

1.Description

EL354N is a small-sized surface mount optocoupler device suitable for surface mount production. The EL354N consists of two gallium arsenide light-emitting diodes and one phototransistor, and its size is smaller than a DIP, making it suitable for high-density surface mount applications such as programmable controllers.

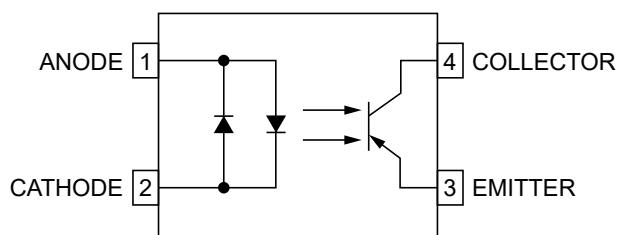
2.Features

- Current transfer ratio
(CTR: 20~300% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output ($V_{iso} = 3750\text{ Vrms}$)
- Minimum BV_{CEO} of 80V guaranteed
- Operation temperature: -55 to $110\text{ }^{\circ}\text{C}$
- Compliance with EU REACH and RoHS

3.Applications

- Switching power supply, intelligent meter
- Industrial control, measuring instruments
- Office equipment such as copiers
- Household appliances, such as air conditioners, fans, water heaters, etc.

4.Pinning Information



SOP-4



5. Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	± 50	mA
	Pulse forward current, (1 μs , pulse)	I_{FP}	± 1	A
	Power Dissipation	P_D	70	mW
	Junction temperature	T_J	125	$^{\circ}\text{C}$
Output	Collector Power Dissipation	P_C	150	mW
	Collector Current	I_C	50	mA
	Collector-Emitter Voltage	V_{CEO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Junction temperature	T_J	125	$^{\circ}\text{C}$
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage		V_{ISO}	3750	Vrms
Operating Temperature		T_{OPR}	-55 to 110	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 to 125	$^{\circ}\text{C}$
Soldering Temperature		T_{SOL}	260 (10s)	$^{\circ}\text{C}$

6. Recommended Operating Condition (Note)

Parameter	Symbol	Min	Typ	Max	Units
Supply voltage	V_{CC}	-	5	48	V
Forward current	I_F	-	16	20	mA
Collector current	I_C	-	1	10	mA

Recommended operating conditions are given as a design guideline to obtain expected performance of the device



7. Electrical Characteristics ($T_A=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input						
Forward Voltage	V_F	$I_F=\pm 20\text{mA}$	1.1	1.2	1.4	V
Terminal Capacitance	C_{IN}	$V=0, f=1\text{kHz}$		30	250	pF
Output						
Collector Dark Current	I_{CEO}	$V_{CE}=20\text{V}, I_F=0\text{mA}$			100	nA
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=0.1\text{mA}, I_F=0$	80			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E=0.1\text{mA}, I_F=0$	7			V
Transfer Characteristics						
Current Transfer Ratio	CTR	$I_F=\pm 1\text{mA}, V_{CE}=5\text{V}$	20		300	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=\pm 20\text{mA}, I_C=1\text{mA}$		0.1	0.2	V
Isolation Resistance	R_{ISO}	DC500V, 40~60%R.H.	5×10^{10}	1×10^{11}		Ω
Floating Capacitance	C_f	$V=0, f=1\text{MHz}$		0.6	1	pF
Capacitance (Collector to emitter)	C_{CE}	$V=0, f=1\text{MHz}$		10		pF
Capacitance (input to output)	C_S	$V=0, f=1\text{MHz}$		0.8		pF
Cut-off Frequency	F_C	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$		80		kHz
Isolation Voltage	BV_S	AC, 1 minute	3750			Vrms
Switching Characteristics						
Rise Time	T_r	$V_{CE}=2\text{V}, I_C=2\text{mA}$			18	μs
Fall Time	T_f	$R_L=100\Omega$			18	μs

