Ordering number : EN9050A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

BXL4004 — General-Purpose Switching Device Applications

Features

- ON-resistance $R_{DS}(on)1=3m\Omega$ (typ.)
- 4.5V drive
- Input capacitance Ciss=8200pF (typ.)

Specifications

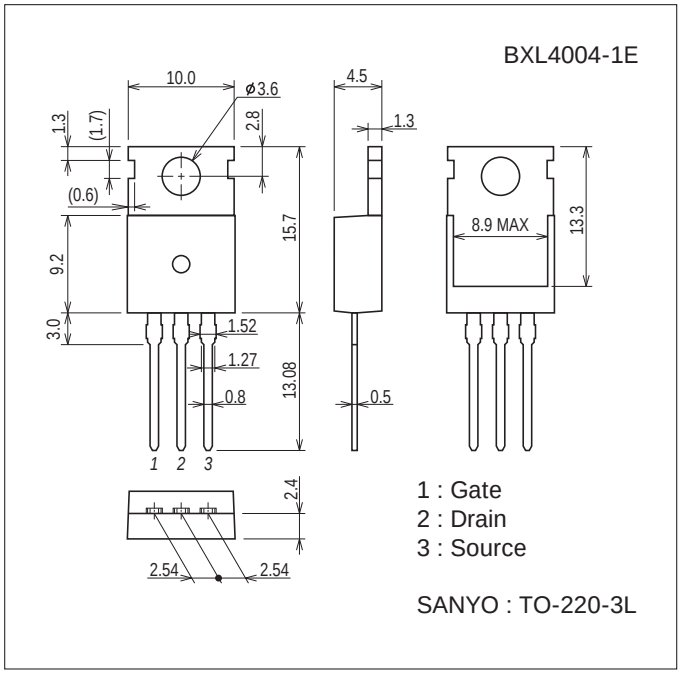
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		40	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		100	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	400	A
Allowable Power Dissipation	P_D		1.75	W
		Tc=25°C	75	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		420	mJ
Avalanche Current *2	I_{AV}		60	A

Note :*1 V_{DD}=24V, L=100μH, I_{AV}=60A (Fig.1)
*2 L≤100μH, Single pulse

Package Dimensions

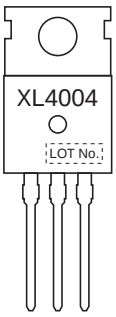
unit : mm (typ)
7536-001



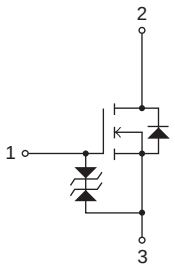
Product & Package Information

- Package : TO-220-3L
- JEITA, JEDEC : SC-46, TO-220AB
- Minimum Packing Quantity : 50 pcs./magazine

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	40			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V			10	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=50A		120		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=50A, V_{GS}=10V		3	3.9	mΩ
	R_{DS}(on)2	I_D=50A, V_{GS}=4.5V		4.7	6.6	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		8200		pF
Output Capacitance	Coss			940		pF
Reverse Transfer Capacitance	Crss			700		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		65		ns
Rise Time	t_r			390		ns
Turn-OFF Delay Time	t_d(off)			510		ns
Fall Time	t_f			360		ns
Total Gate Charge	Qg	V_{DS}=24V, V_{GS}=10V, I_D=100A		140		nC
Gate-to-Source Charge	Qgs			43		nC
Gate-to-Drain “Miller” Charge	Qgd			25		nC
Diode Forward Voltage	V_{SD}	I_S=100A, V_{GS}=0V		1.0	1.2	V
Reverse Recovery Time	t_{rr}	See Fig.3		90		ns
Reverse Recovery Charge	Q_{rr}	I_S=100A, V_{GS}=0V, di/dt=100A/μs		230		nC

