

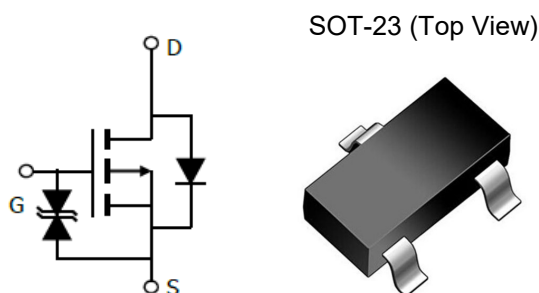
## Description

CM3415 is the P-Channel enhancement mode power field effect transistors with high cell density, trench technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

## Features

- $V_{DS}$ : -20V
- $I_D$ : -4.3A
- $R_{DS(on)}$  (@ $V_{GS}=-4.5V$ ) : < 49m $\Omega$
- $R_{DS(on)}$  (@ $V_{GS}=-2.5V$ ) : < 62m $\Omega$
- $R_{DS(on)}$  (@ $V_{GS}=-1.8V$ ) : < 100m $\Omega$
- High density cell design for extremely low  $R_{DS(on)}$
- Excellent on-resistance and DC current capability

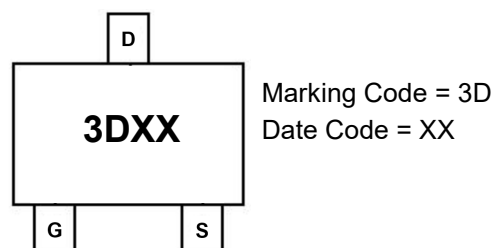
## Equivalent Circuit and Pin Configuration



## Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Portable Instrumentation
- Load switch

## Marking Information



## Ordering Information

| Part Number | Packaging        | Reel Size |
|-------------|------------------|-----------|
| CM3415      | 3000/Tape & Reel | 7 inch    |

## Absolute Maximum Ratings (TA=25 °C unless otherwise noted)

| Parameter                                                       |                        | Symbol          | Maximum     | Unit               |
|-----------------------------------------------------------------|------------------------|-----------------|-------------|--------------------|
| Drain-source Voltage                                            |                        | $V_{DS}$        | -20         | V                  |
| Gate-source Voltage                                             |                        | $V_{GS}$        | $\pm 10$    | V                  |
| Continuous Drain Current                                        | $T_A=25^\circ\text{C}$ | $I_D$           | -4.3        | A                  |
|                                                                 | $T_A=70^\circ\text{C}$ |                 | -3.5        | A                  |
| Pulsed Drain Current <sup>(1)</sup>                             |                        | $I_{DM}$        | -17.2       | A                  |
| Total Power Dissipation @ $T_A=25^\circ\text{C}$ <sup>(2)</sup> |                        | $P_D$           | 1.4         | W                  |
| Thermal Resistance Junction-to-Ambient <sup>(2)</sup>           |                        | $R_{\theta JA}$ | 90          | $^\circ\text{C/W}$ |
| Junction and Storage Temperature Range                          |                        | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics (T<sub>J</sub>=25 °C unless otherwise noted)**

