

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

|                      |                           |
|----------------------|---------------------------|
| <b>Part Number:</b>  | EKI04027                  |
| <b>Manufacturer:</b> | Sanken Electric USA Inc.  |
| <b>Package:</b>      | Please confirm with sales |
| <b>Availability:</b> | Please confirm with sales |

#### Product Page:

<https://antrexco.com/product/details/sanken-electric-usa-inc/eki04027.html>

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#### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

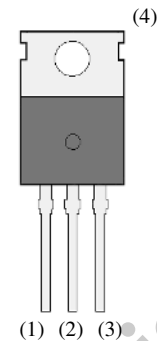
**40 V, 85 A, 2.6 mΩ Low RDS(ON)  
N ch Trench Power MOSFET  
EKI04027**

**Features**

- $V_{(BR)DSS}$  ----- 40 V ( $I_D = 100 \mu A$ )
- $I_D$  ----- 85 A
- $R_{DS(ON)}$  ----- 3.2 mΩ max. ( $V_{GS} = 10$  V,  $I_D = 82.5$  A)
- $Q_g$  ----- 44.9 nC ( $V_{GS} = 4.5$  V,  $V_{DS} = 20$  V,  $I_D = 82.5$  A)
- Low Total Gate Charge
- High Speed Switching
- Low On-Resistance
- Capable of 4.5 V Gate Drive
- 100 % UIL Tested
- RoHS Compliant

**Package**

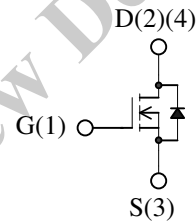
- TO220-3L



Not to scale

**Applications**

- DC-DC converters
- Synchronous Rectification
- Power Supplies



**Absolute Maximum Ratings**

- Unless otherwise specified,  $T_A = 25^\circ C$

| Parameter                                 | Symbol    | Test conditions                                                                                        | Rating      | Unit       |
|-------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------|-------------|------------|
| Drain to Source Voltage                   | $V_{DS}$  |                                                                                                        | 40          | V          |
| Gate to Source Voltage                    | $V_{GS}$  |                                                                                                        | $\pm 20$    | V          |
| Continuous Drain Current                  | $I_D$     | $T_C = 25^\circ C$                                                                                     | 85          | A          |
| Pulsed Drain Current                      | $I_{DM}$  | $PW \leq 100\mu s$<br>Duty cycle $\leq 1\%$                                                            | 170         | A          |
| Continuous Source Current<br>(Body Diode) | $I_S$     |                                                                                                        | 85          | A          |
| Pulsed Source Current<br>(Body Diode)     | $I_{SM}$  | $PW \leq 100\mu s$<br>Duty cycle $\leq 1\%$                                                            | 170         | A          |
| Single Pulse Avalanche Energy             | $E_{AS}$  | $V_{DD} = 20$ V, $L = 1$ mH,<br>$I_{AS} = 13$ A, unclamped,<br>$R_G = 4.7 \Omega$<br>Refer to Figure 1 | 170         | mJ         |
| Avalanche Current                         | $I_{AS}$  |                                                                                                        | 30          | A          |
| Power Dissipation                         | $P_D$     | $T_C = 25^\circ C$                                                                                     | 135         | W          |
| Operating Junction Temperature            | $T_J$     |                                                                                                        | 150         | $^\circ C$ |
| Storage Temperature Range                 | $T_{STG}$ |                                                                                                        | - 55 to 150 | $^\circ C$ |

## Thermal Characteristics

- Unless otherwise specified,  $T_A = 25\text{ }^{\circ}\text{C}$

| Parameter                                   | Symbol          | Test Conditions | Min. | Typ. | Max. | Unit                        |
|---------------------------------------------|-----------------|-----------------|------|------|------|-----------------------------|
| Thermal Resistance<br>(Junction to Case)    | $R_{\theta JC}$ |                 | —    | —    | 0.9  | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance<br>(Junction to Ambient) | $R_{\theta JA}$ |                 | —    | —    | 62.5 | $^{\circ}\text{C}/\text{W}$ |

