L78LR05D-MA-E

150 mA, 5 V Linear Voltage Regulator with Reset Function

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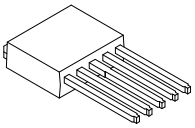


IPAK5 / TP5H
CASE 369AG

Features

- Backup Supported with Reset Function 150 mA
- 5 V Linear Voltage Regulator
- This is a Pb−Free Device

Application

- Prevention of Malfunction that May Occur when the Power Supply of a Microprocessor System is Turned ON/OFF
- Measure Taken against Abnormal Operations that May Occur at the Time of Instantaneous Break of Power Supply and Control of a Battery−backed Up Memory System

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
VIN max	Maximum Input Voltage		25	V
Pd max	Allowable Power Dissipation	No heat sink	1.0	W
Topr	Operating Ambient Temperature		−3.0 to +80	°C
Tstg	Storage Ambient Temperature		−55 to +150	°C

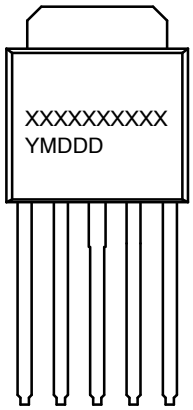
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

OPERATING CONDITIONS (Ta = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
VIN	Input Voltage		7.5 to 20	V
IOUT	Output Current		1 to 150	mA

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

MARKING DIAGRAM



XXXXX = Specific Device Code
Y = Year
M = Month
DDD = Additional Traceability Data

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

ORDERING INFORMATION

Device	Package	Shipping
L78LR05D−MA−E	IPAK5 / TP5H (Pb−Free)	500 / Bulk

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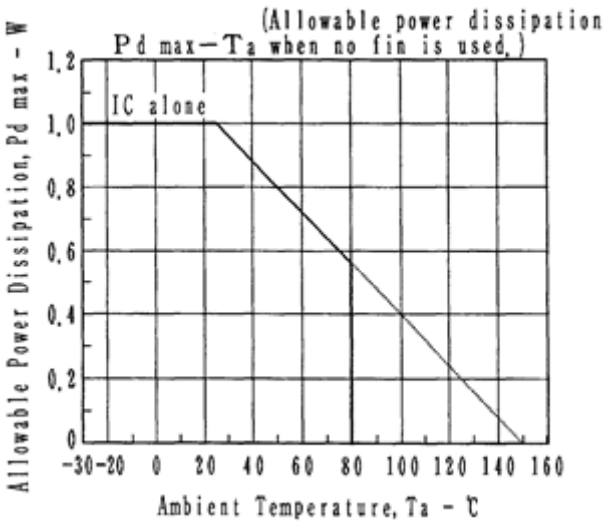


Figure 1. Allowable Power Dissipation (Pd max) vs. Ambient Temperature (Ta)

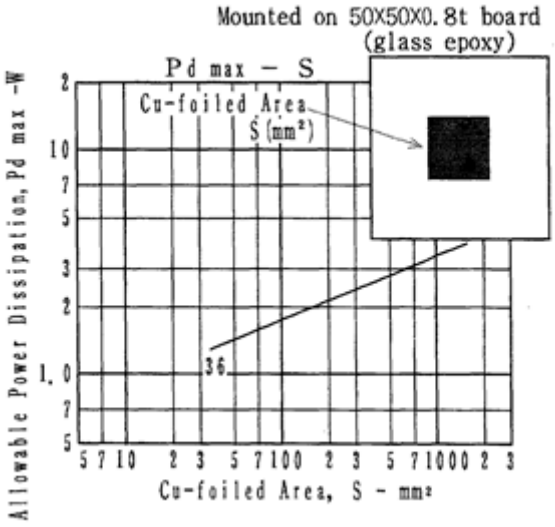


Figure 2. Allowable Power Dissipation (Pd max) vs. Cu−foiled Area (S)

*The measured values of Pd represent the values measured when solder on the Cu−foiled area is all wet

OPERATING CHARACTERISTICS (Ta = 25°C, VIN = 10 V, IOUT = 40 mA, CIN = 1 μF, COUT = 10 μF)