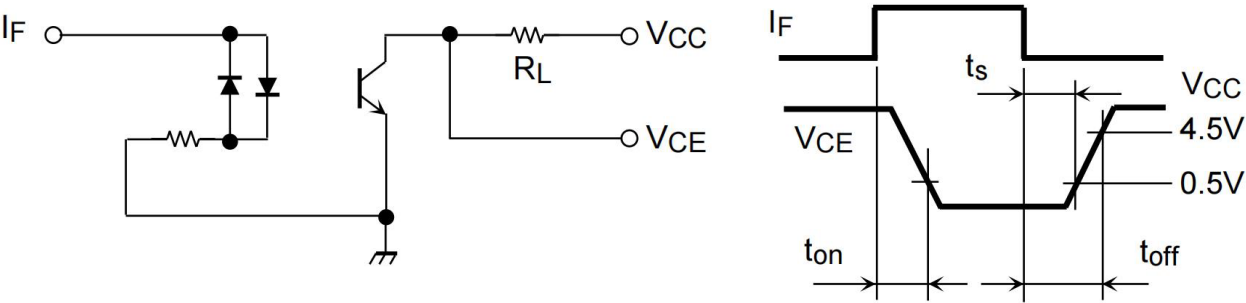
* $\text{CTR} = I_C / I_F \times 100\%$



8.Rank Table of CTR

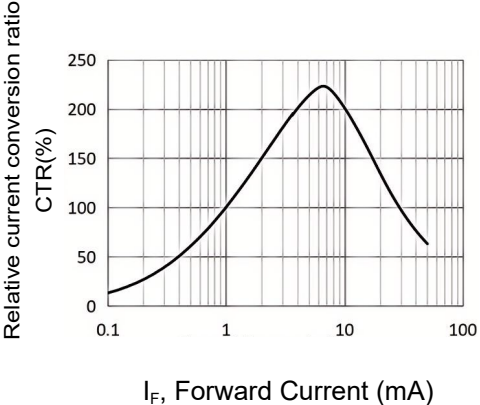
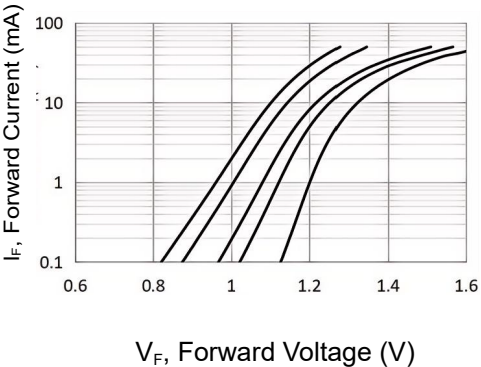
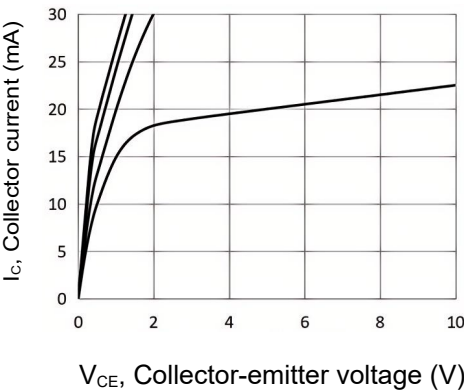
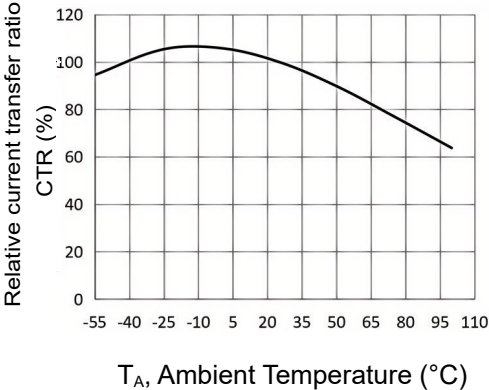
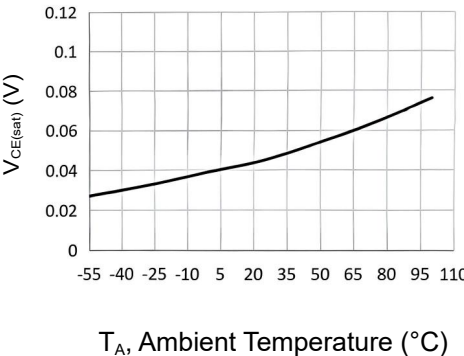
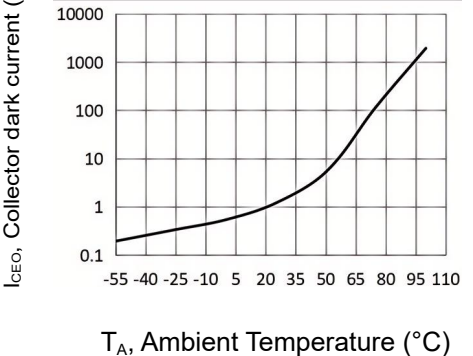
Type	Classification	Current Transfer Ratio (%) (I _C /I _F)			Marking of classification
		I _F =±5mA, V _{CE} =5V, T _A =25°C			
		Min	Type	Max	
EL354N	Standard	20	-	300	Blank,A,B
	A	50	-	150	A
	B	100	-	300	B