## Electrical Characteristics

- Unless otherwise specified,  $T_A = 25\text{ }^{\circ}\text{C}$

| Parameter                                     | Symbol        | Test Conditions                                                                                                            | Min. | Typ. | Max.      | Unit             |
|-----------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|------|------|-----------|------------------|
| Drain to Source Breakdown Voltage             | $V_{(BR)DSS}$ | $I_D = 100\text{ }\mu\text{A}$ , $V_{GS} = 0\text{ V}$                                                                     | 40   | —    | —         | V                |
| Drain to Source Leakage Current               | $I_{DSS}$     | $V_{DS} = 40\text{ V}$ , $V_{GS} = 0\text{ V}$                                                                             | —    | —    | 100       | $\mu\text{A}$    |
| Gate to Source Leakage Current                | $I_{GSS}$     | $V_{GS} = \pm 20\text{ V}$                                                                                                 | —    | —    | $\pm 100$ | nA               |
| Gate Threshold Voltage                        | $V_{GS(th)}$  | $V_{DS} = V_{GS}$ , $I_D = 1.5\text{ mA}$                                                                                  | 1.0  | 2.0  | 2.5       | V                |
| Static Drain to Source On-Resistance          | $R_{DS(on)}$  | $I_D = 82.5\text{ A}$ , $V_{GS} = 10\text{ V}$                                                                             | —    | 2.6  | 3.2       | $\text{m}\Omega$ |
|                                               |               | $I_D = 41.3\text{ A}$ , $V_{GS} = 4.5\text{ V}$                                                                            | —    | 3.1  | 4.0       | $\text{m}\Omega$ |
| Gate Resistance                               | $R_G$         | $f = 1\text{ MHz}$                                                                                                         | —    | 0.8  | —         | $\Omega$         |
| Input Capacitance                             | $C_{iss}$     | $V_{DS} = 25\text{ V}$<br>$V_{GS} = 0\text{ V}$<br>$f = 1\text{ MHz}$                                                      | —    | 6200 | —         | pF               |
| Output Capacitance                            | $C_{oss}$     |                                                                                                                            | —    | 960  | —         |                  |
| Reverse Transfer Capacitance                  | $C_{rss}$     |                                                                                                                            | —    | 640  | —         |                  |
| Total Gate Charge ( $V_{GS} = 10\text{ V}$ )  | $Q_{g1}$      | $V_{DS} = 20\text{ V}$<br>$I_D = 82.5\text{ A}$                                                                            | —    | 93.7 | —         | nC               |
| Total Gate Charge ( $V_{GS} = 4.5\text{ V}$ ) | $Q_{g2}$      |                                                                                                                            | —    | 44.9 | —         |                  |
| Gate to Source Charge                         | $Q_{gs}$      |                                                                                                                            | —    | 15.2 | —         |                  |
| Gate to Drain Charge                          | $Q_{gd}$      |                                                                                                                            | —    | 16.2 | —         |                  |
| Turn-On Delay Time                            | $t_{d(on)}$   | $V_{DD} = 20\text{ V}$<br>$I_D = 82.5\text{ A}$<br>$V_{GS} = 10\text{ V}$ , $R_G = 4.7\text{ }\Omega$<br>Refer to Figure 2 | —    | 9.7  | —         | ns               |
| Rise Time                                     | $t_r$         |                                                                                                                            | —    | 13.2 | —         |                  |
| Turn-Off Delay Time                           | $t_{d(off)}$  |                                                                                                                            | —    | 45.5 | —         |                  |
| Fall Time                                     | $t_f$         |                                                                                                                            | —    | 28.0 | —         |                  |
| Source to Drain Diode Forward Voltage         | $V_{SD}$      | $I_S = 82.5\text{ A}$ , $V_{GS} = 0\text{ V}$                                                                              | —    | 0.9  | 1.5       | V                |
| Source to Drain Diode Reverse Recovery Time   | $t_{rr}$      | $I_F = 82.5\text{ A}$<br>$di/dt = 100\text{ A}/\mu\text{s}$<br>Refer to Figure 3                                           | —    | 43.9 | —         | ns               |
| Source to Drain Diode Reverse Recovery Charge | $Q_{rr}$      |                                                                                                                            | —    | 44.8 | —         | nC               |

