

## 1. Description

These series of AC input optocoupler consists of a photo transistor optically coupled to two gallium arsenide Infrared-emitting diodes in a 4-lead Mini-Flat package.

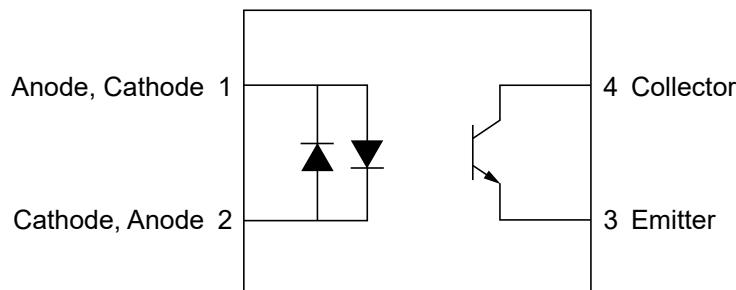
## 2. Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

## 3. Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Temperature range - 55°C to 110°C
- Regulatory Approvals
- UL - UL1577(E547318)

## 4. Pinning information



**LSOP-4/SOP-4**



## 5. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Isolation voltage	$V_{ISO}$	3750	$V_{RMS}$
Operating temperature	$T_{OPR}$	-55 to 110	°C
Storage temperature	$T_{STG}$	-55 to 150	°C
Soldering temperature	$T_{SOL}$	260	°C
Total power dissipation	$P_{TOT}$	200	mW
<b>Emitter</b>			
Forward current	$I_F$	±50	mA
Peak transient current ( $\leq 1\mu s$ P.W, 300pps)	$I_{F(TRANS)}$	1	A
Power dissipation	$P_D$	70	mW
<b>Detector</b>			
Power dissipation	$P_C$	150	mW
Collector-Emitter Breakdown Voltage	$B_{V_{CEO}}$	80	V
Emitter-Collector Breakdown Voltage	$B_{V_{ECO}}$	7	V
Collector Current	$I_C$	50	mA



## 6. Emitter Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Forward Voltage	$V_F$	$I_F=10\text{mA}$		1.24	1.4	V
Input Capacitance	$C_{IN}$	$f=1\text{kHz}$		45		pF

## 7. Detector Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Collector-Emitter Breakdown	$B_{V_{CEO}}$	$I_C=100\mu\text{A}$	80			V
Emitter-Collector Breakdown	$B_{V_{ECO}}$	$I_E=100\mu\text{A}$	7			V
Collector-Emitter Dark Current	$I_{CEO}$	$V_{CE}=20\text{V}, I_F=0\text{mA}$			100	nA

## 8. Transfer Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Current Transfer Ratio	LTV-354	$I_F=\pm 1\text{mA}, V_{CE}=5\text{V}$	20		300	%
	LTV-354-A		50		150	%
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	$R_{IO}$	$V_{IO}=500V_{DC}$	$5 \times 10^{10}$			$\Omega$
Isolation Capacitance	$C_{IO}$	$f=1\text{MHz}$		0.6	1	pF

## 9. Switching Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Rise Time	$t_r$	$I_C=2\text{mA}, V_{CE}=2\text{V}, R_L=100\Omega$		6	18	$\mu\text{s}$
Fall Time	$t_f$			8	18	$\mu\text{s}$



## 10.1 Typical Characteristic

<p style="text-align: center;"><math>I_F</math>, Forward Current (mA)</p> <p style="text-align: center;"><math>T_A</math>, Ambient Temperature (<math>^{\circ}C</math>)</p>	<p style="text-align: center;"><math>P_C</math>, Collector power dissipation (mW)</p> <p style="text-align: center;"><math>T_A</math>, Ambient Temperature (<math>^{\circ}C</math>)</p>
<p style="text-align: center;">Figure 1: Forward Current vs. Ambient Temperature</p>	<p style="text-align: center;">Figure 2: Collector Power Dissipation vs. Ambient Temperature</p>
<p style="text-align: center;"><math>V_{CE(sat)}</math>, Collector-emitter saturation voltage (V)</p> <p style="text-align: center;"><math>I_F</math>, Forward Current (mA)</p>	<p style="text-align: center;"><math>I_F</math>, Forward Current (mA)</p> <p style="text-align: center;"><math>V_F</math>, Forward Voltage (V)</p>
<p style="text-align: center;">Figure 3: Collector-emitter Saturation Voltage vs. Forward Current</p>	<p style="text-align: center;">Figure 4: Forward Current vs. Forward Voltage</p>
<p style="text-align: center;">Normalized Current Transfer Ratio</p> <p style="text-align: center;"><math>I_F</math>, Forward Current (mA)</p>	<p style="text-align: center;"><math>I_C</math>, Collector Current (mA)</p> <p style="text-align: center;"><math>V_{CE}</math>, Collector-emitter voltage (V)</p>
<p style="text-align: center;">Figure 5: Current Transfer Ratio vs. Forward Current</p>	<p style="text-align: center;">Figure 6: Collector Current vs. Collector-emitter Voltage</p>

