JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD

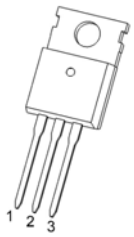
# TO-220-3L-C Plastic-Encapsulate MOSFETS

## CJP15H03 N-Channel Power MOSFET

### DESCRIPTION

The CJP15H03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

**TO-220-3L-C**



1. GATE
2. DRAIN
3. SOURCE

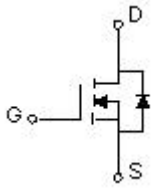
### FEATURES

- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

### APPLICATIONS

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

### EQUIVALENT CIRCUIT




### MAXIMUM RATINGS ( $T_a$=25℃ unless otherwise noted )

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $I_D$ | 150 | A |
| Pulsed Drain Current | $I_{DM}$ | 600 | A |
| Single Pulsed Avalanche Energy | $E_{AS}$(1) | 1700 | mJ |
| Power Dissipation | $P_D$ | 2 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature Range | $T_{stg}$ | -55 ~+150 | ℃ |
| Lead Temperature for Soldering Purposes(1/8'' from case for 10s) | $T_L$ | 260 | ℃ |

(1).$E_{AS}$ condition: $V_{DD}$=20V,L=1mH, $R_G$=25Ω, Starting $T_J$ = 25°C

## ELECTRICAL CHARACTERISTICS($T_a$=25℃ unless otherwise specified)

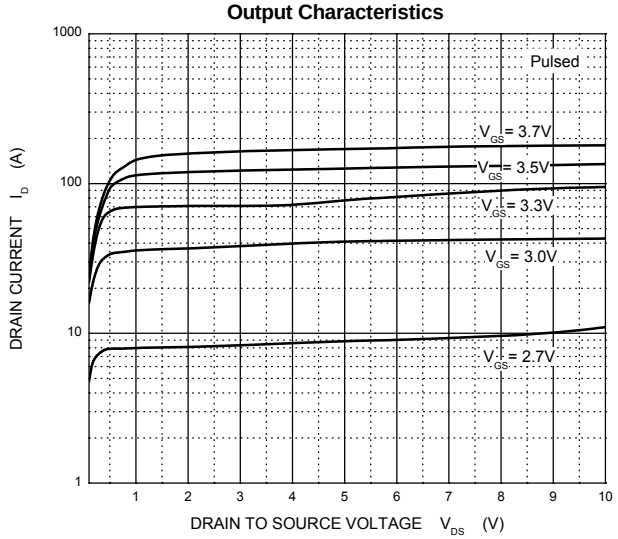
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)\ DSS}$ | $V_{GS}$ = 0V, $I_D$ =250μA | 30 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =30V, $V_{GS}$ =0V | | | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±20V | | | ±100 | nA |
| **On characteristics (note1)** | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 1.2 | | 2.5 | V |
| Static drain-source on-sate resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =20A | | 2.3 | 3 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =10A | | 3.2 | 4 | mΩ |
| Forward transconductance | $g_{Fs}$ | $V_{DS}$ =10V, $I_D$ =20A | 32 | | | S |
| **Dynamic characteristics (note 2)** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ =15V,$V_{GS}$ =0V, f =1MHz | | 5000 | | pF |
| Output capacitance | $C_{oss}$ | | | 1135 | | |
| Reverse transfer capacitance | $C_{rss}$ | | | 563 | | |
| **Switching characteristics (note 2)** | | | | | | |
| Total gate charge | $Q_g$ | $V_{DS}$=15V, $V_{GS}$=10V, $I_D$=30A | | 38 | | nC |
| Gate-source charge | $Q_{gs}$ | | | 9 | | |
| Gate-drain charge | $Q_{gd}$ | | | 13 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=15V, $I_D$=2A $V_{GS}$=10V,$R_G$=2.5Ω, $R_L$=15Ω | | 26 | | ns |
| Turn-on rise time | $t_r$ | | | 24 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 91 | | |
| Turn-off fall time | $t_f$ | | | 39 | | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Drain-source diode forward voltage(note1) | $V_{SD}$ | $V_{GS}$ =0V, $I_S$=150A | | | 1.2 | V |
| Continuous drain-source diode forward current (note3) | $I_S$ | | | | 150 | A |
| Pulsed drain-source diode forward current | $I_{SM}$ | | | | 600 | A |

Notes:

