



# 2SK4177

## N-Channel Power MOSFET 1500V, 2A, 13Ω, TO-263-2L

ON Semiconductor®

<http://onsemi.com>

### Features

- ON-resistance  $R_{DS(on)}=10\Omega$ (typ.)
- 10V drive
- Input capacitance  $C_{iss}=380pF$  (typ.)

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ C$ 

| Parameter                          | Symbol    | Conditions                                | Ratings     | Unit       |
|------------------------------------|-----------|-------------------------------------------|-------------|------------|
| Drain-to-Source Voltage            | $V_{DS}$  |                                           | 1500        | V          |
| Gate-to-Source Voltage             | $V_{GS}$  |                                           | $\pm 20$    | V          |
| Drain Current (DC)                 | $I_D$     |                                           | 2           | A          |
| Drain Current (Pulse)              | $I_{DP}$  | $PW \leq 10\mu s$ , duty cycle $\leq 1\%$ | 4           | A          |
| Allowable Power Dissipation        | $P_D$     | $T_c=25^\circ C$                          | 80          | W          |
| Channel Temperature                | $T_{ch}$  |                                           | 150         | $^\circ C$ |
| Storage Temperature                | $T_{stg}$ |                                           | -55 to +150 | $^\circ C$ |
| Avalanche Energy (Single Pulse) *1 | $E_{AS}$  |                                           | 41          | mJ         |
| Avalanche Current *2               | $I_{AV}$  |                                           | 2           | A          |

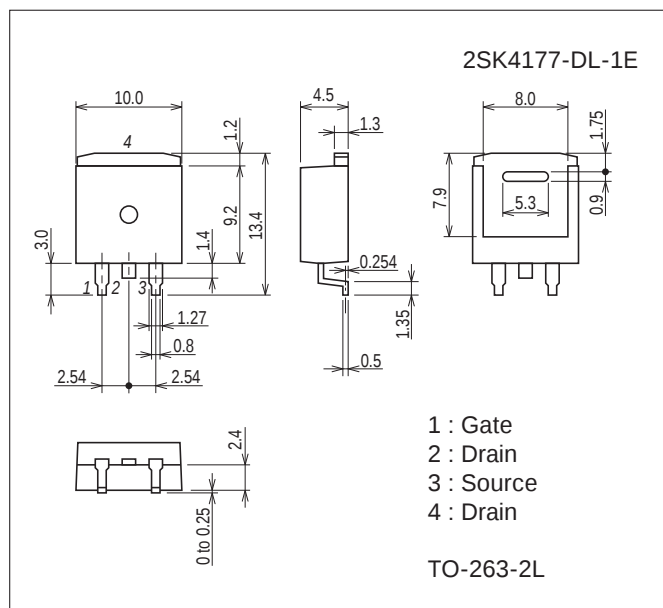
Note : \*1  $V_{DD}=50V$ ,  $L=20mH$ ,  $I_{AV}=2A$  (Fig.1)\*2  $L \leq 20mH$ , single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

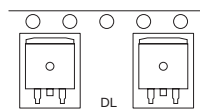
7535-001



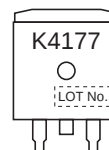
### Product & Package Information

- Package : TO-263-2L
- JEITA, JEDEC : SC-83, TO-263
- Minimum Packing Quantity : 800 pcs./reel

