

### Description

#### Features

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low RDS(ON)

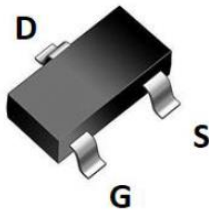
#### Application

- High current load application
- Load switching
- Quick Charge

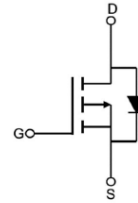
|                                 |     |    |
|---------------------------------|-----|----|
| $V_{DS}$                        | -30 | V  |
| $R_{ds(on),typ}@V_{gs} = -10V$  | 50  | mΩ |
| $R_{ds(on),typ}@V_{gs} = -4.5V$ | 80  | mΩ |
| $I_D$                           | -5  | A  |



Top View



Pin Configuration



### Package Marking and Ordering Information

| Part     | Marking | Package | Packing | Reel Size | Tape Width | Qty  |
|----------|---------|---------|---------|-----------|------------|------|
| CMT9435R | 9435    | SOT23   | Reel    | NA        | NA         | 3000 |

### Key Performance Parameters

| Symbol                  | Parameter                                 | Rating     | Units |
|-------------------------|-------------------------------------------|------------|-------|
| $V_{DS}$                | Drain-Source Voltage                      | -30        | V     |
| $V_{GS}$                | Gate-Source Voltage                       | ±20        | V     |
| $I_{D@Tc=25^{\circ}C}$  | Continuous Drain Current, $V_{GS} = -10V$ | -5         | A     |
| $I_{D@Tc=100^{\circ}C}$ | Continuous Drain Current, $V_{GS} = -10V$ | -4.1       | A     |
| IDM                     | Pulsed Drain Current <sup>1</sup>         | -20        | A     |
| $PD@Tc=25^{\circ}C$     | Total Power Dissipation                   | 3.4        | W     |
| $T_{STG}$               | Storage Temperature Range                 | -55 to 150 | °C    |
| $T_j$                   | Operating Junction Temperature Range      | -55 to 150 | °C    |

## Thermal Data

| Symbol           | Parameter                           | Typ | Max | Units |
|------------------|-------------------------------------|-----|-----|-------|
| R <sub>θJA</sub> | Thermal Resistance Junction-Ambient | 50  | 60  | °C/W  |
| R <sub>θJC</sub> | Thermal Resistance Junction-Case    | 31  | 36  | °C/W  |

## Electrical Characteristics (T<sub>J</sub>=25 °C, Unless otherwise noted)

| Symbol              | Parameter                         | Values |       |      | Unit | Note / Test Condition                                                                      |
|---------------------|-----------------------------------|--------|-------|------|------|--------------------------------------------------------------------------------------------|
|                     |                                   | Min.   | Typ.  | Max. |      |                                                                                            |
| BVDSS               | Drain-Source Breakdown Voltage    | -30    | --    | --   | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA                                                |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | --     | 50    | 77   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4A                                               |
|                     |                                   | --     | 80    | 122  |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2A                                              |
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | -1.2   | -1.75 | -2.5 | V    | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> = -250uA                                 |
| IDSS                | Drain-Source Leakage Current      | --     | --    | 1    | uA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                          |
|                     |                                   | --     | --    | 10   | uA   | V <sub>DS</sub> = -24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C                         |
| IGSS                | Gate-Source Leakage Current       | --     | --    | ±100 | nA   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                 |
| g <sub>fs</sub>     | Forward Transconductance          | --     | 8     | --   | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A                                                |
| R <sub>g</sub>      | Gate Resistance                   | --     | 15    | --   | Ω    | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                           |
| Q <sub>g</sub>      | Total Gate Charge                 | --     | 22    | --   | nC   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -4A                       |
| Q <sub>gs</sub>     | Gate-Source Charge                | --     | 4.5   | --   |      |                                                                                            |
| Q <sub>gd</sub>     | Gate-Drain Charge                 | --     | 9.5   | --   |      |                                                                                            |
| T <sub>d(on)</sub>  | Turn-On Delay Time                | --     | 35    | --   | ns   | V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V, R <sub>G</sub> =6Ω<br>I <sub>D</sub> = -1A |
| T <sub>r</sub>      | Rise Time                         | --     | 18    | --   |      |                                                                                            |
| T <sub>d(off)</sub> | Turn-Off Delay Time               | --     | 37    | --   |      |                                                                                            |
| T <sub>f</sub>      | Fall Time                         | --     | 3.5   | --   |      |                                                                                            |
| C <sub>iss</sub>    | Input Capacitance                 | --     | 233   | --   | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> =0V, f=1MHz                                        |
| C <sub>oss</sub>    | Output Capacitance                | --     | 100   | --   |      |                                                                                            |
| C <sub>rss</sub>    | Reverse Transfer Capacitance      | --     | 47    | --   |      |                                                                                            |

