

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Input Voltage	V_{IN} max		25	V
Allowable Power Dissipation	P_d max	(No fin)	1.0	W
Operating Temperature	T_{opr}		–30 to +80	°C
Storage Temperature	T_{stg}		–55 to +150	°C

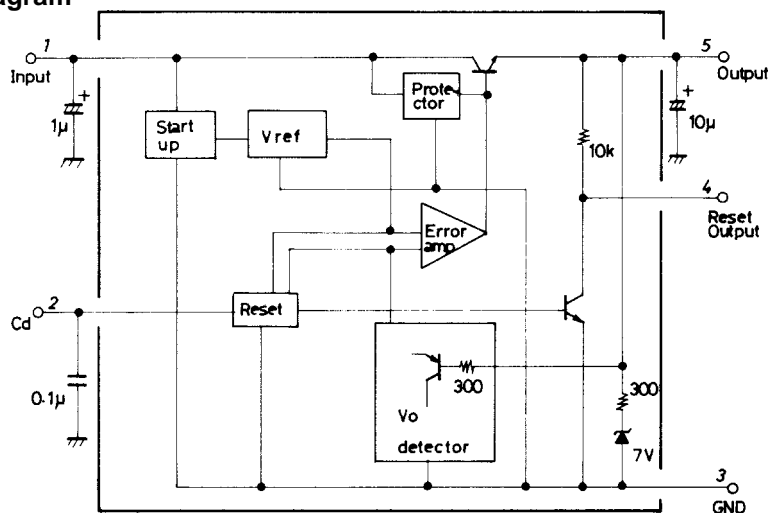
Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input Voltage	V_{IN}		7.5 to 20	V
Output Current	I_{OUT}		1 to 150	mA

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{IN} = 10\text{V}$, $I_{OUT} = 40\text{mA}$, $c_{in} = 1\mu\text{F}$, $c_o = 10\mu\text{F}$

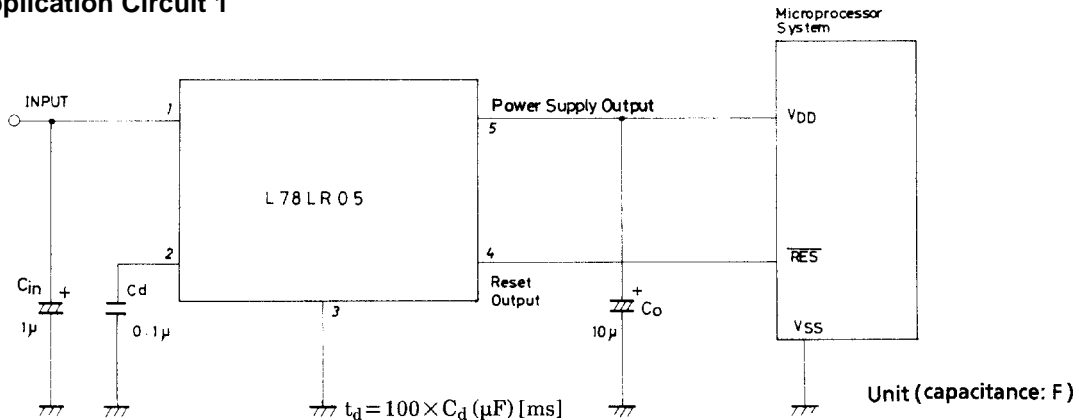
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Voltage	V _{OUT1}	T _J =25°C	4.8	5.0	5.2	V
	V _{OUT2}	7V≤V _{IN} ≤20V, 1mA≤I _{OUT} ≤70mA	4.75		5.25	V
Line Regulation	ΔV _O LINE1	T _J =25°C, 7V≤V _{IN} ≤20V		6.0	75	mV
	ΔV _O LINE2	T _J =25°C, 8V≤V _{IN} ≤20V		3.0	50	mV
Load Regulation	ΔV _O LOAD1	T _J =25°C, 1mA≤I _{OUT} ≤100mA		9.0	60	mV
	ΔV _O LOAD2	T _J =25°C, 1mA≤I _{OUT} ≤40mA		3.0	30	mV
Current Dissipation	I _{CC}	T _J =25°C, I _{OUT} =100mA		1.4	3.4	mA
Current Dissipation Variation	ΔI _{CC} LINE	8V≤V _{IN} ≤20V		0.12	1.5	mA
	ΔI _{CC} LOAD	1mA≤I _{OUT} ≤40mA		0.01	0.1	mA
Output Noise Voltage	V _{NO}	10Hz≤f≤100kHz, I _O =1mA		80		μV
Temperature Coefficient of Output Voltage	ΔV _{OUT} /ΔT _J	I _{OUT} =1mA, T _J =25 to 125°C		±0.5		mV/°C
Ripple Rejection	R _{rej}	T _J =25°C, f=120Hz, 8V≤V _{IN} ≤18V		79		dB
Dropout Voltage	V _{DROP}	T _J =25°C		1.5	2.2	V
Output Short Current	I _{OSC}	T _J =25°C	150	300	450	mA
"H "-Reset Output Voltage	V _{ORH}	T _J =25°C	4.8	5.0	5.2	V
"L "-Reset Output Voltage	V _{ORL}	T _J =25°C, V _{IN} =3V, I _O =1mA		10	200	mV
Reset Threshold Voltage	V _{RT}	B, T _J =25°C	4.60	4.8	4.95	V
		C, T _J =25°C	4.30	4.5	4.65	V
		D, T _J =25°C	4.00	4.2	4.35	V
		E, T _J =25°C	3.70	3.9	4.05	V
		F, T _J =25°C	3.40	3.6	3.75	V
		G, T _J =25°C	3.10	3.3	3.45	V
		H, T _J =25°C	2.80	3.0	3.15	V
Reset Threshold Hysteresis Voltage	V _{RTH}		50	100	200	mV
Reset Output Dely Time	t _d	c _d =0.1μF	7.5	10	12.5	ms
Output Pin Leakage Current	I _O LEAK	V _{IN} =0, V _O =6V		0.001	2	μA
Reset Output Pin Leakage Current	I _{OR} LEAK	V _{IN} =0, V _{OR} =6V		0.001	2	A

