



## JOC3120R Series

Rev.A.1.0

### DESCRIPTION:

The products are gate driver opto-couplers in a plastic DIP8 package with different lead forming options. The device consists of an infrared LED optically coupled to an integrated high-gain, high-speed photodetector IC chip. It provides guaranteed performance and specifications at temperature up to 110 . It is physically smaller and compliant with international safety standards for reinforced insulation. It thus provides a smaller footprint solution for applications that require safety standard certification. An internal noise shield provides a guaranteed common-mode transient immunity of  $\pm 20$  kV/ $\mu$ s. It is ideal for small class IGBT and power MOSFET gate drive. The products are widely used in industrial inverters, IGBT gate drivers, MOSFET gate drivers, induction cooktop and home appliances.



### MAIN FEATURES

- 3A maximum peak output current
- High isolation 5000 VRMS
- Buffer logic type
- Operating temperature range -40°C to 110°C
- REACH & RoHS compliance
- HBM: H3A; MM: M4; CDM: C3
- CQC approved
- VDE approved
- UL approved

### Truth Table

LED	V <sub>CC</sub> -V <sub>EE</sub> (Positive Going)	V <sub>CC</sub> -V <sub>EE</sub> (Negative Going)	Output
OFF	0-30V	0-30V	Low
ON	0-12.1V	0-11.1V	Low
ON	12.1V-13.5V	11.1V-12.4V	TRANSITION
ON	13.5V-30V	12.4V-30V	HIGH

**ABSOLUTE MAXIMUM RATINGS** (Temperature=25°C)

Parameter		Symbol	Value	Unit
LED	Forward Current	I <sub>F</sub>	50	mA
	Peak Forward Current	I <sub>FP</sub>	1 <sup>7</sup>	A
	Reverse Voltage	V <sub>R</sub>	6	V
	Power Dissipation	P <sub>D</sub>	100	mW
Detector	Output Voltage	V <sub>O</sub>	35	V
	Supply Voltage	V <sub>CC</sub>	35	V
	Power Dissipation	P <sub>C</sub>	400	mW
Isolation Voltage		V <sub>iso</sub>	5000 <sup>8</sup>	Vrms
Operating Temperature		T <sub>opr</sub>	-40~110	
Junction Temperature		T <sub>j</sub>	125	
Storage Temperature		T <sub>stg</sub>	-55~125	
Total Power Dissipation		P <sub>tot</sub>	500	mW
Soldering Temperature		T <sub>sol</sub>	260	

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**ELECTRICAL CHARACTERISTICS** (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =10mA	-	1.35	1.6	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> =6V	-	-	1	µA
	Terminal Capacitance	C <sub>t</sub>	V=0,f=1MHz	-	60	-	pF

Peak High-level Output

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Output

			V <sub>O</sub> =Open				
	High Level Output Voltage	V <sub>OH</sub>	I <sub>F</sub> =5mA, V <sub>CC</sub> =10V, I <sub>O</sub> =-100mA	6	8.4	-	V
	Low Level Output Voltage	V <sub>OL</sub>	V <sub>F</sub> =0.8V, V <sub>CC</sub> =10V, I <sub>O</sub> =100mA	-	0.3	1	V
	Threshold Input Current	I <sub>FLH</sub>	V <sub>CC</sub> =15V, V <sub>O</sub> $\hat{U}$ 1V	-	1.2	5	mA
	Threshold Input Voltage	V <sub>FHL</sub>	V <sub>CC</sub> =15V, V <sub>O</sub> $\emptyset$ 1V	0.8	-	-	V
	Supply Voltage	V <sub>CC</sub>	-	15	-	30	V
	UVLO Threshold	VUVLO+	V <sub>O</sub> $\hat{U}$ 5V, I <sub>F</sub> =10mA	12.1	12.8	13.5	V
		VUVLO-	V <sub>O</sub> $\emptyset$ 5V, I <sub>F</sub> =10mA	11.1	11.8	12.4	V

