



# BXL4004

## N-Channel Power MOSFET 40V, 100A, 3.9mΩ, TO-220-3L

ON Semiconductor®

<http://onsemi.com>

### Features

- ON-resistance  $R_{DS(on)} = 3.9\text{m}\Omega$  (typ.)
- Input capacitance  $C_{iss} = 8200\text{pF}$  (typ.)
- 4.5V drive

### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		40	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 20$	V
Drain Current (DC)	$I_D$		100	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	400	A
Allowable Power Dissipation	$P_D$		1.75	W
		$T_c = 25^\circ\text{C}$	75	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	$E_{AS}$		420	mJ
Avalanche Current *2	$I_{AV}$		60	A

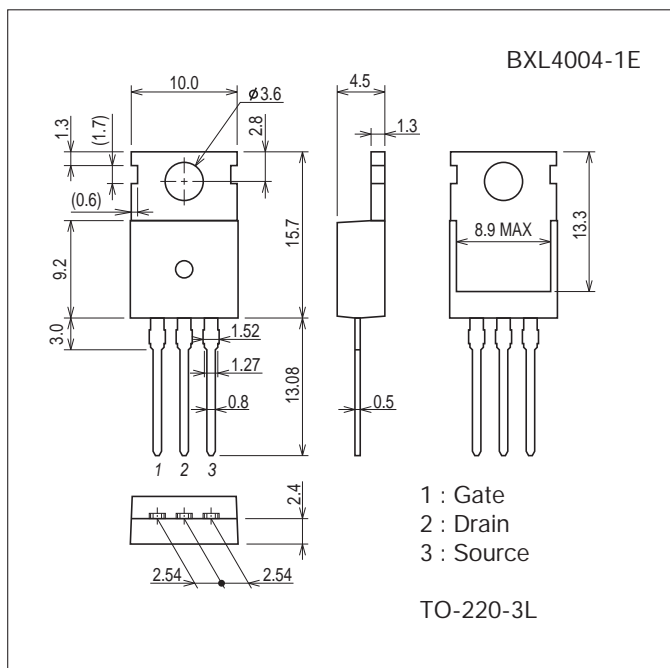
Note : \*1  $V_{DD} = 24\text{V}$ ,  $L = 100\mu\text{H}$ ,  $I_{AV} = 60\text{A}$  (Fig.1)\*2  $L \leq 100\mu\text{H}$ , Single pulse

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)

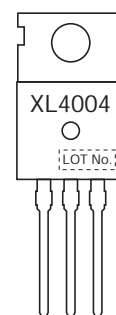
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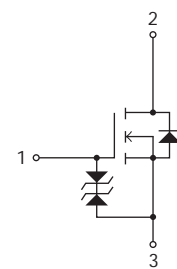
### Product & Package Information

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

### Marking



### Electrical Connection



# BXL4004

## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	V(BR)DSS	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V	40			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V			10	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA	1.2		2.6	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =50A		120		S
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =50A, V <sub>GS</sub> =10V		3	3.9	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =50A, V <sub>GS</sub> =4.5V		4.7	6.6	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, f=1MHz		8200		pF
Output Capacitance	C <sub>oss</sub>			940		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			700		pF
Turn-ON Delay Time	t <sub>d(on)</sub>			65		ns
Rise Time	t <sub>r</sub>	See Fig.2		390		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			510		ns
Fall Time	t <sub>f</sub>			360		ns
Total Gate Charge	Q <sub>g</sub>			140		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =10V, I <sub>D</sub> =100A		43		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>			25		nC
Diode Forward Voltage	V <sub>SD</sub>		I <sub>S</sub> =100A, V <sub>GS</sub> =0V		1.0	1.2
Reverse Recovery Time	t <sub>rr</sub>	See Fig.3		90		ns
Reverse Recovery Charge	Q <sub>rr</sub>		I <sub>S</sub> =100A, V <sub>GS</sub> =0V, di/dt=100A/μs		230	