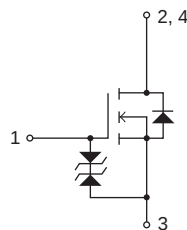
### Packing Type: DL



### Marking



### Electrical Connection



## Electrical Characteristics at Ta=25°C

| Parameter                                  | Symbol        | Conditions                        | Ratings |      |          | Unit     |
|--------------------------------------------|---------------|-----------------------------------|---------|------|----------|----------|
|                                            |               |                                   | min     | typ  | max      |          |
| Drain-to-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D=1mA, V_{GS}=0V$              | 1500    |      |          | V        |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS}=1200V, V_{GS}=0V$         |         |      | 100      | $\mu A$  |
| Gate-to-Source Leakage Current             | $I_{GSS}$     | $V_{GS}=\pm 16V, V_{DS}=0V$       |         |      | $\pm 10$ | $\mu A$  |
| Cutoff Voltage                             | $V_{GS(off)}$ | $V_{DS}=10V, I_D=1mA$             | 2.5     |      | 3.5      | V        |
| Forward Transfer Admittance                | $ y_{fs} $    | $V_{DS}=20V, I_D=1A$              | 0.7     | 1.4  |          | S        |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)}$  | $I_D=1A, V_{GS}=10V$              |         | 10   | 13       | $\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS}=30V, f=1MHz$              |         | 380  |          | pF       |
| Output Capacitance                         | $C_{oss}$     |                                   |         | 70   |          | pF       |
| Reverse Transfer Capacitance               | $C_{rss}$     |                                   |         | 40   |          | pF       |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See Fig.2                         |         | 12   |          | ns       |
| Rise Time                                  | $t_r$         |                                   |         | 37   |          | ns       |
| Turn-OFF Delay Time                        | $t_{d(off)}$  |                                   |         | 152  |          | ns       |
| Fall Time                                  | $t_f$         |                                   |         | 59   |          | ns       |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=200V, V_{GS}=10V, I_D=2A$ |         | 37.5 |          | nC       |
| Gate-to-Source Charge                      | $Q_{gs}$      |                                   |         | 2.7  |          | nC       |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      |                                   |         | 20   |          | nC       |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=2A, V_{GS}=0V$               |         | 0.88 | 1.2      | V        |

