

LM140JAN Three Terminal Positive Regulators

 Check for Samples: [LM140JAN](#)

FEATURES

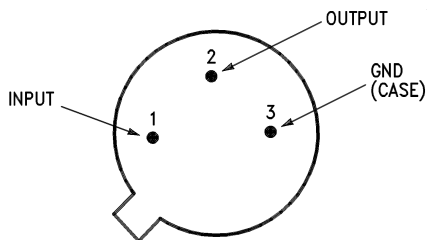
- Complete Specifications at 0.5A and 1.0A Loads
- No External Components
- Internal Thermal Overload Protection
- Internal Short Circuit Current-limiting
- Output Transistor Safe-area Compensation

DESCRIPTION

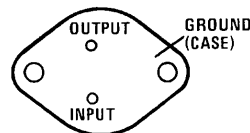
The monolithic 3-terminal positive voltage regulators employ internal current-limiting, thermal shutdown and safe-area compensation, making them essentially indestructible. If adequate heat sinking is provided, they can deliver over 0.5A and 1.0A output current. They are intended as fixed voltage regulators in a wide range of applications including local (on-card) regulation for elimination of noise and distribution problems associated with single-point regulation. In addition to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents.

Considerable effort was expended to make the entire series of regulators easy to use and minimize the number of external components. It is not necessary to bypass the output, although this does improve transient response. Input bypassing is needed only if the regulator is located far from the filter capacitor of the power supply.

Connection Diagrams



**Figure 1. Steel Metal Can TO Package (NDT)
Bottom View**
See Package Number NDT0003A



**Figure 2. TO-3 Metal Can (K)
Bottom View**
See Package Number K0002C



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings⁽¹⁾

DC Input Voltage	35V	
Internal Power Dissipation ⁽²⁾	Internally Limited	
Maximum Junction Temperature (T_{Jmax})	150°C	
Storage Temperature Range	$-65^{\circ}\text{C} \leq T_A \leq +150^{\circ}\text{C}$	
Operating Temperature Range	$-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$	
Lead Temperature (Soldering 10 seconds)	300°C	
Thermal Resistance		
θ_{JA}	T0-5 (Still Air)	232°C/W
	T0-5 (500 LF/Min Air Flow)	77°C/W
	T0-3 (Still Air)	35°C/W
	T0-3 (500 LF/Min Air Flow)	TBD
θ_{JC}	T0-5	15°C/W
	T0-3	4°C/W
ESD Susceptibility ⁽³⁾	2KV	

- (1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits. For ensured specifications and test conditions, see the Electrical Characteristics. The ensured specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.
- (2) The maximum power dissipation must be derated at elevated temperatures and is dictated by T_{Jmax} (maximum junction temperature), θ_{JA} (package junction to ambient thermal resistance), and T_A (ambient temperature). The maximum allowable power dissipation at any temperature is $P_{Dmax} = (T_{Jmax} - T_A)/\theta_{JA}$ or the number given in the Absolute Maximum Ratings, whichever is lower.
- (3) Human body model, 100pF discharged through 1.5K Ω

Quality Conformance Inspection

MIL-Std-883, Method 5005 - Group A

Subgroup	Description	Temp °C
1	Static tests at	25
2	Static tests at	125
3	Static tests at	-55
4	Dynamic tests at	25
5	Dynamic tests at	125
6	Dynamic tests at	-55
7	Functional tests at	25
8A	Functional tests at	125
8B	Functional tests at	-55
9	Switching tests at	25
10	Switching tests at	125
11	Switching tests at	-55
12	Settling time at	25
13	Settling time at	125
14	Settling time at	-55

