

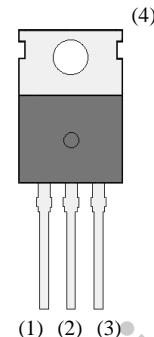
Features

- $V_{(BR)DSS}$ ----- 75 V ($I_D = 100 \mu A$)
- I_D ----- 46 A
- $R_{DS(ON)}$ ----- 14.1 mΩ max. ($V_{GS} = 10 V$, $I_D = 22.8 A$)
- Q_g ----- 15.0 nC ($V_{GS} = 4.5 V$, $V_{DS} = 38 V$, $I_D = 22.8 A$)

- Low Total Gate Charge
- High Speed Switching
- Low On-Resistance
- Capable of 4.5 V Gate Drive
- 100 % UIL Tested
- RoHS Compliant

Package

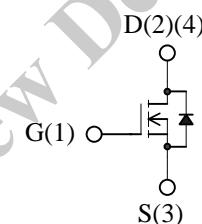
- TO220-3L



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}		75	V
Gate to Source Voltage	V_{GS}		± 20	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	46	A
Pulsed Drain Current	I_{DM}	$PW \leq 100\mu s$ Duty cycle $\leq 1\%$	91	A
Continuous Source Current (Body Diode)	I_S		46	A
Pulsed Source Current (Body Diode)	I_{SM}	$PW \leq 100\mu s$ Duty cycle $\leq 1\%$	91	A
Single Pulse Avalanche Energy	E_{AS}	$V_{DD} = 38 V$, $L = 1 mH$, $I_{AS} = 9.4 A$, unclamped, $R_G = 4.7 \Omega$ Refer to Figure 1	89	mJ
Avalanche Current	I_{AS}		16.7	A
Power Dissipation	P_D	$T_C = 25^\circ C$	90	W
Operating Junction Temperature	T_J		150	$^\circ C$
Storage Temperature Range	T_{STG}		-55 to 150	$^\circ C$

Thermal Characteristics

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Thermal Resistance (Junction to Case)	$R_{\theta\text{JC}}$		—	—	1.4	$^\circ\text{C}/\text{W}$
Thermal Resistance (Junction to Ambient)	$R_{\theta\text{JA}}$		—	—	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain to Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 100 \mu\text{A}, V_{GS} = 0 \text{ V}$	75	—	—	V
Drain to Source Leakage Current	I_{DSS}	$V_{DS} = 75 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20 \text{ V}$	—	—	± 100	nA
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 650 \mu\text{A}$	1.0	2.0	2.5	V
Static Drain to Source On-Resistance	$R_{DS(\text{ON})}$	$I_D = 22.8 \text{ A}, V_{GS} = 10 \text{ V}$	—	10.4	14.1	$\text{m}\Omega$
		$I_D = 11.4 \text{ A}, V_{GS} = 4.5 \text{ V}$	—	12.1	15.9	$\text{m}\Omega$
Gate Resistance	R_G	$f = 1 \text{ MHz}$	—	1.5	—	Ω
Input Capacitance	C_{iss}	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0 \text{ V}$ $f = 1 \text{ MHz}$	—	2520	—	pF
Output Capacitance	C_{oss}		—	245	—	
Reverse Transfer Capacitance	C_{rss}		—	115	—	
Total Gate Charge ($V_{GS} = 10 \text{ V}$)	Q_{g1}	$V_{DS} = 38 \text{ V}$ $I_D = 22.8 \text{ A}$	—	33.0	—	nC
Total Gate Charge ($V_{GS} = 4.5 \text{ V}$)	Q_{g2}		—	15.0	—	
Gate to Source Charge	Q_{gs}		—	6.1	—	
Gate to Drain Charge	Q_{gd}		—	4.5	—	
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 38 \text{ V}$ $I_D = 22.8 \text{ A}$ $V_{GS} = 10 \text{ V}, R_G = 4.7 \Omega$ Refer to Figure 2	—	4.5	—	ns
Rise Time	t_r		—	4.2	—	
Turn-Off Delay Time	$t_{d(\text{off})}$		—	19.4	—	
Fall Time	t_f		—	8.7	—	
Source to Drain Diode Forward Voltage	V_{SD}	$I_S = 22.8 \text{ A}, V_{GS} = 0 \text{ V}$	—	0.9	1.5	V
Source to Drain Diode Reverse Recovery Time	t_{rr}	$I_F = 22.8 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ Refer to Figure 3	—	39.0	—	ns
Source to Drain Diode Reverse Recovery Charge	Q_{rr}		—	56.1	—	nC