Fig.1 Unclamped Inductive Switching Test Circuit

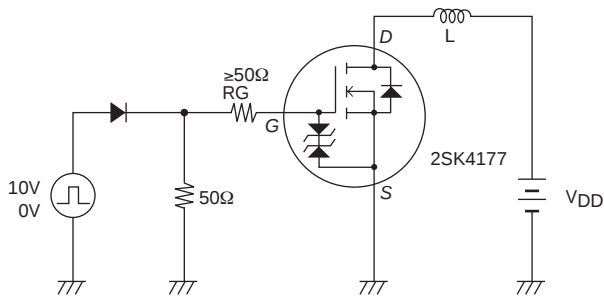
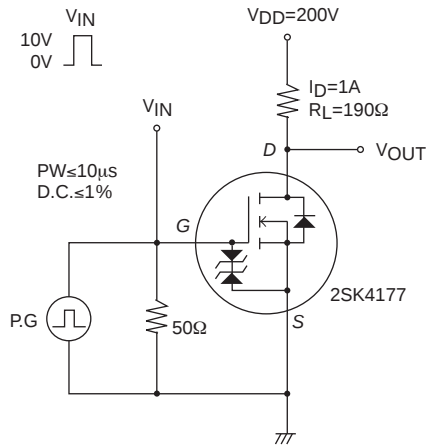
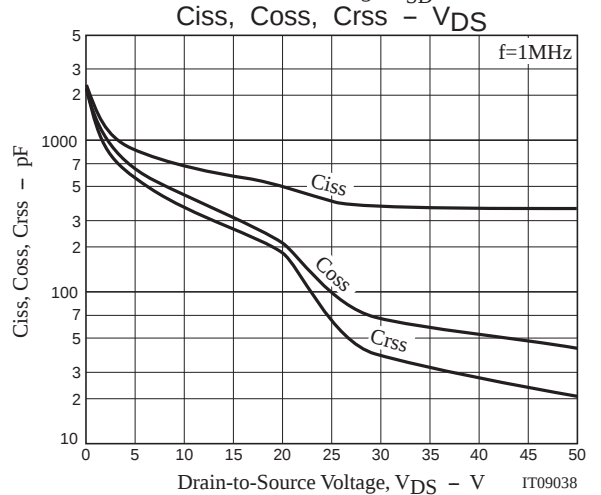
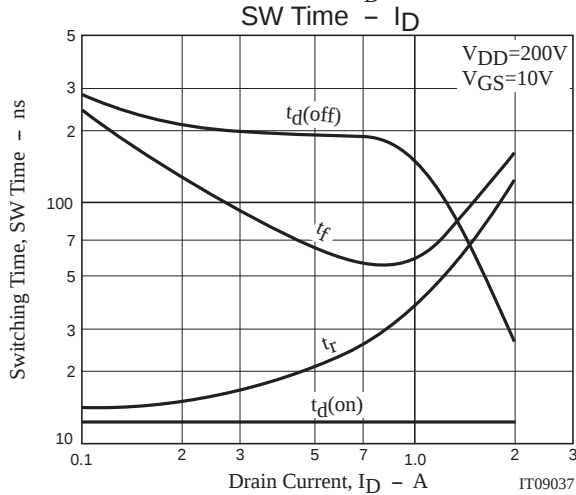
