Description

The LM2575SX/T-LM2576SX/T series switching regulators are monolithicintegrated circuits designed for use in “buck” or “buck/boost” regulator applications requiring accurate outputvoltages over combined variations of line, load andtemperature. This unique series greatly simplifiesswitching power supply design. The LM2575 has amaximum output current of 1A and the LM2576 is ratedfor 3A.

The LM2575SX/T-LM2576SX/T series minicon verters include aswitching regulator and compensation network all withinthe same package. Just add a choke, catch diode andtwo capacitors to obtain an efficient DC-to-DC converter.The current limit and thermal shutdown features of the LM2575SX/T-LM2576SX/T series fully protect the device againstoverstress conditions.

The LM2575SX/T-LM2576SX/T series offers an alternative to popular 3terminal linear regulators by providing higher efficiencywith reduced heatsink size. In many applications a heatsink will not be required.

Features

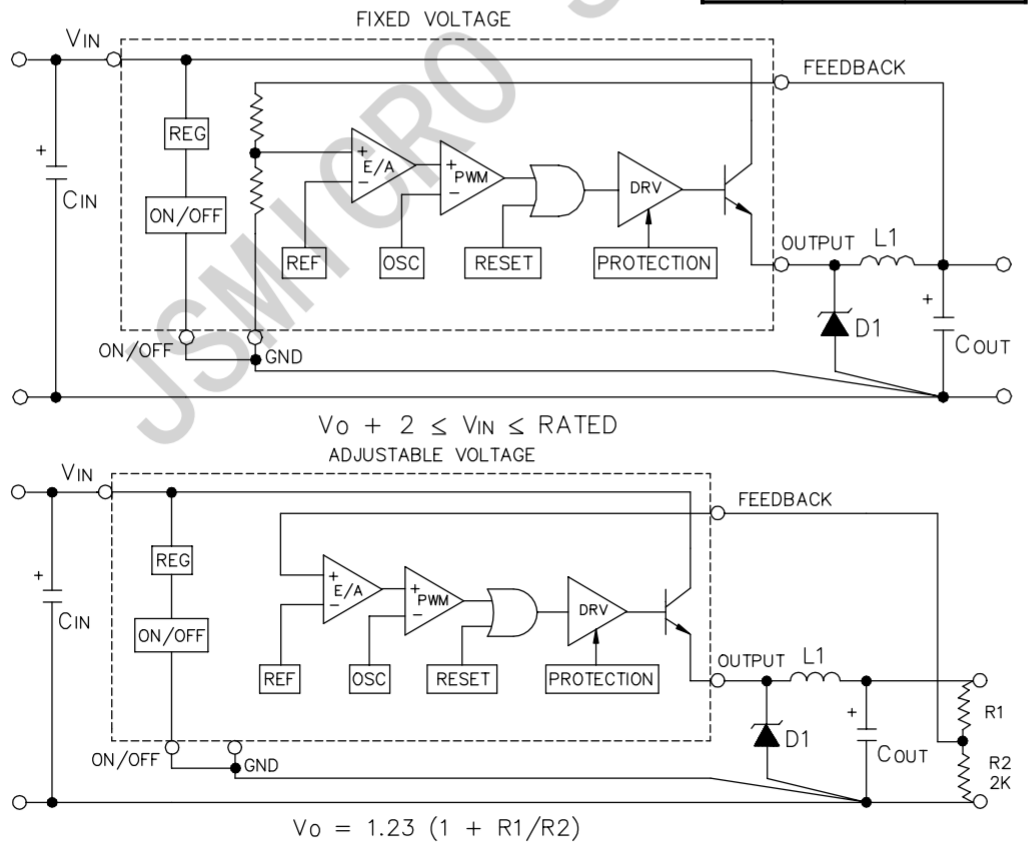
- Pin for pin replacement for National’s LM2575S/6S series
- DC-to-DC buck or buck/boost converter requiring only 4 support components
- Fixed or adjustable voltages
- Preset output voltages of 3.3V, 5V and 12V
- Wide output voltage range, 1.23V to 35V
- 82% typical efficiency @ 5V out
- Wide input voltage range, 4V to 40V
- Inhibit/enable control pin
- Industrial temperature range
- TO-220 and TO-263 packages

Applications

- Micro controller power supplies
- Medical equipment
- Industrial power supplies
- Instrumentation power supplies