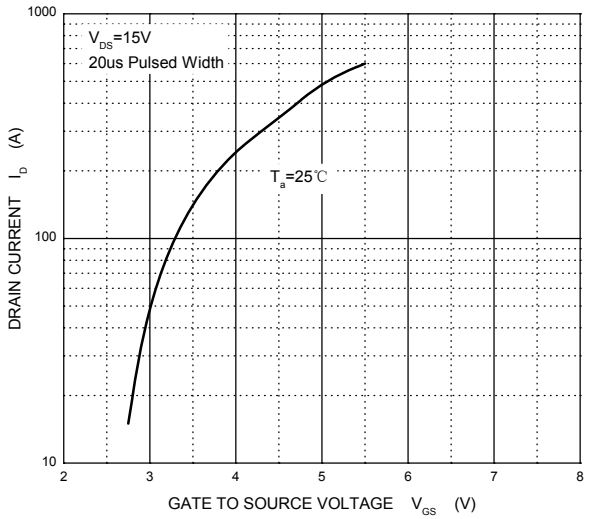
1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Guaranteed by design, not subject to production.
3. Surface Mounted on FR4 Board, t≤10 sec.

# Typical Characteristics

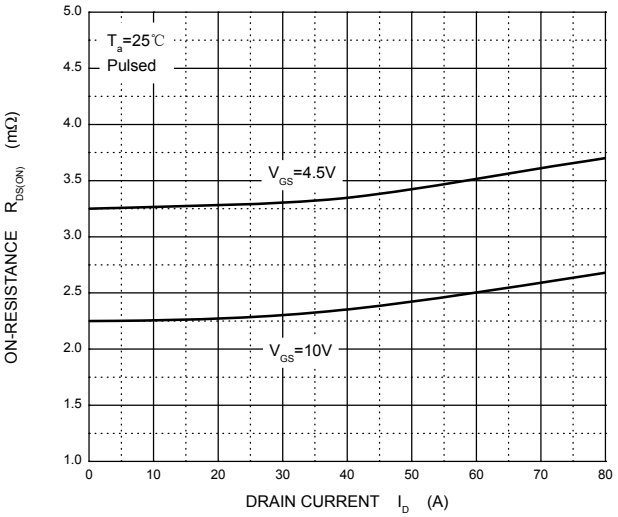
**Output Characteristics**



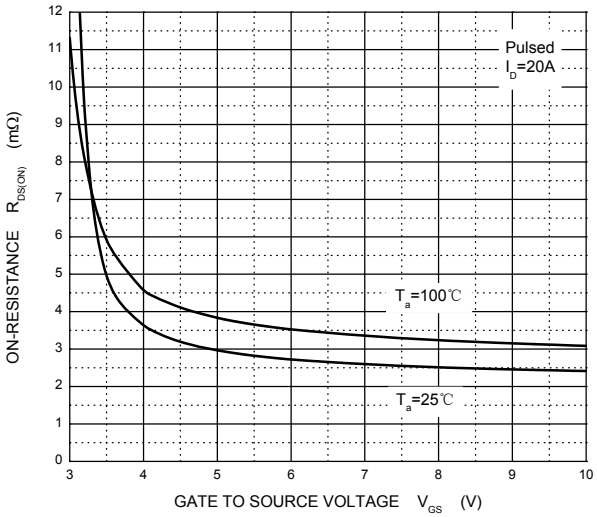