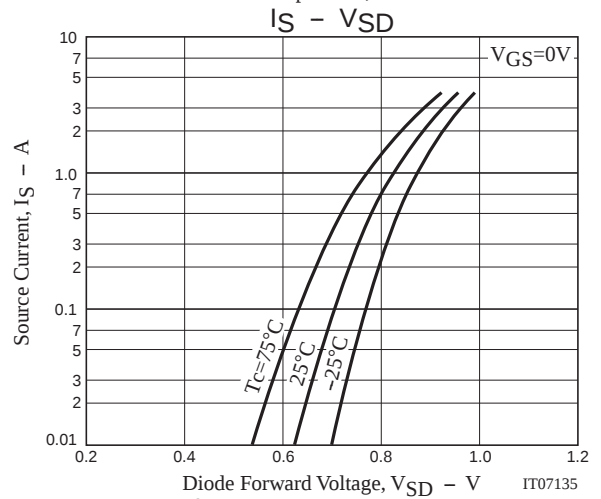
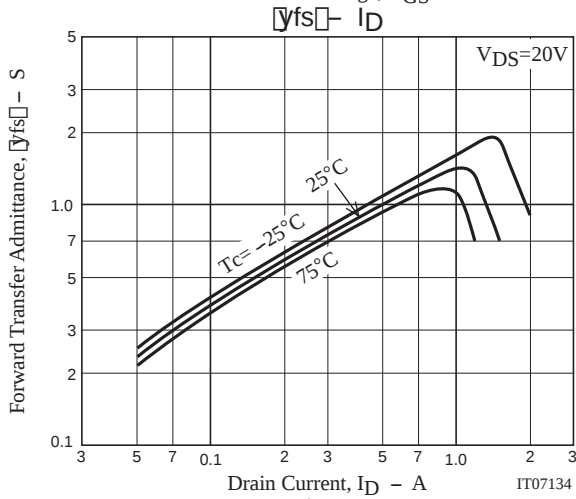
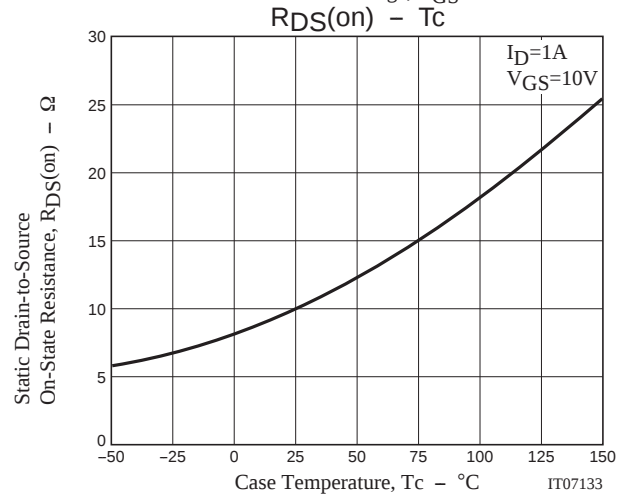
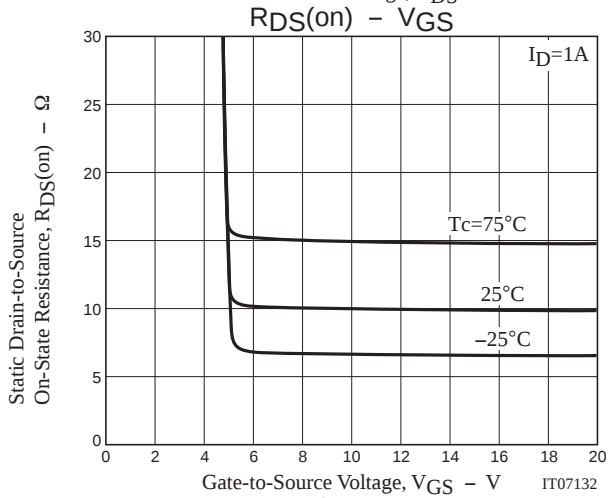
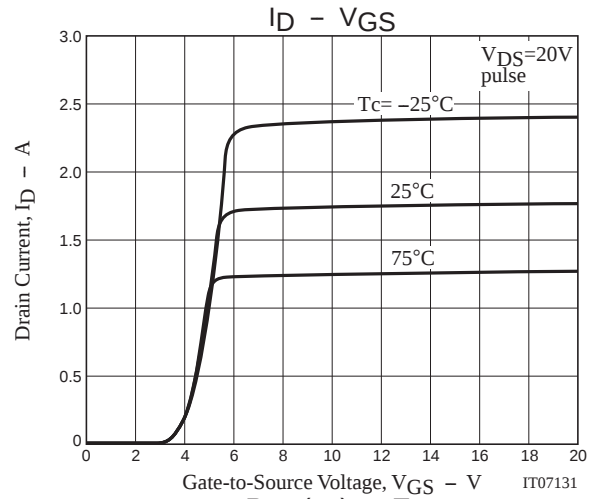
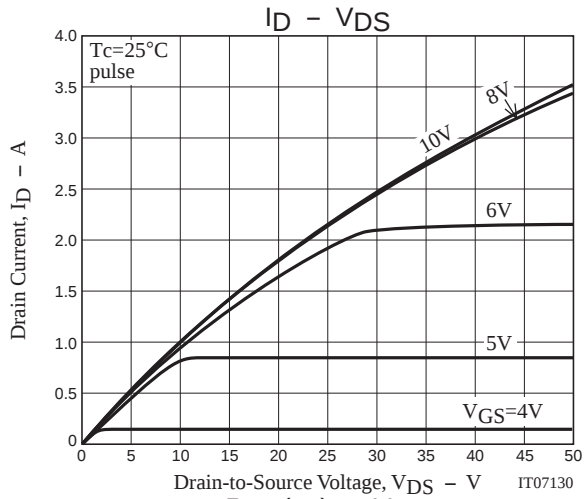


