# CRMLATL2N7002K

## N-Channel 60V, 1.7Ω Typ. Power MOSFET

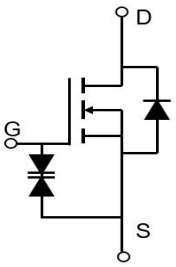
## Description

### Features

- 60V, 0.2A

  $R_{DS(ON)}$ Typ = 1.7Ω @ $V_{GS}$ = 10V

  $R_{DS(ON)}$ Typ = 2.0Ω @ $V_{GS}$ = 4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free
- ESD Protected: 2KV

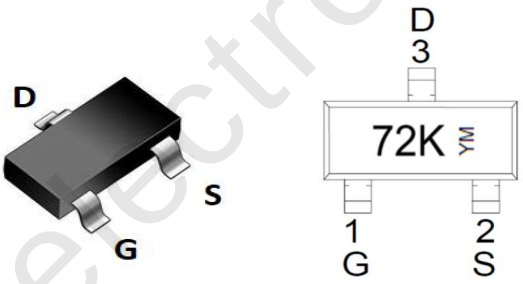



**Schematic Diagram**

### Application

- Battery Operated Systems
- Direct logic-level Interface:

  TTL/CMOS
- Solid-State Relays




**Marking and Pin Assignment**

### Package Marking and Ordering Information

| Device | Marking | Package | Outline | Reel Size | Reel (pcs) | Per Carton (pcs) |
|---|---|---|---|---|---|---|
| CRMLATL2N7002K | 72K | SOT-323-3L | TAPING | 7" | 3000 | 120000 |

### Absolute Maximum Ratings (@ $T_J$ = 25°C unless otherwise specified)

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-to-Source Voltage | | 60 | V |
| $V_{GS}$ | Gate-to-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_A$ = 25°C | 0.2 | A |
| | | $T_A$ = 100°C | 0.12 | A |
| $I_{DM}$ | Pulsed Drain Current [1] | | 0.8 | A |
| $P_D$ | Power Dissipation | $T_A$ = 25°C | 0.3 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient[2] | | 415 | °C/W |
| $T_J$, $T_{STG}$ | Junction & Storage Temperature Range | | -55 to 150 | °C |

## Electrical Characteristics ($T_J$ = 25°C unless otherwise specified)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $I_D$ = 250μA, $V_{GS}$ = 0V | 60 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 60V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±10 | μA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1 | 1.6 | 2 | V |
| $R_{DS(ON)}$ | Static Drain-Source ON-Resistance(3) | $V_{GS}$ = 10V, $I_D$ = 0.2A | - | 1.7 | 2.1 | Ω |
| | | $V_{GS}$ = 4.5V, $I_D$ = 0.1A | - | 2 | 2.4 | Ω |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | - | 28 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 11 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 4 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 0 to 4.5V $V_{DS}$ = 10V, $I_D$ =0.2A | - | 2 | - | nC |
| $Q_{gs}$ | Gate Source Charge | | - | 0.3 | - | nC |
| $Q_{gd}$ | Gate Drain("Miller") Charge | | - | 0.6 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On DelayTime | $V_{GS}$ = 10V, $V_{DD}$ = 10V $I_D$= 0.2A, $R_{GEN}$ = 10Ω | - | 2 | - | ns |
| $t_r$ | Turn-On Rise Time | | - | 15 | - | ns |
| $t_{d(off)}$ | Turn-Off DelayTime | | - | 7 | - | ns |
| $t_f$ | Turn-Off Fall Time | | - | 20 | - | ns |
| **Drain-Source Diode Characteristics and Max Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 0.2 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 0.8 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = 0.2A | - | - | 1.2 | V |

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. $R_{\theta JA}$ is measured with the device mounted on a 1inch$^2$ pad of 2oz copper FR4 PCB
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