	LM2575SX/T	LM2576SX/T
L_1	330μH	100μH
D_1	3A	7A
C_{IN}	68μF	120μF
C_{OUT}	330μF	1,000μF

Typical Application Circuits



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Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Input Voltage	V_{IN}	45	V
On/Off Pin Input Voltage	$V_{ON/OFF}$	$-0.3 \le V_{ON/OFF} \le V_{IN}$	V
Output Voltage to Common (Steady State)		-1	V
Power Dissipation	P_D	Internally Limited	W
Thermal Resistance Junction to Ambient TO-220 TO-263	θ_{JA}	 55 60	°C/W
Thermal Resistance Junction to Case TO-220 TO-263	θ_{JC}	 2.0 2.0	°C/W
Operating Junction Temperature Range	T_J	-40 to +125	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 Sec.	T_{LEAD}	300	°C
ESD Rating (Human Body Model)	V_{ESD}	2	kV

Electrical Characteristics

Unless otherwise specified: V_{IN} = 12V for 3.3V, 5V and ADJ options and 25V for 12V option; V_{OUT} = 5V for ADJ option; T_A = 25ºC; V_{IN} rated = 40V; I_O = 0.5 to 3A (LM2576), 0.2 to 1A (LM2575). Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Voltage LM2576SX/T-3.3	V_O	I_O = 0.5A	3.23	3.30	3.37	V
		8V to V_{IN} Rated	3.20		3.40	
			3.14		**3.47**	
Output Voltage LM2576SX/T-5.0	V_O	I_O = 0.5A	4.90	5.00	5.10	V
		8V to V_{IN} Rated	4.85		5.15	
			4.75		**5.25**	
Output Voltage LM2576SX/T-12	V_O	I_O = 0.5A	11.76	12.00	12.24	V
		15V to V_{IN} Rated	11.52		12.48	
			11.40		**12.60**	
Feedback Voltage LM2576SX/T-ADJ	V_{FB}	I_O = 0.5A	1.217	1.230	1.243	V
		V_O = 5V 8V to V_{IN} Rate	1.193		1.267	
			1.180		**1.280**	
Feedback Bias Current LM2576SX/T-ADJ	I_B	V_{IN} = 12V, I_O = 0.5A		50	100	nA
					500	

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Electrical Characteristics (Cont.)

Unless otherwise specified: V_{IN} = 12V for 3.3V, 5V and ADJ options and 25V for 12V option; V_{OUT} = 5V for ADJ option; T_A = 25ºC; V_{IN} rated = 40V; I_O = 0.5 to 3A (LM2576), 0.2 to 1A (LM2575). Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Voltage	V_O	I_O = 0.2A	3.23	3.30	3.37	V
LM2575SX/T-3.3		8V to V_{IN} Rated	3.20		3.40	
			3.14		**3.47**	
Output Voltage	V_O	I_O = 0.2A	4.90	5.00	5.10	V
LM2575SX/T-5		8V to V_{IN} Rated	4.85		5.15	
			4.75		**5.25**	
Output Voltage	V_O	I_O = 0.2A	11.76	12.00	12.24	V
LM2576SX/T-12		15V to V_{IN} Rated	11.52		12.48	
			11.40		**12.60**	
Feedback Voltage	V_{FB}	I_O = 0.2A	1.217	1.230	1.243	V
LM2575SX/T-ADJ, V_O = 5V		8V to V_{IN} Rated	1.193		1.267	
			1.180		**1.280**	
Feedback Bias Current	I_B	V_{IN} = 12V, I_O = 0.2A		50	100	nA
LM2575SX/T-ADJ					**500**	
Efficiency/Option3.						
3V	η	V_{IN} = 12V, I_O = 1A (LM2575, 3A for LM2576)		77		%
5V				82		
12V		V_{IN} = 15V, I_O = 1A (LM2575, 3A for LM2576)		88		
ADJ, V_O = 5V		V_{IN} = 12V, I_O = 1A (LM2575, 3A for LM2576)		82		
Switching Frequency	f_{SX}		47	52	58	kHz
			43		**62**	
Saturation Voltage(1)	V_{SAT}	LM2575, I_O = 1A		**0.9**	**1.2**	V
		LM2576, I_O = 3A		**0.9**	**1.4**	
Max. Duty Cycle (On)(3)	DC		93	98		%
Peak Current LM2575(1)	I_{CL}		1.7	2.2	3.0	A
			1.3		**3.2**	
Peak Current LM2576(1)	I_{CL}		4.2	5.8	6.9	A
			3.5		**7.5**	

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Electrical Characteristics (Cont.)

Unless otherwise specified: V_{IN} = 12V for 3.3V, 5V and ADJ options and 25V for 12V option; V_{OUT} = 5V for ADJ option; T_A = 25ºC; V_{IN} rated = 40V; I_O = 0.5 to 3A (LM2576), 0.2 to 1A (LM2575). Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output Leakage Current(2) Output = 0V	I_L	V_{IN} = V_{IN} Rated			2	mA
Output = -1V				7.5	30	
Quiescent Current(2)	I_Q			5	10	mA
					12	
Standby Quiescent Current	I_{STBY}			50		µA
(On/Off Pin = 5V)					**500**	
On/Off Pin Logic Input Level	V_{IH}		2.2	1.4		V
			2.4			
	V_{IL}			1.2	1.0	V
					0.8	
On/Off Pin Input Current	I_{IH}	$V_{ON/OFF}$ = 5V (Off)		12	30	µA
	I_{IL}	$V_{ON/OFF}$ = 0V (On)		0	10	

Notes:

(1) Output sourcing current, resistive load, no inductor or capacitor.

