

# 2SK2912(L), 2SK2912(S)

Silicon N Channel MOS FET  
High Speed Power Switching

# HITACHI

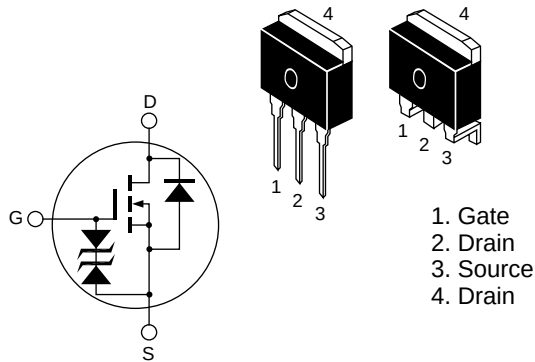
ADE-208-495  
1st. Edition

## Features

- Low on-resistance  
 $R_{DS} = 15 \text{ m}\Omega$  typ.
- High speed switching
- 4V gate drive device can be driven from 5V source

## Outline

LDPAK



2SK2912(L), 2SK2912(S)

Absolute Maximum Ratings (Ta = 25°C)

| Item                                      | Symbol                              | Ratings     | Unit |
|-------------------------------------------|-------------------------------------|-------------|------|
| Drain to source voltage                   | V <sub>DSS</sub>                    | 60          | V    |
| Gate to source voltage                    | V <sub>GSS</sub>                    | ±20         | V    |
| Drain current                             | I <sub>D</sub>                      | 40          | A    |
| Drain peak current                        | I <sub>D(pulse)</sub> <sup>*1</sup> | 160         | A    |
| Body to drain diode reverse drain current | I <sub>DR</sub>                     | 40          | A    |
| Avalanche current                         | I <sub>AP</sub> <sup>*3</sup>       | 40          | A    |
| Avalanche Energy                          | E <sub>AR</sub> <sup>*3</sup>       | 137         | mJ   |
| Channel dissipation                       | Pch <sup>*2</sup>                   | 50          | W    |
| Channel temperature                       | Tch                                 | 150         | °C   |
| Storage temperature                       | Tstg                                | −55 to +150 | °C   |

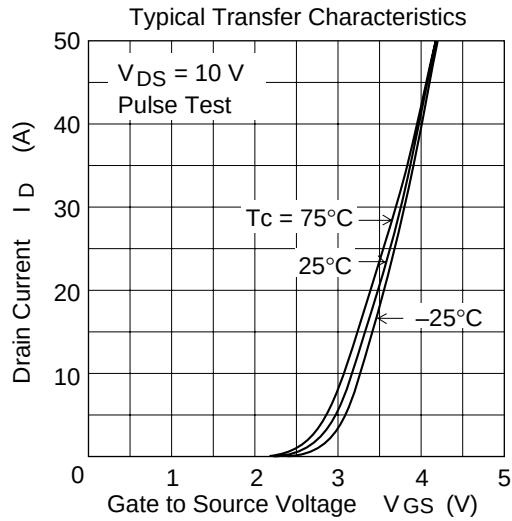
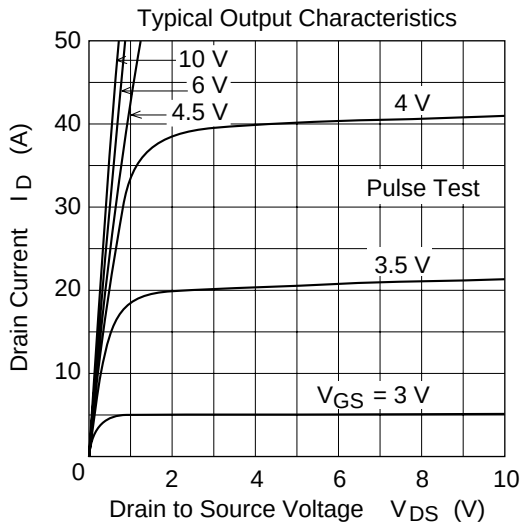
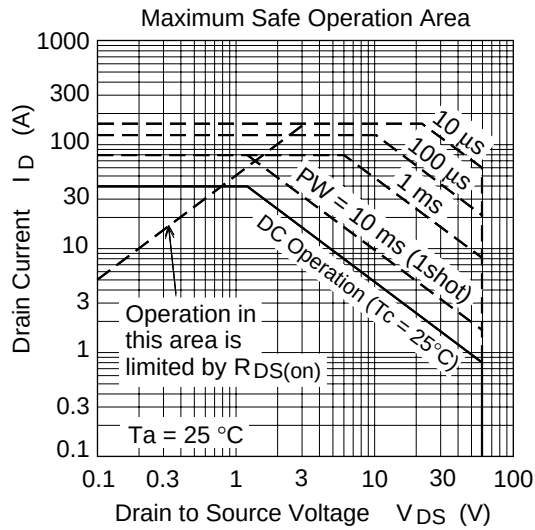
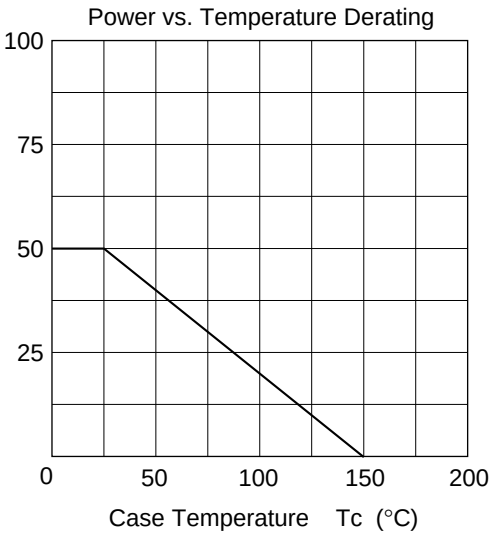
- Notes: 1. PW ≤ 10μs, duty cycle ≤ 1 %  
2. Value at Tc = 25°C  
3. Value at Tch = 25°C, Rg ≥ 50 Ω

