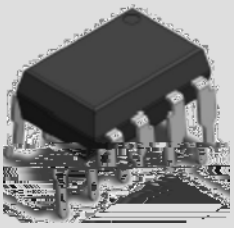
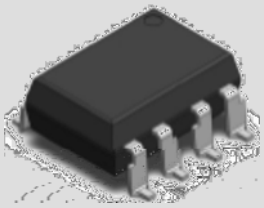
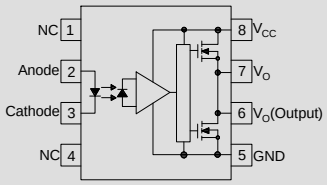
JOC3120R Series

Rev.A.1.0

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 ±35 kV/μs. 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.







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

LED	V_{CC}-V_{EE} (Positive Going)	V_{CC}-V_{EE} (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

(Temperature=25°C)

Parameter		Symbol	Value	Unit
LED	Forward Current	I_F	50	mA
	Peak Forward Current	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
Detector	Output Voltage	V_O	35	V
	Supply Voltage	V_{CC}	35	V
	Power Dissipation	P_C	400	mW
Isolation Voltage		V_{iso}	5000	Vrms
Operating Temperature		T_{opr}	-40~110	
Junction Temperature		T_j	125	
Storage Temperature		T_{stg}	-55~125	
Total Power Dissipation		P_{tot}	500	mW
Soldering Temperature		T_{sol}	260	

: 100μs pulse, 100Hz frequency
: AC for 1minute, R.H.=40~60%

(Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	I_F=10mA	-	1.35	1.6	V
	Reverse Current	I_R	V_R=6V	-	-	1	μA
	Terminal Capacitance	C_t	V=0,f=1MHz	-	60	-	pF
Output	Peak High-level Output Current	I_{OPH}	V_O=V_{CC}-4V, Pulse width≤50μs	-1	-	-	A
			V_O=V_{CC}-15V, Pulse width≤10μs	-3	-	-	A
	Peak Low-level Output Current	I_{OPL}	V_O=V_{EE}+2.5V, Pulse width≤50μs	1	-	-	A
			V_O=V_{EE}+15V, Pulse width≤10μs	3	-	-	A
	High Level Supply Current	I_{CCH}	I_F=10mA V_{CC}=30V, V_O=Open	-	1.2	2	mA
	Low Level Supply Current	I_{CCL}	I_F=0mA , V_{CC}=30V, V_O=Open	-	1.1	2	mA

	High Level Output Voltage	V_{OH}	I_O=-100mA	V_{CC}-0.3	V_{CC}-0.2	-	V
	Low Level Output Voltage	V_{OL}	I_O=100mA	-	-	0.2	V
	Threshold Input Current	I_{FLH}	V_O 5V	-	1.2	5	mA
	Threshold Input Voltage	V_{FHL}	V_O 5V	0.8	-	-	V
	Supply Voltage	V_{CC}	-	15	-	30	V
	UVLO Threshold	VUVLO+	V_O 5V, I_F=10mA	12.1	12.8	13.5	V
		VUVLO-	V_O 5V, I_F=10mA	11.1	11.8	12.4	V

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to High Output Level	t_{PLH}	R_g=10Ω, C_g=25nF, f=20kHz, Duty Cycle=50%, I_F=7mA, V_{CC}=30V	50	-	200	ns
Propagation Delay Time to Low Output Level	t_{PHL}		50	-	200	
Pulse Width Distortion	PWD		-	-	70	
Propagation Delay Difference Between Any Two Parts	t_{PHL}- t_{PLH}		-100	-	100	
Output Rise Time (10 to 90%)	t_r	R_g=10Ω, C_g=25nF, I_F=0→7mA, V_{CC}=30V	-	50	-	
Output Fall Time (90 to 10%)	t_f	R_g=10Ω, C_g=25nF, I_F=7→0mA, V_{CC}=30V	-	50	-	
Common Mode Transient Immunity at High Level Output	$\|CM_H\|$	I_F=7mA V_{CC}=30V, T_a=25 , V_O(min)=26V V_{CM}=1500Vpp	±35	-	-	kV/μs
Common Mode Transient Immunity at Low Level Output	$\|CM_L\|$	I_F=0mA V_{CC}=30V, T_a=25 , V_O(max)=1V V_{CM}=1500Vpp	±35	-	-	kV/μs

All Typical values at T_a=25

: Input signal (f=25kHz,duty=50%, tr=tf=5ns or less). C_L is less than 15 pF which includes probe and stray wiring capacitance.

