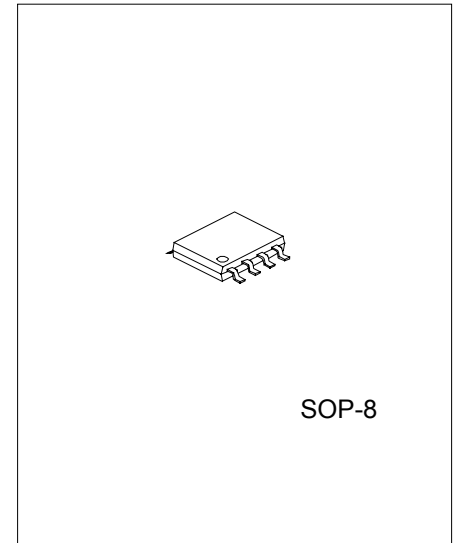


**LR478****LINEAR INTEGRATED CIRCUIT****REGULATOR+RESET IC**■ **DESCRIPTION**

The UTC **LR478** developed for use in CD-ROM drives, combines a 3V regulator adapted to low power consumption with a much-sought reset function (regulator input monitoring), with internal delay circuit, set to detect 4.2V.

■ **FEATURES**

- *Large Output Current: 300mA (max.)
- *High Ripple Rejection Rate: 80dB(typ.)
- *Internal Thermal Shutdown Circuit
- *Internal Current Limiting Circuit
- *Easy Set Delay Time from Voltage Detection to Reset Release



SOP-8

*Pb-free plating product number: LR478L

■ **ORDERING INFORMATION**

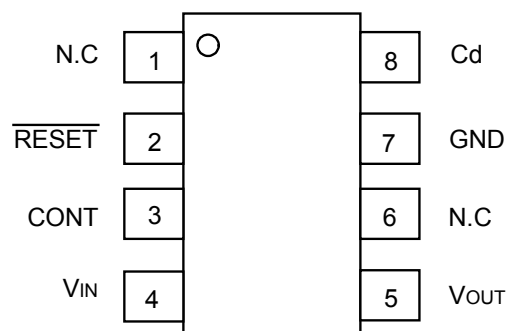
Order Number		Package	Packing
Normal	Lead Free Plating		
LR478-xx-S08-R	LR478L-xx-S08-R	SOP-8	Tape Reel
LR478-xx-S08-T	LR478L-xx-S08-T	SOP-8	Tube

Note: xx: Output Voltage, refer to Rank List as below.

■ **OUTPUT DETECTION VOLTAGE RANK LIST**

PART NUMBER	REGULATOR OUTPUT VOLTAGE (V)	DETECTION VOLTAGE (V)
LR478-3.4V	3.40±0.05	4.20±0.09
LR478-3.3V	3.30±0.05	4.20±0.09
LR478-2.5V	2.50±0.05	4.20±0.09

