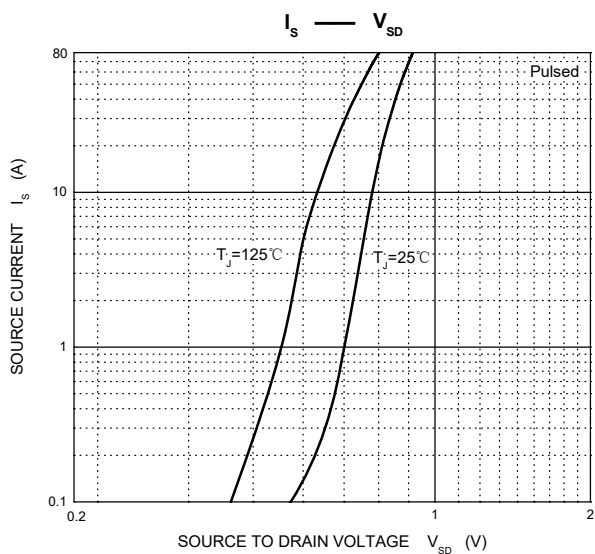
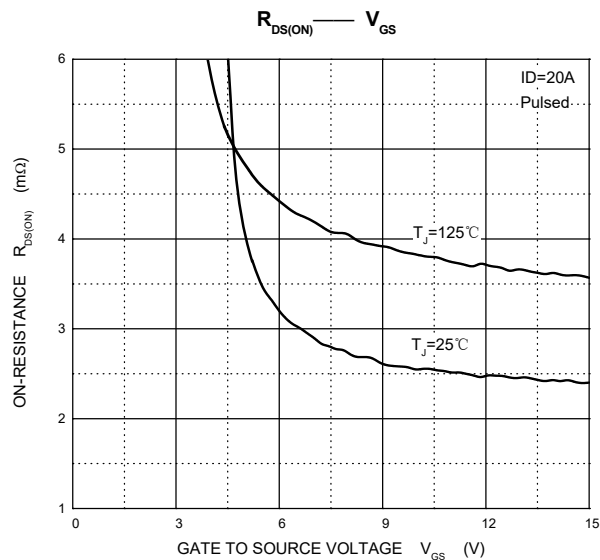
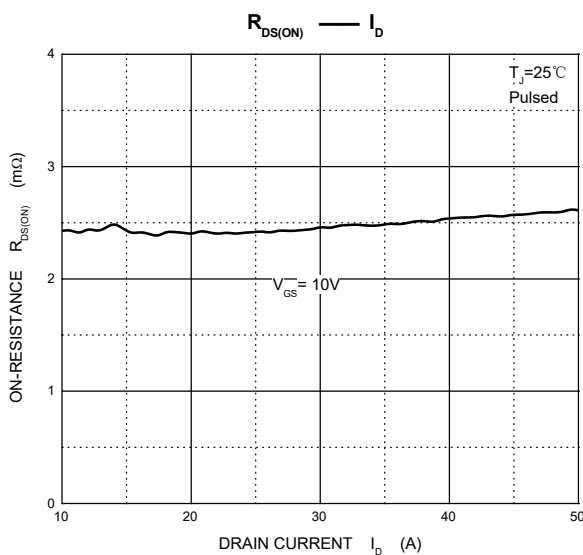
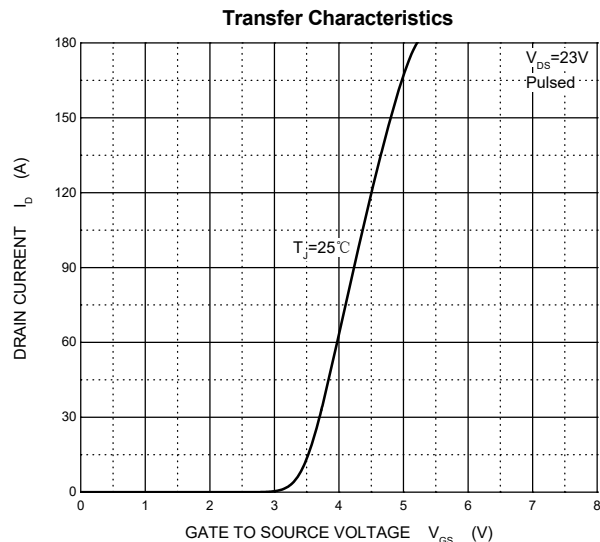
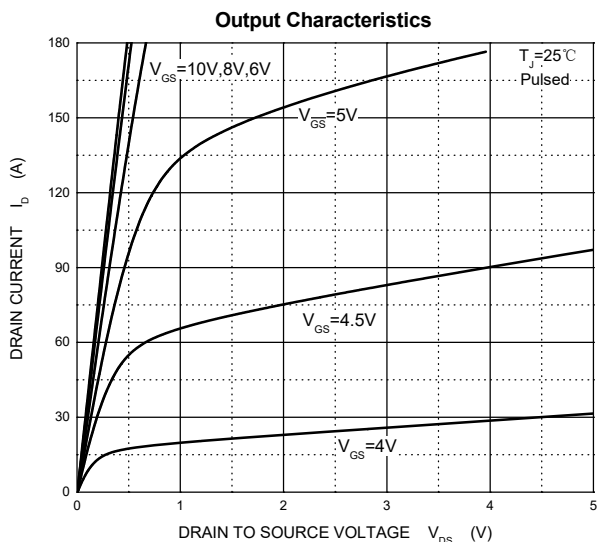
$T_a=25\text{ }^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---------------|---|-----------------------------------|-------|-----------|---------------|
| Off characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 10mA$ | 100 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 80V, V_{GS} = 0V$ | $T_J = 25\text{ }^\circ\text{C}$ | | 1.0 | μA |
| | | | $T_J = 125\text{ }^\circ\text{C}$ | | 100 | |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 20, V_{DS} = 0V$ | | | ± 100 | nA |
| On characteristics ④ | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 2.0 | 3.0 | 4.0 | V |
| Static drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$ | | 2.5 | 3.0 | m Ω |
| Dynamic characteristics ⑤ | | | | | | |
| Input capacitance | C_{iss} | $V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$ | | 6480 | 9800 | pF |
| Output capacitance | C_{oss} | | | 1560 | 2400 | |
| Reverse transfer capacitance | C_{rss} | | | 23 | 45 | |
| Gate resistance | R_g | $f = 1\text{MHz}$ | | 1.5 | | Ω |
| Switching characteristics ⑤ | | | | | | |
| Total gate charge | Q_g | $V_{GS} = 10V, V_{DS} = 50V, I_D = 20A$ | | 110 | 220 | nC |
| Gate-source charge | Q_{gs} | | | 23 | 46 | |
| Gate-drain charge | Q_{gd} | | | 21 | 42 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DS} = 50V, I_D = 5A, V_{GS} = 10V, R_{GEN} = 10\Omega$ | | 138 | | ns |
| Turn-on rise time | t_r | | | 276 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 720 | | |
| Turn-off fall time | t_f | | | 500 | | |
| Drain-Source Diode Characteristics | | | | | | |
| Drain-source diode forward voltage(note1) | V_{SD} ④ | $V_{GS} = 0V, I_S = 20A$ | | | 1.2 | V |
| Continuous drain-source diode forward current | I_S ① | | | | 180 | A |
| Pulsed drain-source diode forward current | I_{SM} ② | | | | 540 | A |
| Reverse recovery time | t_{rr} | $di_F/dt = 100A/\mu\text{s}, I_F = 50A, V_{DD} = 100V, V_{GS} = 0V$ | | 86 | | ns |
| Reverse recovery charge | Q_{rr} | | | 204.7 | | nC |