Fig.1 Unclamped Inductive Switching Test Circuit

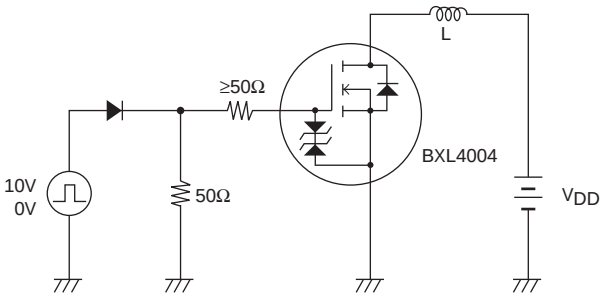


Fig.2 Switching Time Test Circuit

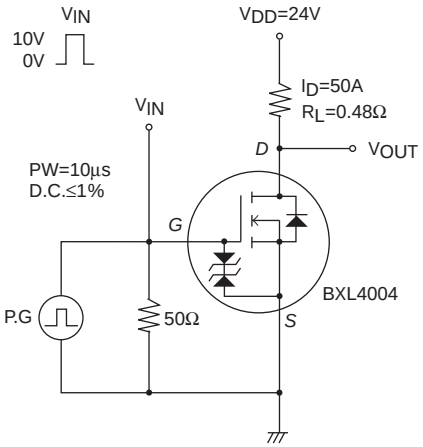
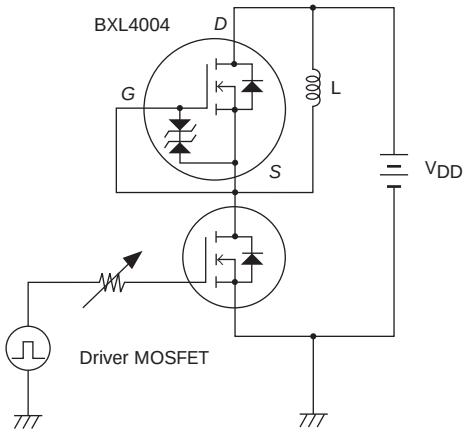
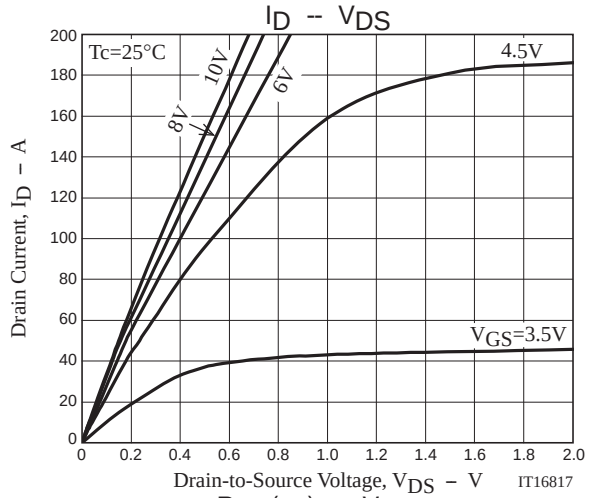


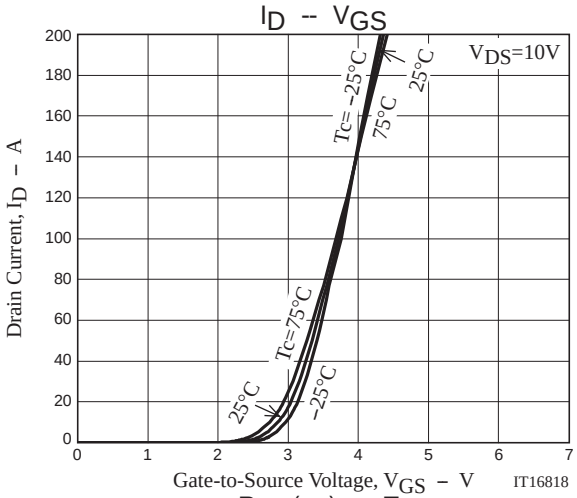
Fig.3 Reverse Recovery Time Test Circuit