**Transfer Characteristics**



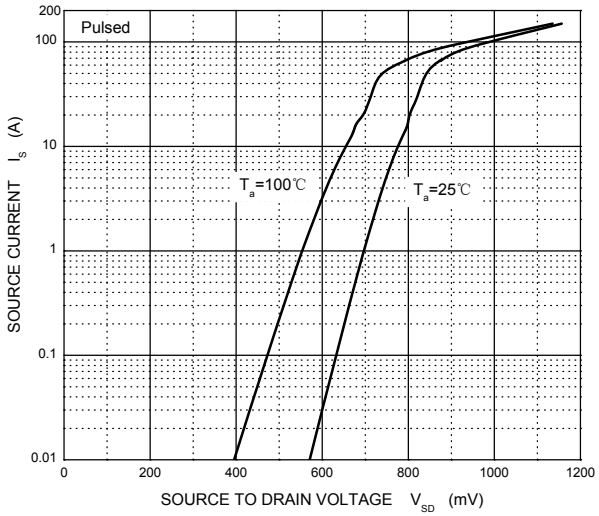

**$R_{DS(ON)}$ —— $I_D$**



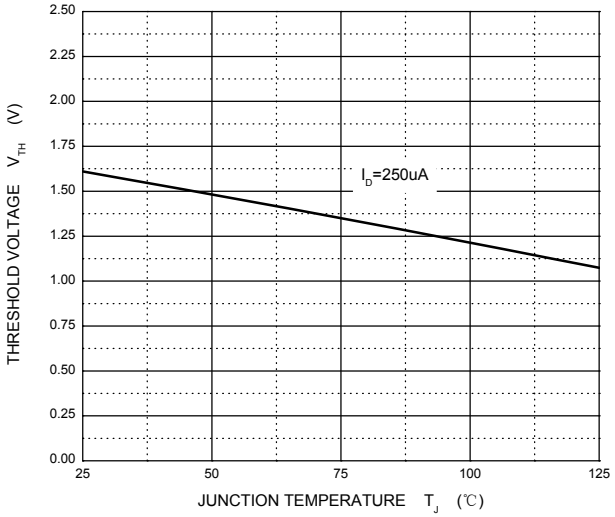

**$R_{DS(ON)}$—— $V_{GS}$**



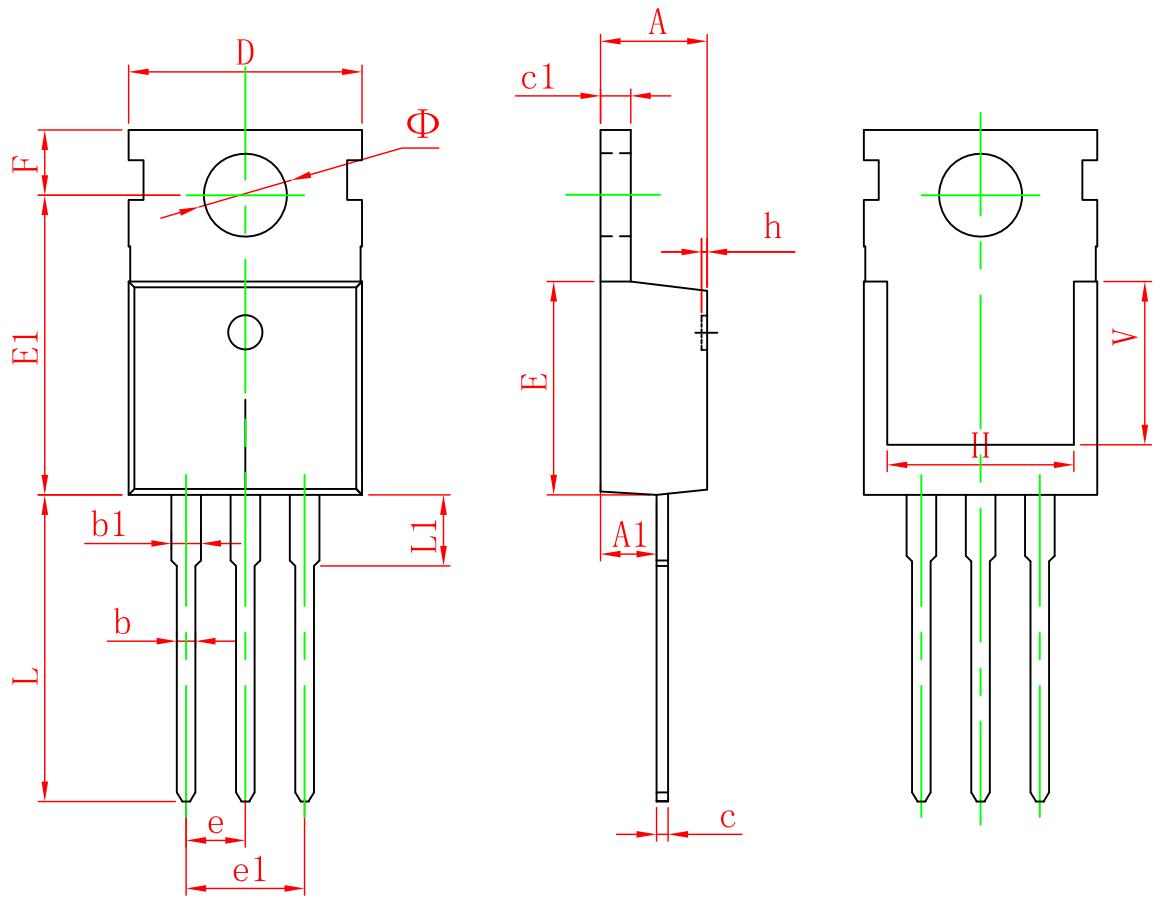

**$I_S$ —— $V_{SD}$**




**Threshold Voltage**



## 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 |