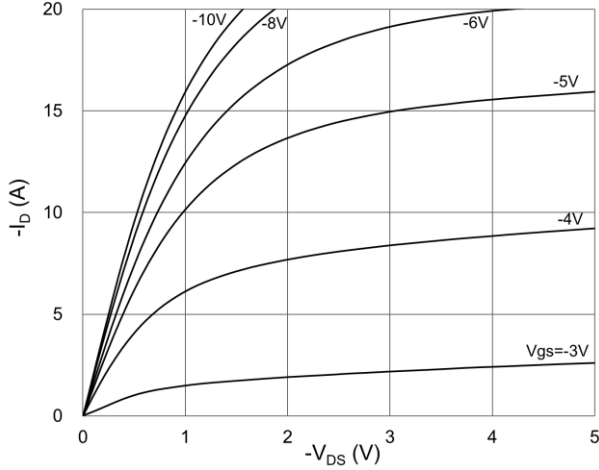
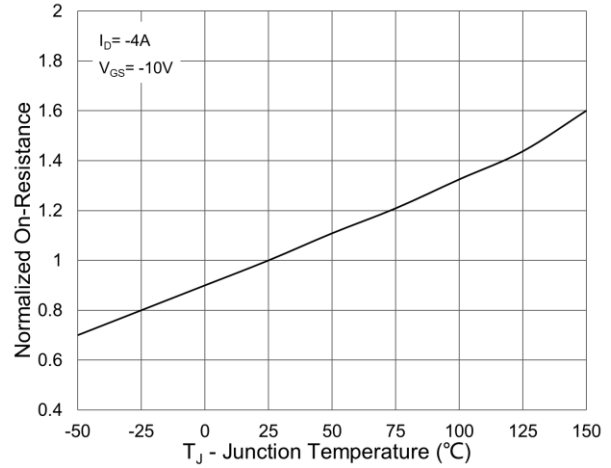
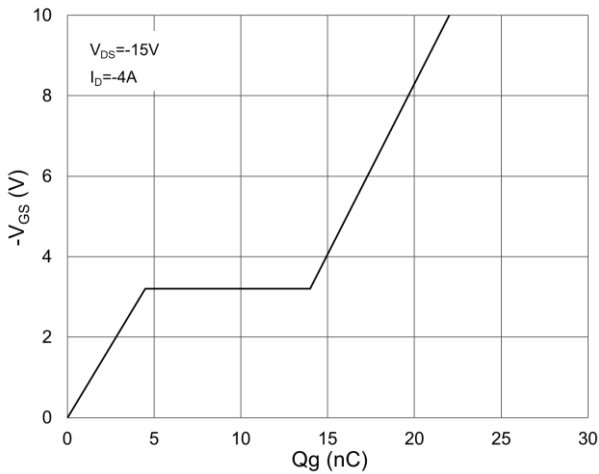
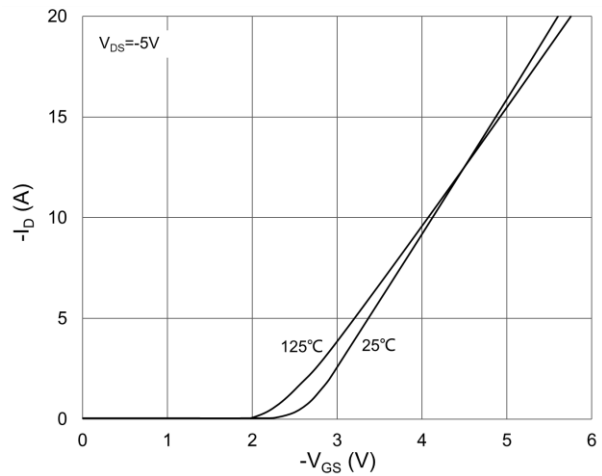
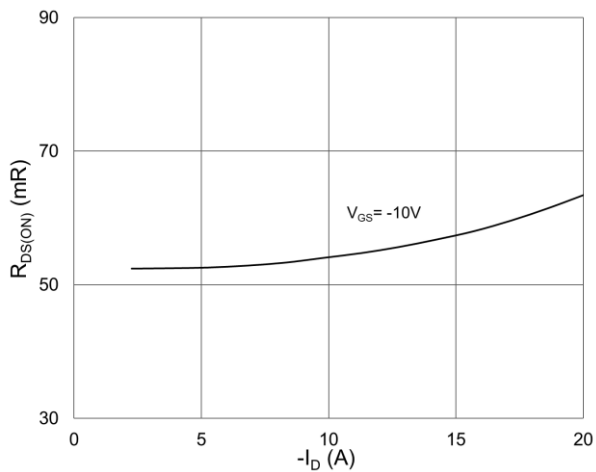
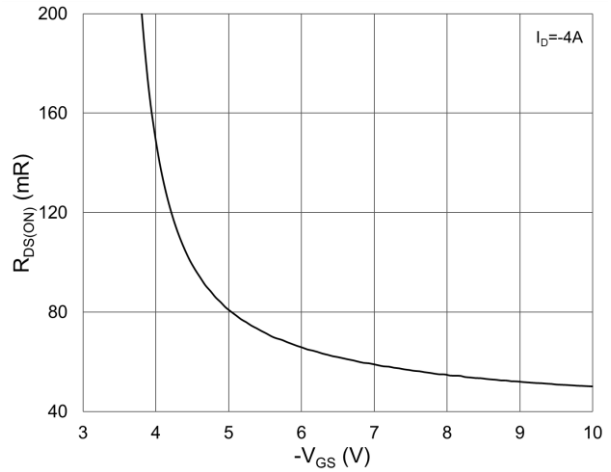
## Diode Characteristics