**SWITCHING SPECIFICATION**

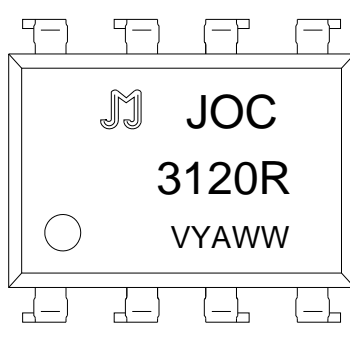
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to High Output Level	t <sub>PLH</sub>	R <sub>g</sub> =47 $\Omega$ , C <sub>g</sub> =3nF, I <sub>F</sub> =0 5mA, V <sub>CC</sub> =30V	30	-	500	ns
Propagation Delay Time to Low Output Level	t <sub>PHL</sub>	R <sub>g</sub> =47 $\Omega$ , C <sub>g</sub> =3nF, I <sub>F</sub> =5 0mA, V <sub>CC</sub> =30V	30	-	500	
Propagation Delay Difference Between Any Two Parts	t <sub>PHL</sub> - t <sub>PLH</sub>	R <sub>g</sub> =47 $\Omega$ , C <sub>g</sub> =3nF, I <sub>F</sub> =0 5mA, V <sub>CC</sub> =30V	-	-	350	
Output Rise Time (10 to 90%)	t <sub>r</sub>	R <sub>g</sub> =47 $\Omega$ , C <sub>g</sub> =3nF, I <sub>F</sub> =0 5mA, V <sub>CC</sub> =30V	-	50	-	
Output Fall Time (90 to 10%)	t <sub>f</sub>	R <sub>g</sub> =47 $\Omega$ , C <sub>g</sub> =3nF, I <sub>F</sub> =5 0mA, V <sub>CC</sub> =30V	-	50	-	
Common Mode Transient Immunity at High Level Output	CM <sub>H</sub>	I <sub>F</sub> =5mA V <sub>CC</sub> =30V, T <sub>a</sub> =25 $^{\circ}$ C, V <sub>O</sub> (min)=26V V <sub>CM</sub> =1000Vpp	$\pm$ 35	-	-	