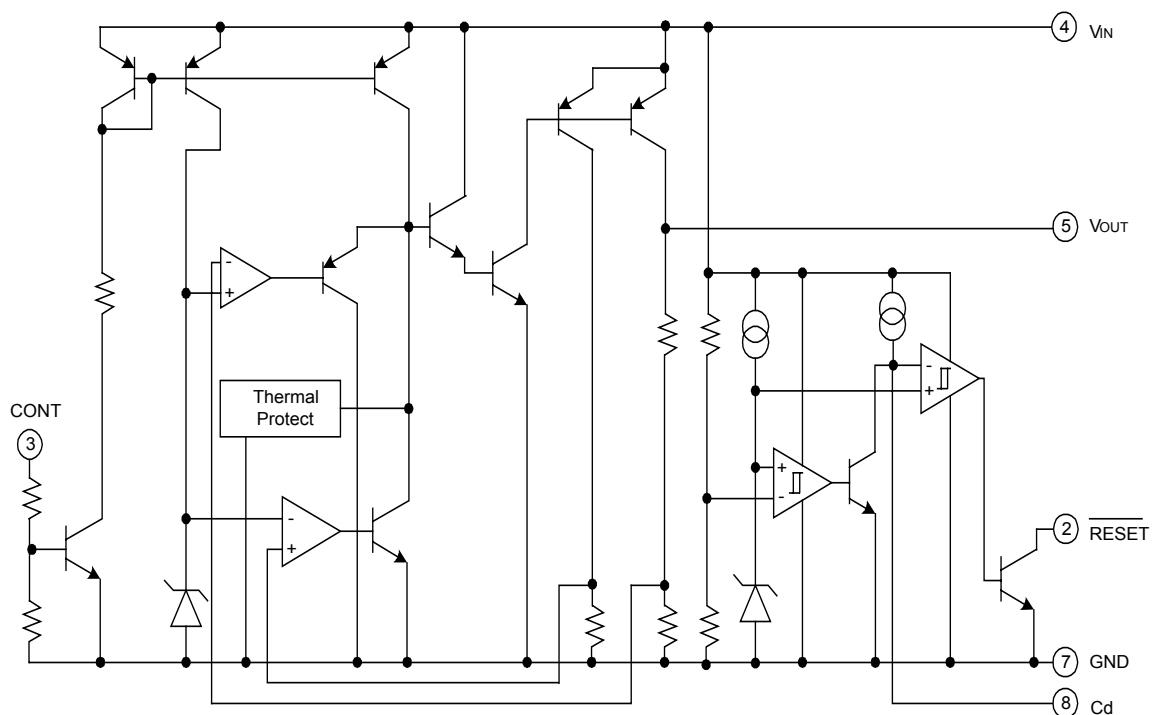
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	FUNCTIONS	EQUIVALENT CIRCUIT DIAGRAM						
1	N.C								
2	$\overline{\text{RESET}}$	Input voltage detection output Input voltage detection output pin $\overline{\text{RESET}}$ pin logic <table><tr><td></td><td>$\overline{\text{RESET}}$</td></tr><tr><td>$V_{\text{IN}} < V_{\text{S}}$</td><td>L</td></tr><tr><td>$V_{\text{IN}} > V_{\text{S}}$</td><td>H</td></tr></table>		$\overline{\text{RESET}}$	$V_{\text{IN}} < V_{\text{S}}$	L	$V_{\text{IN}} > V_{\text{S}}$	H	
	$\overline{\text{RESET}}$								
$V_{\text{IN}} < V_{\text{S}}$	L								
$V_{\text{IN}} > V_{\text{S}}$	H								
3	CONT	Output voltage on/off-control pin <table><tr><td>V_{CONT}</td><td>Output</td></tr><tr><td>L</td><td>OFF</td></tr><tr><td>H</td><td>ON</td></tr></table> Connect cont-terminal with V_{IN} when it is not used.	V_{CONT}	Output	L	OFF	H	ON	
V_{CONT}	Output								
L	OFF								
H	ON								
4	V_{IN}	Voltage supply input pin							
5	V_{OUT}	Regulator Output pin							
6	N.C								
7	GND	GND pin							
8	C_{d}	Delay time capacitor pin RESET pin output delay time can be set by the capacitance connected to the C_{d} pin. $t_{\text{PLH}} = 100000.C$ t_{PLH} : transmission delay time[s] C: capacitor value [F]							

■ BLACK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{IN}	-0.3 ~ +10	V
Output Current	I_{OUT}	400	mA
Power Dissipation(note3)	P_D	700	mW
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-20 ~ +85	°C
Storage Temperature	T_{STG}	-40~+150	°C

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The device is guaranteed to meet performance specification within 0 ~ +70 operating temperature range and assured by design from -20 ~ +85 .