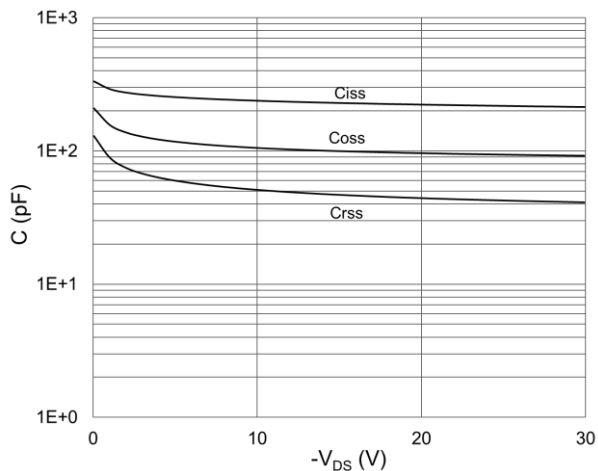
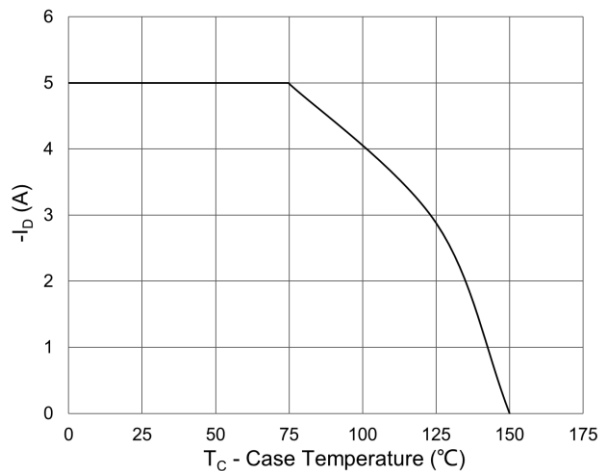
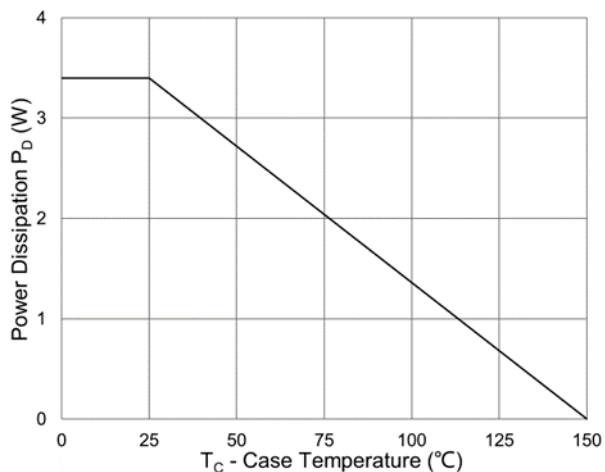
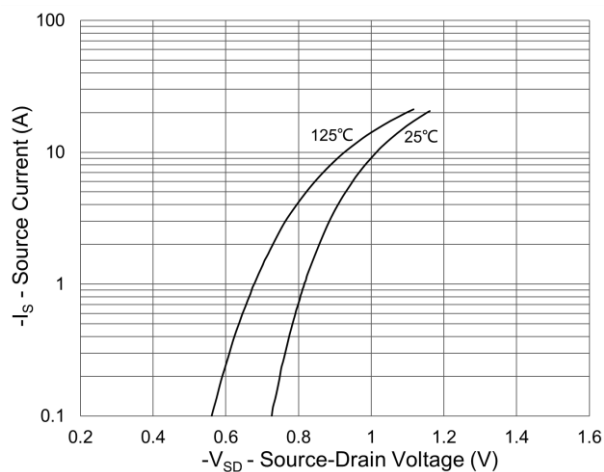
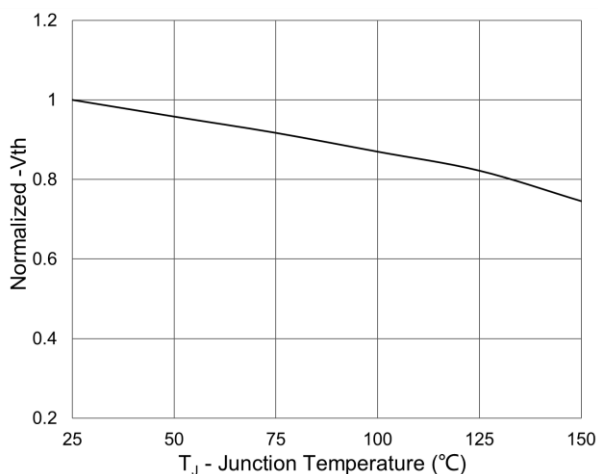
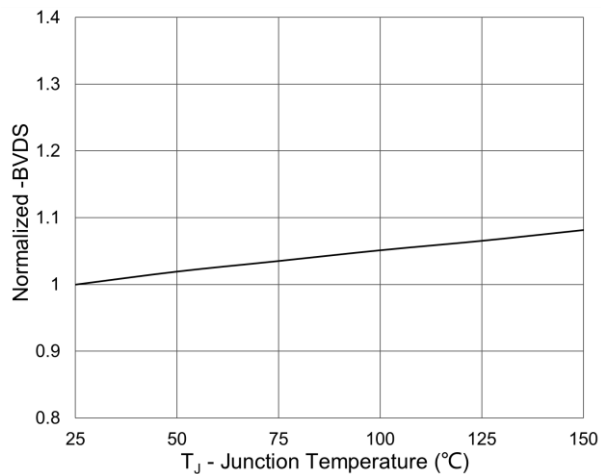
| Symbol          | Parameter                 | Conditions                                                      | Min | Typ | Max  | Units |
|-----------------|---------------------------|-----------------------------------------------------------------|-----|-----|------|-------|
| I <sub>S</sub>  | Continuous Source Current | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current               | --  | --  | -5   | A     |
| I <sub>sm</sub> | Pulsed Source Current     |                                                                 | --  | --  | -20  | A     |
| V <sub>SD</sub> | Diode Forward Voltage     | V <sub>GS</sub> =0V, I <sub>S</sub> = -2A, T <sub>J</sub> =25°C | --  | --  | -1.2 | V     |