## Test Circuits and Performance Curves

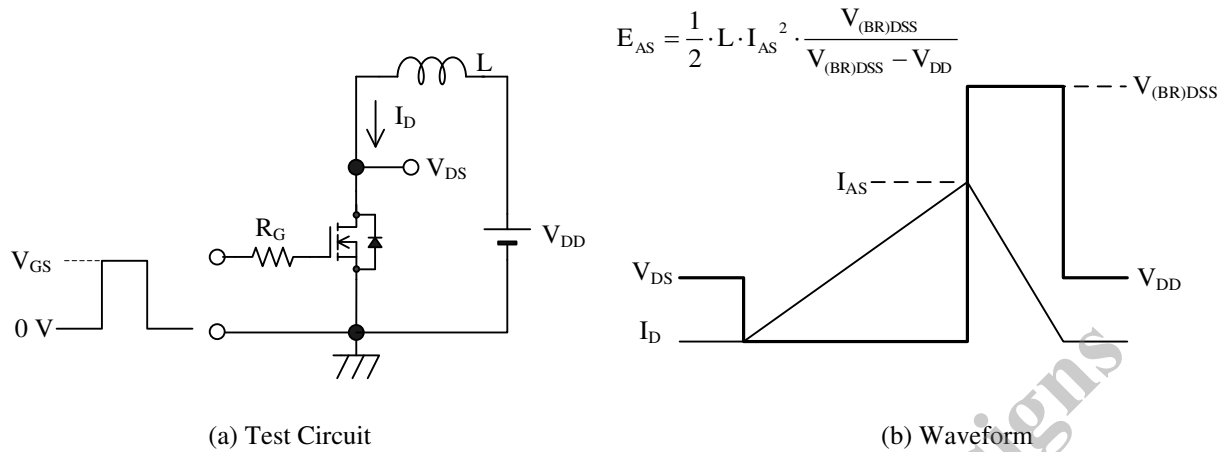


Figure 1. Unclamped Inductive Switching

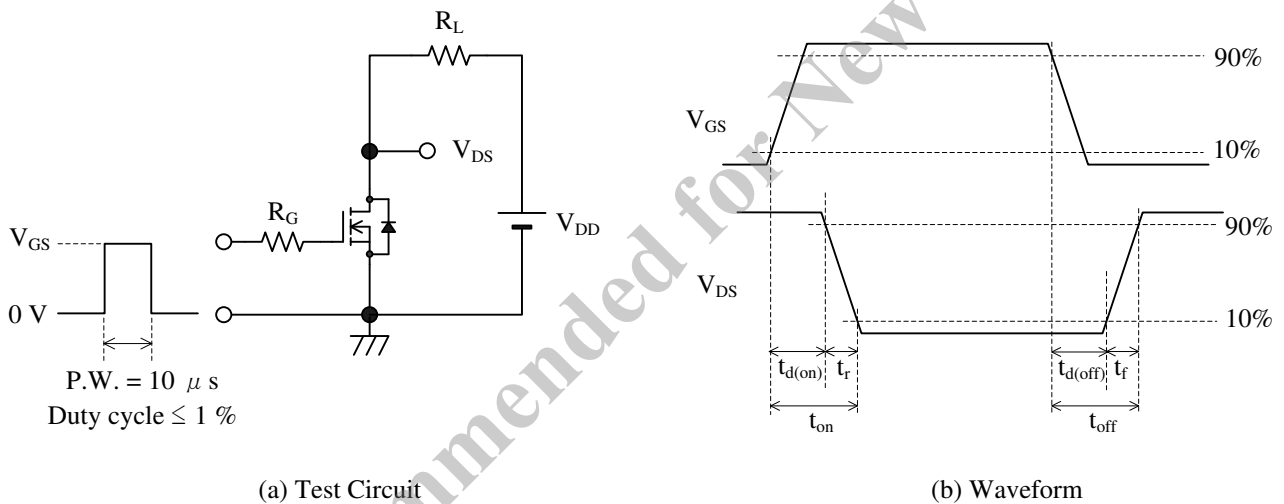


Figure 2. Switching Time