Notes:

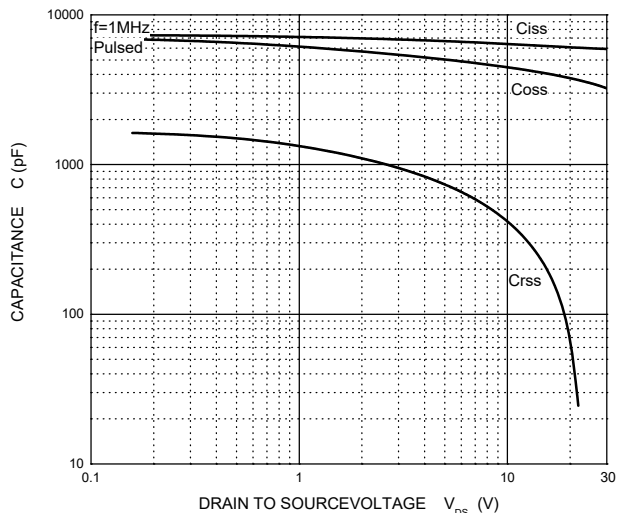
- $T_C = 25\text{ }^\circ\text{C}$ Limited only by maximum temperature allowed.
- $P_W \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$.
- EAS condition: $V_{DD} = 50V, V_{GS} = 10V, L = 0.5\text{mH}, R_g = 25\Omega$ Starting $T_J = 25\text{ }^\circ\text{C}$.
- Pulse Test : Pulse Width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production.