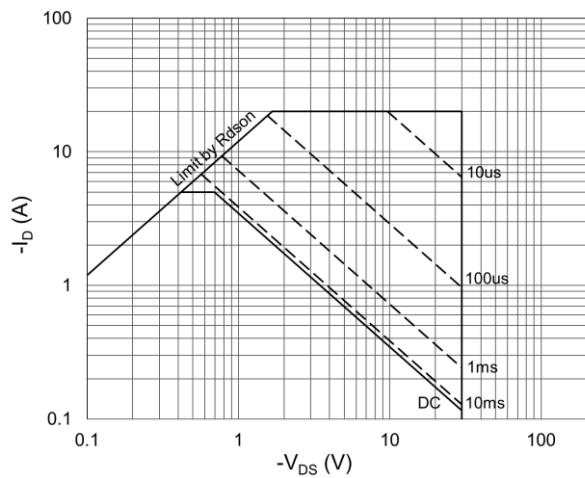
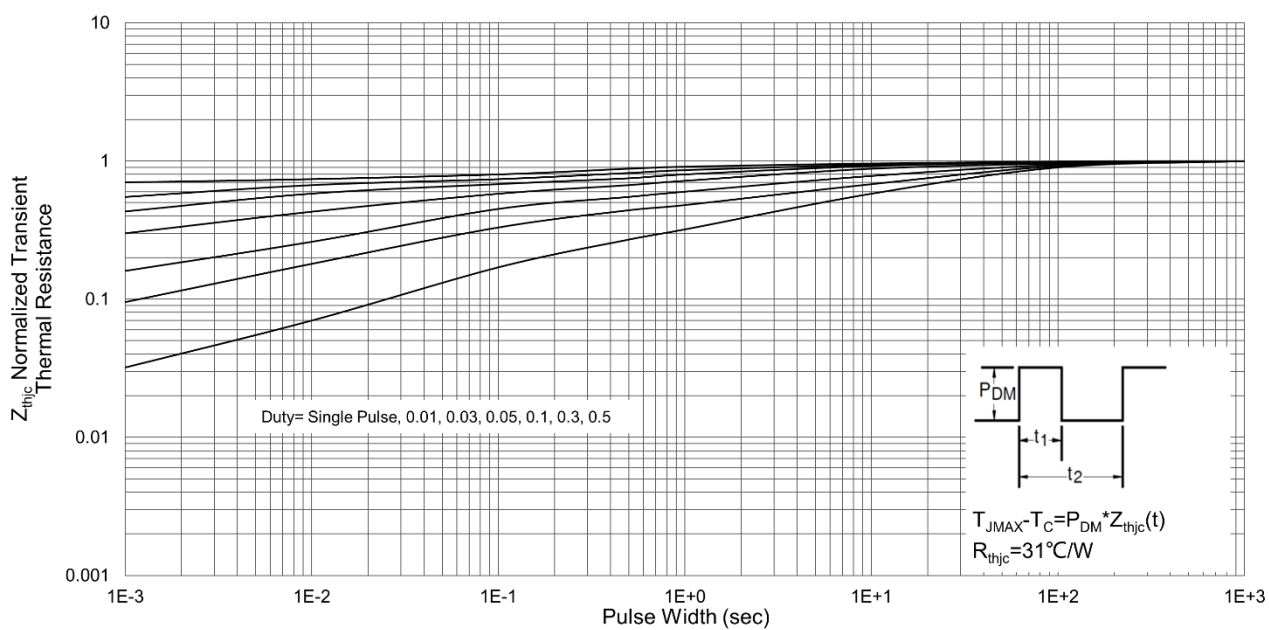
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