I<sub>F</sub>

Common Mode Transient  
Immunity at Low Level Output

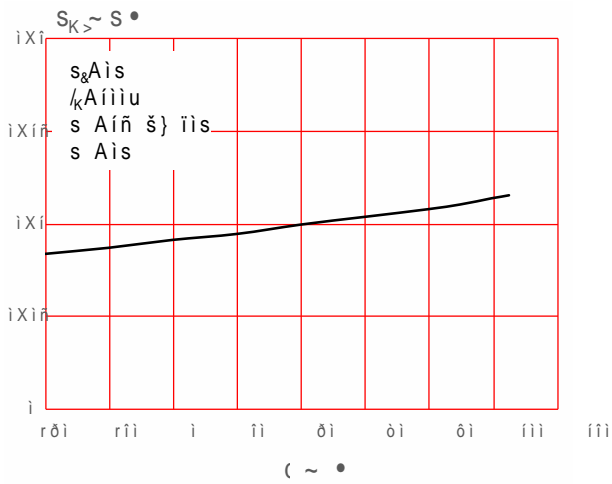
|CM<sub>L</sub>|

ORDERING AND MARKING INFORMATION

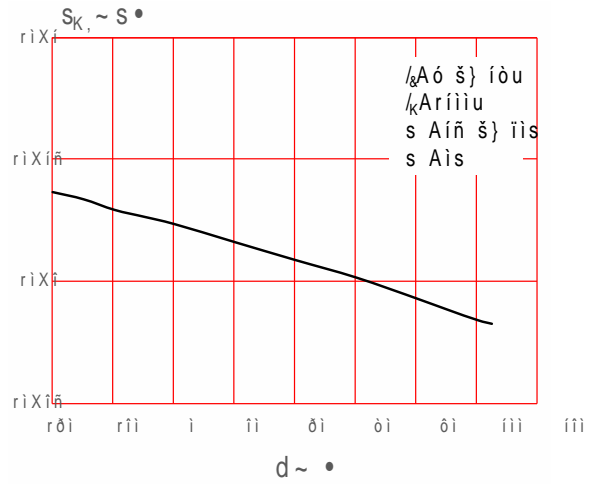
MARKING INFORMATION	
 <p>Diagram showing the marking on a component: <b>JOC 3120R VYAWW</b></p>	<p>:K W }u%o vÇ ŒX                  ïïïZ W W Œš Eµu Œ                  sz tt W &gt;Kd EKX</p>
ORDERING INFORMATION	
JOC3120R(Y)(Z) GV	
<p>:K t }u%o vÇ ŒX                  ïïïZ t W Œš Eµu Œ                  z t &gt; &amp;}Œu K%o š]}v                  • t d %o v Z o K%o š]}v                  ' t 'Œ v                  s t s K%o š]}v ~s }Œ E}v •</p>	
Packing Quantity	
Option	Quantity
/W	ñì hv]š•ldµ
^D	íïï hv]š•lZ o

**JOC3120R**

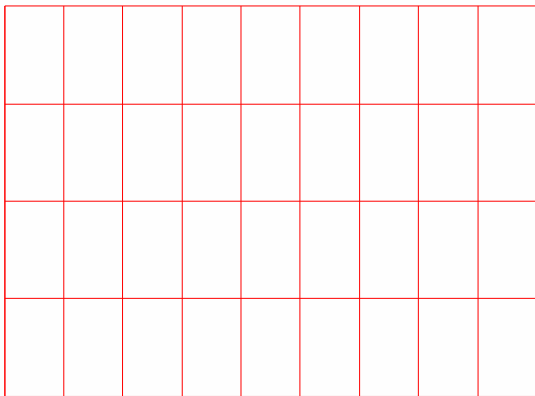
**FIG.7:** Low-level Output Voltage vs. Ambient Temperature



**FIG.8:** High-level Output Voltage vs. Ambient Temperature



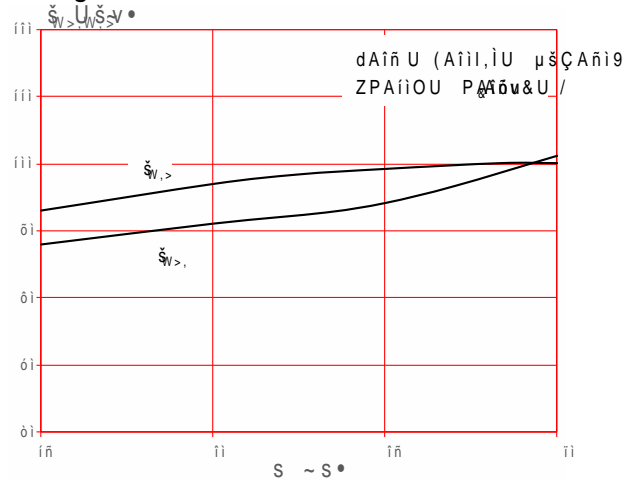
**FIG.9:** Peak Low-level Output Current vs. Low-level Output Voltage