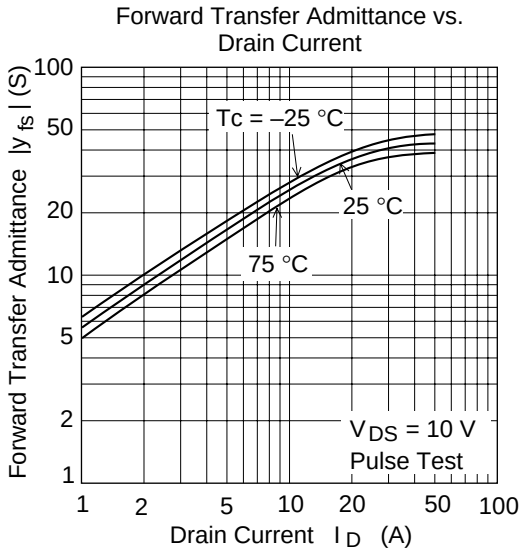
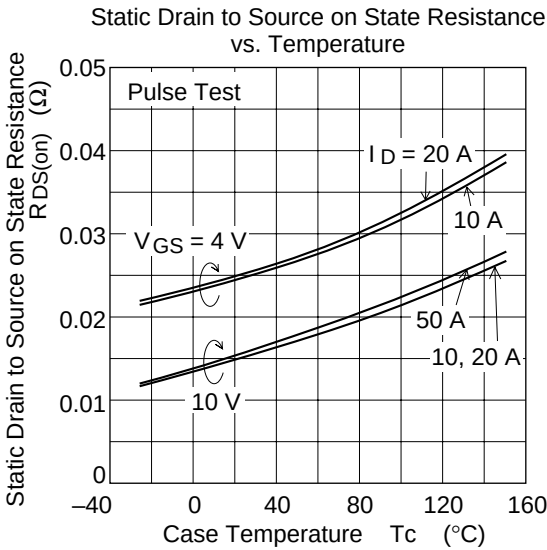
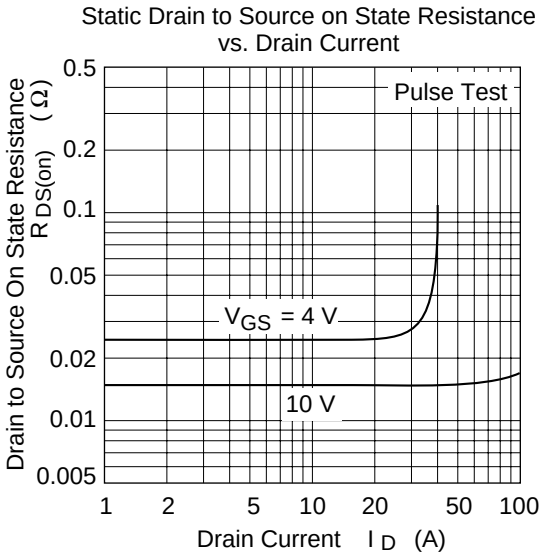
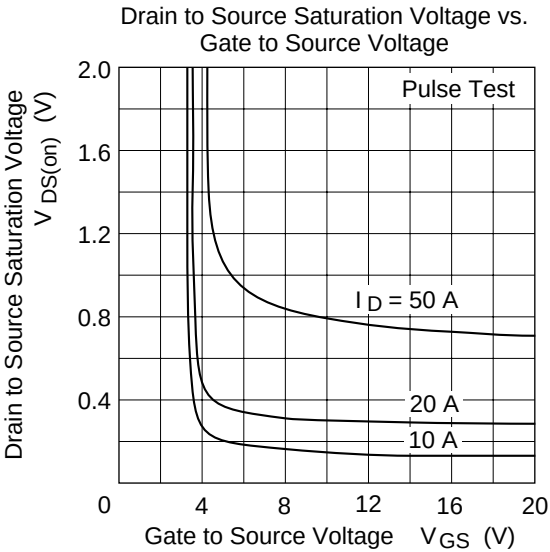
**Electrical Characteristics** (Ta = 25°C)