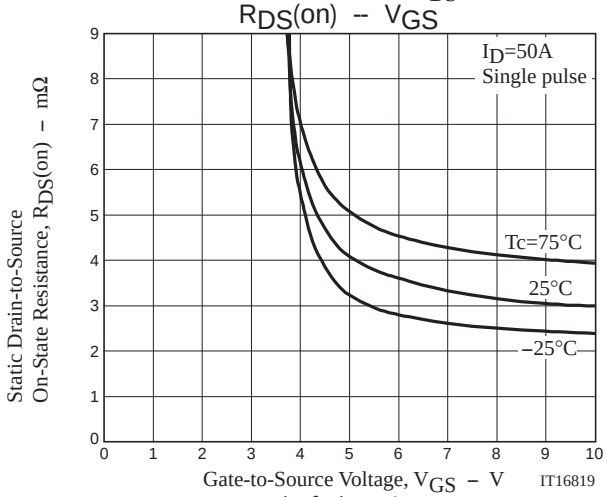


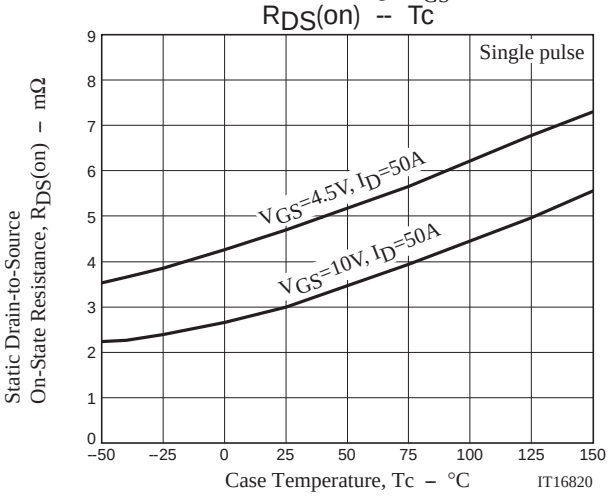
Ordering Information

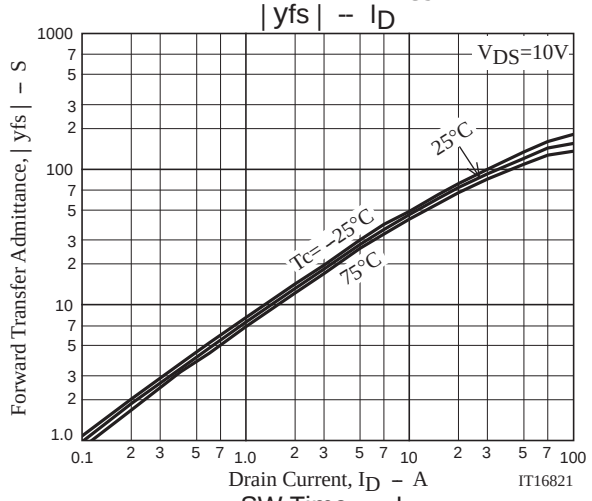
Device	Package	Shipping	memo
BXL4004-1E	TO-220-3L	50pcs./magazine	Pb Free and Halogen Free

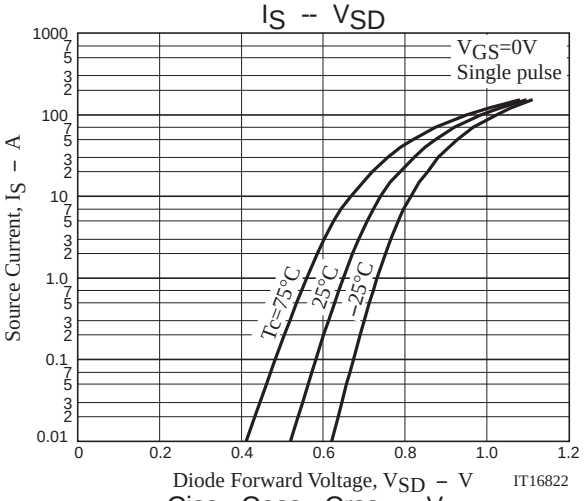

ID -- VDS
Tc=25°C
4.5V
10V
8V
6V
VGS=3.5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16817