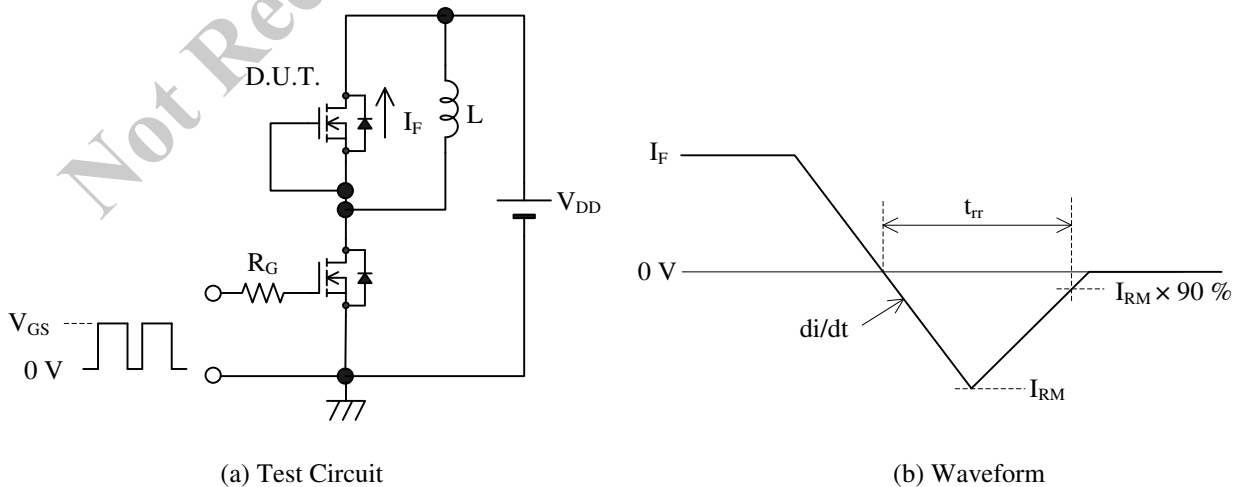
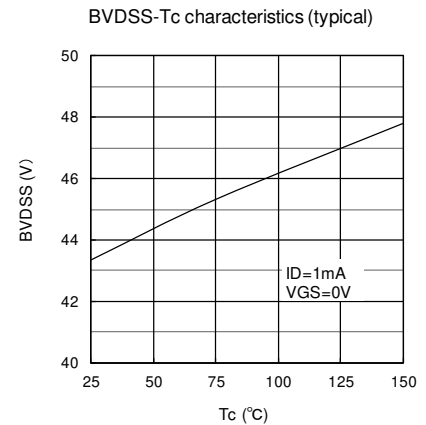
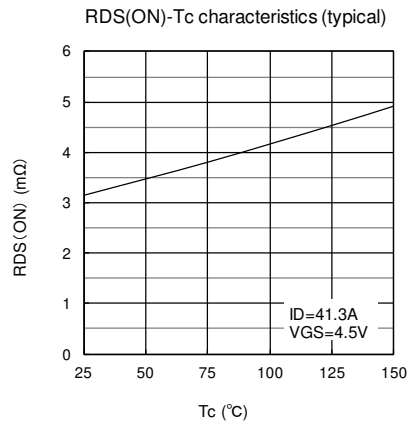
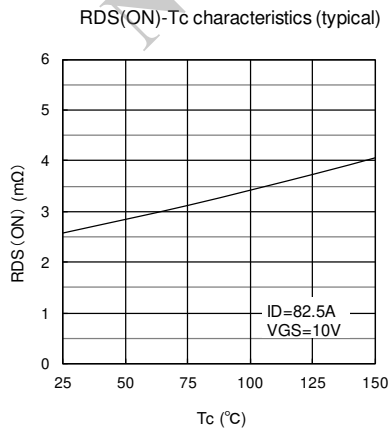
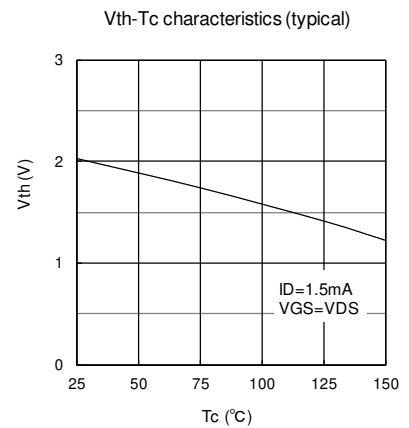
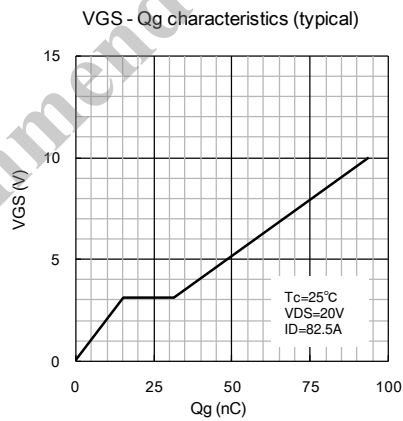
