

## SOT23-3L 30V $BV_{DSS}$ , 17m $\Omega$ $R_{DS(on)}$ , N-channel MOSFET

### 1. Description

The CCX3404A is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product CCX3404A is Pb-free.

### 2. Features

- 30V,  $R_{DS(on)}$ =17m $\Omega$ (TYP.) @ $V_{GS}$ =10V  
 $R_{DS(on)}$ =26m $\Omega$ (TYP.) @ $V_{GS}$ =4.5V
- Use trench MOSFET technology
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

### 3. Applications

- PWM applications
- Load switch
- DC/DC conversion
- Power management in portable/desktop PCs

### 4. Ordering Information

| Part Number | Package  | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|-------------|----------|---------|--------------|-------------|-------------------|---------------------|-----------|
| CCX3404A    | SOT23-3L | 3404    | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 7 inches  |

Table-1 Ordering information

### 5. Pin Configuration and Functions

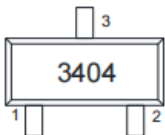
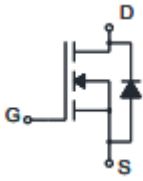
| Pin | Function | Outline                                                                             | Circuit Diagram                                                                       |
|-----|----------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2   | Source   |  |  |
| 1   | Gate     |                                                                                     |                                                                                       |
| 3   | Drain    |                                                                                     |                                                                                       |

Table-2 Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter                         |                          | Symbol     | Limit      | Unit               |
|-----------------------------------|--------------------------|------------|------------|--------------------|
| Drain-Source Voltage              |                          | $BV_{DSS}$ | 30         | V                  |
| Gate-Source Voltage               |                          | $V_{GS}$   | $\pm 20$   | V                  |
| Continuous Drain Current          | $T_A=25^{\circ}\text{C}$ | $I_D$      | 6.2        | A                  |
|                                   | $T_A=75^{\circ}\text{C}$ |            | 4.7        |                    |
| Maximum Power Dissipation         | $T_A=25^{\circ}\text{C}$ | $P_D$      | 1.4        | W                  |
|                                   | $T_A=75^{\circ}\text{C}$ |            | 0.9        |                    |
| Pulsed Drain Current <sup>a</sup> |                          | $I_{DM}$   | 24.8       | A                  |
| Operating Junction Temperature    |                          | $T_J$      | 150        | $^{\circ}\text{C}$ |
| Lead Temperature                  |                          | $T_L$      | 260        | $^{\circ}\text{C}$ |
| Storage Temperature Range         |                          | $T_{stg}$  | -55 to 150 | $^{\circ}\text{C}$ |

### Thermal resistance ratings

| Single Operation                                    |                 |         |         |                      |
|-----------------------------------------------------|-----------------|---------|---------|----------------------|
| Parameter                                           | Symbol          | Typical | Maximum | Unit                 |
| Junction-to-Ambient Thermal Resistance <sup>a</sup> | $R_{\theta JA}$ | 72      | 90      | $^{\circ}\text{C/W}$ |

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

## Electrical Characteristics

At TA = 25°C unless otherwise specified

| Parameter                                | Symbol              | Test Conditions                                                                      | Min. | Typ. | Max. | Unit |
|------------------------------------------|---------------------|--------------------------------------------------------------------------------------|------|------|------|------|
| OFF CHARACTERISTICS                      |                     |                                                                                      |      |      |      |      |
| Drain-to-Source Breakdown Voltage        | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                           | 30   |      |      | V    |
| Zero Gate Voltage Drain Current          | I <sub>DSS</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V                                            |      |      | 1.0  | uA   |
| Gate-to-source Leakage Current           | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                           |      |      | ±100 | nA   |
| ON CHARACTERISTICS                       |                     |                                                                                      |      |      |      |      |
| Gate Threshold Voltage                   | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                             | 1.0  | 1.5  | 2.2  | V    |
| Drain-to-source On-resistance            | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                             |      | 17   | 24   | mΩ   |
|                                          |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A                                            |      | 26   | 38   |      |
| Forward Trans conductance                | g <sub>FS</sub>     | V <sub>DS</sub> =5.0V, I <sub>D</sub> =5A                                            |      |      | 40   | S    |
| CHARGES, CAPACITANCESAND GATE RESISTANCE |                     |                                                                                      |      |      |      |      |
| Input Capacitance                        | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, f=1MHz, V <sub>DS</sub> =15V                                    |      | 255  |      | pF   |
| Output Capacitance                       | C <sub>OSS</sub>    |                                                                                      |      | 45   |      |      |
| Reverse Transfer Capacitance             | C <sub>RSS</sub>    |                                                                                      |      | 35   |      |      |
| Total Gate Charge                        | Q <sub>G(TOT)</sub> | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>b</sub> =5A                       |      | 9.8  | 12   | nC   |
| Gate-to-Source Charge                    | Q <sub>GS</sub>     |                                                                                      |      | 1.8  | 2.2  |      |
| Gate-to-Drain Charge                     | Q <sub>GD</sub>     |                                                                                      |      | 2.2  | 3    |      |
| SWITCHING CHARACTERISTICS                |                     |                                                                                      |      |      |      |      |
| Turn-On Delay Time                       | t <sub>d(ON)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =2Ω, R <sub>GEN</sub> =3Ω |      | 5    |      | ns   |
| Rise Time                                | t <sub>r</sub>      |                                                                                      |      | 3.2  |      |      |
| Turn-Off Delay Time                      | t <sub>d(OFF)</sub> |                                                                                      |      | 24   |      |      |
| Fall Time                                | t <sub>f</sub>      |                                                                                      |      | 6    |      |      |
| BODY DIODE CHARACTERISTICS               |                     |                                                                                      |      |      |      |      |
| Forward Voltage                          | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =1.0A                                            | 0.45 |      | 1.2  | V    |