**FIG.10:** High-level Output Voltage Drop vs. Ambient Temperature

FIG.13: Propagation Delay Time vs. Supply

Voltage



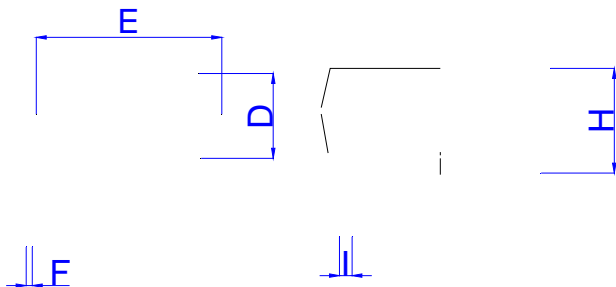
Test Circuits

FIG.14: Switching Time Test Circuit and Waveform



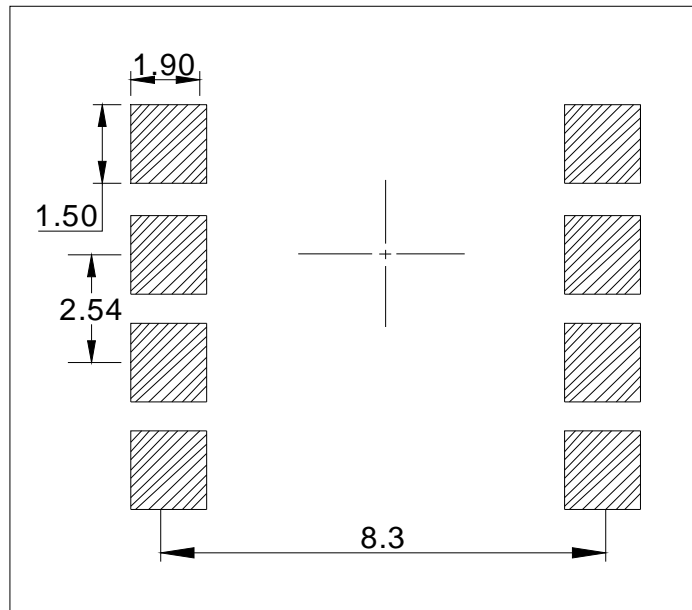
Package Dimension (Unit: mm)

Standard DIP Type:



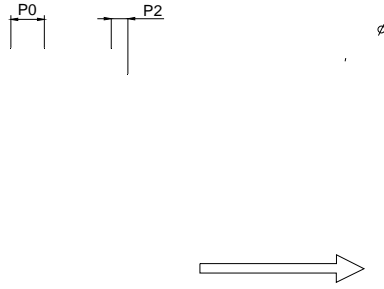
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.60	0.244		0.260
B	9.40		9.80	0.370		0.386
C	7.15		8.95	0.281		0.352
D	3.20		3.60	0.126		0.142
E	7.32		7.92	0.288		0.312
F	0.15		0.35	0.006		0.014
G	0.90		1.50	0.035		0.059
H	3.90		4.50	0.154		0.177
I	0.40		0.60	0.016		0.024
J						