9.Switching Time Test Circuit



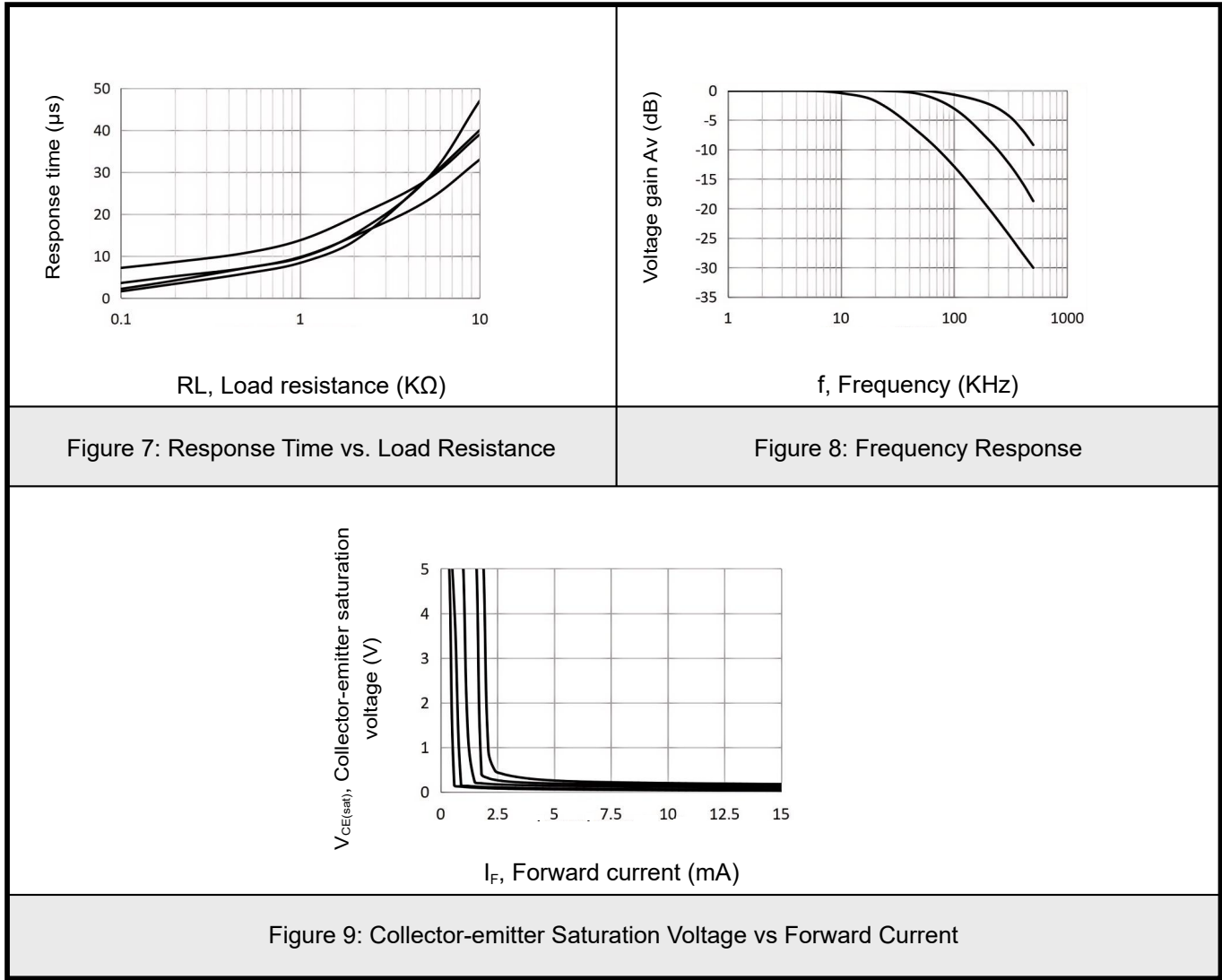


10.1 Typical Characteristic

 <p>Relative current conversion ratio CTR(%)</p> <p>I_F, Forward Current (mA)</p>	 <p>I_F, Forward Current (mA)</p> <p>V_F, Forward Voltage (V)</p>	Figure 1: Relative Current Transfer Ratio vs. Forward Current	Figure 2: Forward Current vs. Forward Voltage
 <p>I_C, Collector current (mA)</p> <p>V_{CE}, Collector-emitter voltage (V)</p>	 <p>Relative current transfer ratio CTR (%)</p> <p>T_A, Ambient Temperature (°C)</p>	Figure 3: Collector Current vs. Collector-emitter Voltage	Figure 4: Relative Current Transfer Ratio vs. Ambient Temperature
 <p>$V_{CE(sat)}$ (V)</p> <p>T_A, Ambient Temperature (°C)</p>	 <p>I_{CEO}, Collector dark current (nA)</p> <p>T_A, Ambient Temperature (°C)</p>	Figure 