: CM_H is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic high state (VO 26V).

: CML is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic low state (VO 1V).

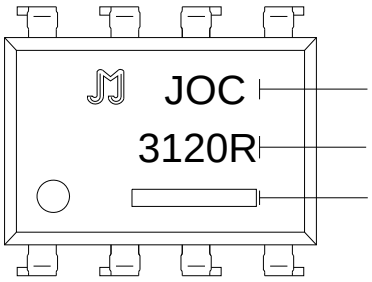
Characteristics	Symbol	Min.	Typ.	Max.	Unit
Input On-state Current	$I_{F(ON)}$	7	-	10	mA
Input Off-state Voltage	$V_{F(OFF)}$	0	-	0.8	V
Supply Voltage	V_{CC}	15	-	30	V
Operating Frequency	f	-	-	50	kHz

: The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this datasheet should also be considered.

: Aceramic capacitor(0.1μF) should be connected between pin 6 (V_{CC}) and pin 4 (GND) to stabilize the operation of a high-gain linear amplifier. Otherwise, this photocoupler may not switch properly. The bypass capacitor should be placed within 1 cm of each pin.

: The rise and fall times of the input on-current should be less than 0.5 μs.

: If the rising slope of the supply voltage (V_{CC}) for the detector is steep, stable operation of the internal circuits cannot be guaranteed. Be sure to set 3 V/μs or less for a rising slope of the V_{CC}.



: Company Abbr.
: Part Number & Rank
: Production Information Code

DIP	50 Units/Tube	40 Tubes/Inner box	5 Inner box/Outer box =10k Units
SMD	1200 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box =12k Units