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



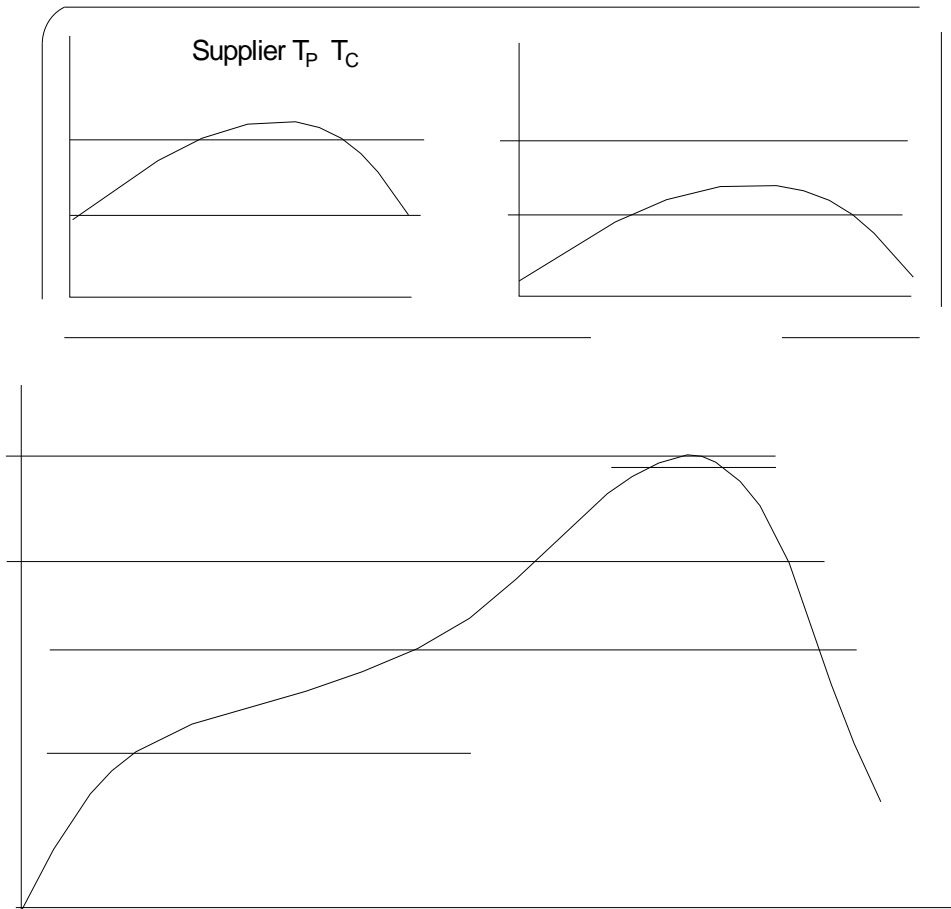
TUBE SP IFI- A i l r r t t

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

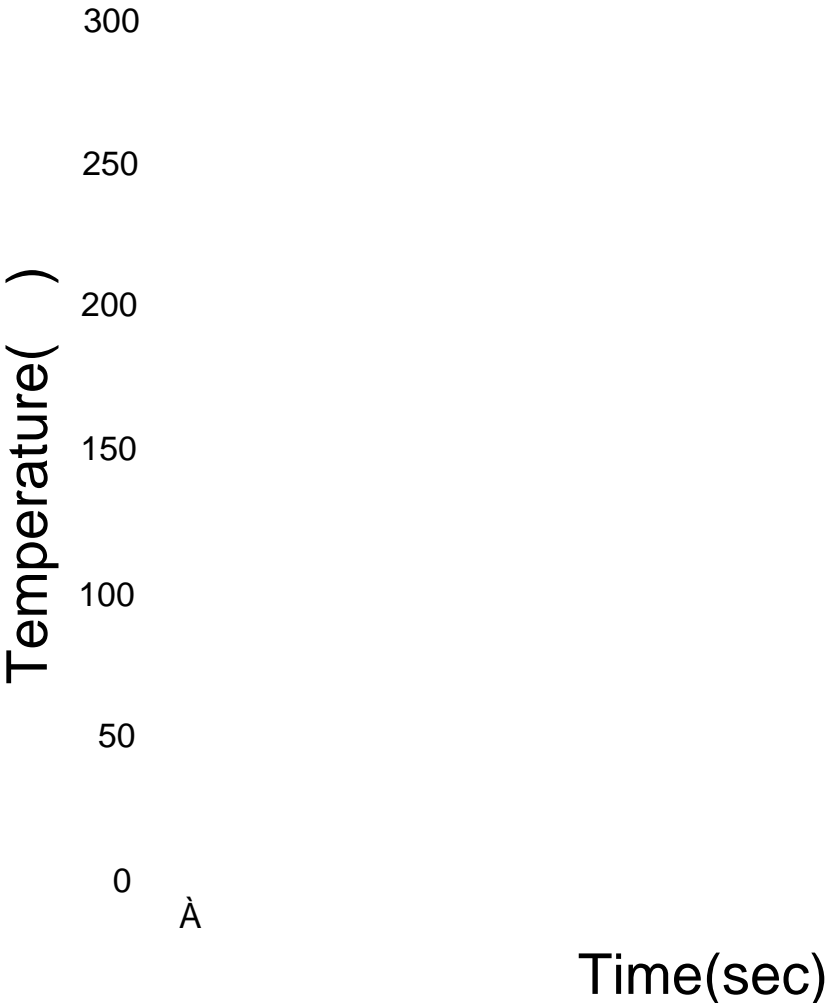


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0		1.50	1.60		0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	11.90	12.00	12.10	0.469	0.472	0.476
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
T	0.35	0.40	0.45	0.014	0.016	0.018
W	15.90	16.00	16.20	0.626	0.630	0.638

REFLOW INFORMATION



WAVE SOLDERING



Note:

1. Reflow soldering is recommended at the temperatures and times shown, no more than three times.
2. Avoid direct contact between the epoxy body and any tools or surfaces exceeding its maximum