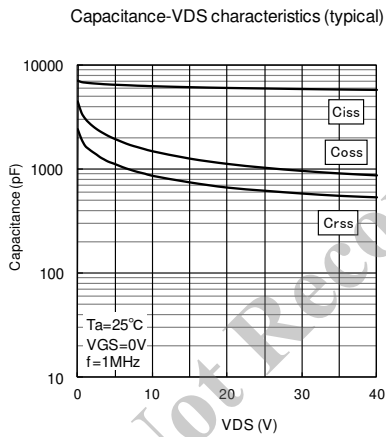
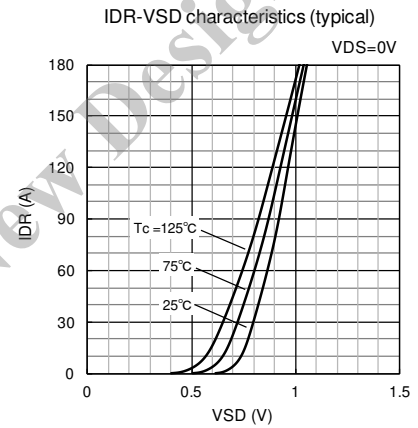
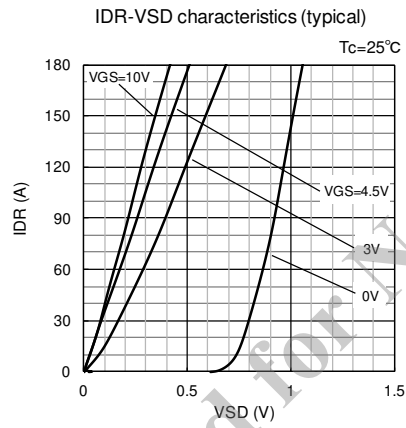
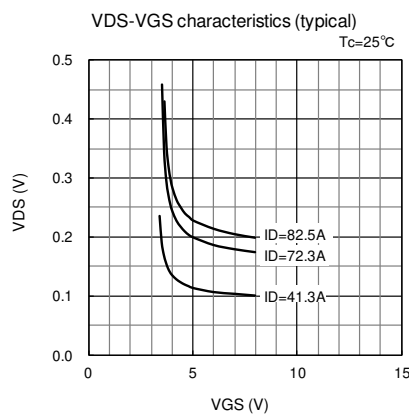
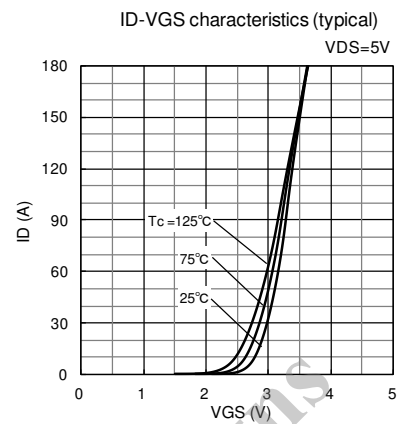