FIG

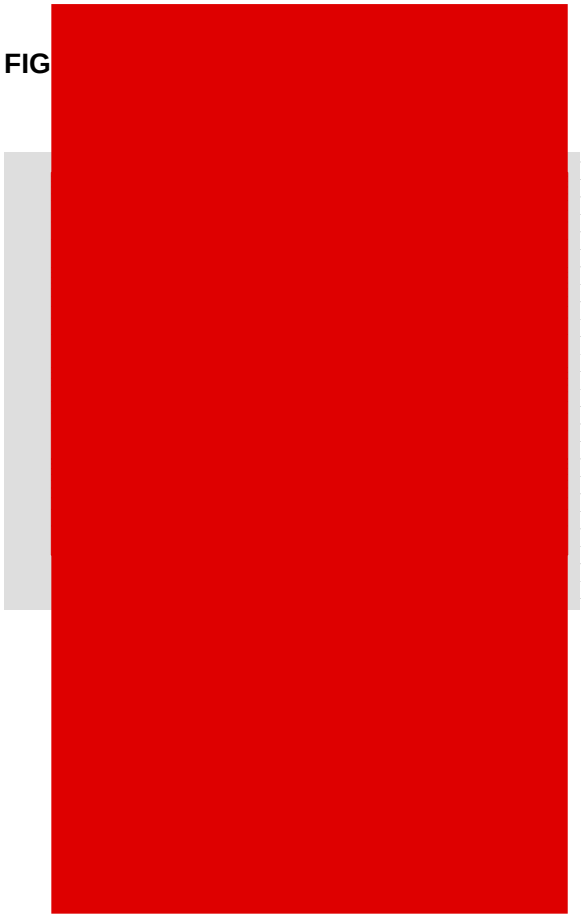


FIG.2: Max. Allowable LED Forward Current vs. Ambient Temperature

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

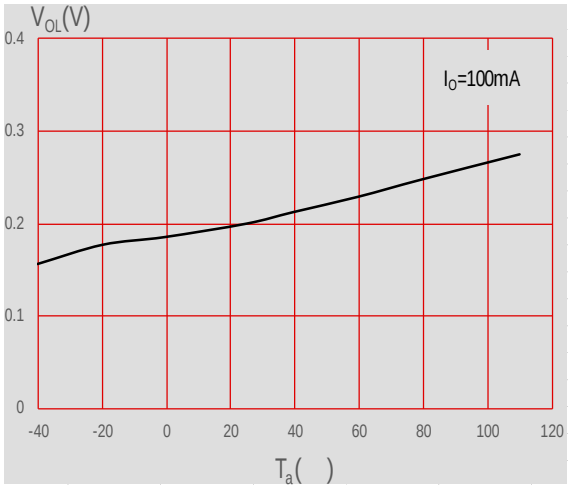


FIG.8: High-level Output Voltage vs. Ambient Temperature

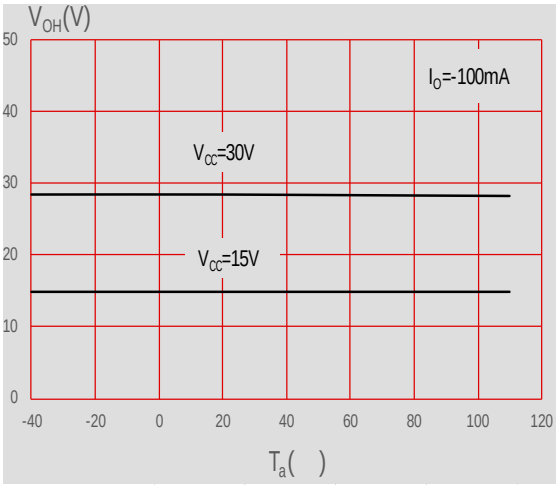


FIG.9: Peak Low-level Output Current vs. Low-level Output Voltage

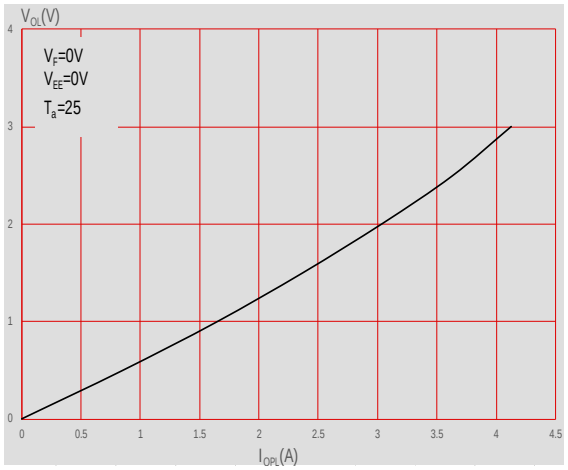