MOSFET ELECTRICAL CHARACTERISTICS

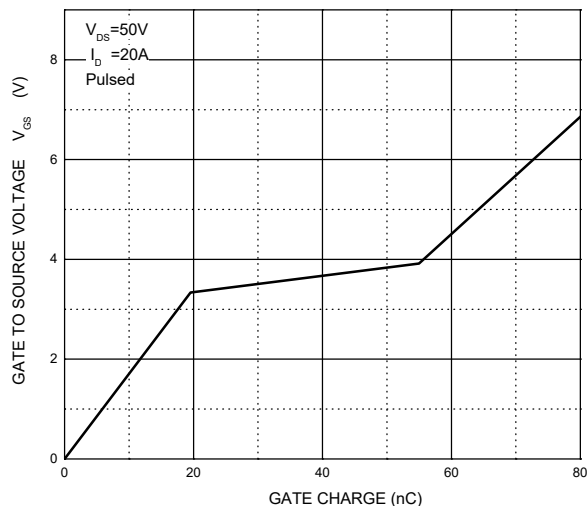


MOSFET ELECTRICAL CHARACTERISTICS

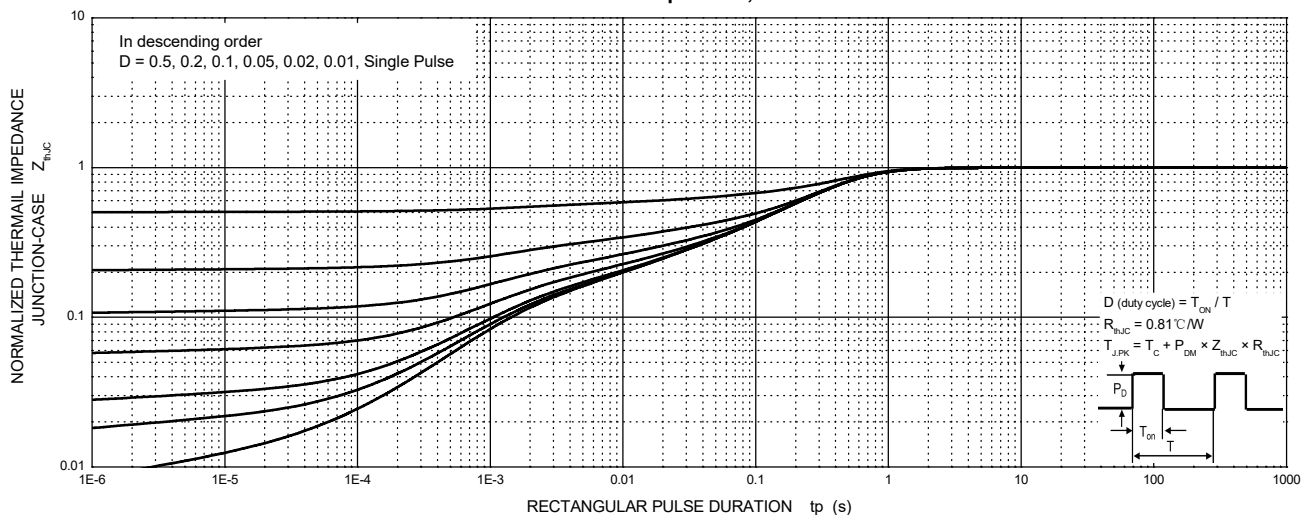
Capacitances



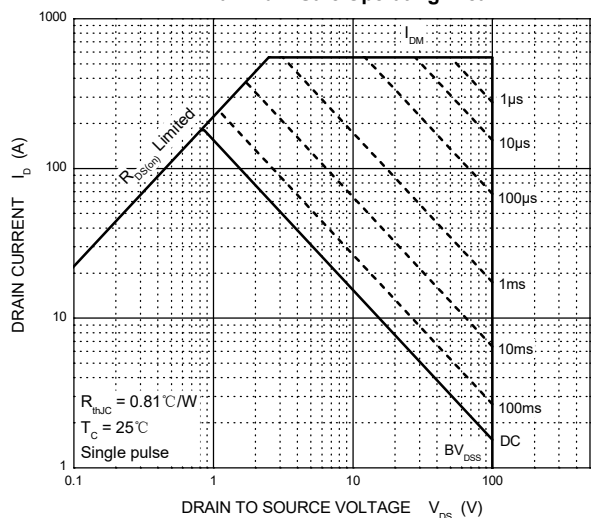
Gate Charge



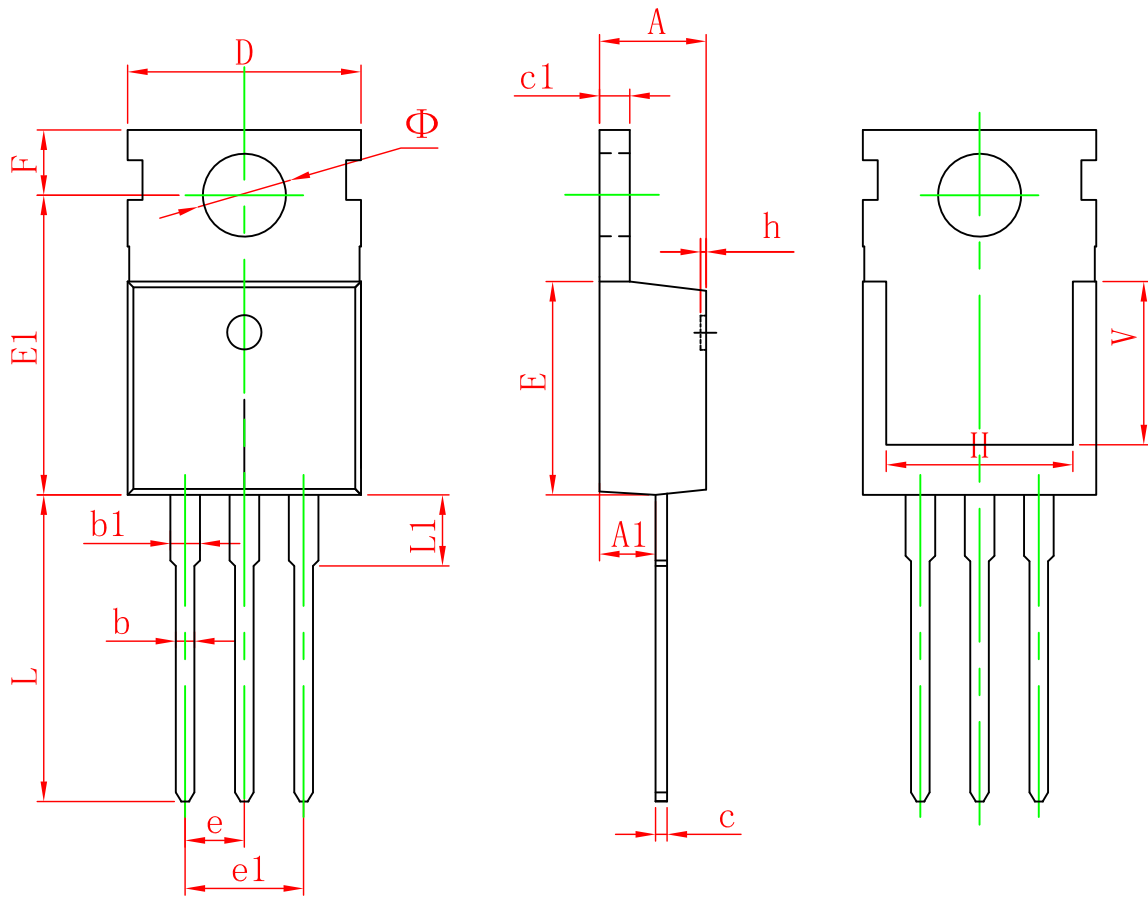
Transient Thermal Impedance, Junction-Case



Maximum Safe Operating Area



TO-220-3L-C Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.400 | 4.600 | 0.173 | 0.181 |
| A1 | 2.250 | 2.550 | 0.089 | 0.100 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 9.910 | 10.250 | 0.390 | 0.404 |
| E | 8.950 | 9.750 | 0.352 | 0.384 |
| E1 | 12.650 | 12.950 | 0.498 | 0.510 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.650 | 2.950 | 0.104 | 0.116 |
| H | 7.900 | 8.100 | 0.311 | 0.319 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 12.900 | 13.400 | 0.508 | 0.528 |
| L1 | 2.850 | 3.250 | 0.112 | 0.128 |
| V | 7.500 REF. | | 0.295 REF. | |
| Φ | 3.400 | 3.800 | 0.134 | 0.150 |