Test Circuits and Performance Curves

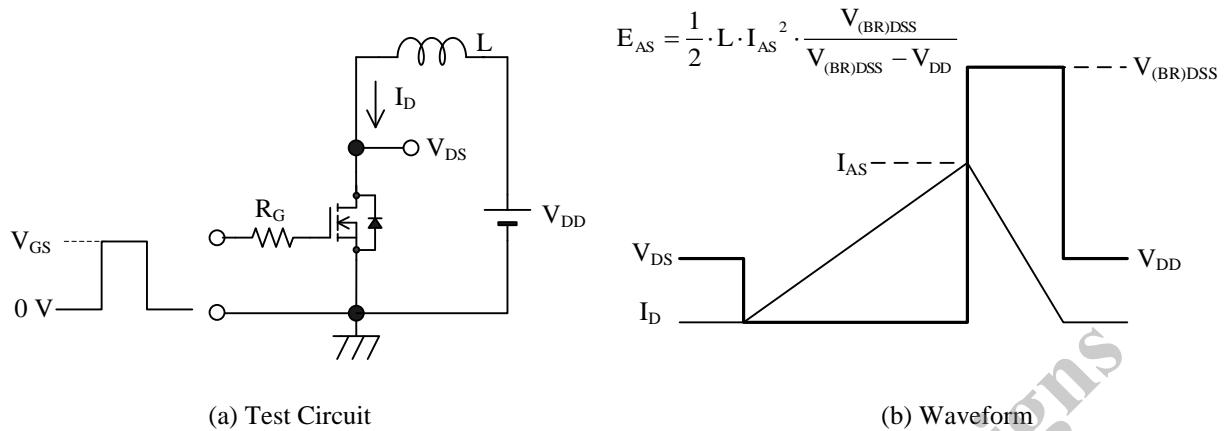


Figure 1. Unclamped Inductive Switching

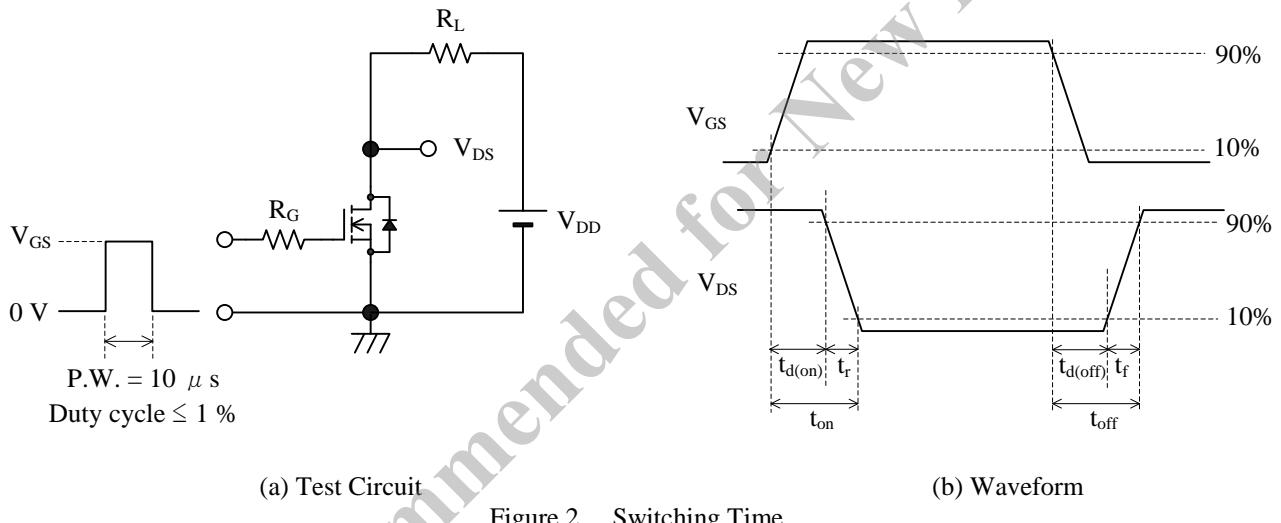


Figure 2. Switching Time