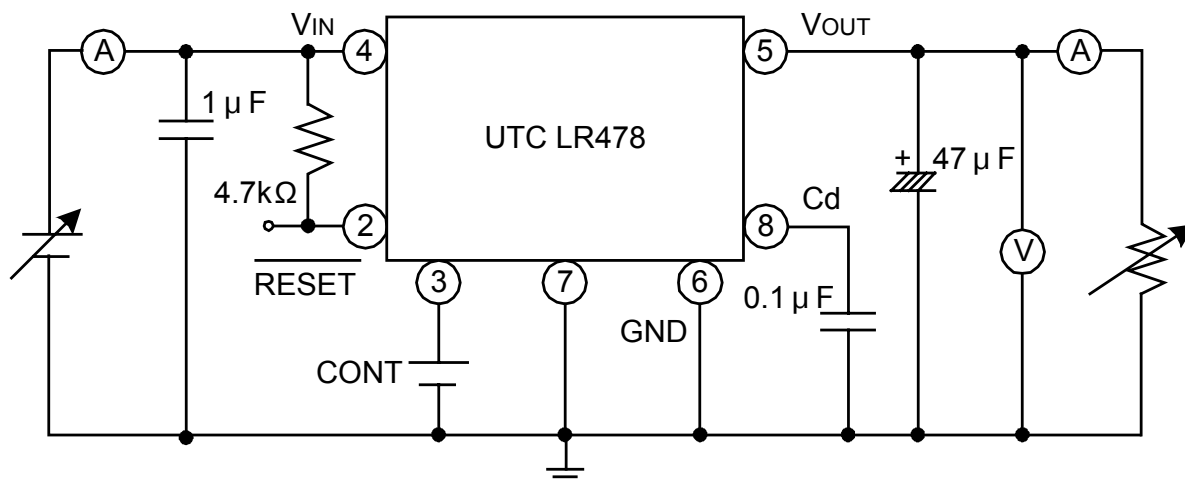
■ RECOMMENDED OPERATION CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Operating Voltage	V_{OPR}	0 ~ 10	V
Output Current	I_{OUT}	0 ~ 300	mA

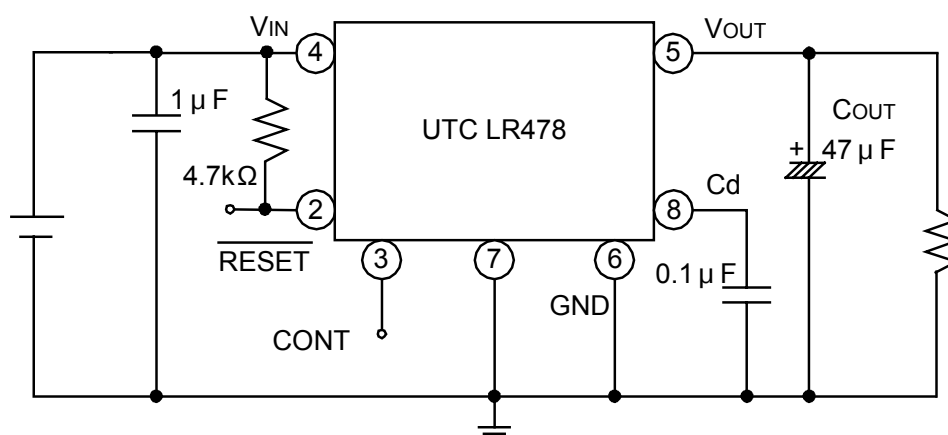
■ ELECTRICAL CHARACTERISTICS($V_{CONT}=1.6V$, $T_a=25^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
No-load Input Current 1	I_{Q1}	$V_{IN}=5V$, $I_{OUT}=0mA$		3	8	mA
No-load Input Current 2	I_{Q2}	$V_{IN}=4V$, $I_{OUT}=0mA$		4		mA
Input Current (OFF)	I_{Q3}	$V_{IN}=5V$, $V_{CONT}=0.4V$		250		μA
Regulator						
Output Voltage	V_{OUT}	$V_{IN}=5V$, $I_{OUT}=30mA$	3.33	3.40	3.47	V
Input-Output Different Voltage	$V_{IO(DIFF)}$	$V_{IN}=3.2V$, $I_{OUT}=150mA$		0.15	0.3	V
Line Regulation	ΔV_{OUT}	$V_{IN}=4.4\sim 5.5V$, $I_{OUT}=30mA$		10	20	mV
Load Regulation	ΔV_{OUT}	$V_{IN}=5V$, $I_{OUT}=0\sim 300mA$		20	120	mV
V_{OUT} Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	$V_{IN}=5V$, $I_{OUT}=30mA$, $T_J = -20\sim 85^{\circ}C$		100		ppm/°C
Ripple Rejection	RR	$V_{IN}=5V$, $I_{OUT}=30mA$, $f=120Hz$ $V_{RIPPLE}=1V_{P-P}$	50	80		dB