LM140H-5.0 (JL140-5BXA, SXA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O (1)	Output Voltage	V _I = 8V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 8V, I _L = -500mA		4.75	5.25	V	1, 2, 3
		V _I = 20V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 20V, I _L = -500mA		4.75	5.25	V	1, 2, 3
		V _I = 35V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 35V, I _L = -50mA		4.75	5.25	V	1, 2, 3
V _{RLine}	Line Regulation	8V ≤ V _I ≤ 35V, I _L = -50mA		-150	150	mV	1, 2, 3
		8V ≤ V _I ≤ 25V, I _L = -350mA		-50	50	mV	1, 2, 3
V _{RLoad}	Load Regulation	V _I = 10V, -500mA ≤ I _L ≤ -5mA		-100	100	mV	1, 2, 3
		V _I = 35V, -50mA ≤ I _L ≤ -5mA		-150	150	mV	1, 2, 3
I _{SCD}	Stand by Current Drain	V _I = 10V, I _L = -5mA		-7.0	-0.5	mA	1, 2, 3
		V _I = 35V, I _L = -5mA		-8.0	-0.5	mA	1, 2, 3
ΔI _{SCD} Line	Stand by I _{Drain} vs. V _{Line}	8V ≤ V _I ≤ 35V, I _L = -5mA		-1.0	1.0	mA	1, 2, 3
ΔI _{SCD} Load	Stand by I _{Drain} vs. I _{Load}	V _I = 10V, -500mA ≤ I _L ≤ -5mA		-0.5	0.5	mA	1, 2, 3
I _{OL}	Overload Current	V _I = 8V, Forced ΔV _O = -0.48V		-2.0	-0.5	A	1, 2, 3
I _{OS}	Output Short Circuit Current	V _I = 10V		-2.0	-0.01	A	1, 2, 3
		V _I = 25V		-1.5	-0.01	A	1, 2, 3
		V _I = 35V		-1.0	-0.01	A	1, 2, 3
V _O (2)	Output Voltage	V _I = 10V, I _L = -5mA	(1)	4.7	5.3	V	2
V _O (3)	Output Voltage	V _I = 10V, I _L = -5mA	(2)	4.75	5.25	V	7, 8A, 8B
ΔV _O / ΔT	Average Temperature Coefficient of Output Voltage	V _I = 10V, I _L = -5mA, 25°C ≤ T _A ≤ 125°C	(3)	-2.0	2.0	mV/°C	8A
		V _I = 10V, I _L = -5mA, -55°C ≤ T _A ≤ 25°C	(3)	-2.0	2.0	mV/°C	8B

(1) Tested at T_A = +125°C, correlated to T_A = +150°C.

(2) Tested at extremes as a set up for ΔV_O/ΔT tests.

(3) Calculated parameter. For calculations use V_O @ V_I = 10V, I_L = -5mA.; Tested at extremes as a set up for ΔV_O/ΔT tests.

LM140H-5.0 (JL140-5BXA, SXA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
NO	Output Noise Voltage	V _I = 10V, I _L = -50mA			125	μV _{RMS}	7
ΔV _O / ΔV _I	Transient Line Response	V _I = 10V, I _L = -5mA, V _{Pulse} = 3V			30	mV/V	7
ΔV _O / ΔI _L	Transient Load Response	V _I = 10V, ΔI _L = -200mA, I _L = -50mA			2.5	mV/mA	7
ΔV _I / ΔV _O	Ripple Rejection	V _I = 10V, I _L = -125mA, e _i = 1V _{RMS} at f = 2400Hz,		60		dB	4

LM140H-5.0 (JL140-5BXA, SXA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O	Output Voltage	V _I = 8V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 8V, I _L = -500mA		-0.025	0.025	V	1
		V _I = 20V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 20V, I _L = -500mA		-0.025	0.025	V	1
		V _I = 35V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 35V, I _L = -500mA		-0.025	0.025	V	1
I _{SCD}	Stand by Current Drain	V _I = 10V, I _L = -5mA		-20	20	%	1