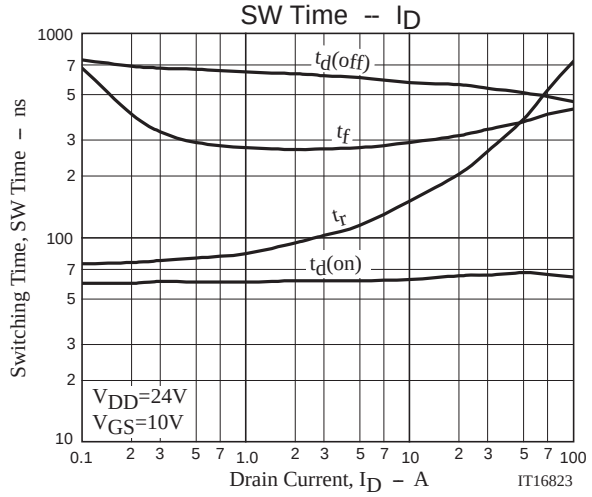

ID -- VGS
VDS=10V
Tc=–25°C
25°C
75°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT16818

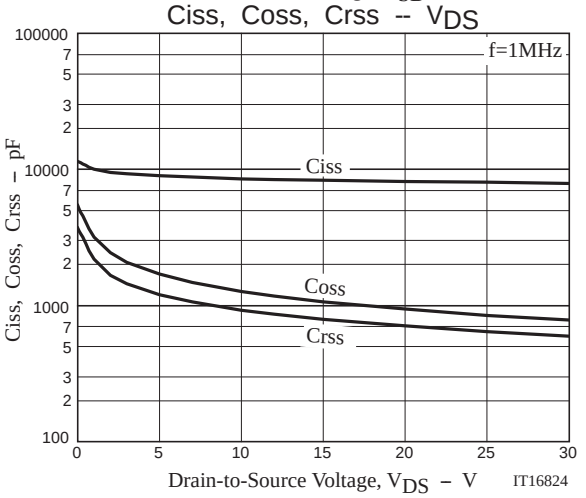

RDS(on) -- VGS
ID=50A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT16819

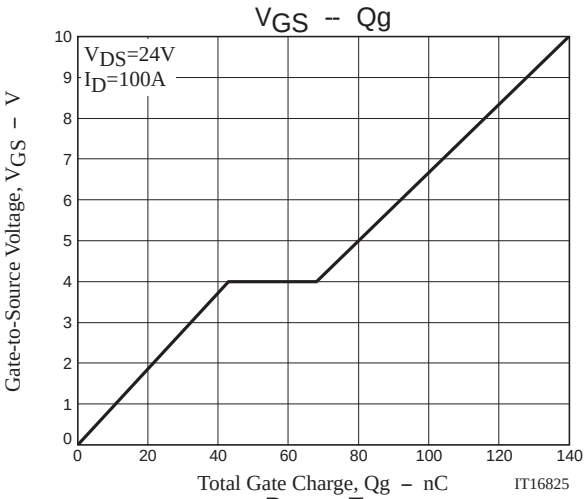

RDS(on) -- Tc
Single pulse
VGS=4.5V, ID=50A
VGS=10V, ID=50A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT16820