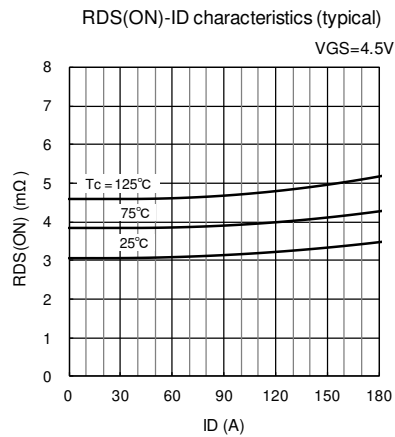
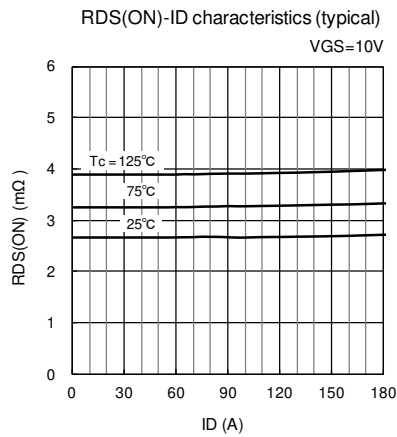
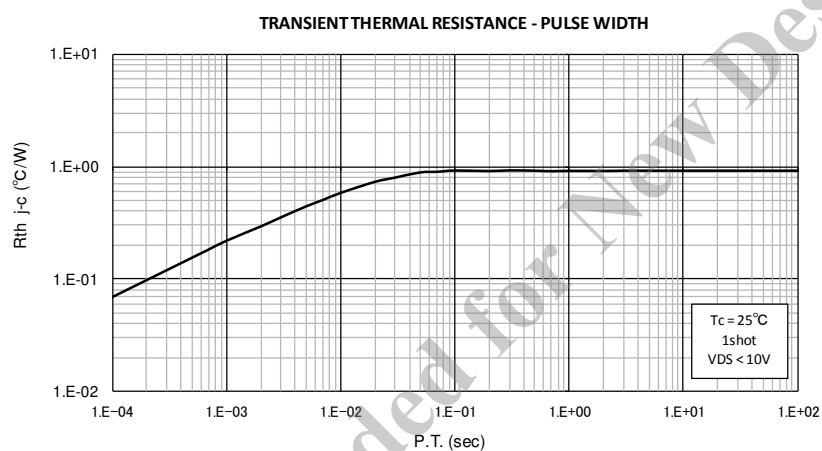
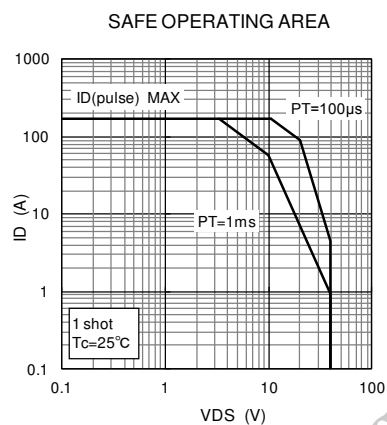
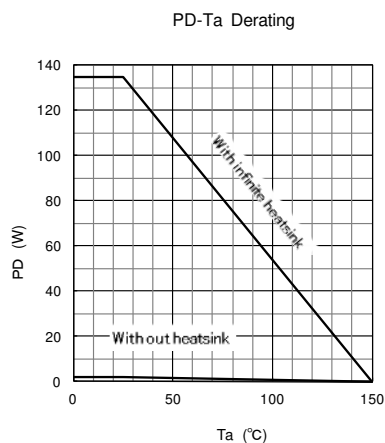