Output Noise Voltage	V_{IN}	$V_{IN}=5V$, $I_{OUT}=30mA$, $f=20\sim 80kHz$		40	120	μV_{rms}
CONT Terminal Current	I_{CONT}	$V_{CONT}=1.6V$		5	10	μA
High Threshold Voltage	$V_{THR(H)}$		1.6		$V_{IN}+0.3$	V
Low Threshold Voltage	$V_{THR(L)}$		-0.3		0.4	V
Reset						
Detection Voltage	VS	$V_{IN}=V_{THR(H)}\rightarrow V_{THR(L)}$	4.11	4.20	4.29	V
Vs Temperature Coefficient	$\Delta V_S/\Delta T$	$T_J = -20\sim 85^{\circ}C$		100		ppm/°C
Hysteresis Voltage	V_{HYS}	$V_{IN}=V_{THR(H)}\rightarrow V_{THR(L)}\rightarrow V_{THR(H)}$	100		200	mV
Low-Level Output Voltage	V_{OL}	$V_{IN}=3.9V$, $R_L=4.7K$		100	200	mV
Output Leakage Current	I_{LEAK}	$V_{IN}=5V$			± 0.1	μA
Output Current 1	I_{OUT1}	$V_{IN}=3.9V$, $R_L=0$	5			mA
Output Current 2	I_{OUT2}	$V_{IN}=3.9V$, $R_L=0$, $T_a = -20\sim 85^{\circ}C$	3			mA
"H" Transmission Delay Time	t_{PLH}	$C_d = 0.0\mu F$		30	90	μs
Reset Delay Time	t_{PLH1}	$V_{IN}=4V\rightarrow 5V$, $C_d = 0.1\mu F$	5	10	20	ms
"L" Transmission Delay Time	t_{PLH}			30	90	μs
Threshold Operating Voltage	$V_{THR(OPR)}$	$V_{OL}=0.4V$		0.65	0.85	V