Fig.1 Unclamped Inductive Switching Test Circuit

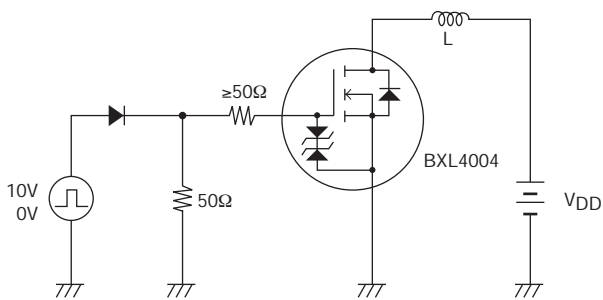


Fig.2 Switching Time Test Circuit

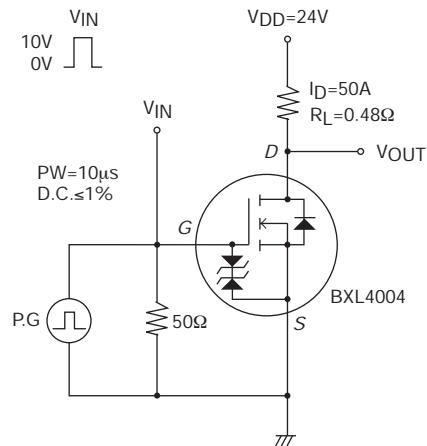
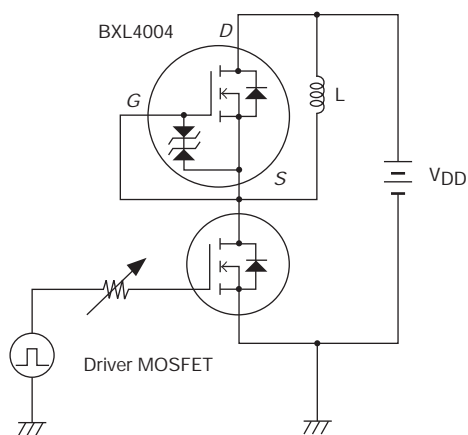
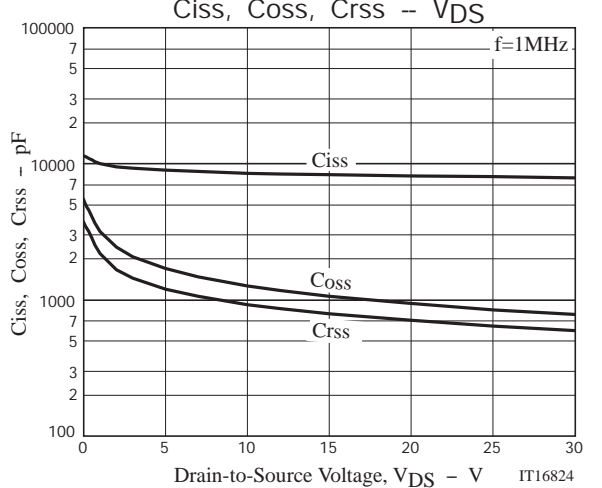