## 7. Typical Characteristic

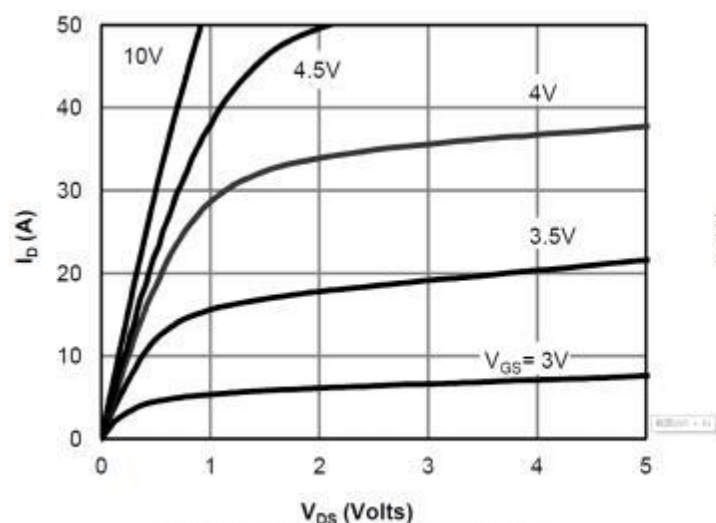


Figure 1: On-Region Characteristics

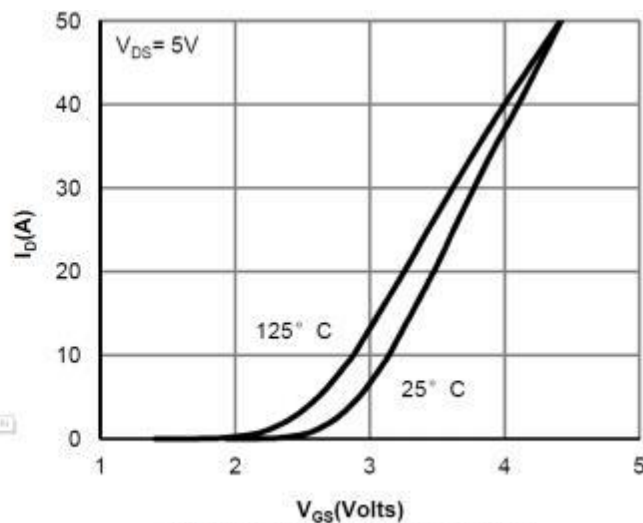


Figure 2: Transfer Characteristics

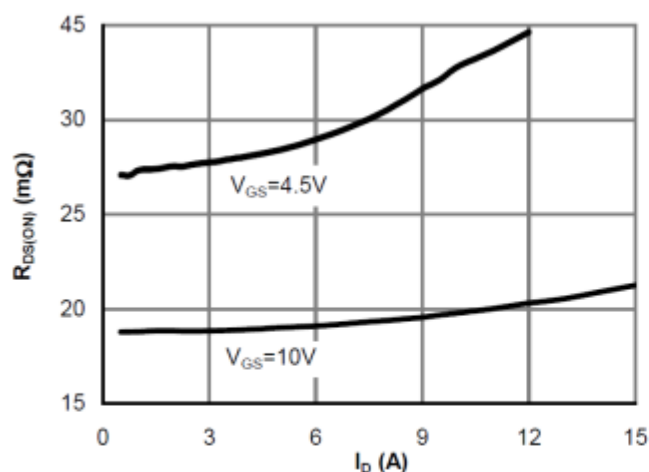


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

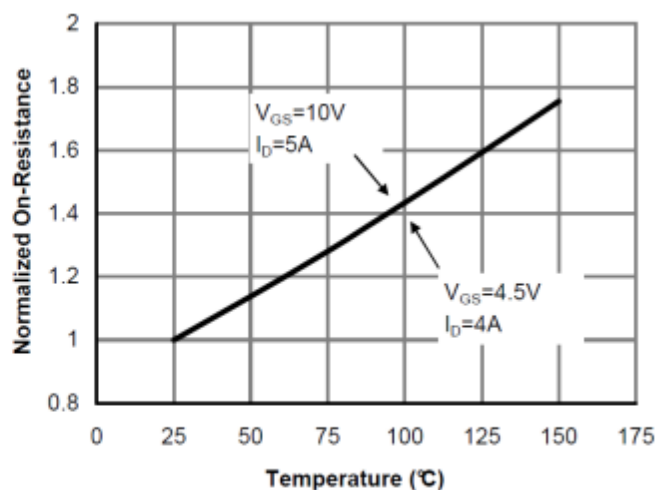


Figure 4: On-Resistance vs. Junction Temperature

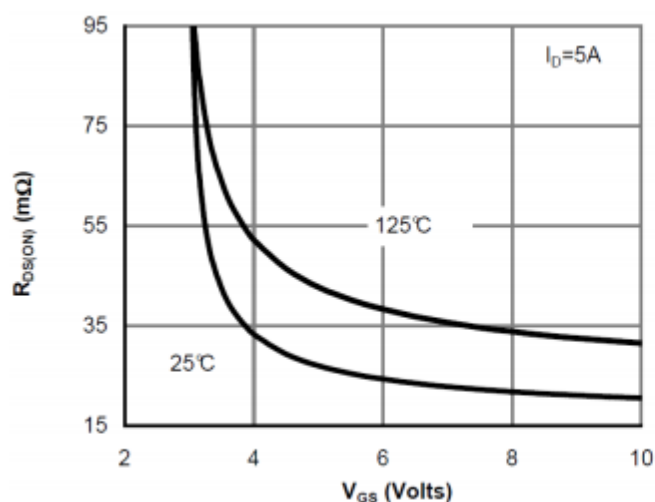


Figure 5: On-Resistance vs. Gate-Source Voltage

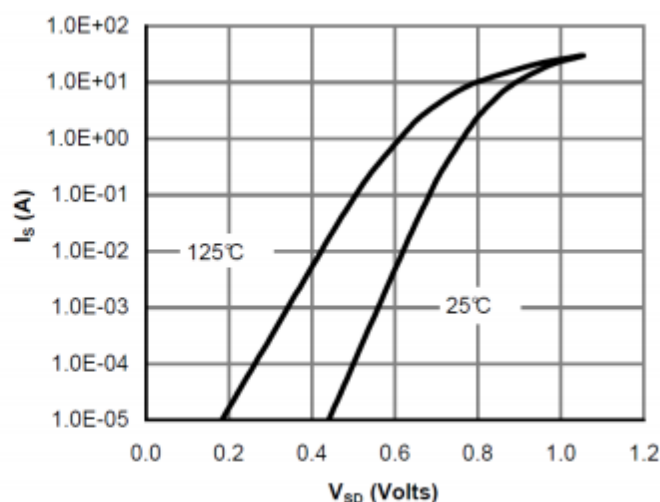


Figure 6: Body-Diode Characteristics