| Item                                       | Symbol        | Min | Typ  | Max | Unit | Test Conditions                                                         |
|--------------------------------------------|---------------|-----|------|-----|------|-------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 60  | —    | —   | V    | $I_D = 10\text{mA}$ , $V_{GS} = 0$                                      |
| Gate to source breakdown voltage           | $V_{(BR)GSS}$ | ±20 | —    | —   | V    | $I_G = \pm 100\mu\text{A}$ , $V_{DS} = 0$                               |
| Gate to source leak current                | $I_{GSS}$     | —   | —    | ±10 | μA   | $V_{GS} = \pm 16\text{V}$ , $V_{DS} = 0$                                |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —    | 10  | μA   | $V_{DS} = 60\text{V}$ , $V_{GS} = 0$                                    |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.5 | —    | 2.5 | V    | $I_D = 1\text{mA}$ , $V_{DS} = 10\text{V}$                              |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 15   | 20  | mΩ   | $I_D = 20\text{A}$ , $V_{GS} = 10\text{V}^{*1}$                         |
|                                            | $R_{DS(on)}$  | —   | 25   | 40  | mΩ   | $I_D = 20\text{A}$ , $V_{GS} = 4\text{V}^{*1}$                          |
| Forward transfer admittance                | $ y_{fs} $    | 20  | 35   | —   | S    | $I_D = 20\text{A}$ , $V_{DS} = 10\text{V}^{*1}$                         |
| Input capacitance                          | $C_{iss}$     | —   | 1500 | —   | pF   | $V_{DS} = 10\text{V}$                                                   |
| Output capacitance                         | $C_{oss}$     | —   | 720  | —   | pF   | $V_{GS} = 0$                                                            |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 200  | —   | pF   | $f = 1\text{MHz}$                                                       |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 20   | —   | ns   | $I_D = 20\text{A}$ , $V_{GS} = 10\text{V}$                              |
| Rise time                                  | $t_r$         | —   | 180  | —   | ns   | $R_L = 1.5\Omega$                                                       |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 200  | —   | ns   |                                                                         |
| Fall time                                  | $t_f$         | —   | 200  | —   | ns   |                                                                         |
| Body to drain diode forward voltage        | $V_{DF}$      | —   | 0.95 | —   | V    | $I_F = 40\text{A}$ , $V_{GS} = 0$                                       |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —   | 70   | —   | V    | $I_F = 40\text{A}$ , $V_{GS} = 0$<br>$di_F/dt = 50\text{A}/\mu\text{s}$ |