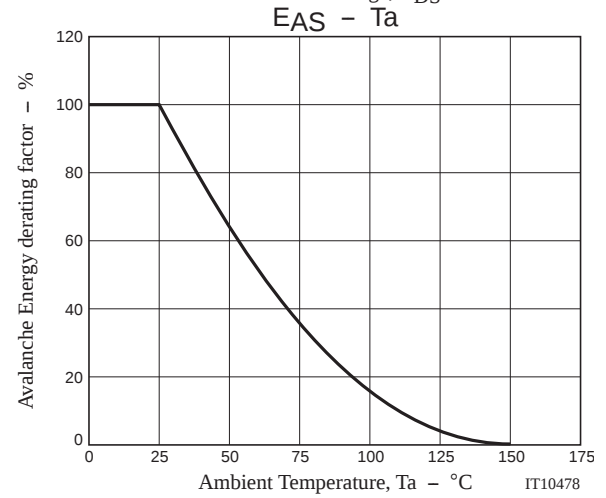
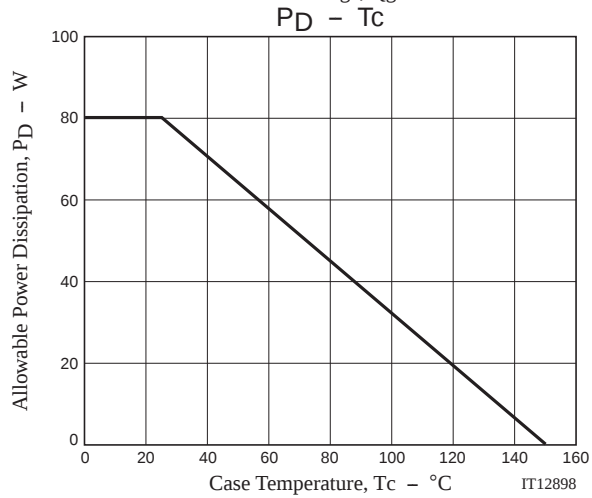
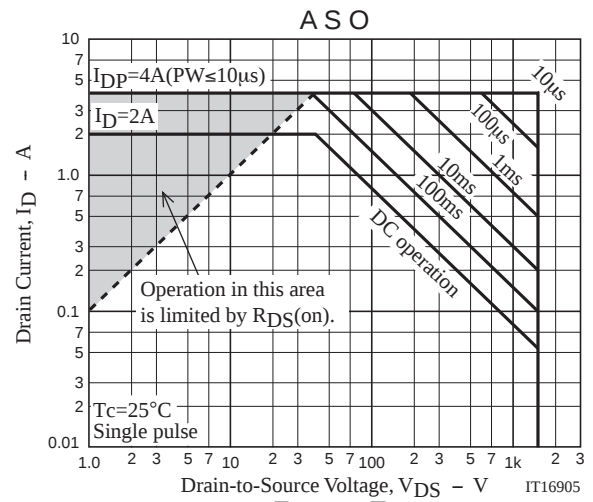
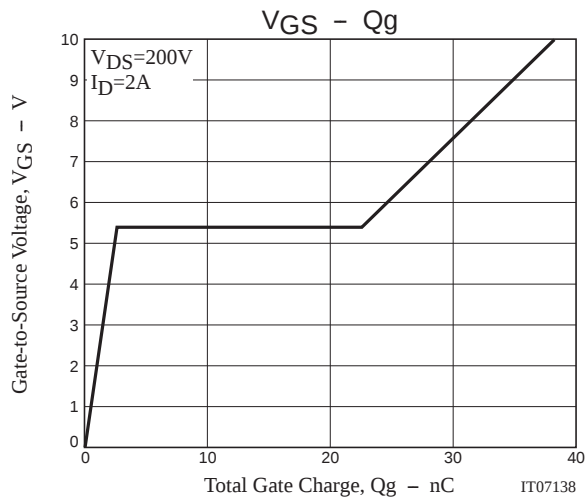
Fig.2 Switching Time Test Circuit