| Parameter                             | Symbol  | Conditions                           | Min  | Typ  | Max  | Units |
|---------------------------------------|---------|--------------------------------------|------|------|------|-------|
| Static Parameter                      |         |                                      |      |      |      |       |
| Drain-Source Breakdown Voltage        | BVDSS   | VGS=0V, ID=-250μA                    | -20  |      |      | V     |
| Zero Gate Voltage Drain Current       | IDSS    | VDS=-20V, VGS=0V, TC=25°C            |      |      | -1   | μA    |
| Gate-Body Leakage Current             | IGSS    | VGS=±10V, VDS=0V                     |      |      | ±10  | μA    |
| Gate Threshold Voltage                | VGS(th) | VDS=VGS, ID=-250μA                   | -0.4 |      | -1.0 | V     |
| Static Drain-Source on-Resistance     | RDS(on) | VGS=-4.5V, ID=-4A                    |      | 41   | 49   | mΩ    |
|                                       |         | VGS=-2.5V, ID=-4A                    |      | 50   | 62   |       |
|                                       |         | VGS=-1.8V, ID=-1A                    |      | 60   | 100  |       |
| Diode Forward Voltage                 | VSD     | IS=-4A, VGS=0V                       |      | -0.9 | -1.2 | V     |
| Maximum Body-Diode Continuous Current | IS      |                                      |      |      | -4.3 | A     |
| Dynamic Parameters                    |         |                                      |      |      |      |       |
| Input Capacitance                     | Ciss    | VDS=-10V, VGS=0V, f=1MHz             |      | 440  |      | pF    |
| Output Capacitance                    | Coss    |                                      |      | 107  |      |       |
| Reverse Transfer Capacitance          | Crss    |                                      |      | 48   |      |       |
| Switching Parameters                  |         |                                      |      |      |      |       |
| Total Gate Charge                     | Qg      | VGS=-4.5V, VDS=-10V, ID=-4A          |      | 21.5 |      | nC    |
| Gate Source Charge                    | Qgs     |                                      |      | 2.3  |      |       |
| Gate Drain Charge                     | Qgd     |                                      |      | 2.9  |      |       |
| Turn-on Delay Time                    | tD(on)  | VGS=-4.5V, VDD=-9V, RL=2.5Ω, RGEN=3Ω |      | 96   |      | ns    |
| Turn-on Rise Time                     | tr      |                                      |      | 70   |      |       |
| Turn-off Delay Time                   | tD(off) |                                      |      | 198  |      |       |
| Turn-off Fall Time                    | tf      |                                      |      | 186  |      |       |

Noted: (1) Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

(2) Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. With 2oz Copper, t ≤ 10s