Symbol	Characteristic	Conditions		Min	Typ	Max	Unit
VOUT1	Output Voltage	Tj = 25°C		4.8	5.0	5.2	V
VOUT2		7 V ≤ VIN ≤ 20V, 1 mA ≤ IOUT ≤ 70 mA		4.75	–	5.25	V
ΔVO LINE1	Line regulation	Tj = 25°C	7 V ≤ VIN ≤ 20 V	–	6	75	mV
ΔVO LINE2			8 V ≤ VIN ≤ 20 V	–	3	50	mV
ΔVO LOAD1	Load regulation		1 mA ≤ IOUT ≤ 100 mA	–	9	60	mV
ΔVO LOAD2			1 mA ≤ IOUT ≤ 40 mA	–	3	30	mV
ICC	Current drain		Iout = 100 mA	–	1.4	3.4	mA
ΔICC LINE	Current drain Variation range	8 V ≤ IN ≤ 20 V		–	0.12	1.5	mA
ΔICC LOAD		1 mA ≤ IOUT ≤ 40 mA		–	0.01	0.1	mA
VNO	Output noise voltage	10 Hz ≤ f ≤ 100 kHz, IOUT = 1 mA		–	80	–	μV
ΔVOUT/ΔTj	Temperature coefficient of output voltage	IOUT = 1 mA, Tj = 25 to 125°C		–	±0.5	–	mV/°C
Rrej	Ripple rejection	Tj = 25°C, f = 120 Hz,8 V ≤ VIN ≤ 18 V		–	79	–	dB
VDROP	Dropout voltage	Tj = 25°C		–	1.5	2.2	V
IOSC	Output short current			150	300	450	mA
VORH	“H” reset output voltage			4.8	5.0	5.2	V
VORL	“L” reset output voltage	Tj = 25°C, VIN = 3 V, IOUT = 1 mA		–	10	200	mV
VRT	Reset threshold voltage	Tj = 25°C		4.00	4.20	4.35	V
VRTH	Reset threshold Hysteresis voltage			50	100	200	mV
td	Reset output delay time	Cd = 0.1 μF		7.5	10	12.5	ms
IO LEAK	Output pin leak current	VIN = 0 V, VO = 6 V		–	0.001	2	μA
IOR LEAK	Reset output pin leak current	VIN = 0 V, VO = 6 V		–	0.001	2	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Equivalent Circuit Block Diagram

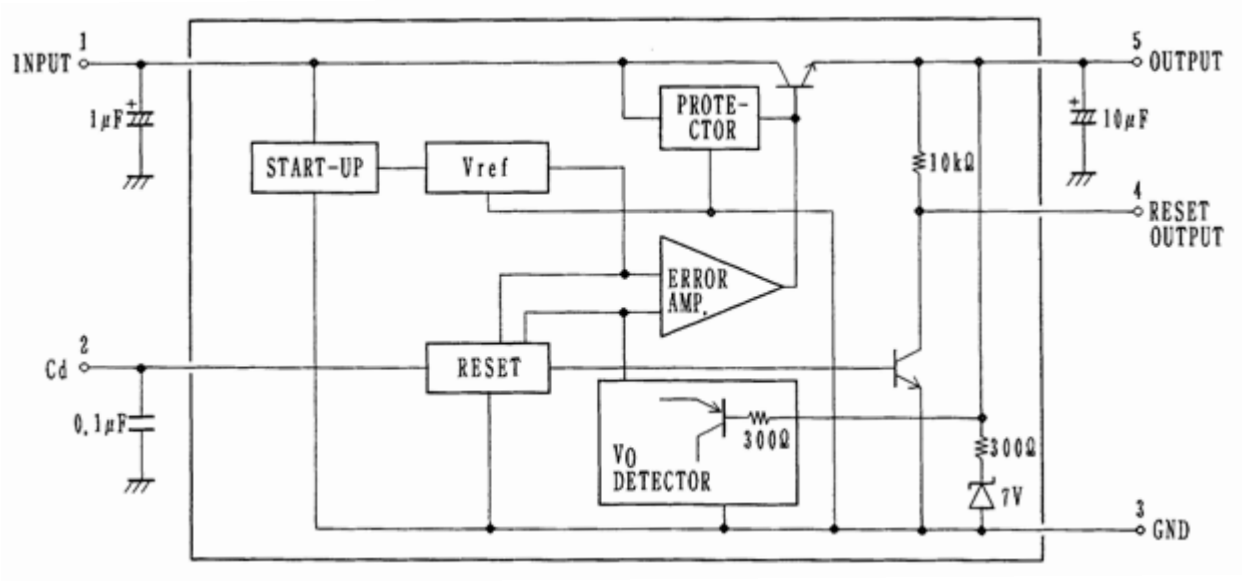
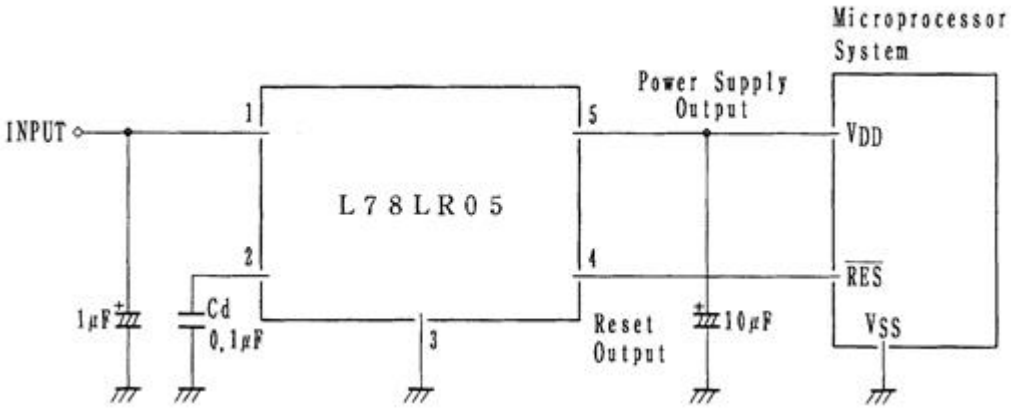