LM140H-12 (JL140-12BXA, SXA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O (1)	Output Voltage	V _I = 15V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 15V, I _L = -0.5A		11.4	12.6	V	1, 2, 3
		V _I = 27V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 27V, I _L = -0.5A		11.4	12.6	V	1, 2, 3
		V _I = 35V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 35V, I _L = -500mA		11.4	12.6	V	1, 2, 3
V _{RLine}	Line Regulation	15V ≤ V _I ≤ 35V, I _L = -50mA		-360	360	mV	1, 2, 3
		15V ≤ V _I ≤ 32V, I _L = -350mA		-120	120	mV	1, 2, 3
V _{RLoad}	Load Regulation	V _I = 17V, -500mA ≤ I _L ≤ -5mA		-240	240	mV	1, 2, 3
		V _I = 35V, -50mA ≤ I _L ≤ -5mA		-360	360	mV	1, 2, 3
I _{SCD}	Stand by Current Drain	V _I = 17V, I _L = -5mA		-7.0	-0.5	mA	1, 2, 3
		V _I = 35V, I _L = -5mA		-8.0	-0.5	mA	1, 2, 3
ΔI _{SCD} Line	Stand by I _{Drain} vs. V _{Line}	15V ≤ V _I ≤ 35V, I _L = -5mA		-1.0	1.0	mA	1, 2, 3
ΔI _{SCD} Load	Stand by I _{Drain} vs. I _{Load}	V _I = 17V, -500mA ≤ I _L ≤ -5mA		-0.5	0.5	mA	1, 2, 3
I _{OL}	Over Load Current	V _I = 15V, ΔV _O = -1.13V		-2.0	-0.5	A	1, 2, 3
I _{OS}	Output Short Circuit Current	V _I = 17V		-1.75	-0.01	A	1, 2, 3
		V _I = 32V		-1.25	-0.01	A	1, 2, 3
		V _I = 35V		-1.00	-0.01	A	1, 2, 3
V _O (2)	Output Voltage	V _I = 17V, I _L = -5mA	(1)	11.28	12.72	V	2
V _O (3)	Output Voltage	V _I = 17V, I _L = -5mA	(2)	11.4	12.6	V	7, 8A, 8B

(1) Tested at T_A = +125°C, correlated to T_A = +150°C.

(2) Tested at extremes as a set up for ΔV_O/ΔT tests.

LM140H-12 (JL140-12BXA, SXA) JAN Electrical Characteristics DC Parameters (continued)

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$\Delta V_O / \Delta T$	Average Temperature Coefficient Output Voltage	$25^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$, $V_I = 17\text{V}$, $I_L = -5\text{mA}$	(3)	-3.0	3.0	mV/°C	8A
		$-55^\circ\text{C} \leq T_A \leq 25^\circ\text{C}$, $V_I = 17\text{V}$, $I_L = -5\text{mA}$	(3)	-3.0	3.0	mV/°C	8B

(3) Calculated parameter. For calculations use V_O @ $V_I = 17\text{V}$, $I_L = -5\text{mA}$.; Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

LM140H-12 (JL140-12BXA, SXA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
NO	Output Noise Voltage	$V_I = 17\text{V}$, $I_L = -50\text{mA}$			250	μV_{RMS}	7
$\Delta V_O / \Delta I_L$	Transient Load Response	$V_I = 17\text{V}$, $I_L = -50\text{mA}$, $\Delta I_L = -200\text{mA}$			2.5	mV/mA	7
$\Delta V_O / \Delta V_I$	Transient Line Response	$V_I = 17\text{V}$, $V_{\text{Pulse}} = 3\text{V}$, $I_L = -5\text{mA}$			30	mV/V	7
$\Delta V_I / \Delta V_O$	Ripple Rejection	$V_I = 17\text{V}$, $I_L = -125\text{mA}$, $e_I = 1\text{V}_{\text{RMS}}$ at $f = 2400\text{Hz}$		55		dB	4

LM140H-12 (JL140-12BXA, SXA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O	Output Voltage	$V_I = 15\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 15\text{V}$, $I_L = -0.5\text{A}$		-0.06	0.06	V	1
		$V_I = 27\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 27\text{V}$, $I_L = -0.5\text{A}$		-0.06	0.06	V	1
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 35\text{V}$, $I_L = -50\text{mA}$		-0.06	0.06	V	1
I_{SCD}	Stand by Current Drain	$V_I = 17\text{V}$, $I_L = -5\text{mA}$		-20	20	%	1

LM140H-15 (JL140-15BXA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O (1)	Output Voltage	$V_I = 18.5\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 18.5\text{V}$, $I_L = -500\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 30\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 30\text{V}$, $I_L = -500\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -50\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
V_{RLine}	Line Regulation	$18.5\text{V} \leq V_I \leq 35\text{V}$, $I_L = -350\text{mA}$		-150	150	mV	1, 2, 3
V_{RLOAD}	Load Regulation	$-500\text{mA} \leq I_L \leq -5\text{mA}$, $V_I = 20\text{V}$		-300	300	mV	1, 2, 3
		$-50\text{mA} \leq I_L \leq -5\text{mA}$, $V_I = 35\text{V}$		-450	450	mV	1, 2, 3
I_{SCD}	Stand by Current Drain	$V_I = 20\text{V}$, $I_L = -5\text{mA}$		-7.0	-0.5	mA	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		-8.0	-0.5	mA	1, 2, 3
$\Delta I_{\text{SCD Line}}$	Stand by I_{Drain} vs. V_{Line}	$18.5\text{V} \leq V_I \leq 35\text{V}$, $I_L = -5\text{mA}$		-1.0	1.0	mA	1, 2, 3
$\Delta I_{\text{SCD Load}}$	Stand by I_{Drain} vs. I_{Load}	$-500\text{mA} \leq I_L \leq -5\text{mA}$, $V_I = 20\text{V}$		-0.5	0.5	mA	1, 2, 3