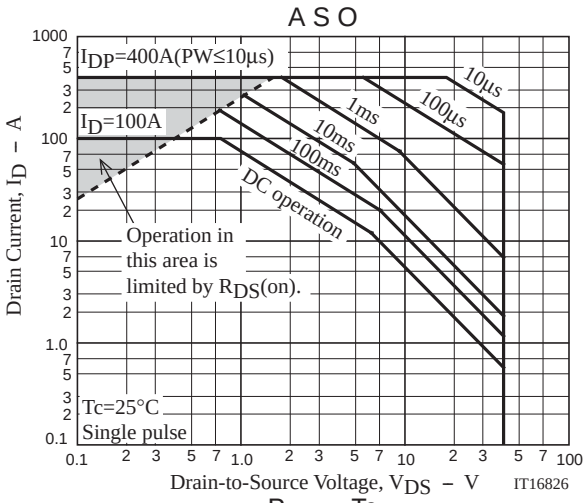

| yfs | -- ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16821

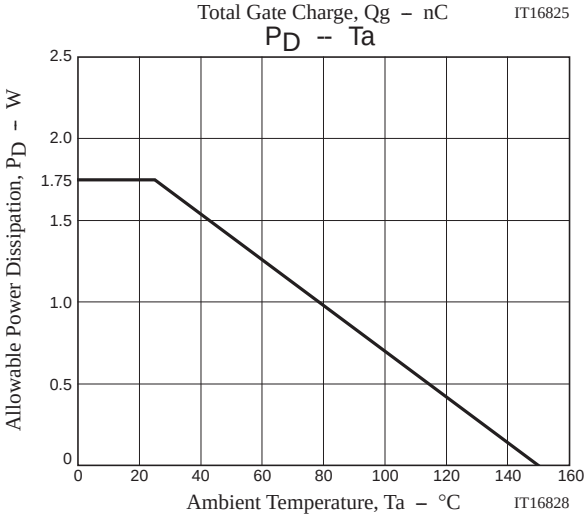

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT16822

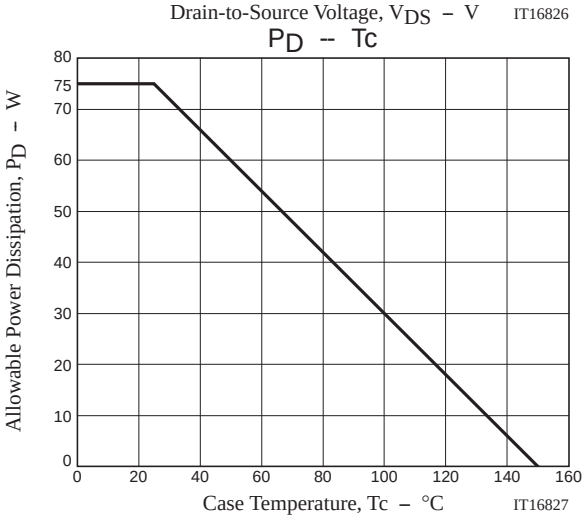

SW Time -- ID
td(off)
tf
tr
td(on)
VDD=24V
VGS=10V
Switching Time, SW Time – ns
Drain Current, ID – A
IT16823

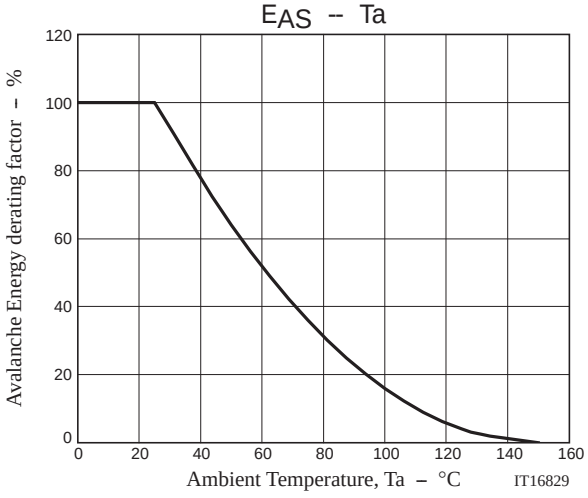

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT16824


VGS -- Qg
VDS=24V
ID=100A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16825


A S O
IDP=400A(PW≤10μs)
ID=100A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16826


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16828


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT16827


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT16829

Magazine Specification

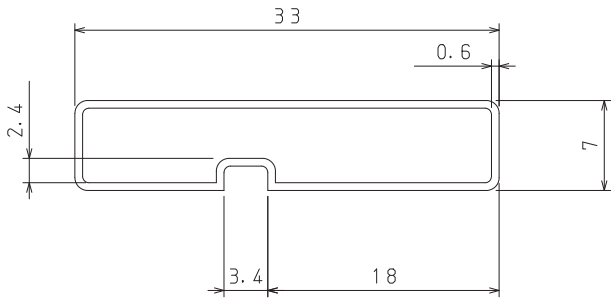
BXL4004-1E

1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			Packing format	
	Magazine	Inner box	Outer box	Inner BOX	Outer BOX
TO-220-3L	50	1,000	4000	SPD-0V0001 20 magazines contained Dimensions:mm (external) 568×150×55	SPD-LV0010 4 inner boxes contained Dimensions:mm (external) 590x225x178