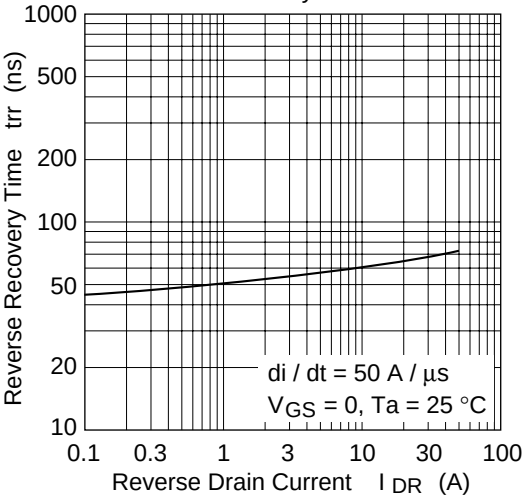
Note: 1. Pulse test

Main Characteristics

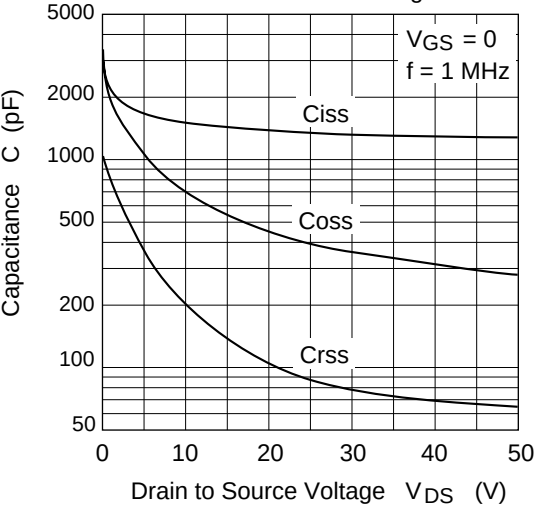




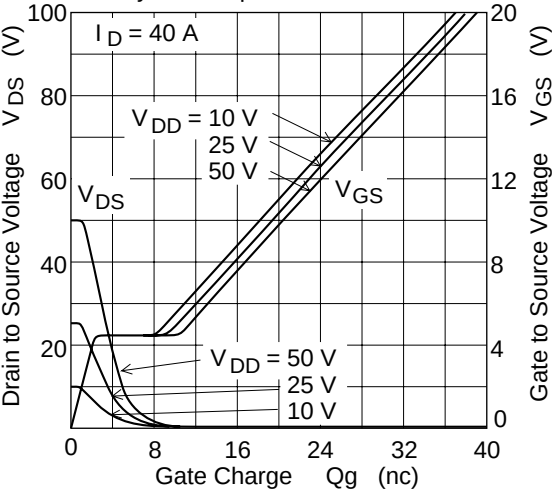
Body to Drain Diode Reverse Recovery Time



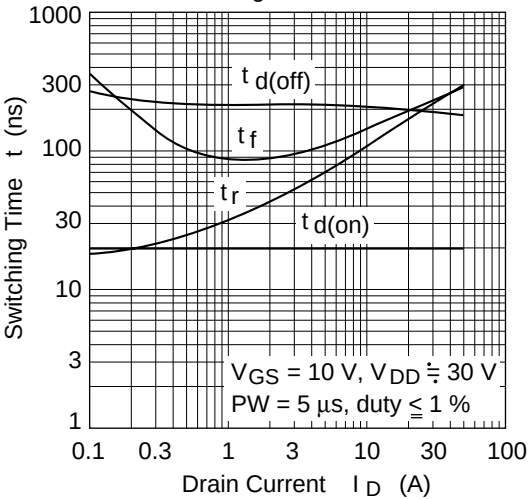
Typical Capacitance vs. Drain to Source Voltage

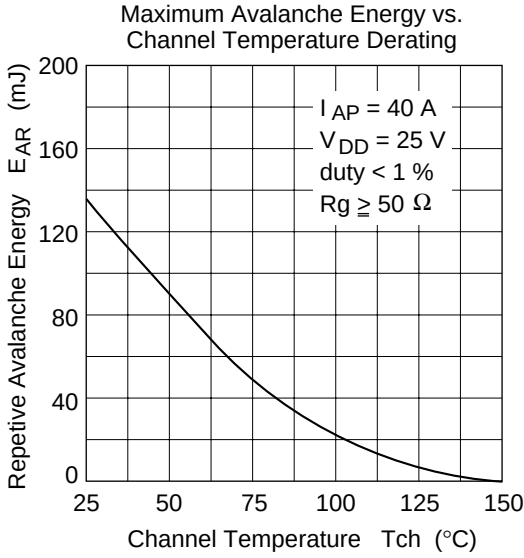
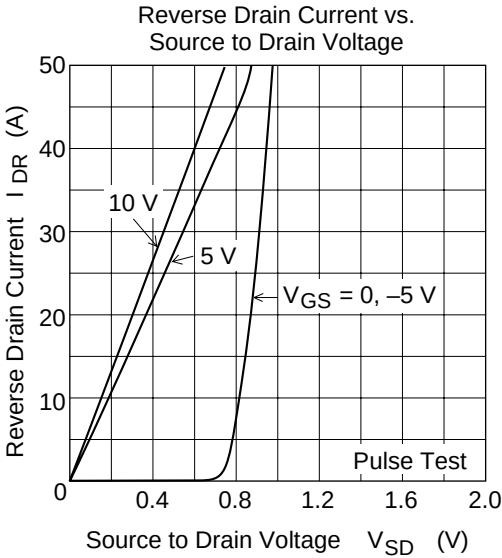