Equivalent Circuit Block Diagram

Unit (resistance: Ω , capacitance: F)

L78LR05

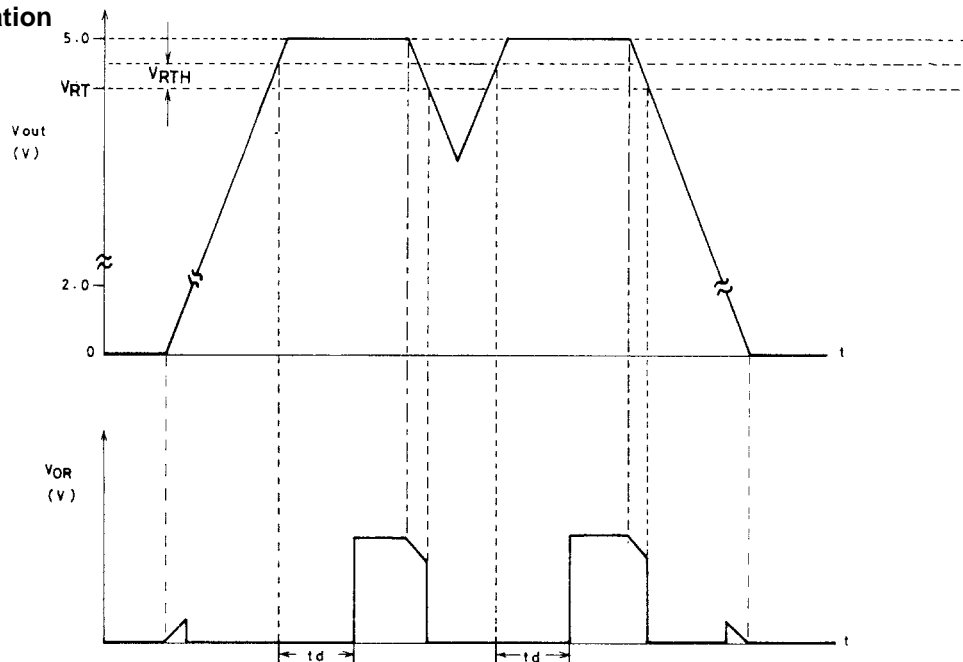
Sample Application Circuit 1



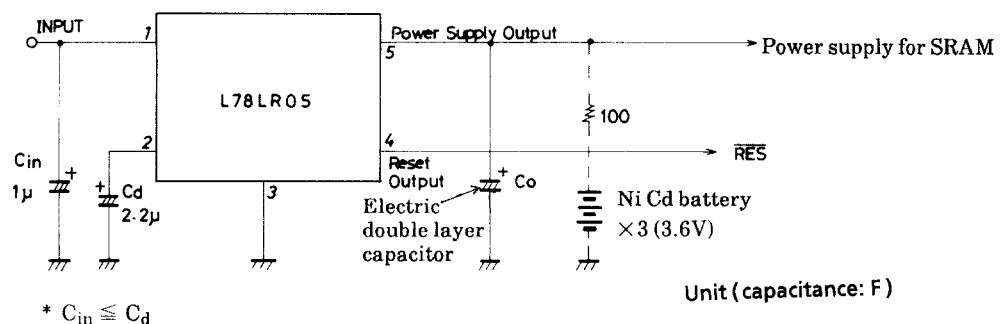
Note 1 : When the capacitance of C_d is large, the capacitor may not discharge completely, causing t_d to be made shorter than a set value. If this is a problem, either connect a high speed diode (DS442) between pin2 (anode side) and pin5 (cathode side) or ensure an adequate discharge time by using values for capacitors C_{in} and C_d such that $C_{in} > C_d$.

Note 2 : If a pull-up resistor is connected to the reset output pin externally, it is possible to cause a sink current up to 4mA to flow.

Reset Operation



Sample Application Circuit 2 (Direct battery backup)

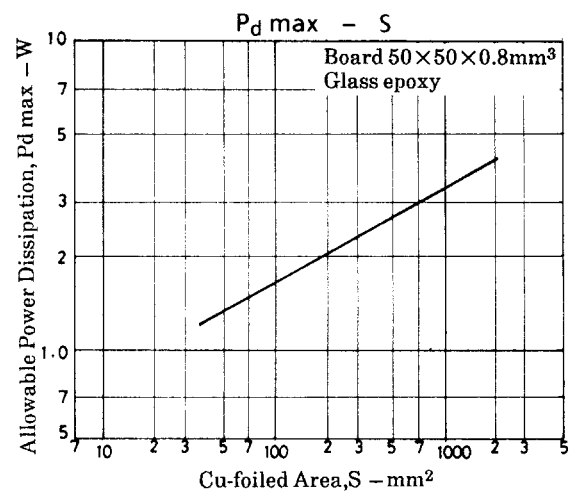
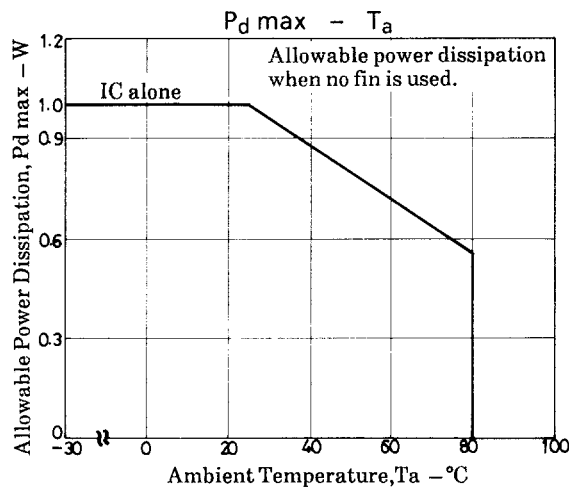


Since the leakage current at the output pin (pin5) of the L78LR05 is so low as 2μA or less, a backup circuit can be implemented by connecting an electric double layer capacitor (super capacitor : NEC, gold capacitor : Matsushita Electric) or a Ni Cd battery direct to the output pin. Since a reverse blocking diode, which has been so far connected to the output pin, is not required, a regulated power-supply voltage can be supplied to a load during the steady-state operation, without voltage drop caused by the diode and effects of temperature characteristics, current characteristics of the diode. No battery-regulator switching circuit is required at the battery backup start mode.

Note 3 : The capacitance of reset output signal delay capacitor C_d must exceed that of input capacitor C_{in} . If the capacitance of C_d is small, a reset pulse signal may be generated once when the main power source is turned off (at the battery backup start mode).