FIG.10: High-level Output Voltage Drop vs. Ambient Temperature

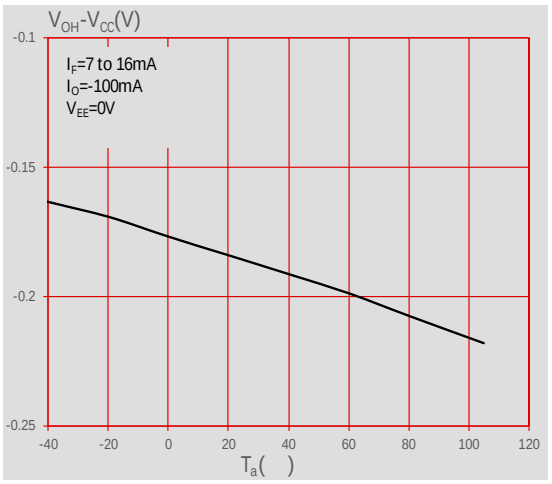


FIG.11: Propagation Delay Time vs. Ambient Temperature

FIG.12: Propagation Delay Time vs. Forward Current

FIG.13: Propagation Delay Time vs. Supply Voltage

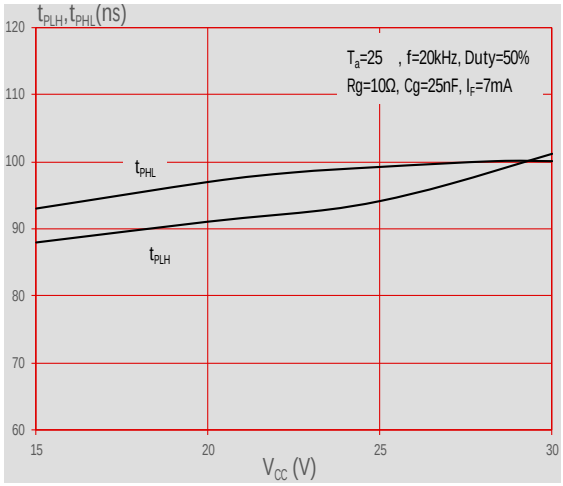
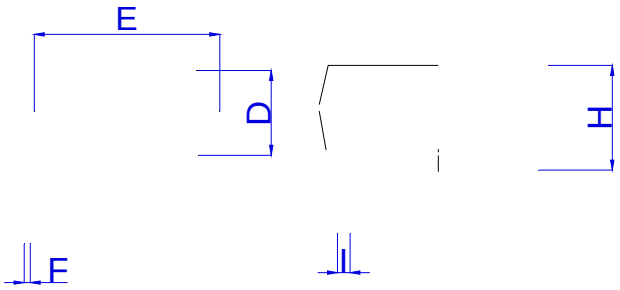


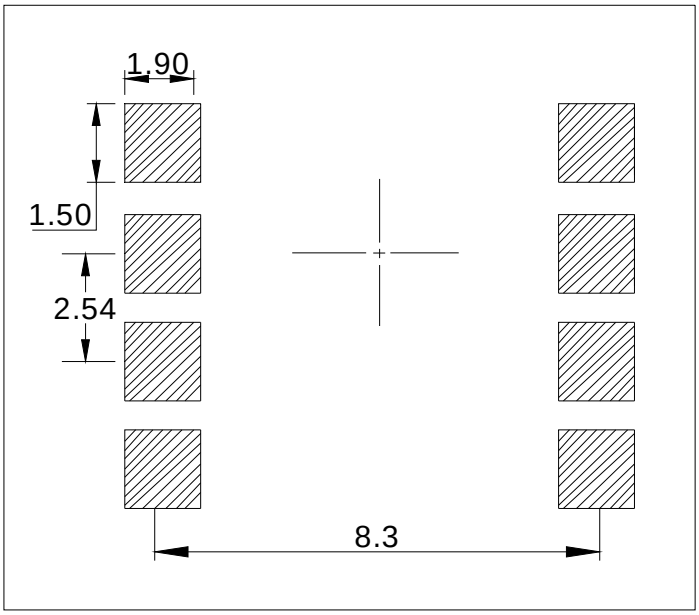
FIG.14: Switching Time Test Circuit and Waveform