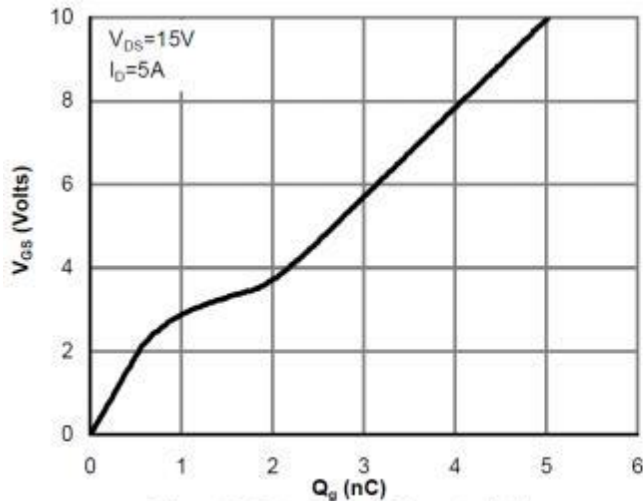


Figure 7: Gate-Charge Characteristics

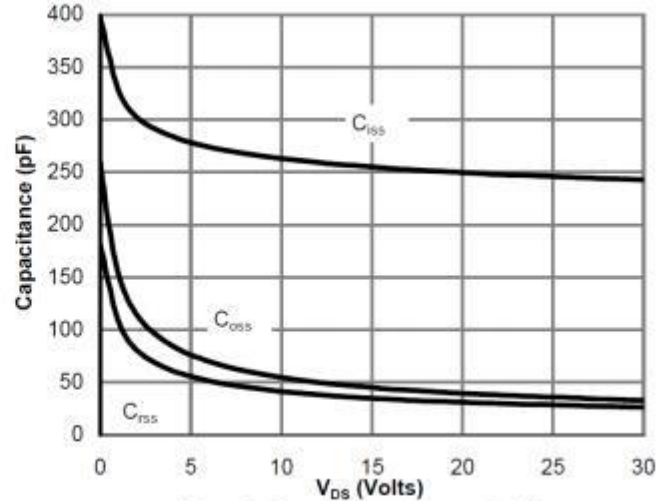


Figure 8: Capacitance Characteristics

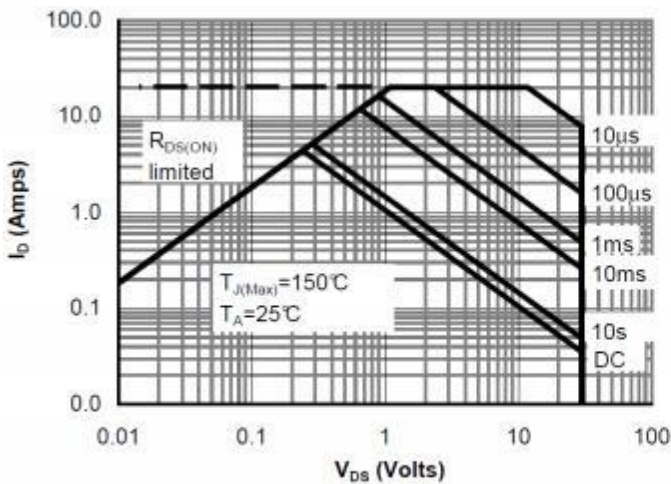


Figure 9: Maximum Forward Biased Safe Operating Area

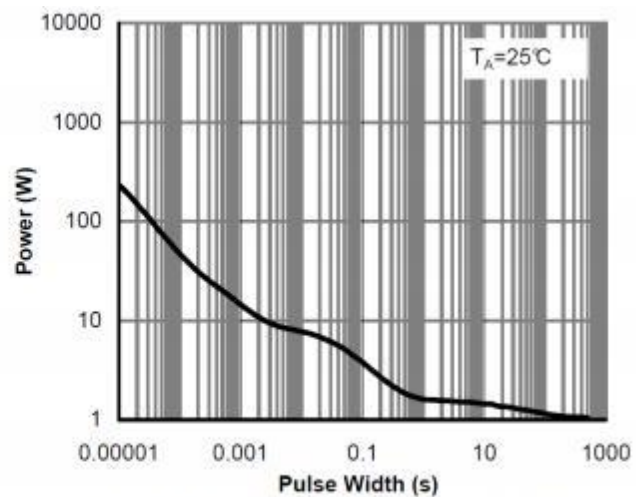


Figure 10: Single Pulse Power Rating Junction-to-Ambient

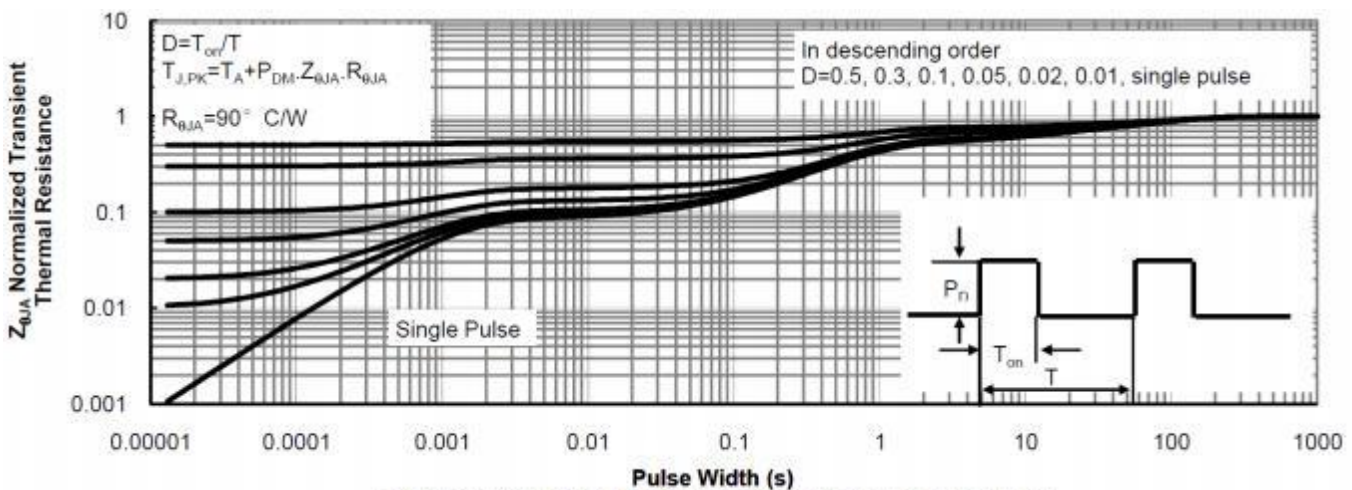
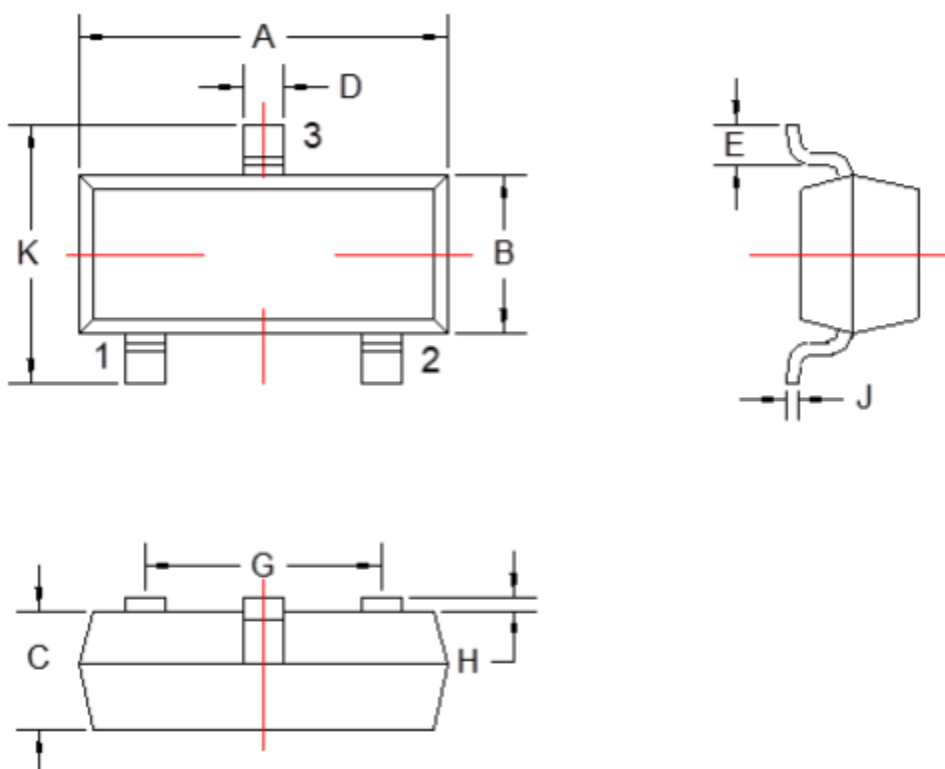


Figure 11: Normalized Maximum Transient Thermal Impedance

## 8. Dimension (SOT23-3L)



Units: mm

| COMMON DIMENSIONS |             |      |            |       |
|-------------------|-------------|------|------------|-------|
| SYMBOL            | MILLIMETERS |      | INCHS      |       |
|                   | MIN         | MAX  | MIN        | MAX   |
| A                 | 2.8         | 3    | 0.11       | 0.118 |
| B                 | 1.5         | 1.7  | 0.059      | 0.067 |
| C                 | 1           | 1.2  | 0.039      | 0.047 |
| D                 | 0.3         | 0.5  | 0.012      | 0.02  |
| E                 | 0.25        | 0.55 | 0.01       | 0.022 |
| G                 | 1.90 TYP.   |      | 0.075 TYP. |       |
| H                 | 0           | 0.1  | 0          | 0.004 |
| J                 | 0.04        | 0.21 | 0.002      | 0.008 |
| K                 | 2.6         | 3    | 0.102      | 0.118 |

## Notice

1. All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise. The right to explain is owned by CCX electronics company.
2. Confirm that operation temperature is within the specified range described in the product specification.  
Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
3. CCX shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.