## Typical Performance Characteristics

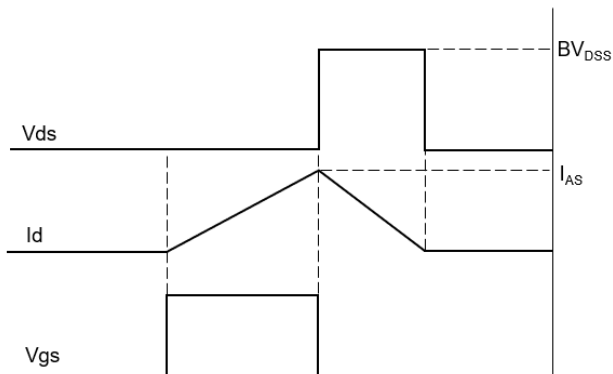
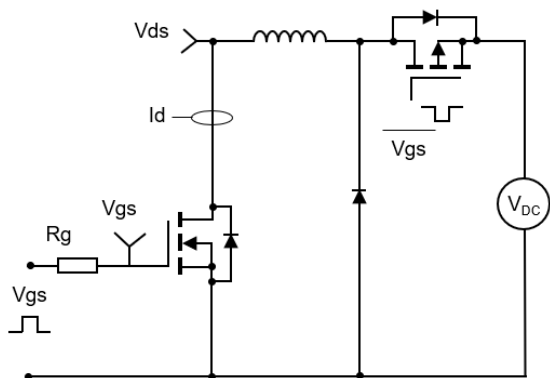
**Fig1 Output Characteristics**

**Fig2 Normalized  $R_{DS(on)}$  vs.  $T_J$** 

**Fig3 Gate Charge Waveform**

**Fig4 Transfer Characteristics**

**Fig5  $R_{DS(on)}$  vs. Drain Current and Gate Voltage**

**Fig6  $R_{DS(on)}$  vs. Gate Voltage**


**Fig7 Capacitance Characteristics**

**Fig8 Drain Current Derating**

**Fig9 Power Dissipation**

**Fig10 Source-Drain Diode Forward Characteristics**

**Fig11 Normalized Threshold Voltage vs.  $T_J$** 

**Fig12 Normalized Breakdown Voltage vs.  $T_J$** 


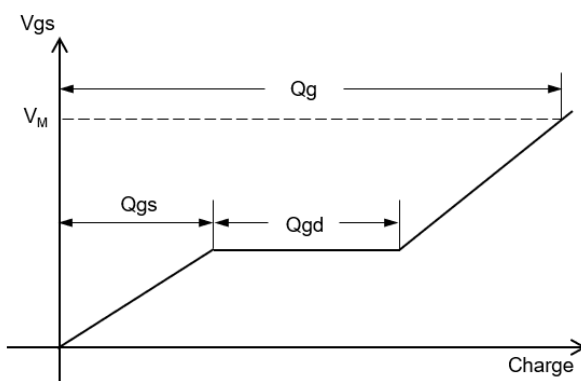
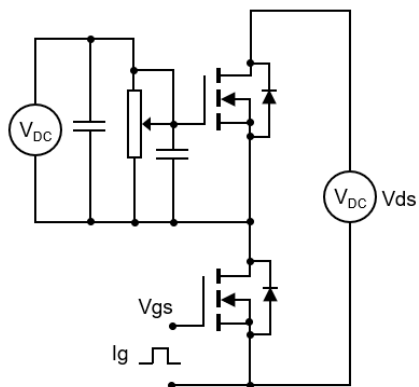
**Fig13 Maximum Safe Operation Area**