## Ordering Information

| Device        | Package   | Shipping     | memo    |
|---------------|-----------|--------------|---------|
| 2SK4177-DL-1E | TO-263-2L | 800pcs./reel | Pb Free |





## Taping Specification

2SK4177-DL-1E

## 1. Packing Format

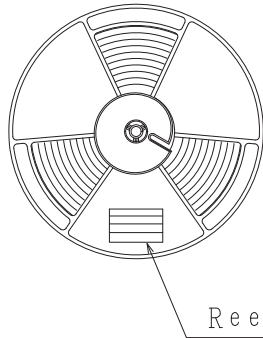
| Package Name | Maximum Number of devices contained (pcs) |           |           | Packing format                                                           |                                                                                  |
|--------------|-------------------------------------------|-----------|-----------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|              | Reel                                      | Inner box | Outer box | Inner BOX                                                                | Outer BOX                                                                        |
| TO-263-2L    | 800                                       | 1600      | 6400      | SPD-0V0011<br>2 reel contained<br>Dimensions:mm (external)<br>351×340×68 | SPD-0V0009<br>4 inner boxes contained<br>Dimensions:mm (external)<br>390×370×318 |

Reel label, Inner box label

Outer box label

(unit:mm)

## Packing method



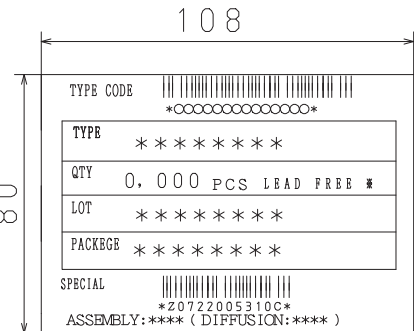
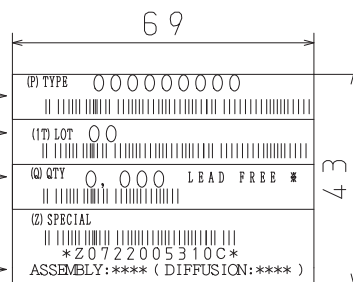
Reel label

Type No. →

LOT No. →

Quantity →

Origin →



It is a label at the time of factory shipments.  
The form of a label may change in physical  
distribution process.

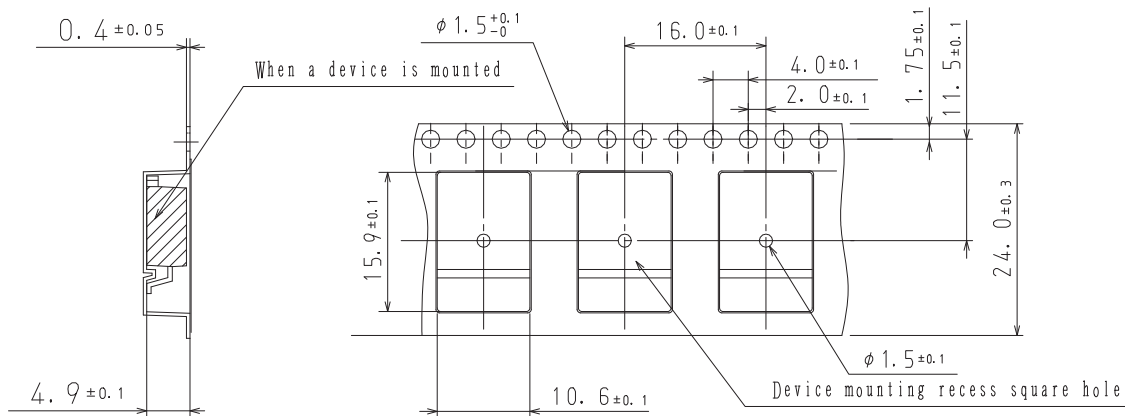
## NOTE (1)

The LEAD FREE \* description shows that the surface  
treatment of the terminal is lead free.

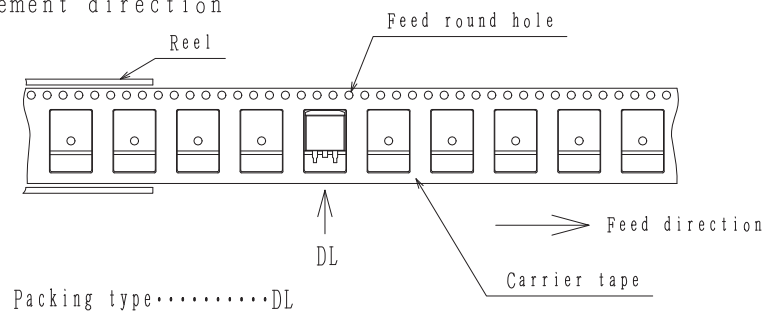
| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |

## 2. Taping configuration

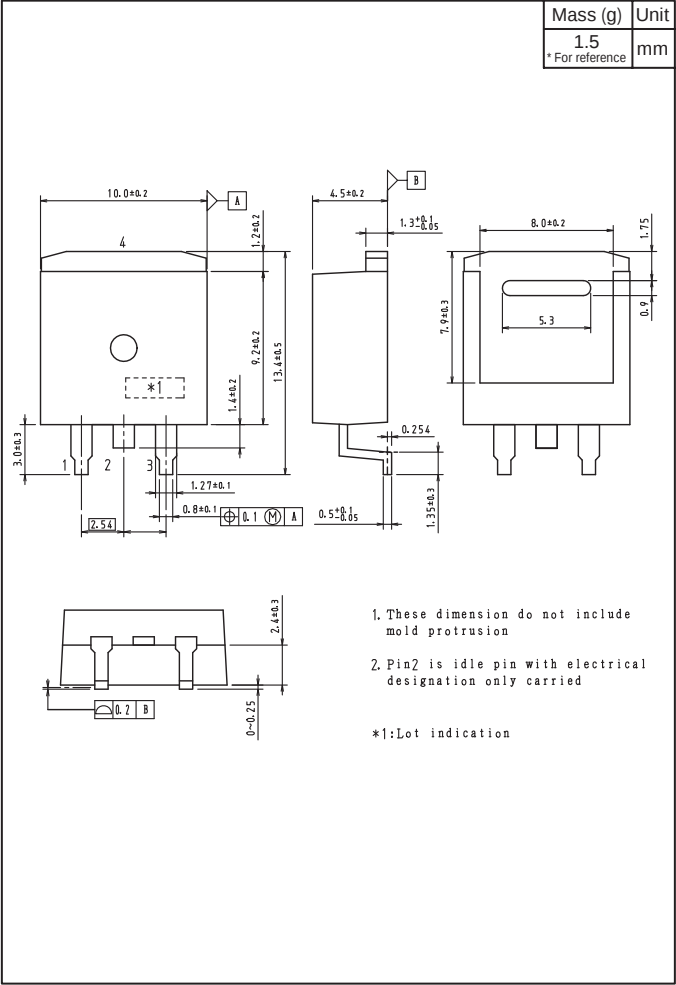
## 2-1. Carrier tape size (unit:mm)



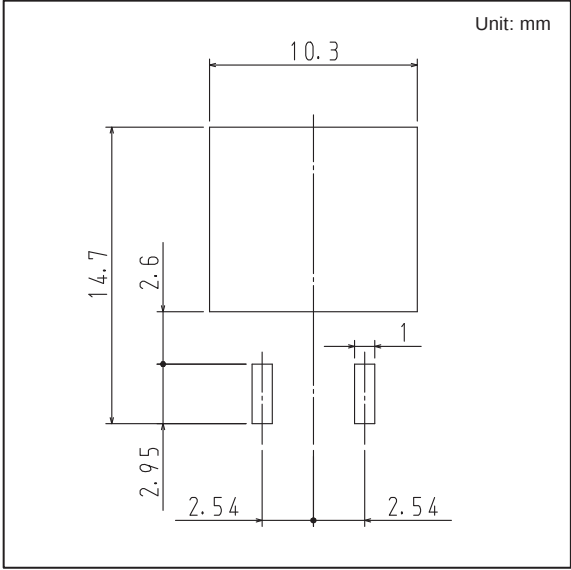
## 2-2. Device placement direction



Outline Drawing  
2SK4177-DL-1E



Land Pattern Example



Note on usage : Since the 2SK4177 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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