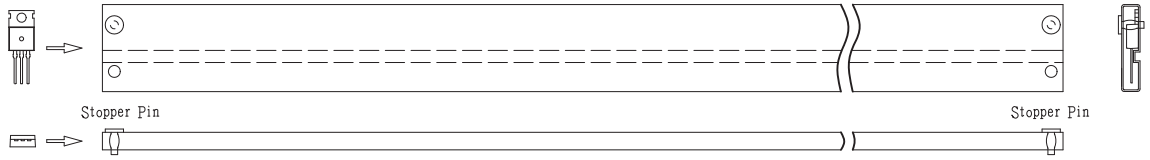
2. Magazine dimensions

(unit:mm)

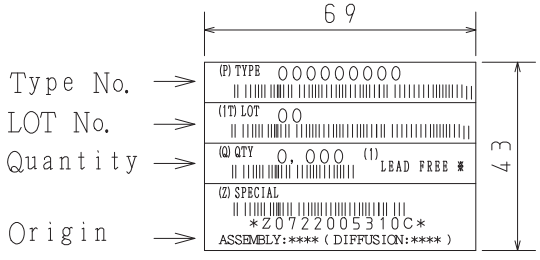


Tolerance=±0.2mm
Thickness=0.6+0.2/−0mm
Length =512.6±1mm
Material =PVC (Antistatic treatment)

3. Storage method to magazine

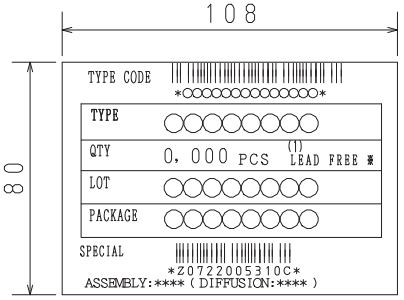


4. Inner box label (unit:mm)



5. Outer box label (unit:mm)

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



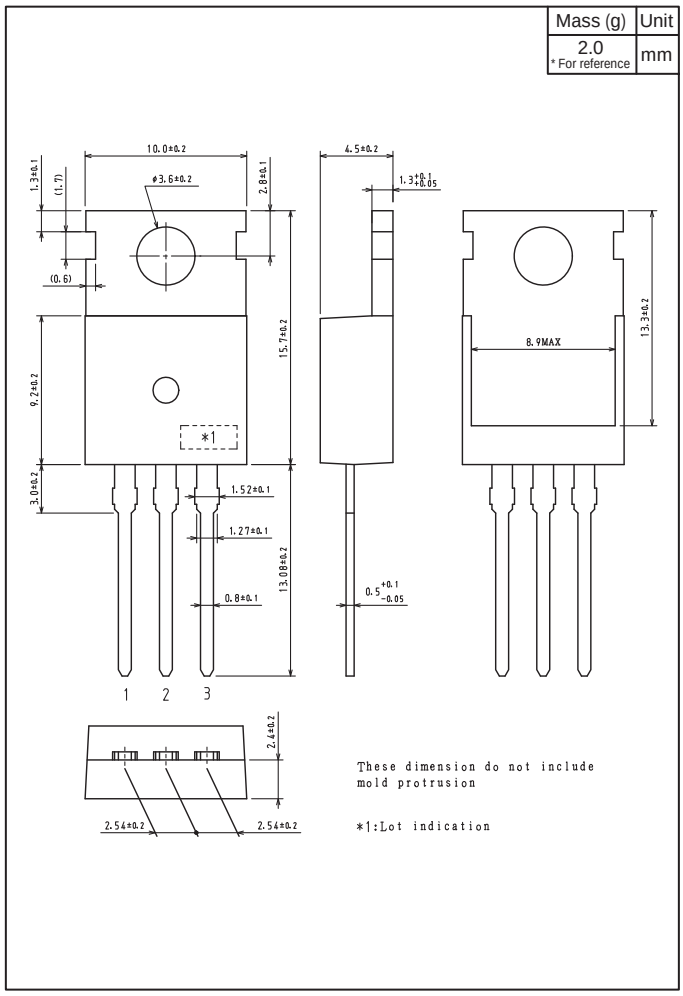
NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A

Outline Drawing

BXL4004-1E

Mass (g)	Unit
2.0 * For reference	mm



Note on usage : Since the BXL4004 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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