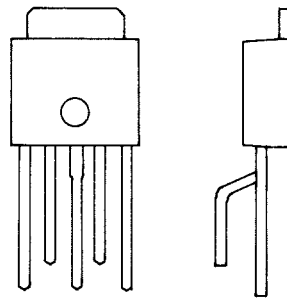
Allowable Power Dissipation

The allowable power dissipation is 1.0W ($T_a=25^\circ\text{C}$) with fin attached. When the L78LR05 is surface-mounted on a hybrid IC board or printed circuit board, a high allowable power dissipation can be obtained, though it is placed in a small-sized package. Shown below is the relationship between the Cu-foiled area the allowable power dissipation when the L78LR05 is surface-mounted on a glass epoxy board ($50\times50\times0.8\text{mm}^3$).

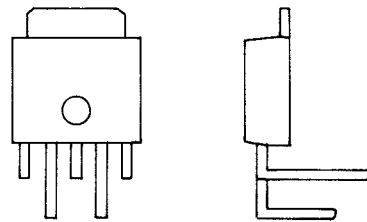


* The measured values of P_d represent the values measured when solder on the Cu-foiled area is all wet.

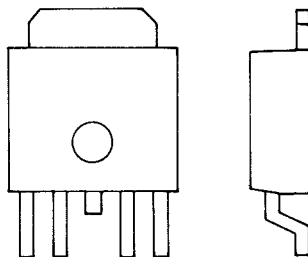
Lead Forming



MA forming

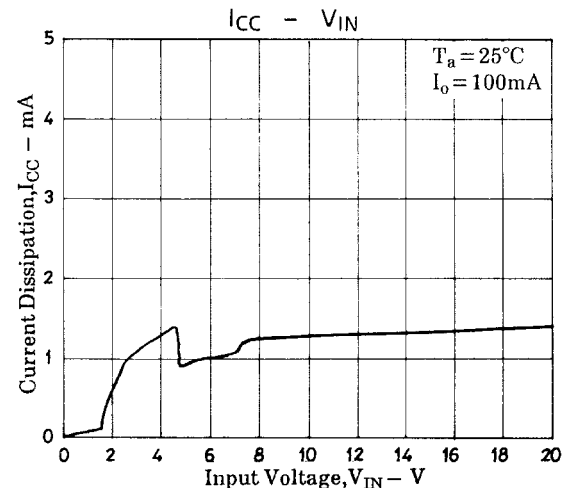
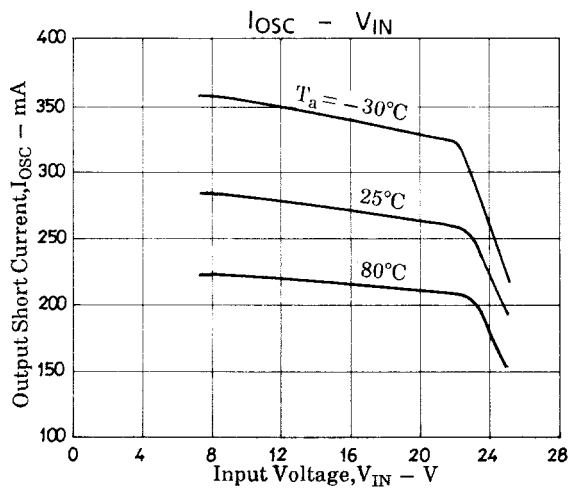
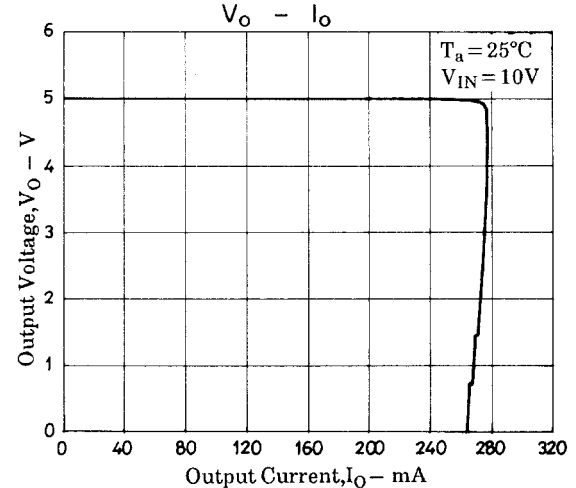
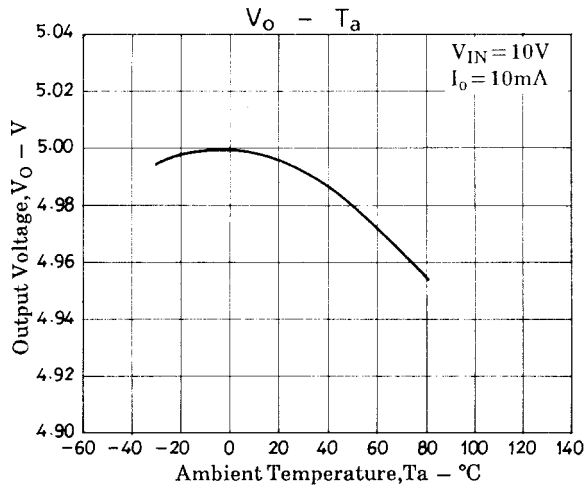
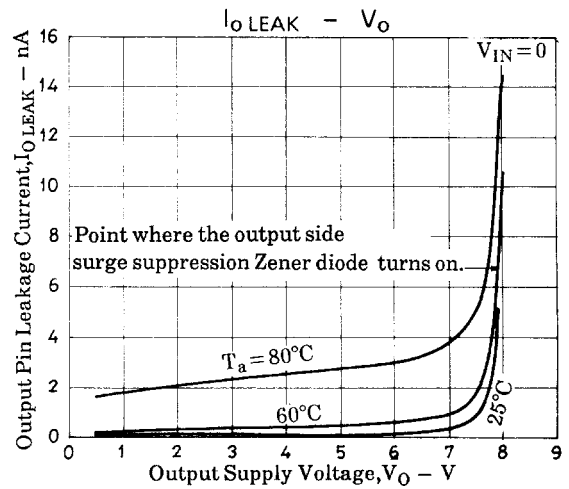
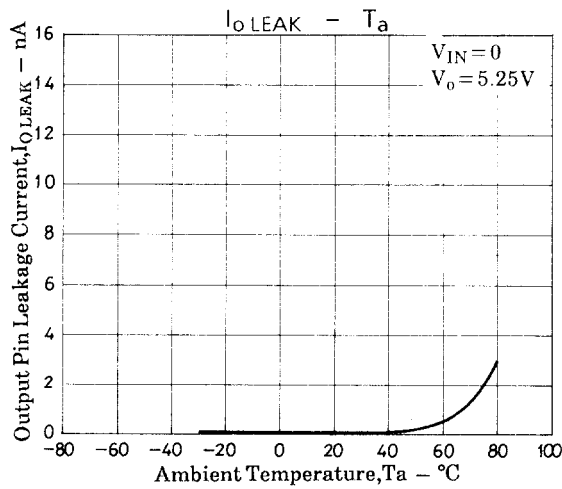
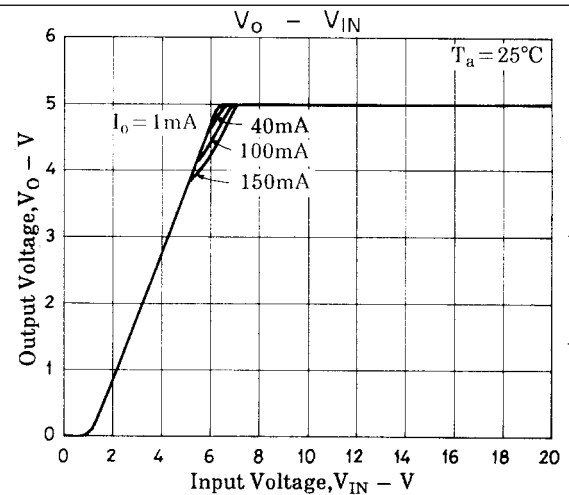
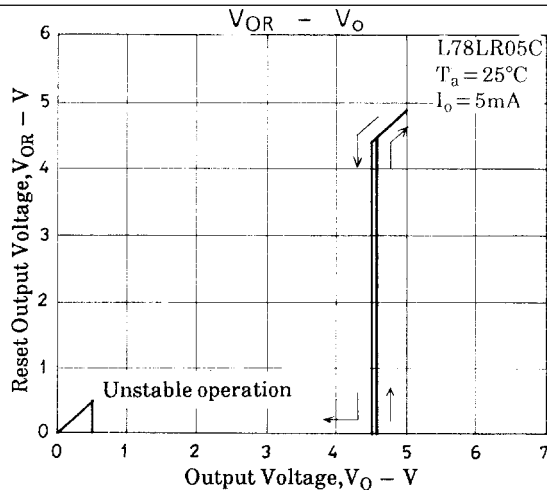