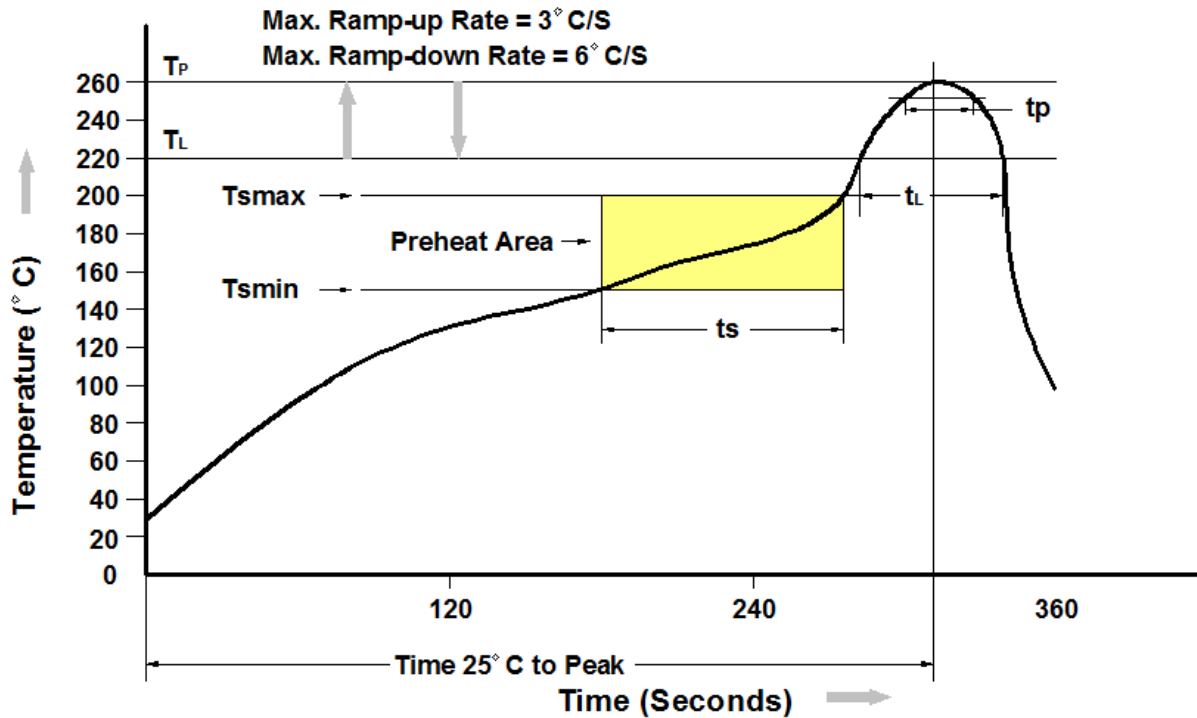


## 10.2 Typical Characteristic

<p>Normalized Current Transfer Ratio</p> <p><math>T_A</math>, Ambient Temperature (<math>^{\circ}\text{C}</math>)</p>	<p><math>V_{CE(sat)}</math>, Collector-emitter saturation voltage (V)</p> <p><math>T_A</math>, Ambient Temperature (<math>^{\circ}\text{C}</math>)</p>
<p>Figure 7: Relative Current Transfer Ratio vs. Ambient Temperature</p>	<p>Figure 8: Collector-emitter Saturation Voltage vs. Ambient Temperature</p>
<p><math>I_{CEO}</math>, Collector dark current (nA)</p> <p><math>T_A</math>, Ambient Temperature (<math>^{\circ}\text{C}</math>)</p>	<p>Response time (<math>\mu\text{s}</math>)</p> <p><math>R_L</math>, Load resistance (k<math>\Omega</math>)</p>
<p>Figure 9: Collector Dark Current vs. Ambient Temperature</p>	<p>Figure 10: Response Time vs. Load Resistance</p>
<p>Voltage gain <math>A_v</math> (dB)</p> <p><math>f</math>, Frequency (kHz)</p>	
<p>Figure 11: Frequency Response</p>	