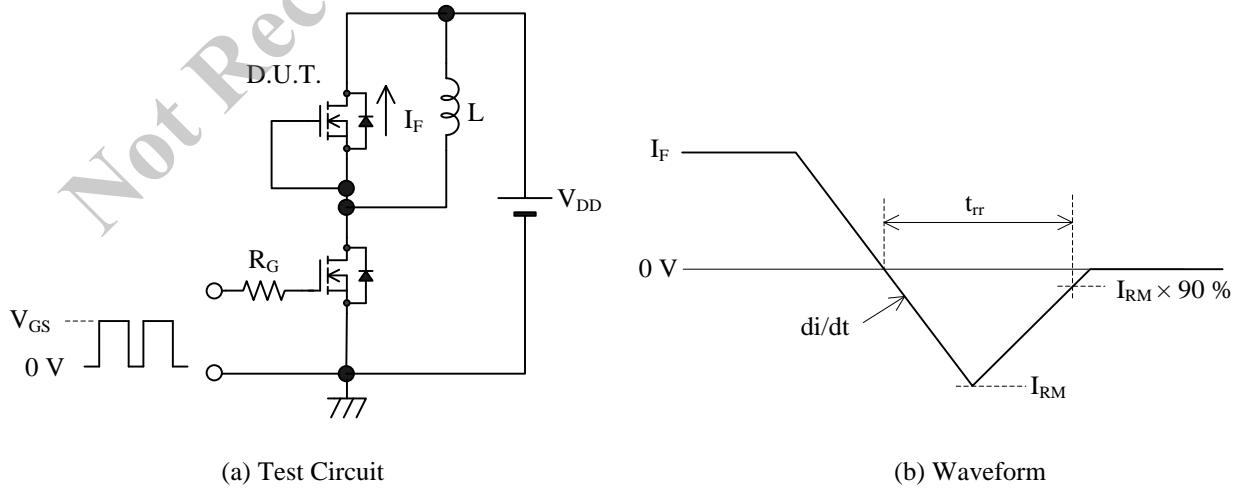
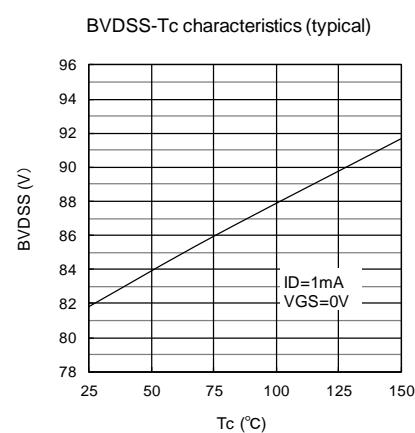
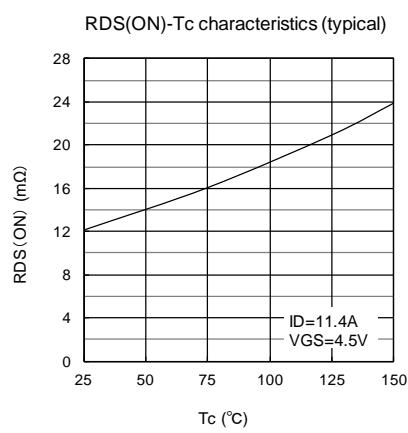
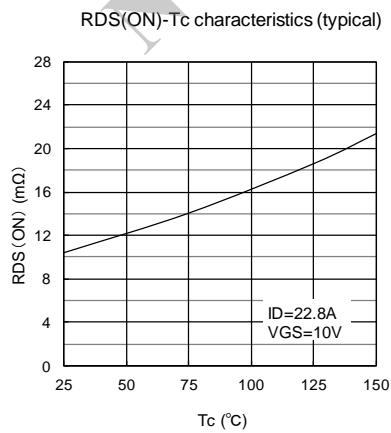
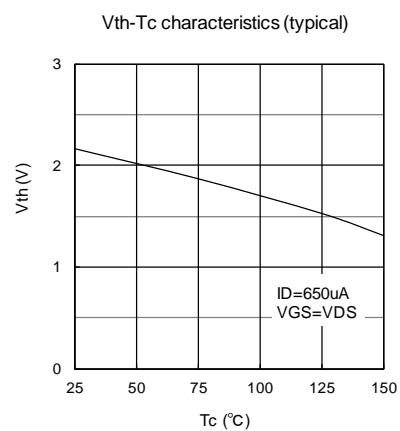