LM140H-15 (JL140-15BXA) JAN Electrical Characteristics DC Parameters (continued)

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
I_{OL}	Overload Current	Forced $\Delta V_O = -1.43V$, $V_I = 18.5V$		-2.0	-0.5	A	1, 2, 3
I_{OS}	Output Short Circuit Current	$V_I = 20V$		-1.75	-0.01	A	1, 2, 3
	Output Short Circuit Current	$V_I = 35V$		-1.0	-0.01	A	1, 2, 3
V_O (2)	Output Voltage	$V_I = 20V$, $I_L = -5mA$	(1)	14.1	15.9	V	2
V_O (3)	Output Voltage	$V_I = 20V$, $I_L = -5mA$	(2)	14.2 5	15.7 5	V	7, 8A, 8B
$\Delta V_O / \Delta T$	Average Temperature Coefficient Output Voltage	$25^\circ C \leq T_A \leq +125^\circ C$, $V_I = 20V$, $I_L = -5mA$	(3)	-3.75	3.75	mV/°C	8A
	Average Temperature Coefficient Output Voltage	$-55^\circ C \leq T_A \leq 25^\circ C$, $V_I = 20V$, $I_L = -5mA$	(3)	-3.75	3.75	mV/°C	8B

(1) Tested at $T_A = +125^\circ C$, correlated to $T_A = +150^\circ C$.

(2) Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

(3) Calculated parameter. For calculations use V_O @ $V_I = 17V$, $I_L = -5mA$.; Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

LM140H-15 (JL140-15BXA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
NO	Output Noise Voltage	$V_I = 20V$, $I_L = -50mA$			300	μV_{RMS}	7
$\Delta V_O / \Delta I_L$	Transient Load Response	$\Delta I_L = -200mA$, $V_I = 20V$, $I_L = -50mA$			2.5	mV/mA	7
$\Delta V_O / \Delta V_I$	Transient Line Response	$V_I = 20V$, $I_L = -5mA$, $V_{Pulse} = 3V$			30	mV/V	7
$\Delta V_I / \Delta V_O$	Ripple Rejection	$V_I = 20V$, $I_L = -125mA$, $e_i = 1V_{RMS}$ at $f = 2400Hz$		53		dB	4

LM140H-15 (JL140-15BXA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O	Output Voltage	$V_I = 18.5V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 18.5V$, $I_L = -500mA$		- 0.07 5	0.07 5	V	1
		$V_I = 30V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 30V$, $I_L = -500mA$		- 0.07 5	0.07 5	V	1
		$V_I = 35V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 35V$, $I_L = -500mA$		- 0.07 5	0.07 5	V	1
I_{SCD}	Stand by Current Drain	$V_I = 20V$, $I_L = -5mA$		-20	20	%	1