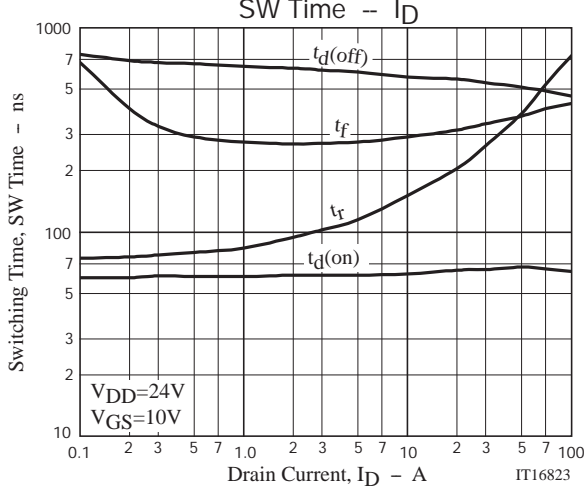
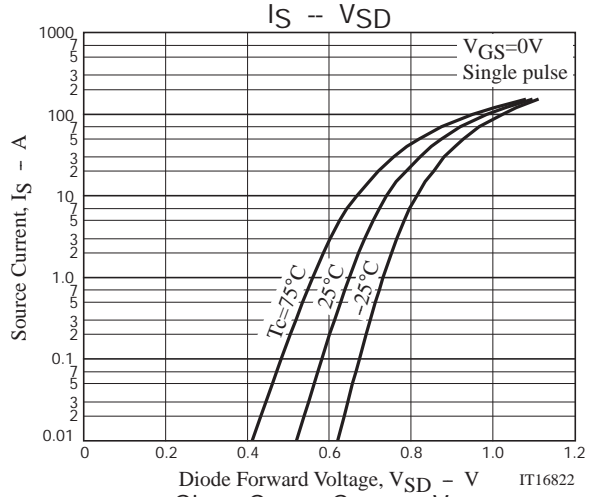
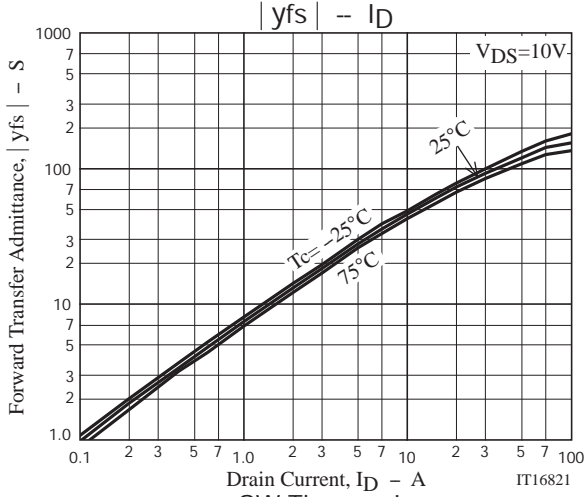
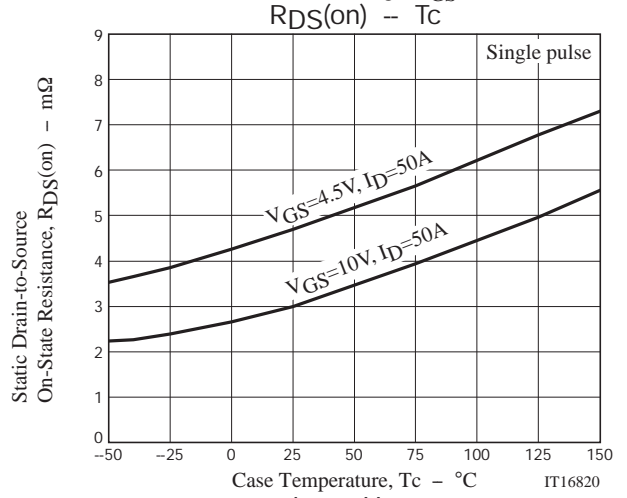
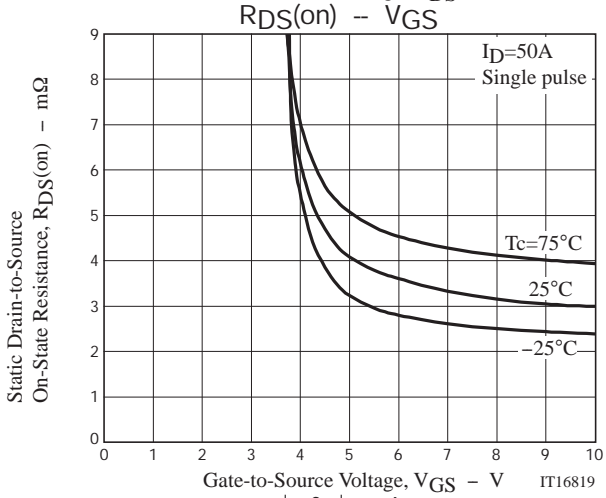
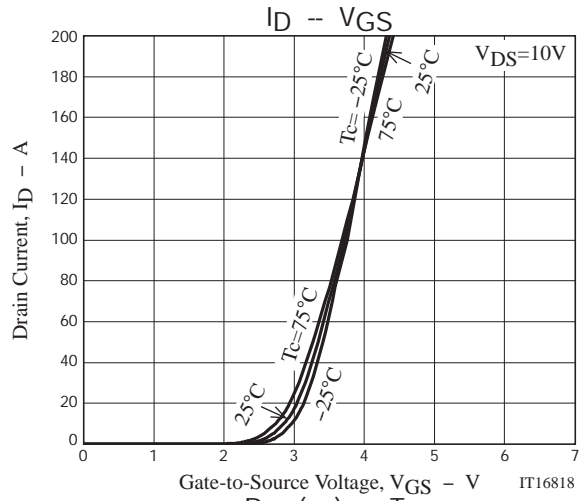
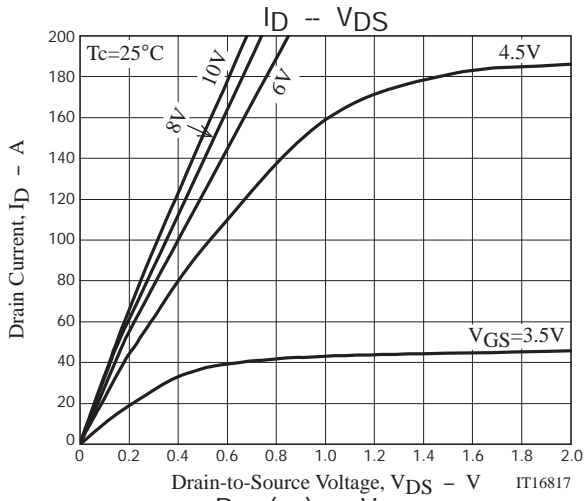