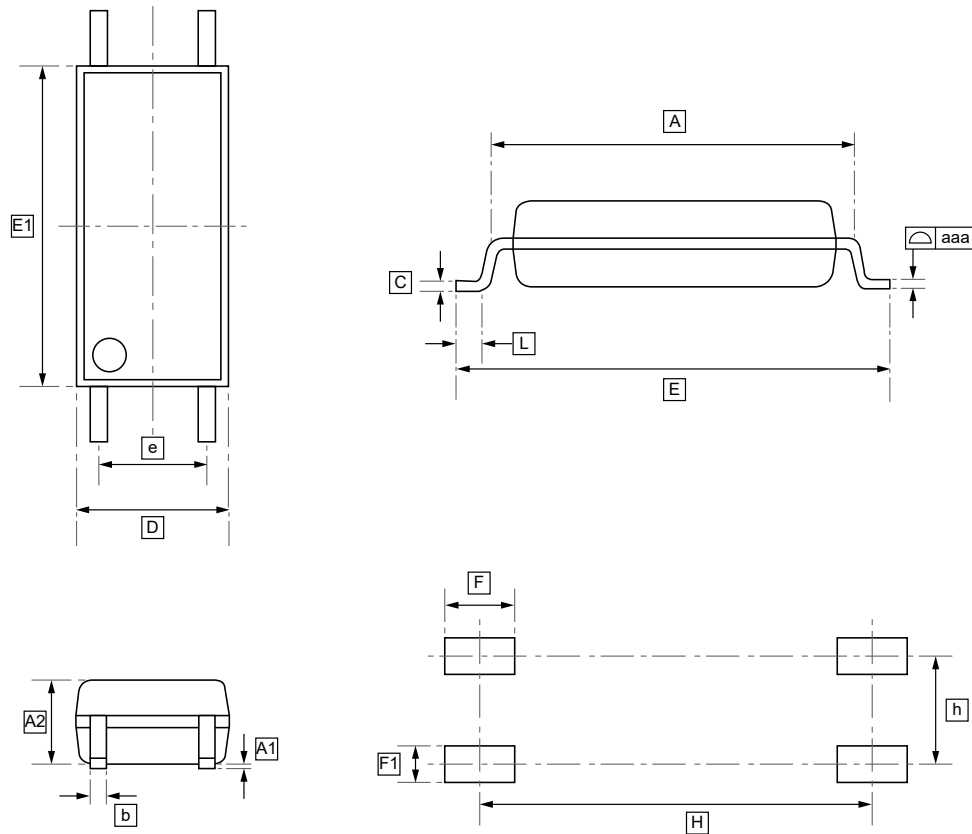
## 11.Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min.( $T_{smin}$ )	150°C
Temperature Max.( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds
Ramp-up Rate ( $t_L$ to $t_p$ )	3°C/second max.
Liquidous Temperature ( $T_L$ )	217°C
Time ( $t_L$ ) Maintained Above ( $T_L$ )	60-150 seconds
Peak Body Package Temperature	260°C +0°C/-5°C
Time ( $t_p$ ) within 5°C of 260°C	30 seconds
Ramp-down Rate ( $T_P$ to $T_L$ )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