5: Collector-emitter Saturation Voltage vs. Ambient Temperature	Figure 6: Collector Dark Current vs Ambient Temperature



10.2 Typical Characteristic





11.Solder Reflow Profile

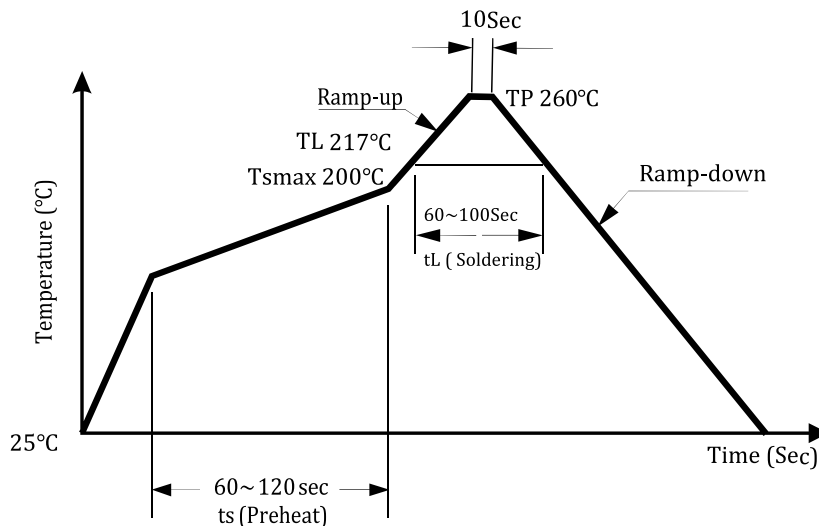
Welding precautions

Whether using a soldering iron or reflow soldering, the soldering temperature should be as close as possible to the conditions shown below. During reflow soldering

When reflow soldering does not exceed 260°C, the soldering must be completed within 10 seconds. The soldering temperature curve is based on the surface temperature of the plastic enclosure (see the figure below, with the surface temperature of the plastic enclosure as the reference)

Reflow soldering is only allowed once or twice.

After unpacking, it must be used up within 2 weeks.