LM140K-5.0 (JL140-5BYA, SYA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O (1)	Output Voltage	V _I = 8V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 8V, I _L = -1A		4.75	5.25	V	1, 2, 3
		V _I = 20V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 20V, I _L = -1A		4.75	5.25	V	1, 2, 3
		V _I = 35V, I _L = -5mA		4.75	5.25	V	1, 2, 3
		V _I = 35V, I _L = -0.1A		4.75	5.25	V	1, 2, 3
V _{RLine}	Line Regulation	8V ≤ V _I ≤ 35V, I _L = -0.1A		-150	150	mV	1, 2, 3
		8V ≤ V _I ≤ 25V, I _L = -0.5A		-50	50	mV	1, 2, 3
V _{RLoad}	Load Regulation	V _I = 10V, -1A ≤ I _L ≤ -5mA		-100	100	mV	1, 2, 3
		V _I = 35V, -0.1A ≤ I _L ≤ -5mA		-150	150	mV	1, 2, 3
I _{SCD}	Stand by Current Drain	V _I = 10V, I _L = -5mA		-7.0	-0.5	mA	1, 2, 3
		V _I = 35V, I _L = -5mA		-8.0	-0.5	mA	1, 2, 3
ΔI _{SCD} Line	Stand by I _{Drain} vs. V _{Line}	8V ≤ V _I ≤ 35V, I _L = -5mA		-1.0	1.0	mA	1, 2, 3
ΔI _{SCD} Load	Stand by I _{Drain} vs. I _{Load}	V _I = 10V, -1A ≤ I _L ≤ -5mA		-0.5	0.5	mA	1, 2, 3
I _{OL}	Overload Current	V _I = 8V, Forced ΔV _O = -0.48V		-4.0	-1.0	A	1, 2, 3
I _{OS}	Output Short Circuit Current	V _I = 10V		-4.0	-0.02	A	1, 2, 3
		V _I = 25V		-3.0	-0.02	A	1, 2, 3
		V _I = 35V		-2.0	-0.02	A	1, 2, 3
V _O (2)	Output Voltage	V _I = 10V, I _L = -5mA	(1)	4.7	5.3	V	2
V _O (3)	Output Voltage	V _I = 10V, I _L = -5mA	(2)	4.75	5.25	V	7, 8A, 8B
ΔV _O / ΔT	Average Temperature Coefficient Output Voltage	V _I = 10V, I _L = -5mA, 25°C ≤ T _A ≤ 125°C	(3)	-2.0	2.0	mV/°C	8A
		V _I = 10V, I _L = -5mA, -55°C ≤ T _A ≤ 25°C	(3)	-2.0	2.0	mV/°C	8B

(1) Tested at T_A = +125°C, correlated to T_A = +150°C.

(2) Tested at extremes as a set up for ΔV_O/ΔT tests.

(3) Calculated parameter. For calculations use V_O @ V_I = 10V, I_L = -5mA.; Tested at extremes as a set up for ΔV_O/ΔT tests.

LM140K-5.0 (JL140-5BYA, SYA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
NO	Output Noise Voltage	V _I = 10V, I _L = -0.1A			125	μV _{RMS}	7
ΔV _O / ΔV _I	Transient Line Response	V _I = 10V, V _{Pulse} = 3V, I _L = -5mA			30	mV/V	7
ΔV _O / ΔI _L	Transient Load Response	V _I = 10V, ΔI _L = -400mA, I _L = -100mA			2.5	mV/mA	7
ΔV _I / ΔV _O	Ripple Rejection	V _I = 10V, I _L = -350mA, e _i = 1V _{RMS} at f = 2400Hz		60		dB	4

LM140K-5.0 (JL140-5BYA, SYA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O	Output Voltage	V _I = 8V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 8V, I _L = -1A		-0.025	0.025	V	1
		V _I = 20V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 20V, I _L = -1A		-0.025	0.025	V	1
		V _I = 35V, I _L = -5mA		-0.025	0.025	V	1
		V _I = 35V, I _L = -0.1A		-0.025	0.025	V	1
I _{SCD}	Stand by Current Drain	V _I = 10V, I _L = -5mA		-20	20	%	1

LM140K-12 (JL140-12BYA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V _O (1)	Output Voltage	V _I = 15V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 15V, I _L = -1A		11.4	12.6	V	1, 2, 3
		V _I = 27V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 27V, I _L = -1A		11.4	12.6	V	1, 2, 3
		V _I = 35V, I _L = -5mA		11.4	12.6	V	1, 2, 3
		V _I = 35V, I _L = -0.1A		11.4	12.6	V	1, 2, 3
V _{RLine}	Line Regulation	15V ≤ V _I ≤ 35V, I _L = -0.1A		-360	360	mV	1, 2, 3
		15V ≤ V _I ≤ 32V, I _L = -0.5A		-120	120	mV	1, 2, 3
V _{RLoad}	Load Regulation	V _I = 17V, -1A ≤ I _L ≤ -5mA		-240	240	mV	1, 2, 3
		V _I = 35V, -0.1A ≤ I _L ≤ -5mA		-360	360	mV	1, 2, 3
I _{SCD}	Stand by Current Drain	V _I = 17V, I _L = -5mA		-7.0	-0.5	mA	1, 2, 3
		V _I = 35V, I _L = -5mA		-8.0	-0.5	mA	1, 2, 3
ΔI _{SCD} Line	Stand by I _{Drain} vs. V _{Line}	15V ≤ V _I ≤ 35V, I _L = -5mA		-1.0	1.0	mA	1, 2, 3
ΔI _{SCD} Load	Stand by I _{Drain} vs. I _{Load}	V _I = 17V, -1A ≤ I _L ≤ -5mA		-0.5	0.5	mA	1, 2, 3
I _{OL}	Over Load Current	Forced ΔV _O = -1.13V, V _I = 15V		-4.0	-1.0	A	1, 2, 3
I _{OS}	Output Short Circuit Current	V _I = 17V		-3.5	-0.02	A	1, 2, 3
		V _I = 32V		-2.5	-0.02	A	1, 2, 3
		V _I = 35V		-2.0	-0.02	A	1, 2, 3
V _O (2)	Output Voltage	V _I = 17V, I _L = -5mA	(1)	11.28	12.72	V	2
V _O (3)	Output Voltage	V _I = 17V, I _L = -5mA	(2)	11.4	12.6	V	7, 8A, 8B