## Test Circuit

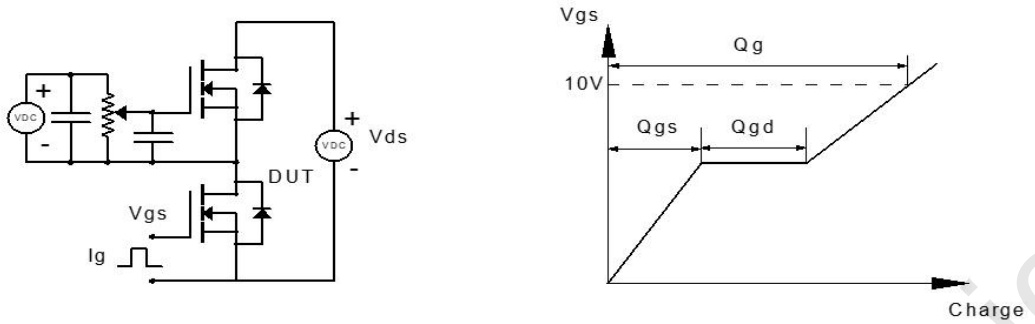



**Figure 1: Gate Charge Test Circuit & Waveform**

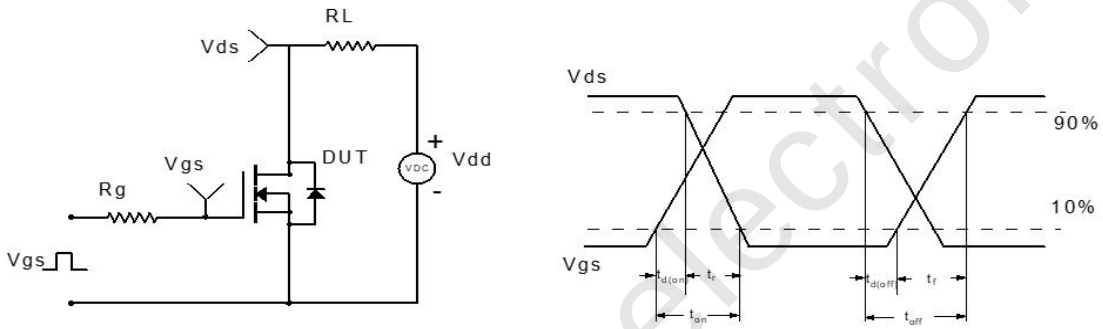



**Figure 2: Resistive Switching Test Circuit & Waveform**

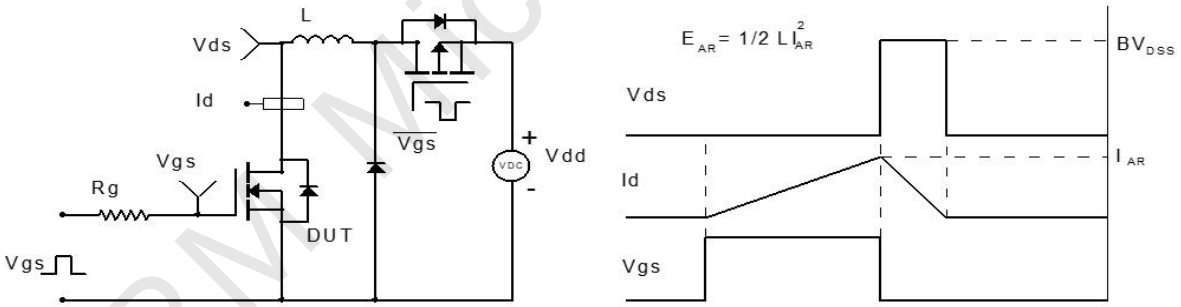



**Figure 3: Unclamped Inductive Switching Test Circuit& Waveform**

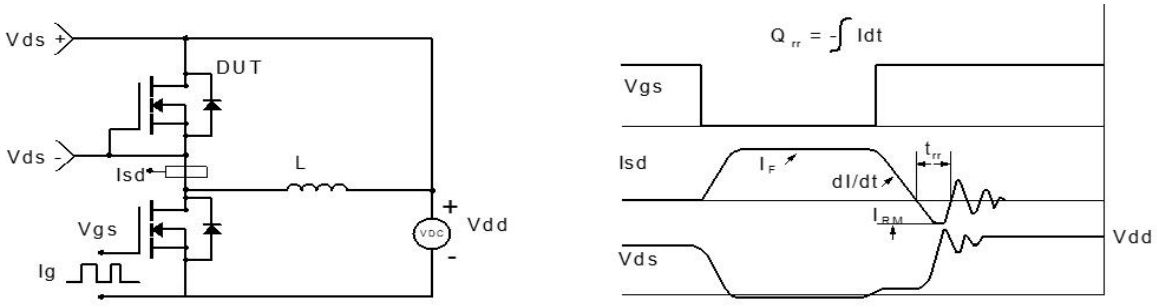
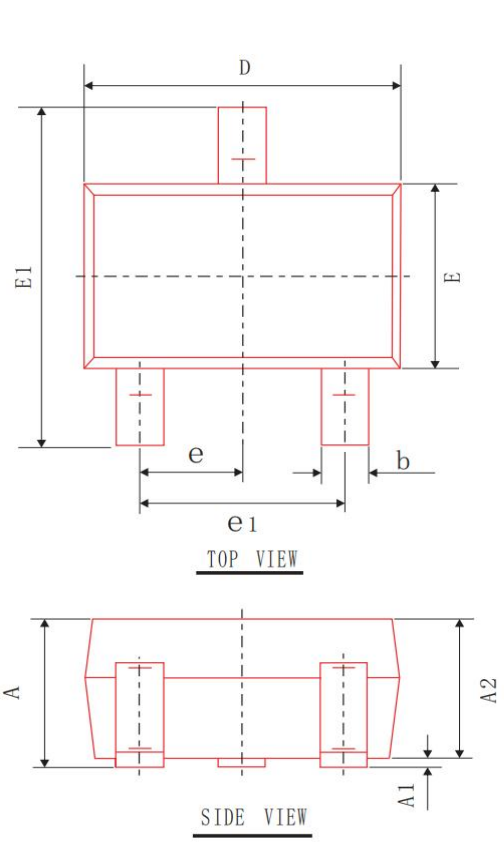



**Figure 4: Diode Recovery Test Circuit & Waveform**

## Package Mechanical Data(SOT-323-3L)




COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.00 | 0.05 | 0.10 |
| A2 | 0.90 | 0.95 | 1.00 |
| b | 0.20 | 0.25 | 0.30 |
| c | 0.08 | 0.10 | 0.15 |
| e1 | 1.20 | 1.30 | 1.40 |
| D | 2.00 | 2.10 | 2.20 |
| E | 1.15 | 1.25 | 1.35 |
| E1 | 2.15 | 2.30 | 2.45 |
| L | 0.26 | 0.36 | 0.46 |
| θ | 0° | 4° | 8° |
| L1 | | 0.525 REF | |
| e | | 0.65 TYP | |

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