• Wave soldering

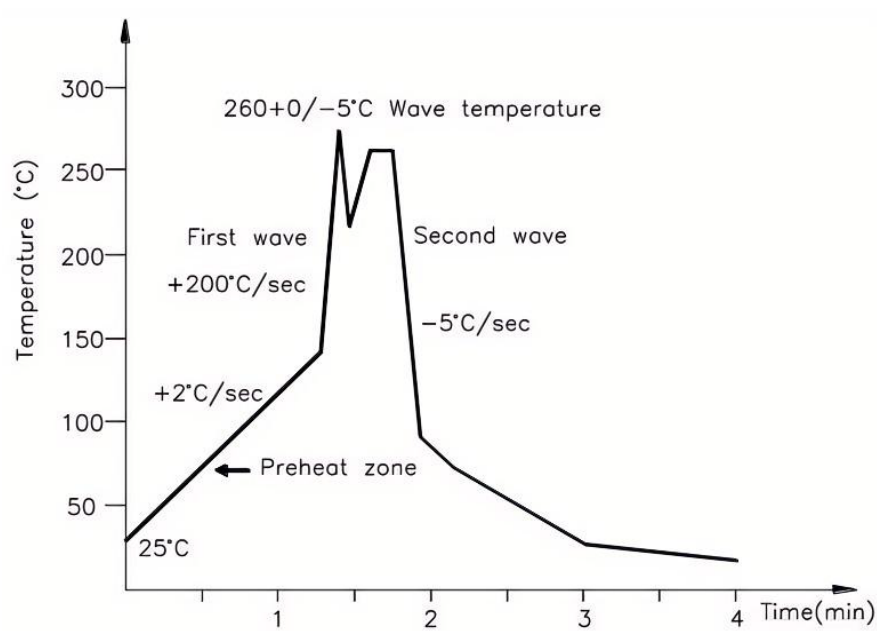
It is recommended to perform one-time welding under temperature conditions.

Temperature: 260+0/-5°C

Time: 10 seconds.

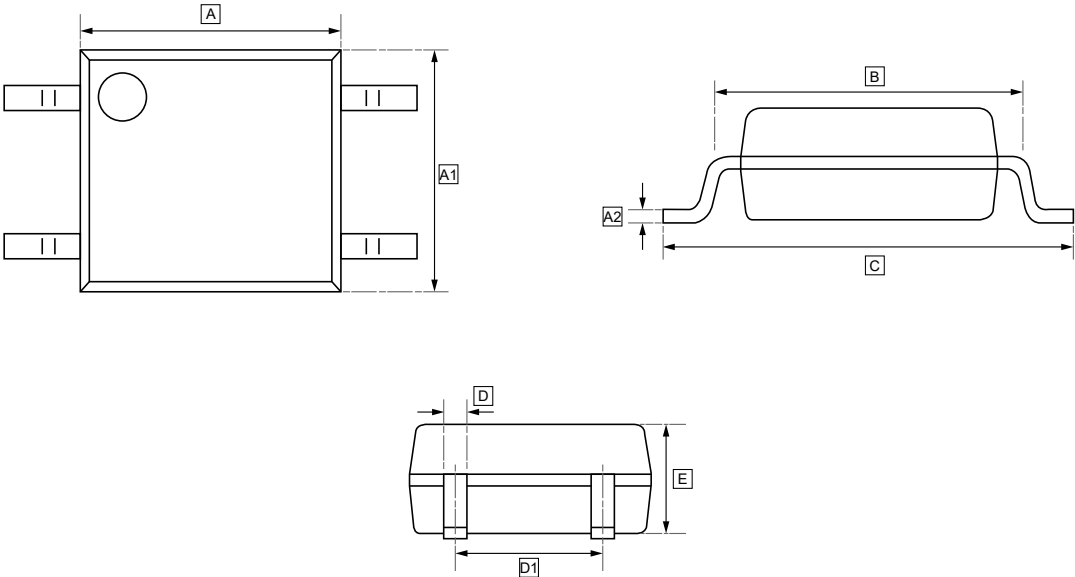
Preheating temperature: 25 to 140°C,

Preheating time: 30 to 80 seconds.





12.SOP-4 Package Outline Dimensions

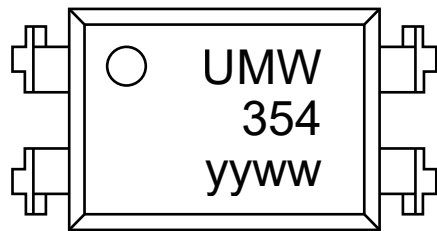


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	C	D	D1	E
Min	4.30	3.60	0.15	5.00	6.70	0.30	2.54	1.82
Max	4.50	4.10		5.40	7.30	0.50	TYP	2.02



13.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW EL354N	SOP-4	3000	Tape and reel



14.Disclaimer

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