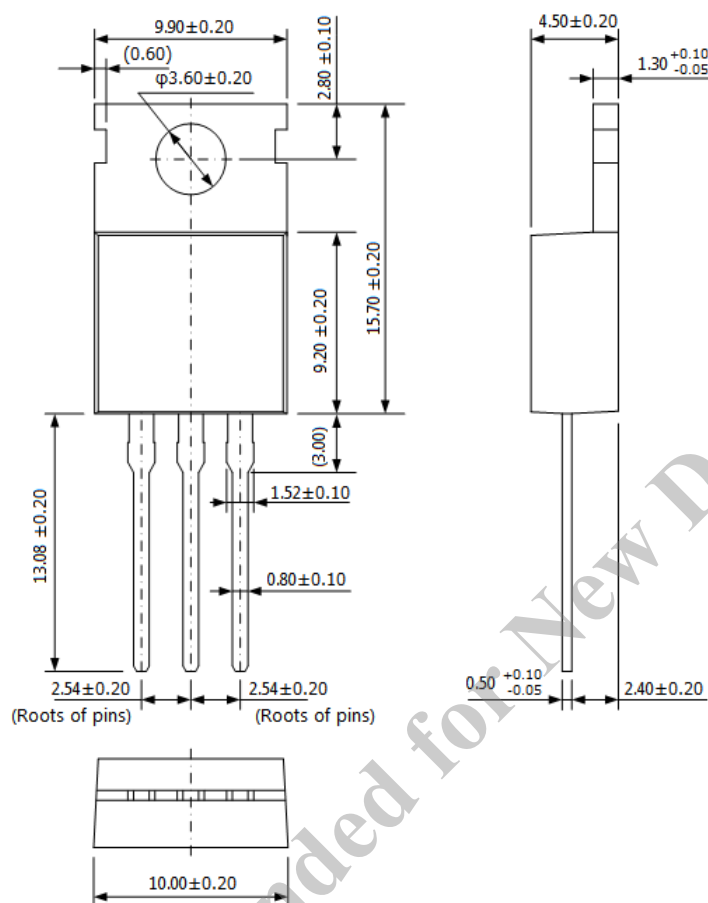
Figure 3. Diode Reverse Recovery Time





## Physical Dimensions

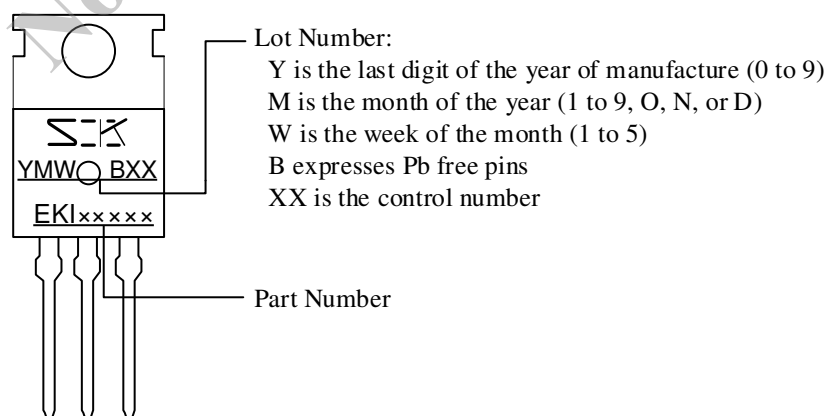
### ● TO220-3L



### NOTES:

- Dimensions in millimeters
- Maximum gate burr height is 0.3 mm.
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time, within the following limits:  
Flow:  $260 \pm 5$  °C /  $10 \pm 1$  s, 2 times  
Soldering Iron:  $380 \pm 10$  °C /  $3.5 \pm 0.5$  s, 1 time  
Soldering should be at a distance of at least 1.5 mm from the body of the product.
- Recommended screw torque for TO220: 0.490 N·m to 0.686 N·m (5 kgf·cm to 7 kgf·cm)

## Marking Diagram



## Important Notes

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