(1) Tested at T_A = +125°C, correlated to T_A = +150°C.

(2) Tested at extremes as a set up for ΔV_O/ΔT tests.

LM140K-12 (JL140-12BYA) JAN Electrical Characteristics DC Parameters (continued)

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$\Delta V_O / \Delta T$	Average Temperature Coefficient Output Voltage	$25^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$, $V_I = 17\text{V}$, $I_L = -5\text{mA}$	(3)	-3.0	3.0	mV/°C	8A
		$-55^\circ\text{C} \leq T_A \leq 25^\circ\text{C}$, $V_I = 17\text{V}$, $I_L = -5\text{mA}$	(3)	-3.0	3.0	mV/°C	8B

(3) Calculated parameter. For calculations use V_O @ $V_I = 17\text{V}$, $I_L = -5\text{mA}$.; Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

LM140K-12 (JL140-12BYA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sup - groups
NO	Output Noise Voltage	$V_I = 17\text{V}$, $I_L = -0.1\text{A}$			250	μV_{RMS}	7
$\Delta V_O / \Delta I_L$	Transient Load Response	$V_I = 17\text{V}$, $I_L = -100\text{mA}$, $\Delta I_L = -400\text{mA}$			2.5	mV/mA	7
$\Delta V_O / \Delta V_I$	Transient Line Response	$V_I = 17\text{V}$, $V_{\text{Pulse}} = 3\text{V}$, $I_L = -5\text{mA}$			30	mV/V	7
$\Delta V_I / \Delta V_O$	Ripple Rejection	$V_I = 17\text{V}$, $e_i = 1\text{V}_{\text{RMS}}$ at $f = 2400\text{Hz}$, $I_L = -350\text{mA}$		55		dB	4

LM140K-12 (JL140-12BYA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O	Output Voltage	$V_I = 15\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 15\text{V}$, $I_L = -1\text{A}$		-0.06	0.06	V	1
		$V_I = 27\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 27\text{V}$, $I_L = -1\text{A}$		-0.06	0.06	V	1
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		-0.06	0.06	V	1
		$V_I = 35\text{V}$, $I_L = -0.1\text{A}$		-0.06	0.06	V	1
I_{SCD}	Stand by Current Drain	$V_I = 17\text{V}$, $I_L = -5\text{mA}$		-20	20	%	1

LM140K-15 (JL140-15BYA, SYA) JAN Electrical Characteristics DC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O (1)	Output Voltage	$V_I = 18.5\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 18.5\text{V}$, $I_L = -1\text{A}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 30\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 30\text{V}$, $I_L = -1\text{A}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		14.2 5	15.7 5	V	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -0.1\text{A}$		14.2 5	15.7 5	V	1, 2, 3
V_{RLine}	Line Regulation	$18.5\text{V} \leq V_I \leq 35\text{V}$, $I_L = -0.5\text{A}$		-150	150	mV	1, 2, 3
V_{RLoad}	Load Regulation	$V_I = 20\text{V}$, $-1\text{A} \leq I_L \leq -5\text{mA}$		-300	300	mV	1, 2, 3
		$V_I = 35\text{V}$, $-0.1\text{A} \leq I_L \leq -5\text{mA}$		-450	450	mV	1, 2, 3
I_{SCD}	Stand by Current Drain	$V_I = 20\text{V}$, $I_L = -5\text{mA}$		-7.0	-0.5	mA	1, 2, 3
		$V_I = 35\text{V}$, $I_L = -5\text{mA}$		-8.0	-0.5	mA	1, 2, 3
$\Delta I_{\text{SCD Line}}$	Stand by I_{Drain} vs. V_{Line}	$18.5\text{V} \leq V_I \leq 35\text{V}$, $I_L = -5\text{mA}$		-1.0	1.0	mA	1, 2, 3
$\Delta I_{\text{SCD Load}}$	Stand by I_{Drain} vs. I_{Load}	$V_I = 20\text{V}$, $-1\text{A} \leq I_L \leq -5\text{mA}$		-0.5	0.5	mA	1, 2, 3