**Fig14 Normalized Transient Impedance**


## Test Circuit & Waveform

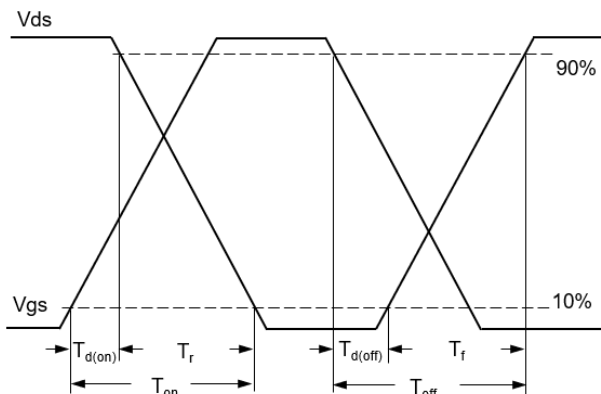
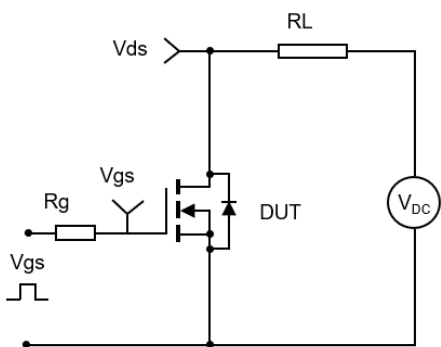
### 1. Unclamped Inductive Switching Test Circuit & Waveform



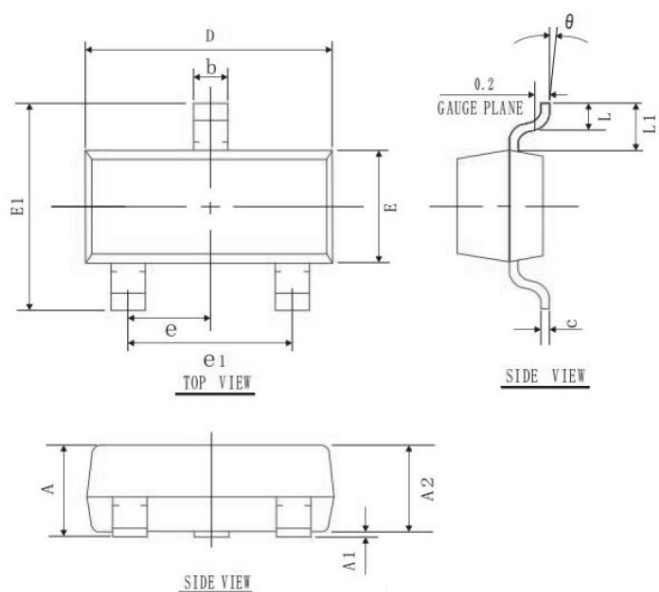
### 2. Gate Charge Test Circuit & Waveform



### 3. Resistive Switching Test Circuit & Waveform



## SOT23-3L Package Information



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

| SYMBOL   | MIN      | NOM  | MAX  |
|----------|----------|------|------|
| A        | 0.90     | 1.05 | 1.20 |
| A1       | 0.00     | 0.05 | 0.10 |
| A2       | 0.90     | 1.00 | 1.10 |
| b        | 0.30     | 0.40 | 0.50 |
| c        | 0.08     | 0.10 | 0.15 |
| D        | 2.80     | 2.90 | 3.00 |
| E        | 1.20     | 1.30 | 1.40 |
| E1       | 2.30     | 2.40 | 2.50 |
| L        | 0.30     | 0.40 | 0.50 |
| $\theta$ | 0°       | 5°   | 10°  |
| L1       | 0.55 REF |      |      |
| e        | 0.95 BSC |      |      |
| e1       | 1.90 REF |      |      |