■ TEST CIRCUIT

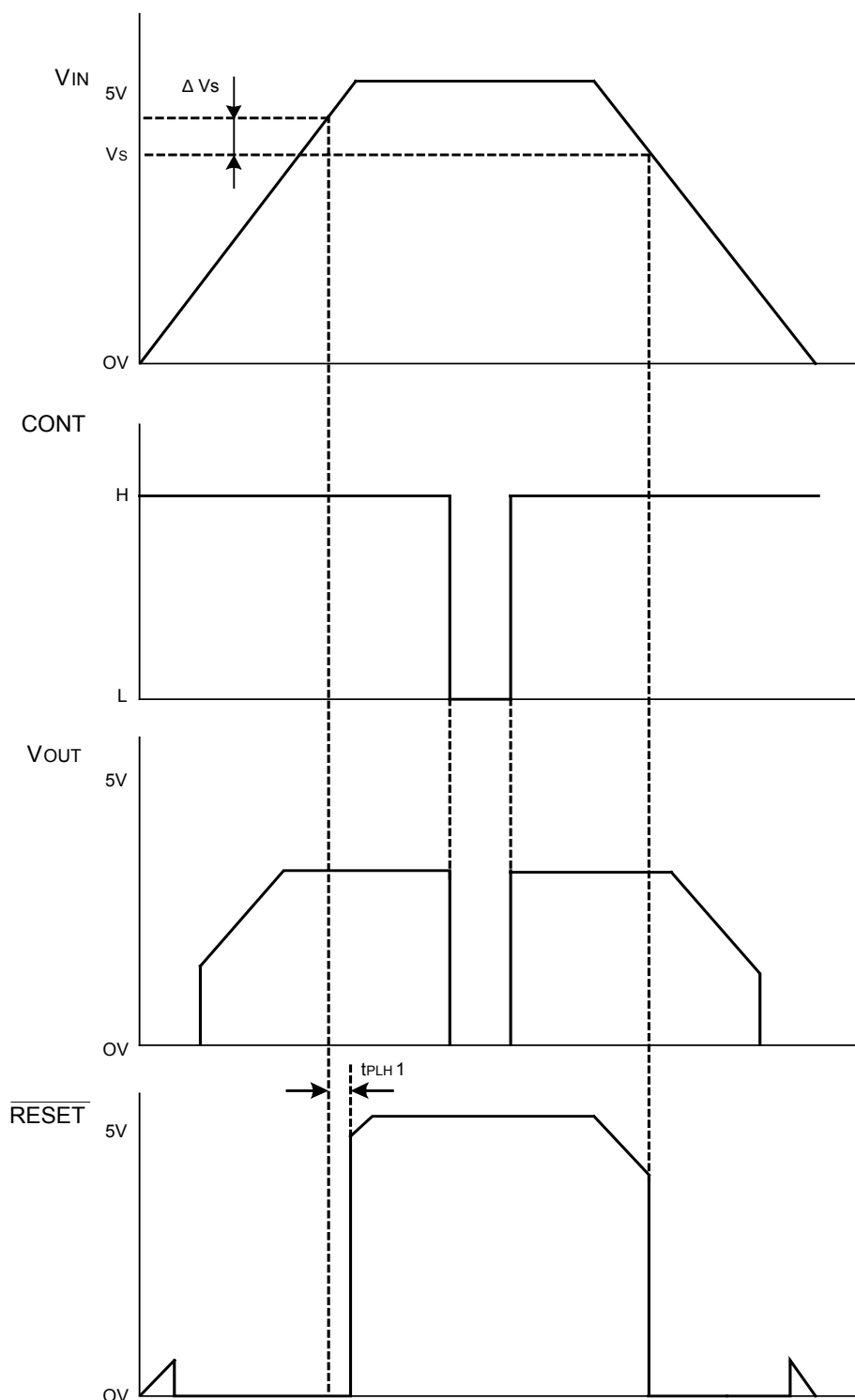


■ TYPICAL APPLICATION CIRCUIT

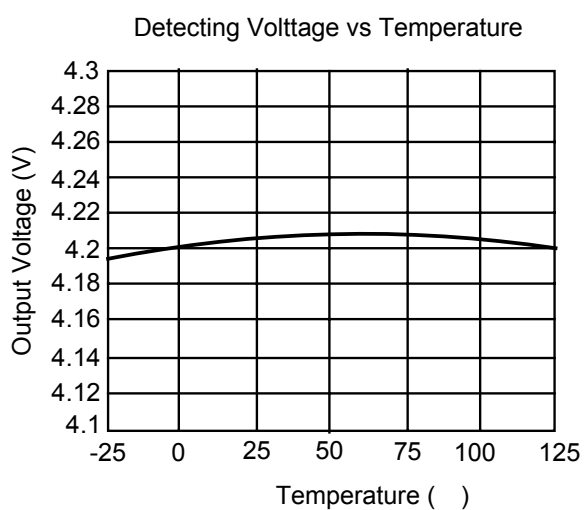
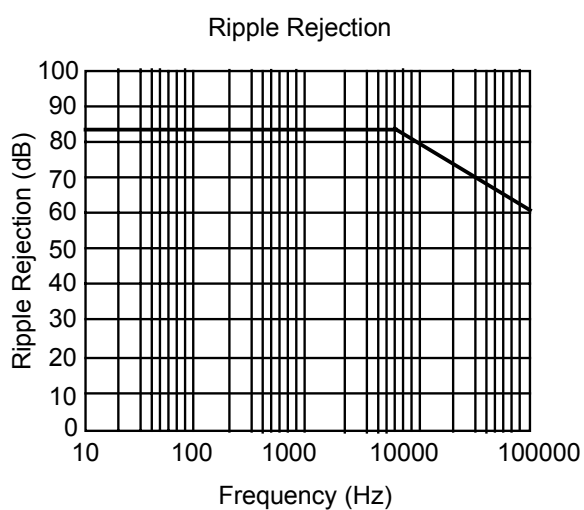
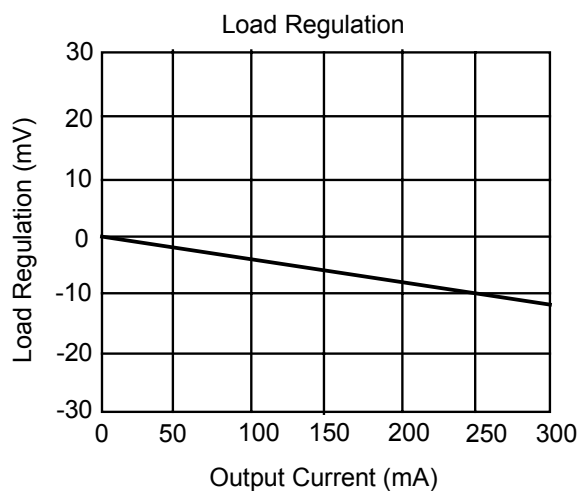
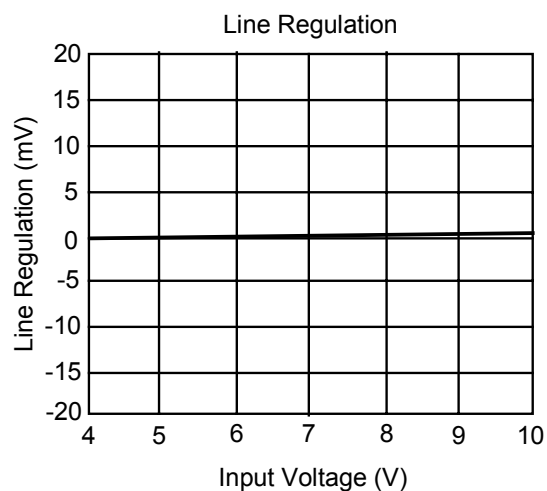
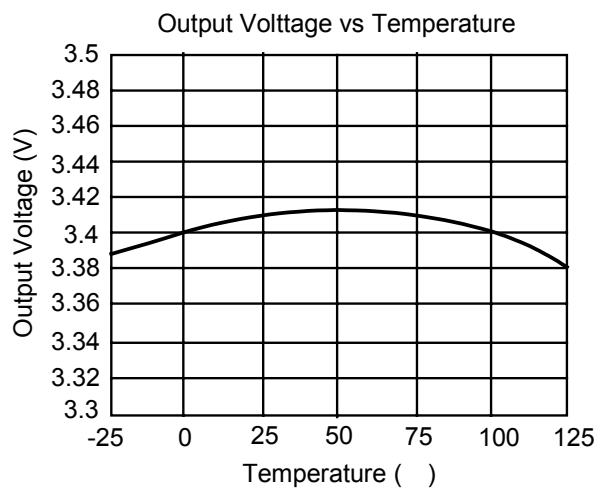