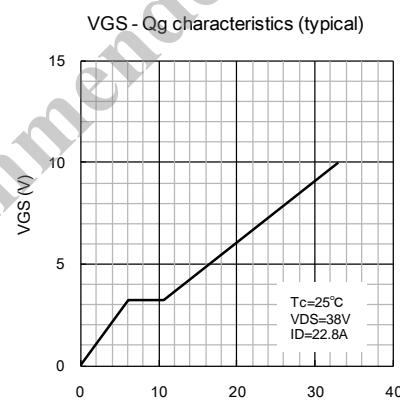
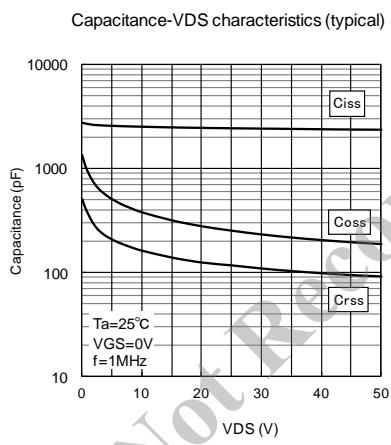
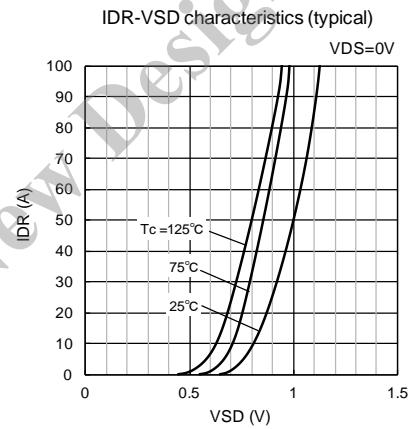
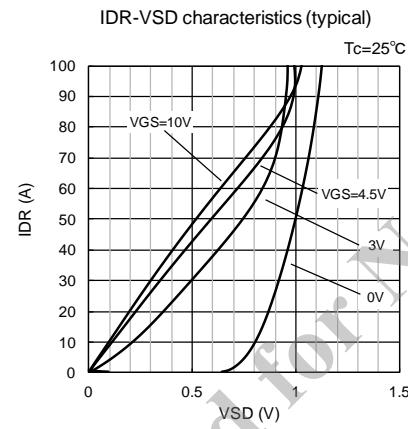