Dynamic Input Characteristics

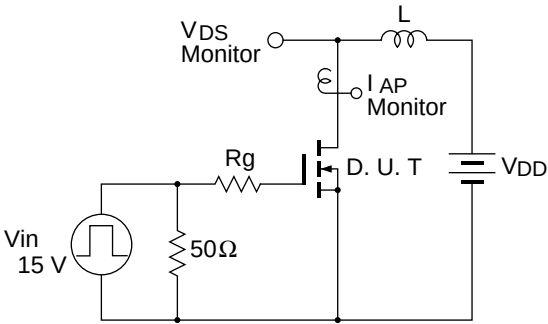


Switching Characteristics



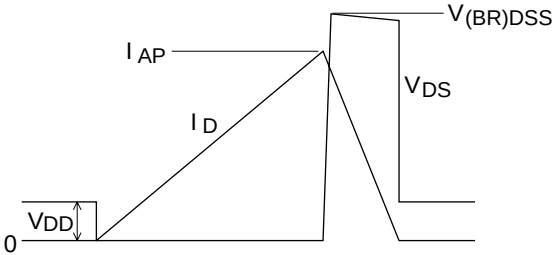


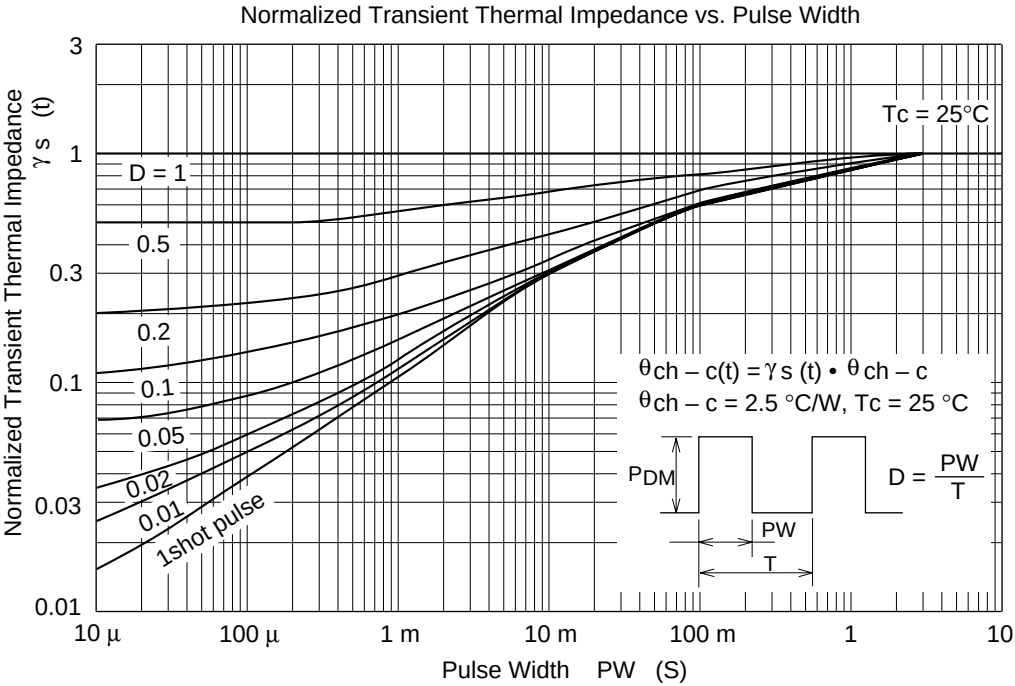
Avalanche Test Circuit



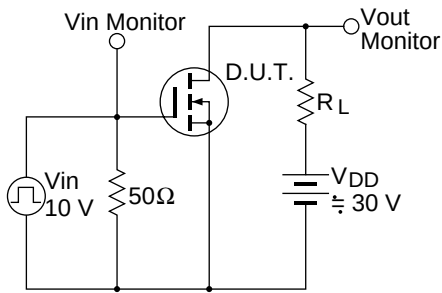
Avalanche Waveform