## 12.1 LSOP-4 Package Outline Dimensions



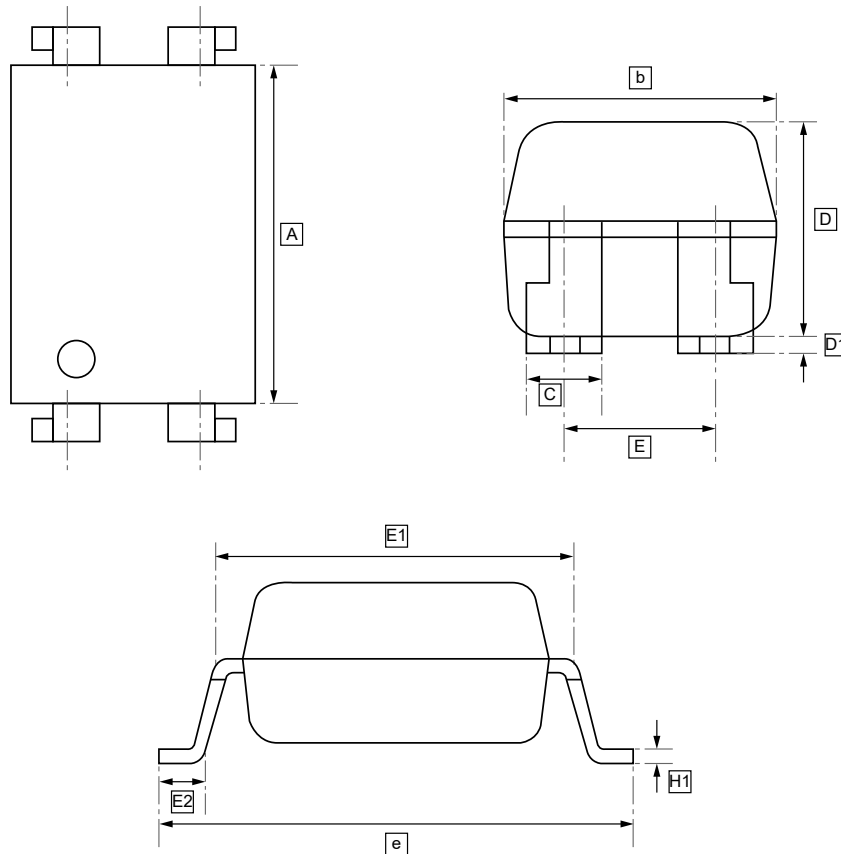
### DIMENSIONS (mm are the original dimensions)

Symbol	E1	D	E	A	A2	e	A1	b	C	L	aaa	F
Min	7.32	3.30	9.90	8.35	1.75	2.54	0.00	0.30	0.10	0.40	0.00	1.60
Max	7.92	3.90	10.50	8.95	2.35		0.20	0.50	0.30	-	0.10	

Symbol	F1	H	h
Min	0.80	9.22	2.54
Max			



## 12.2 SOP-4 Package Outline Dimensions

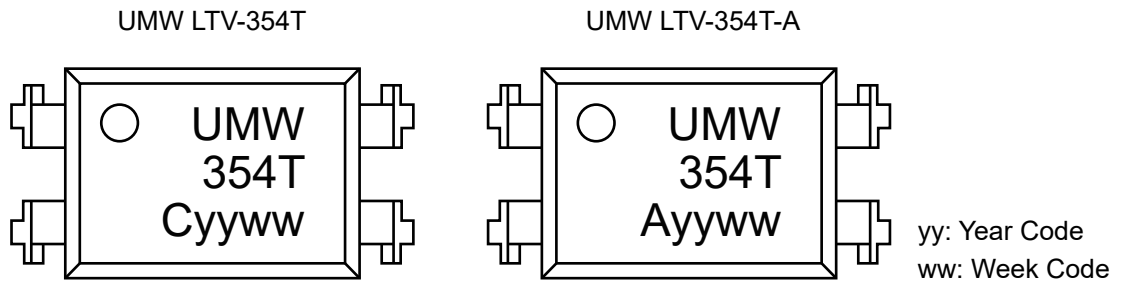


**DIMENSIONS (mm are the original dimensions)**

Symbol	A	b	C	D	D1	E	E1	E2	e	H1
<b>Min</b>	6.15	4.33	1.1	3.4	0.05	2.29	7.37	0.75	9.85	0.26
<b>Max</b>	6.65	4.83	1.3	3.9	0.6	2.79	7.87	1.25	10.45	



## 13. Ordering Information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW LTV-354T	354T	SOP-4	3000	Tape and reel
UMW LTV-354T-A	354T	SOP-4	3000	Tape and reel



## **14.Disclaimer**

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