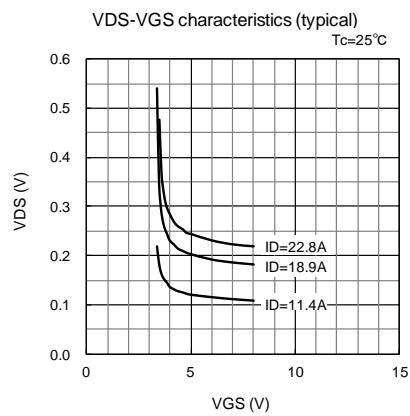
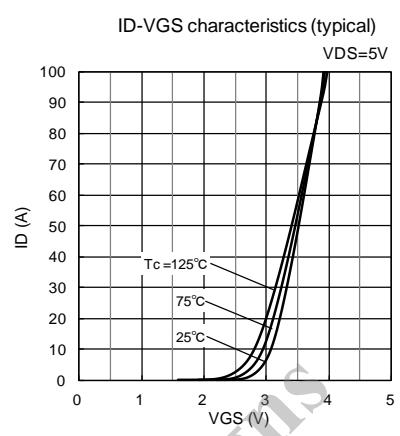
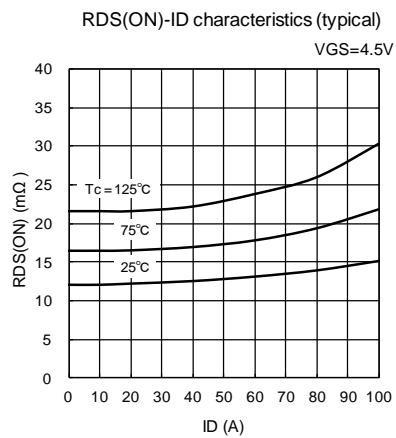
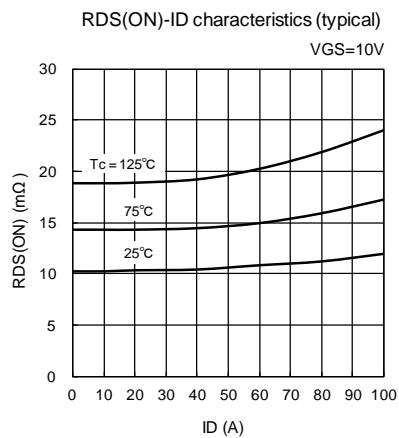
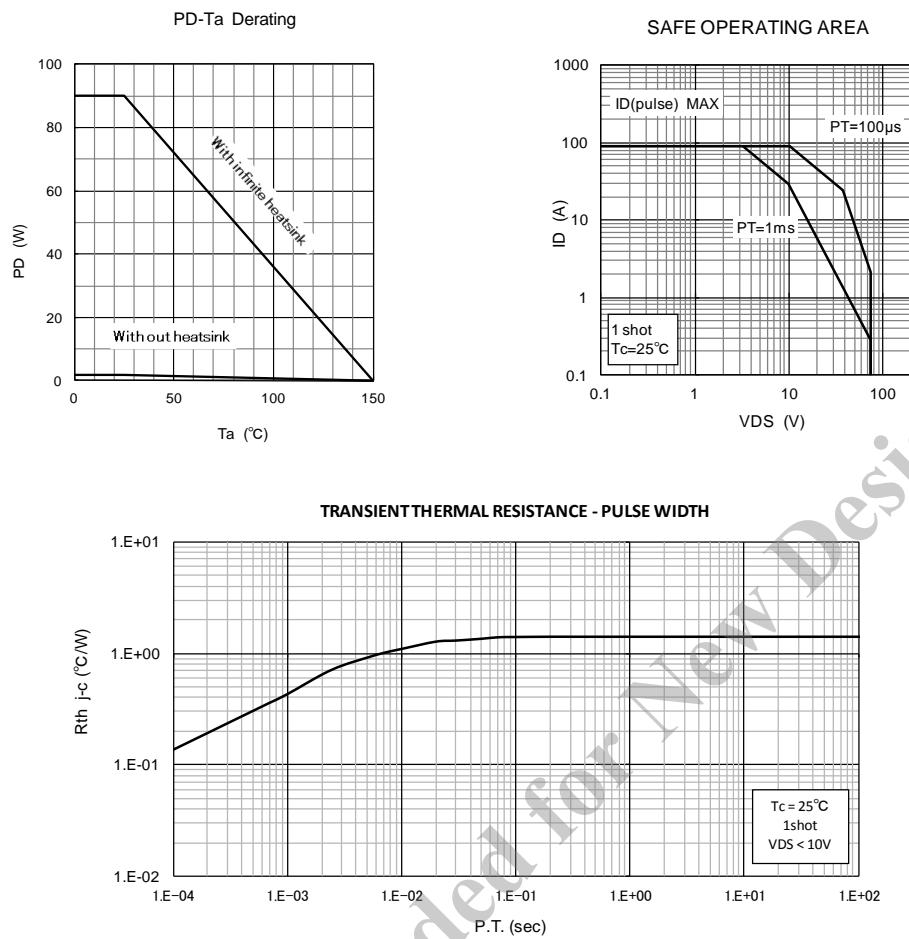