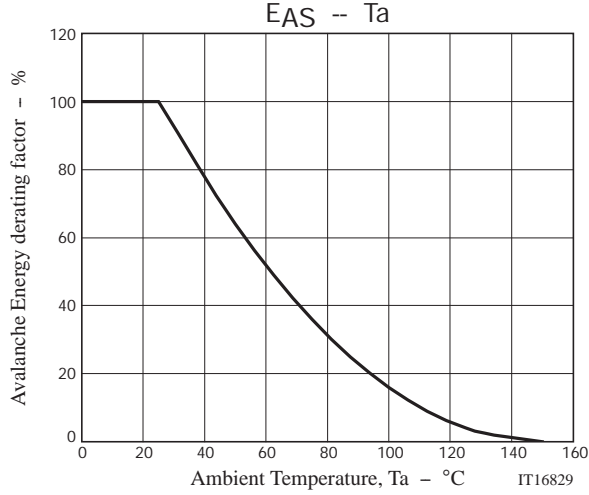
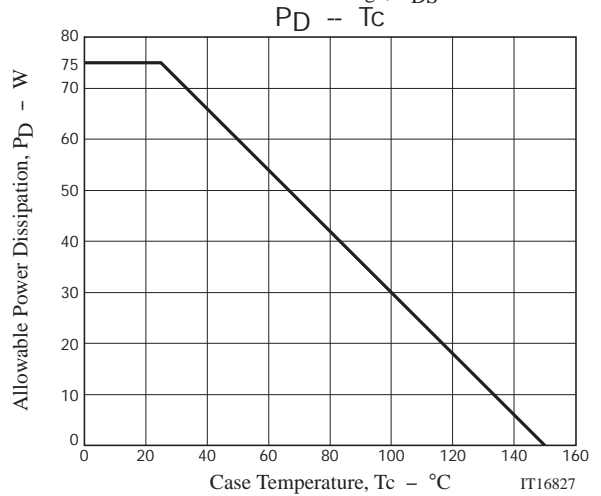
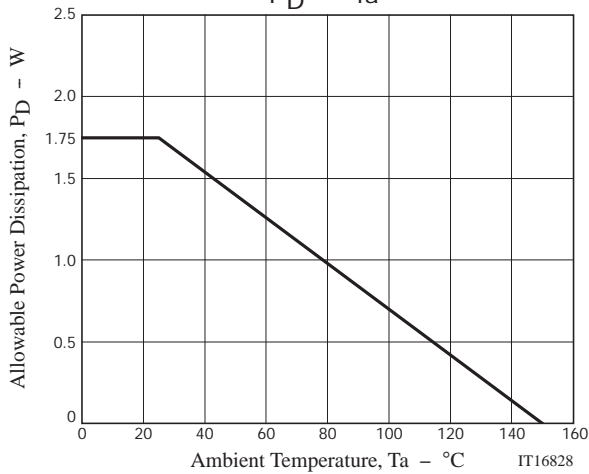
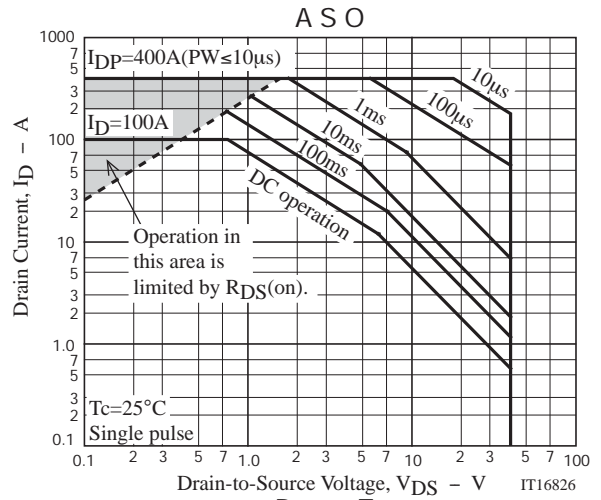
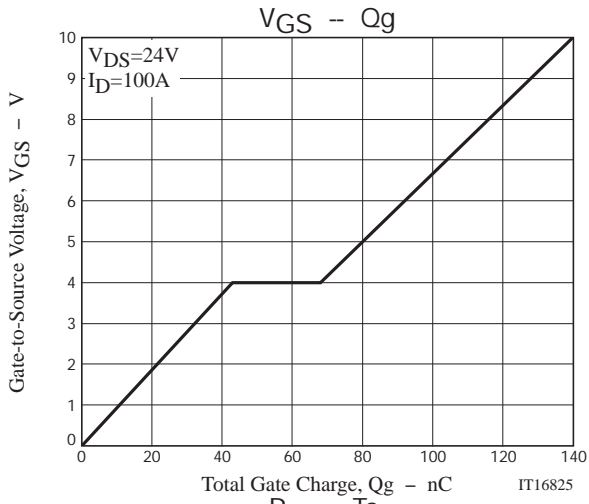
Fig.3 Reverse Recovery Time Test Circuit