(2) Feedback = V_O + 1.0V.

(3) Feedback = 0V.

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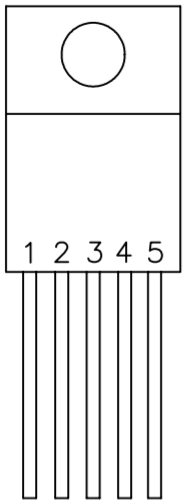
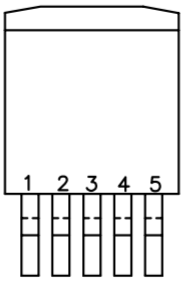
Pin Configurations



TO-220-5



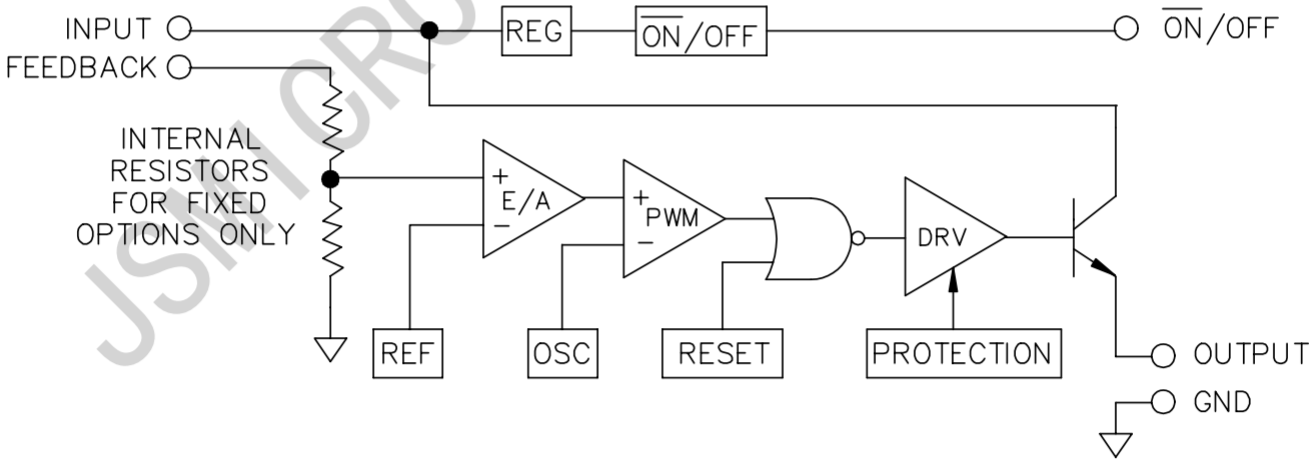
TO-263-5

Pin	Function
1	V_{IN}
2	OUTPUT
3	COMMON
4	FEEDBACK
5	ON/OFF
TAB is COMMON	

Ordering Information

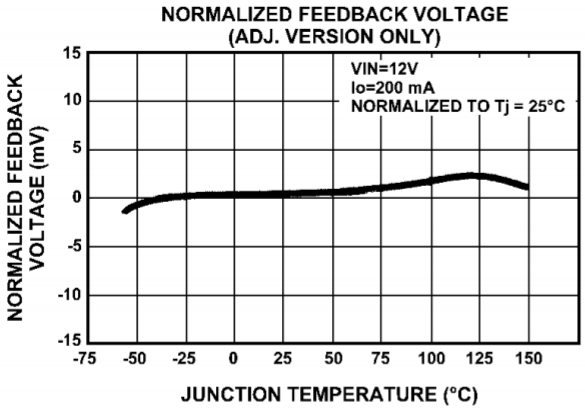
(1) -XX = Voltage Option. Available voltages are 3.3V (-3.3), 5V (-5.0), 12V (-12), and ADJ (-ADJ), which is adjustable between 1.23V and 35V.