Figure 3. Equivalent Circuit Block Diagram

Sample Application Circuit



td = 100 x Cd (μF) [ms]

NOTES:

1. When Cd ≥ 10 μF, the capacitor may not discharge completely, causing td to be made shorter than a set value. In this case, connect high−speed diode (DS442) across pin 2 (anode side) and pin 5 (cathode side)
2. Connecting a pull−up resistor to the reset output externally allows sink current up to 4 mA to flow.

Figure 4. Sample Application Circuit

Reset Operation

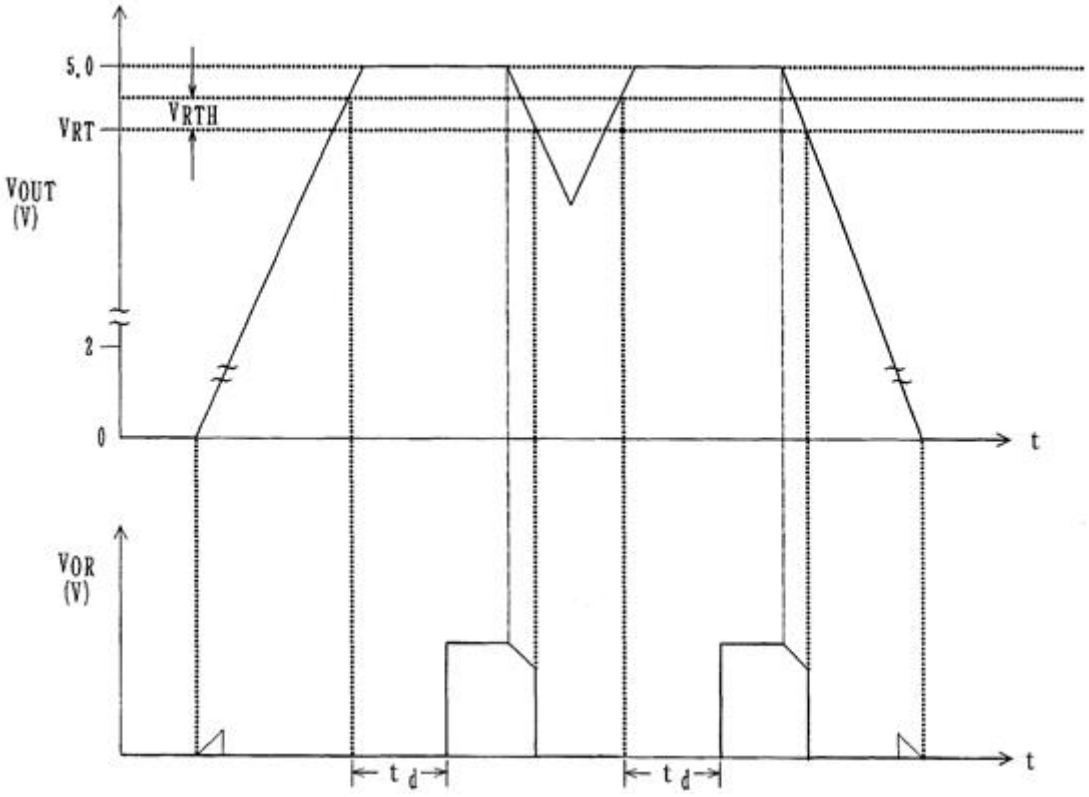
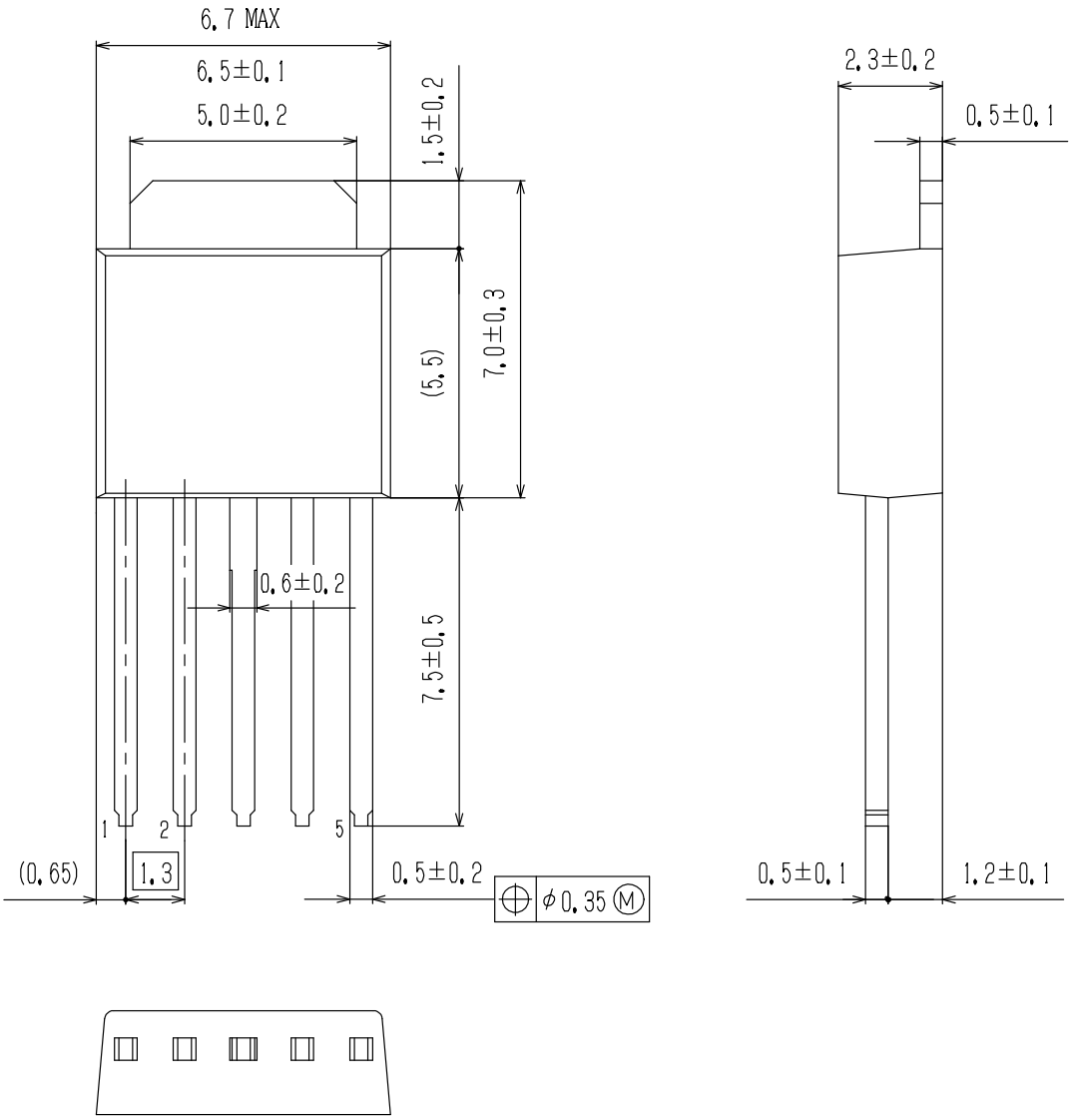


Figure 5. Reset Operation

PACKAGE DIMENSIONS

IPAK5 / TP5H
CASE 369AG
ISSUE A



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