## Ordering Information

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





Magazine Specification

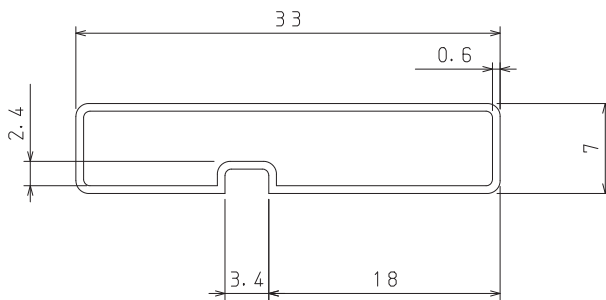
BXL4004-1E

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) 590×225×178

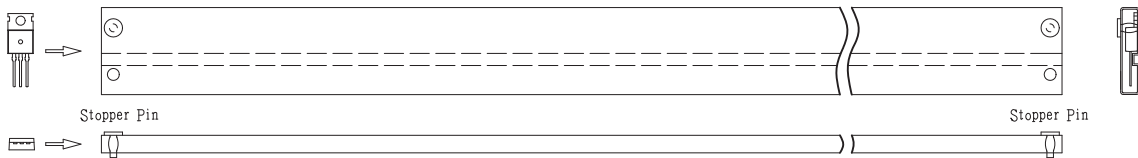
2. Magazine dimensions

(unit:mm)