$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$

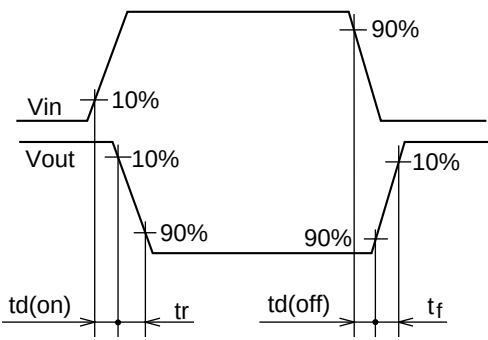




Switching Time Test Circuit



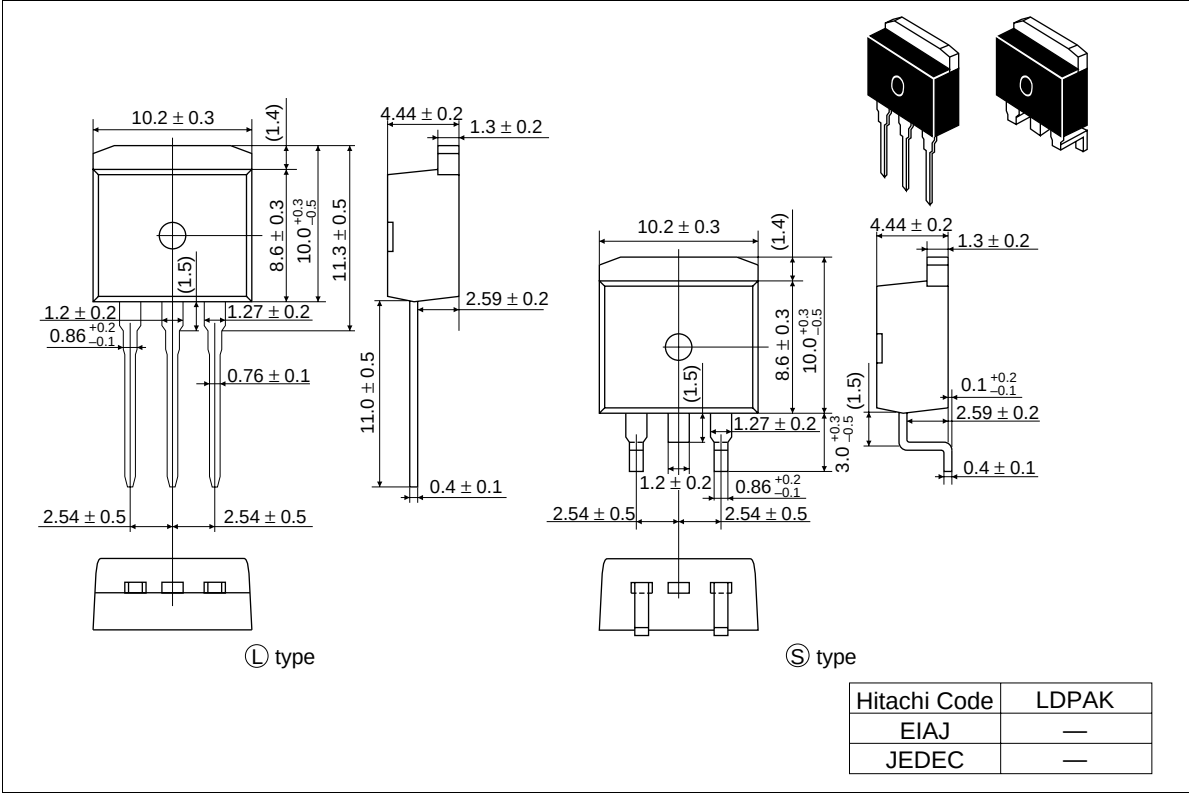
Switching Time Waveforms





Package Dimensions

Unit: mm



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