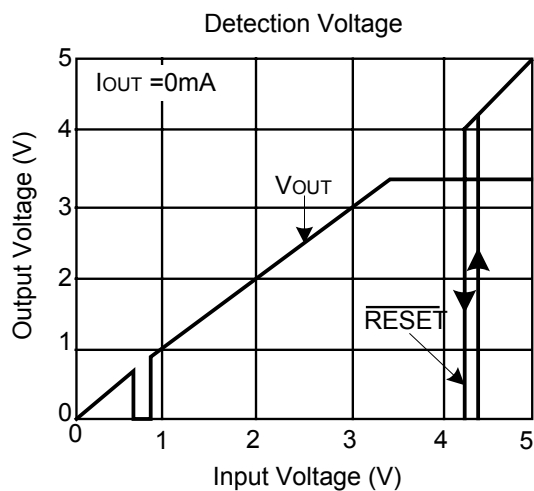


Note: External output-capacitor(C_{OUT}) for stability is necessary due to without internally compensated.

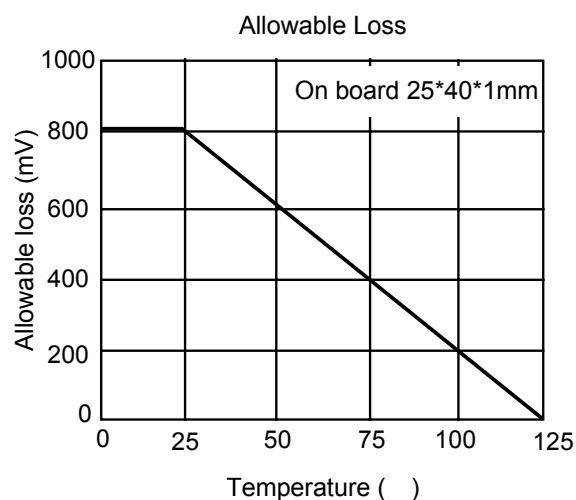
■ TIMING CHART



TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.