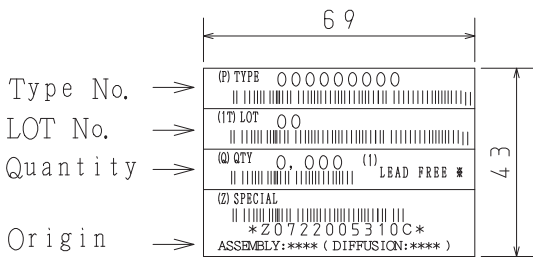


Tolerance=±0.2mm  
 Thickness=0.6+0.2/-0mm  
 Length =512.6±1mm  
 Material =PVC (Antistatic treatment)

3. Storage method to magazine

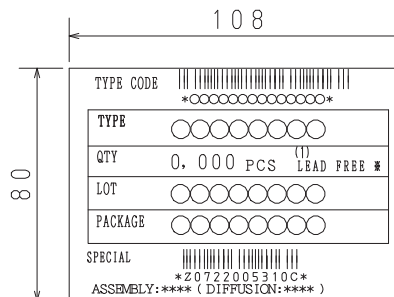


4. Inner box label (unit:mm)



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)

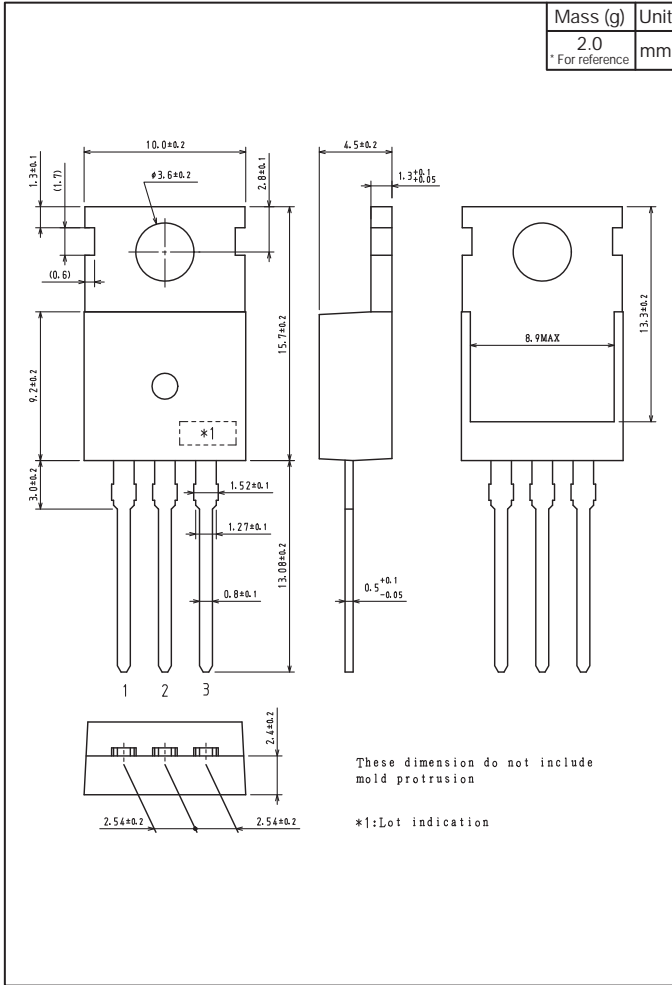
The LEAD FREE \* description shows that the surface treatment of the terminal is lead free,

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A

Outline Drawing

BXL4004-1E

Mass (g)	Unit
2.0	mm
* For reference	



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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