## Typical Performance Characteristics

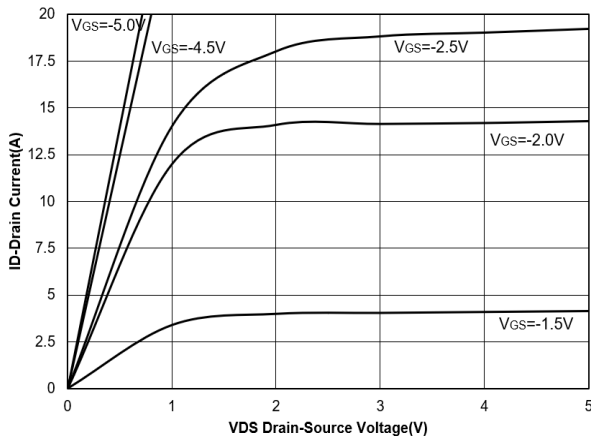


Figure 1. Output Characteristics

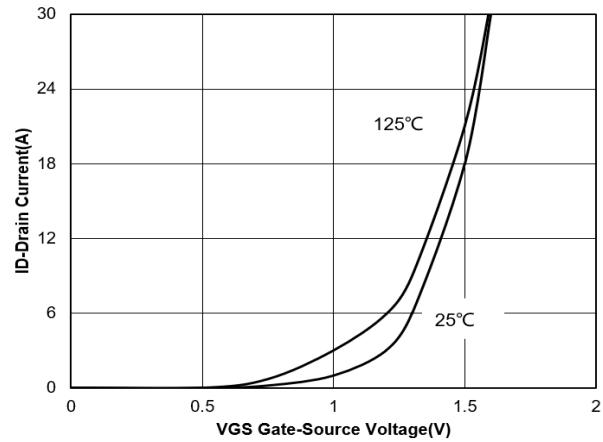


Figure 2. Transfer Characteristics

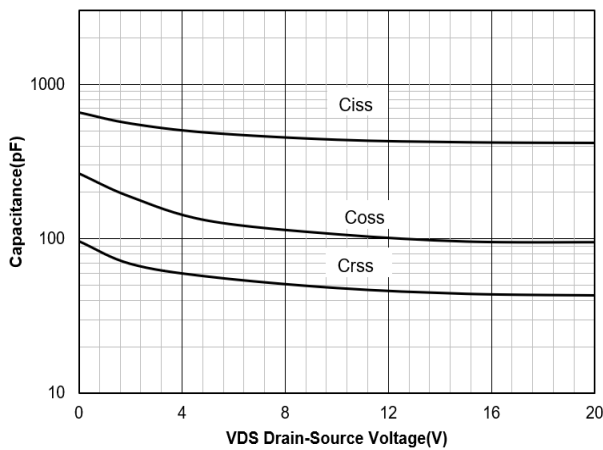


Figure 3. Capacitance Characteristics

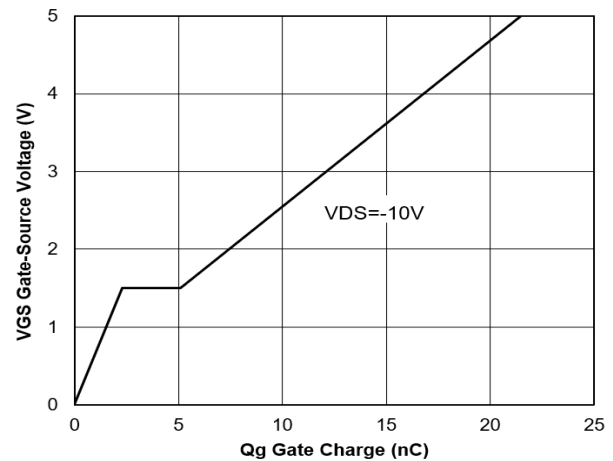


Figure 4. Gate Charge

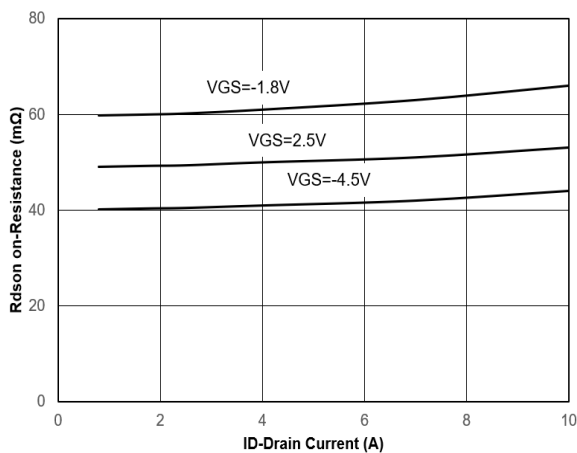


Figure 5. Drain-Source on Resistance

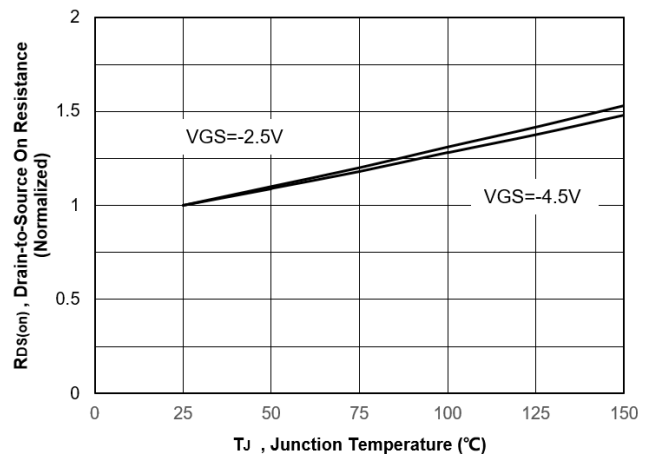


Figure 6. Normalized On-Resistance Vs. Temperature

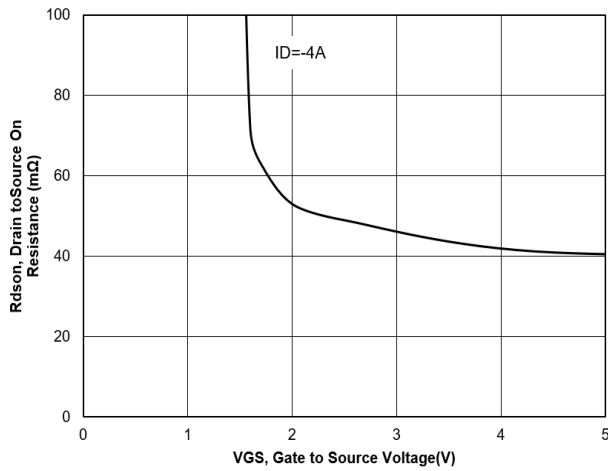


Figure 7. Typical Drain to Source ON Resistance VS Gate Voltage and Drain Current