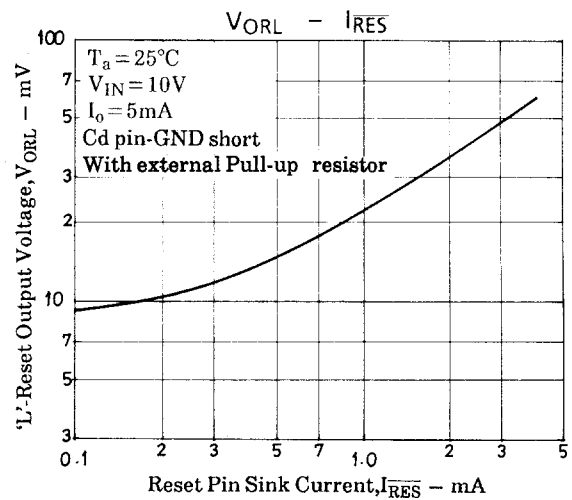
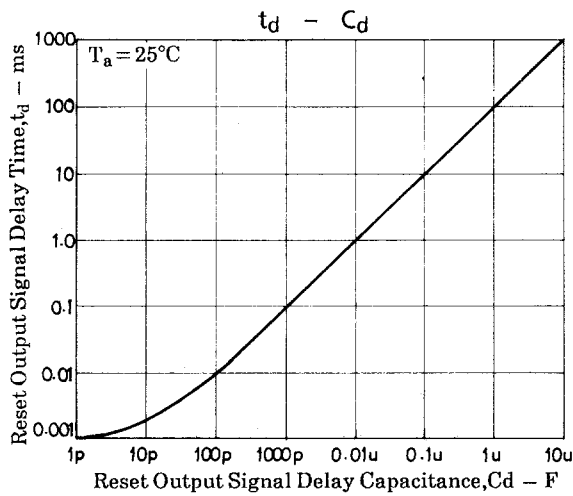
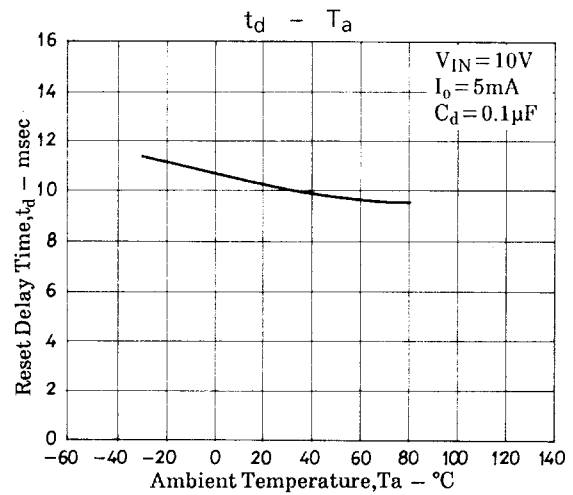
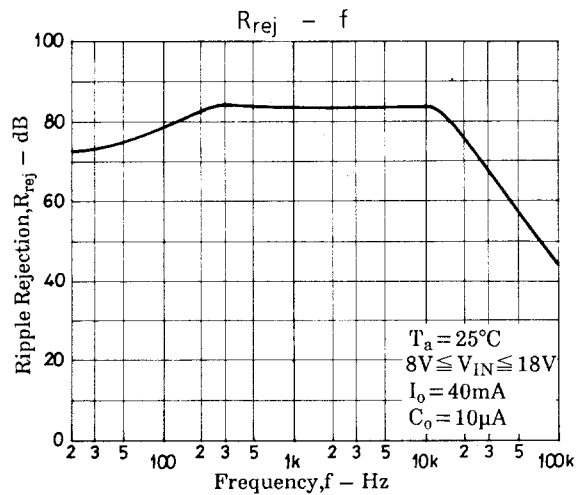
LR forming



FA forming

L78LR05





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