LM140K-15 (JL140-15BYA, SYA) JAN Electrical Characteristics DC Parameters (continued)

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
I_{OL}	Overload Current	Forced $\Delta V_O = -1.43V$, $V_I = 18.5V$		-4.0	-1.0	A	1, 2, 3
I_{OS}	Output Short Circuit Current	$V_I = 20V$		-3.5	-0.02	A	1, 2, 3
		$V_I = 35V$		-2.0	-0.02	A	1, 2, 3
V_O (2)	Output Voltage	$V_I = 20V$, $I_L = -5mA$	(1)	14.1	15.9	V	2
V_O (3)	Output Voltage	$V_I = 20V$, $I_L = -5mA$	(2)	14.2 5	15.7 5	V	7, 8A, 8B
$\Delta V_O / \Delta T$	Average Temperature Coefficient Output Voltage	$25^\circ C \leq T_A \leq +125^\circ C$, $V_I = 20V$, $I_L = -5mA$	(3)	-3.75	3.75	mV/°C	8A
		$-55^\circ C \leq T_A \leq 25^\circ C$, $V_I = 20V$, $I_L = -5mA$	(3)	-3.75	3.75	mV/°C	8B

(1) Tested at $T_A = +125^\circ C$, correlated to $T_A = +150^\circ C$.

(2) Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

(3) Calculated parameter. For calculations use V_O @ $V_I = 20V$, $I_L = -5mA$.; Tested at extremes as a set up for $\Delta V_O / \Delta T$ tests.

LM140K-15 (JL140-15BYA, SYA) JAN Electrical Characteristics AC Parameters

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
NO	Output Noise Voltage	$V_I = 20V$, $I_L = -0.1A$			300	μV_{RMS}	7
$\Delta V_O / \Delta I_L$	Transient Load Response	$\Delta I_L = -400mA$, $V_I = 20V$, $I_L = -100mA$			2.5	mV/mA	7
$\Delta V_O / \Delta V_I$	Transient Line Response	$V_I = 20V$, $V_{Pulse} = 3V$, $I_L = -5mA$			30	mV/V	7
$\Delta V_I / \Delta V_O$	Ripple Rejection	$V_I = 20V$, $I_L = -350mA$, $e_i = 1V_{RMS}$ at $f = 2400Hz$		53		dB	4

LM140K-15 (JL140-15BYA, SYA) JAN Electrical Characteristics DC Drift Parameters

Delta calculations performed on JAN S devices at group B, Subgroup 5, only.

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
V_O	Output Voltage	$V_I = 18.5V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 18.5V$, $I_L = -1A$		- 0.07 5	0.07 5	V	1
		$V_I = 30V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 30V$, $I_L = -1A$		- 0.07 5	0.07 5	V	1
		$V_I = 35V$, $I_L = -5mA$		- 0.07 5	0.07 5	V	1
		$V_I = 35V$, $I_L = -0.1A$		- 0.07 5	0.07 5	V	1
I_{SCD}	Stand by Current Drain	$V_I = 20V$, $I_L = -5mA$		-20	20	%	1

REVISION HISTORY

Released	Revision	Section	Originator	Changes
02/07/06	A	New Release, Corporate format	L. Lytle	6 MDS data sheets converted into one Corp. data sheet format. The drift tables were eliminated from the 883 section since it did not apply. MDS data sheets MJLM140-05-H Rev 0B0, MJLM140-05-K Rev. 0B0, MJLM140-12-H Rev 0B0, MJLM140-12-K Rev 0B0, MJLM140-15-H Rev 0B0, and MJLM140-15-K Rev 0B0 will be archived.
03/20/2013	A	ALL		Changed layout of National Data Sheet to TI format

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