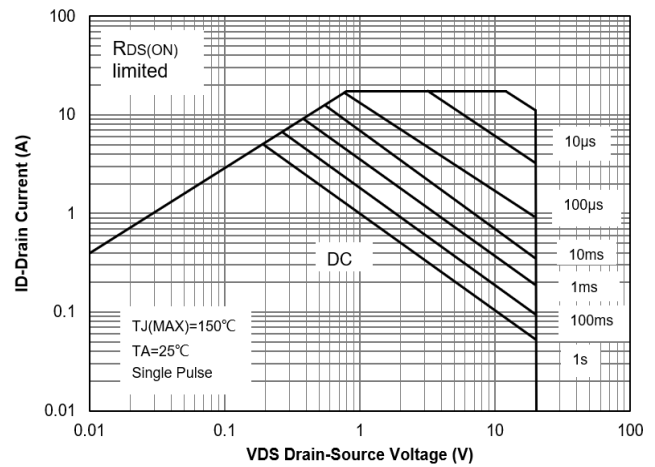


Figure 8. Safe Operation Area

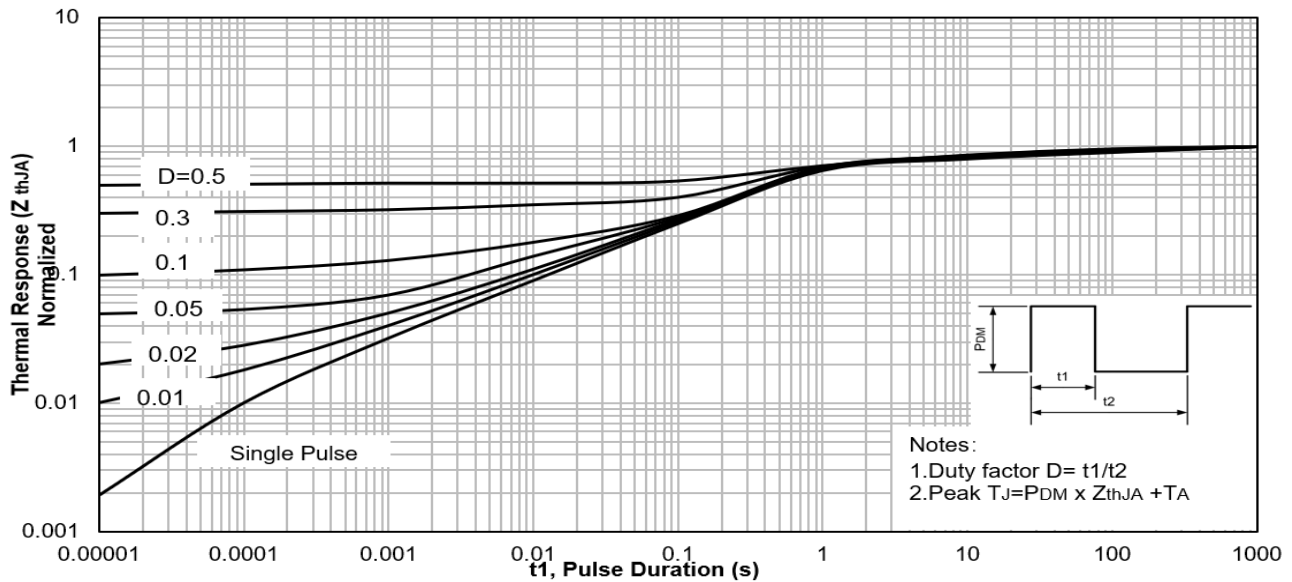


Figure 9. Maximum Effective Transient Thermal Impedance ,Junction-to-Ambient

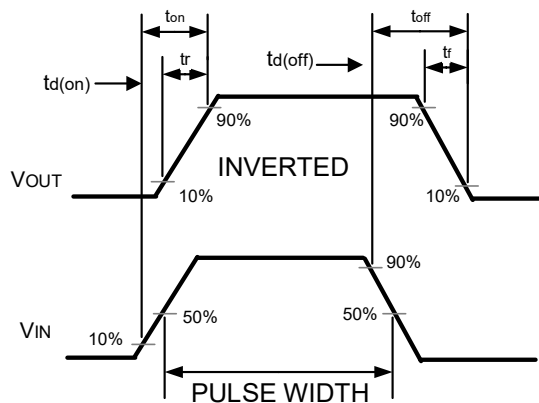
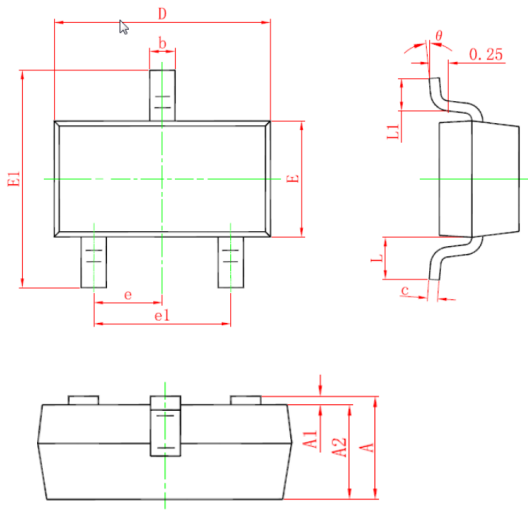


Figure 10. Switching wave

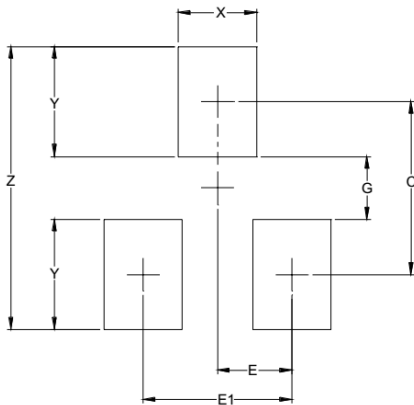
### SOT-23 Package Outline Drawing

(Unit : mm)



| SYM | DIMENSIONS  |     |      |          |     |       |
|-----|-------------|-----|------|----------|-----|-------|
|     | MILLIMETERS |     |      | INCHES   |     |       |
|     | MIN         | NOM | MAX  | MIN      | NOM | MAX   |
| A   | 0.90        | --  | 1.15 | 0.035    | --  | 0.045 |
| A1  | 0.00        | --  | 0.10 | 0.000    | --  | 0.004 |
| A2  | 0.90        | --  | 1.05 | 0.035    | --  | 0.041 |
| b   | 0.30        | --  | 0.50 | 0.012    | --  | 0.020 |
| c   | 0.08        | --  | 0.15 | 0.003    | --  | 0.006 |
| D   | 2.80        | --  | 3.00 | 0.110    | --  | 0.118 |
| E   | 1.20        | --  | 1.40 | 0.047    | --  | 0.055 |
| E1  | 2.25        | --  | 2.55 | 0.089    | --  | 0.100 |
| e   | 0.95TYP     |     |      | 0.037TYP |     |       |
| e1  | 1.80        | --  | 2.00 | 0.071    | --  | 0.079 |
| L   | 0.55REF     |     |      | 0.022REF |     |       |
| L1  | 0.30        | --  | 0.50 | 0.012    | --  | 0.020 |
| Θ   | 0°          | --  | 8°   | 0°       | --  | 8°    |

### Suggested Land Pattern



| SYM | DIMENSIONS |             |
|-----|------------|-------------|
|     | INCHES     | MILLIMETERS |
| C   | 0.087      | 2.20        |
| E   | 0.037      | 0.95        |
| E1  | 0.075      | 1.90        |
| G   | 0.031      | 0.80        |
| X   | 0.039      | 1.00        |
| Y   | 0.055      | 1.40        |
| Z   | 0.141      | 3.60        |

### Contact Information

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