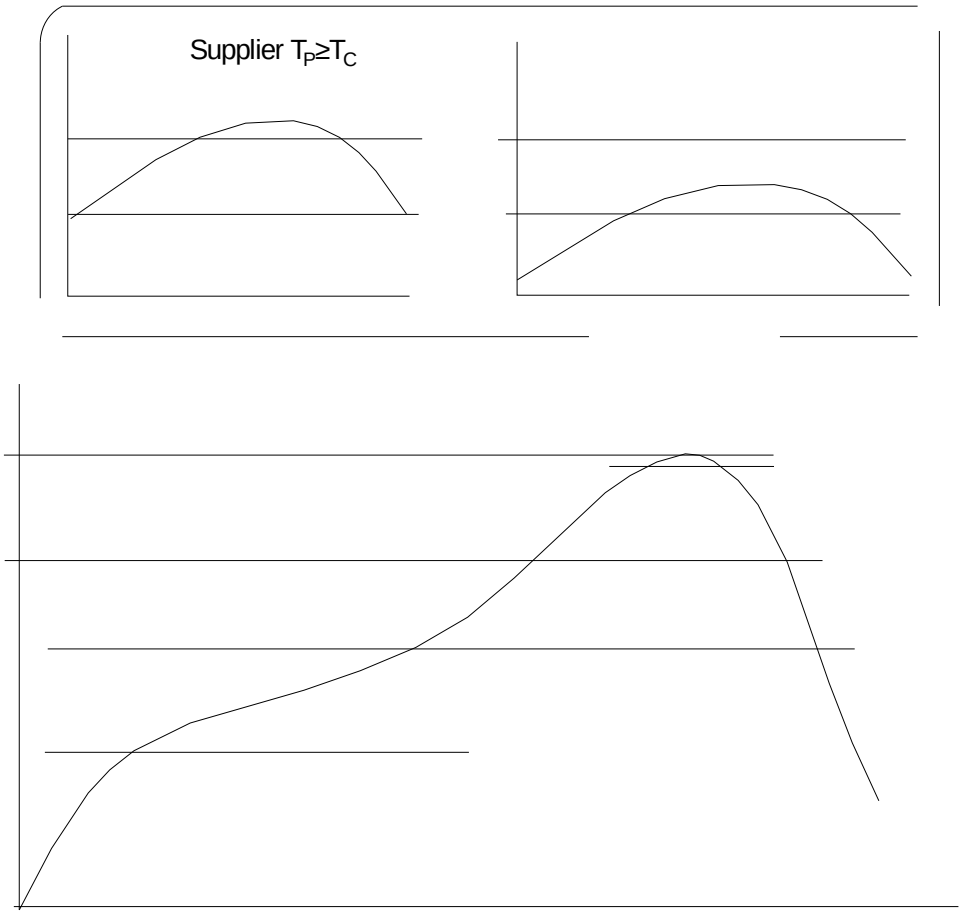


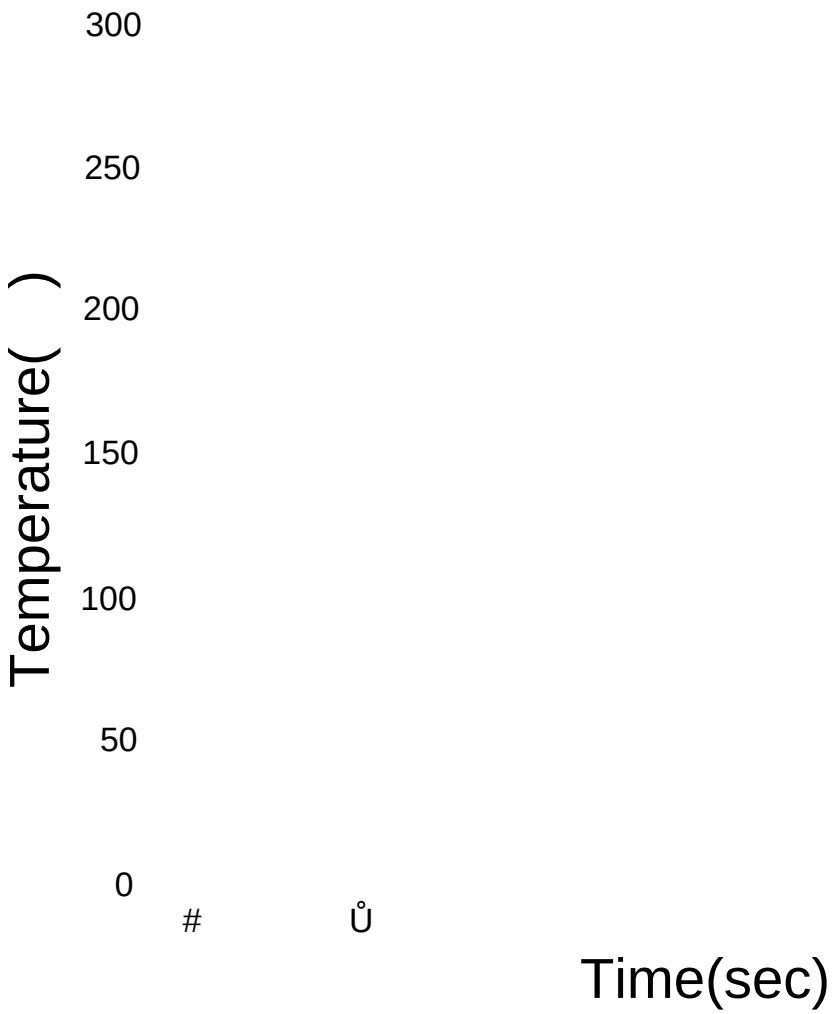
Standard DIP Type:



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						


1.90
1.50
2.54
8.3


Supplier $T_P \geq T_C$


300
250
200
150
100
50
0
Temperature( )
#
Ů
Time(sec)

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