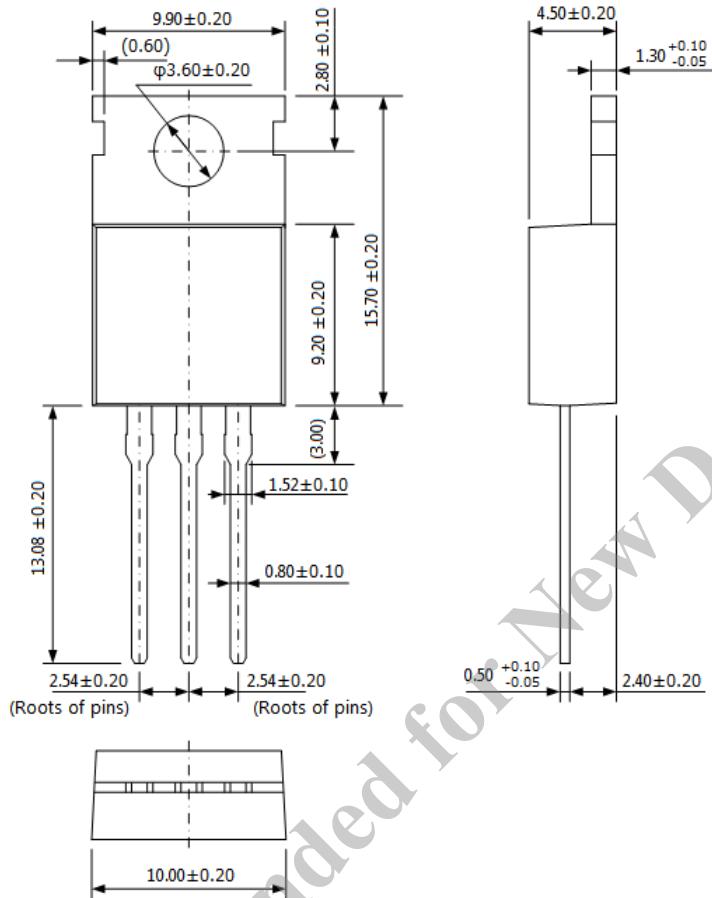
Figure 3. Diode Reverse Recovery Time



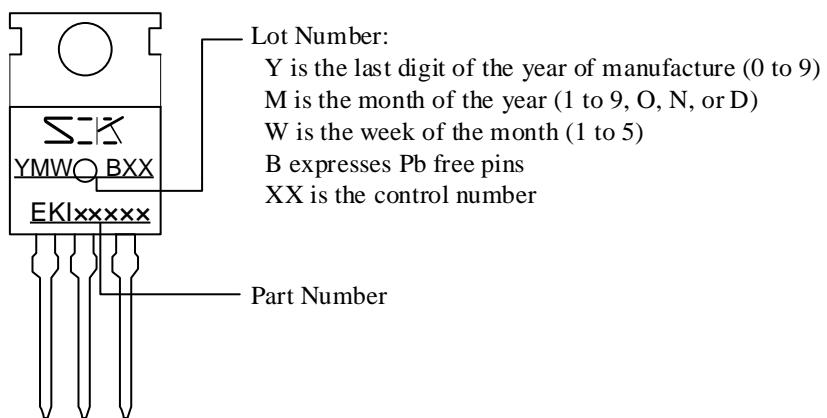


Physical Dimensions

- 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 ± 5 °C / 10 ± 1 s, 2 times
 Soldering Iron: 380 ± 10 °C / 3.5 ± 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

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