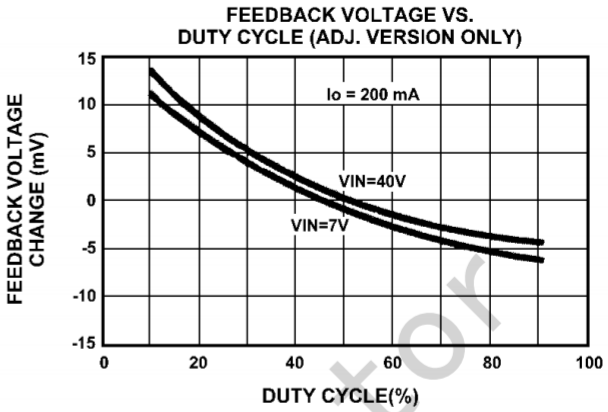
Block Diagram

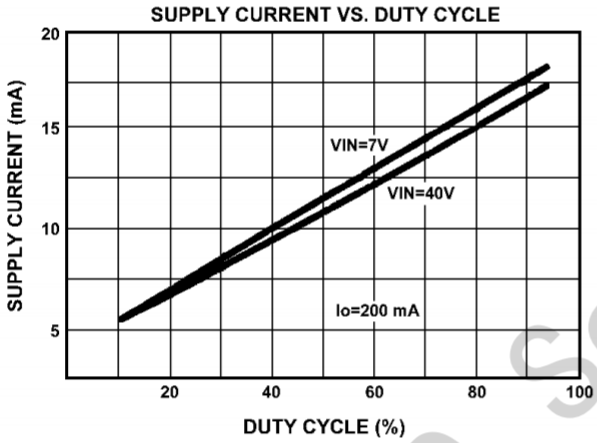


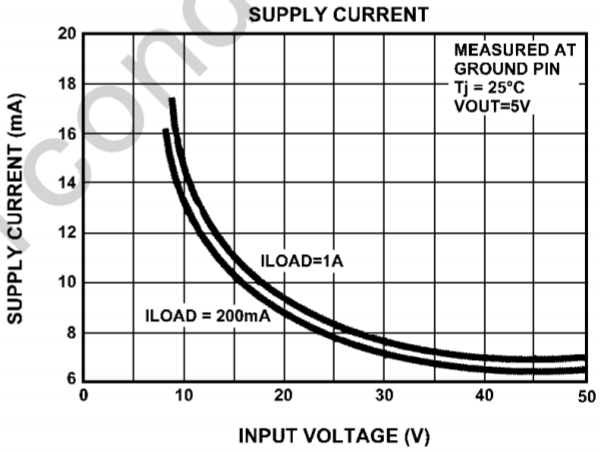
JSMICRO Semiconductor

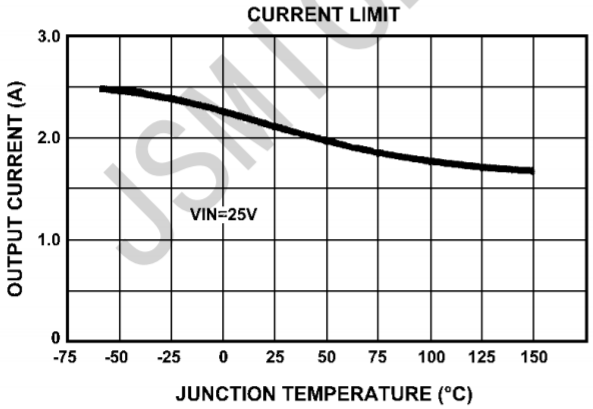
Typical Characteristics - LM2575SX/T

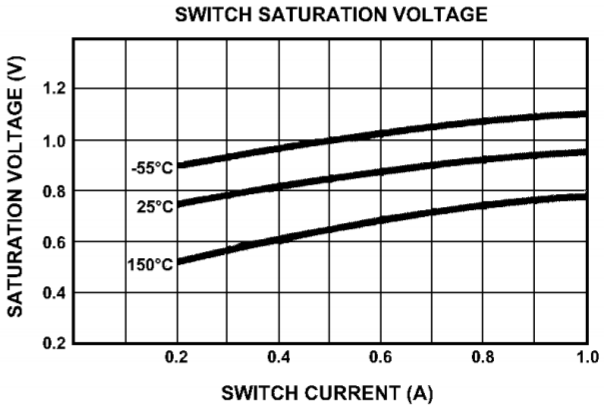








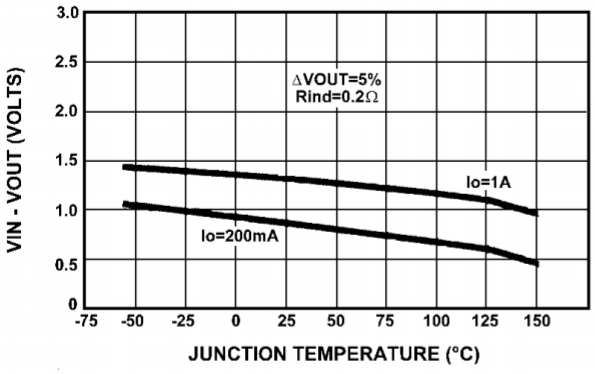




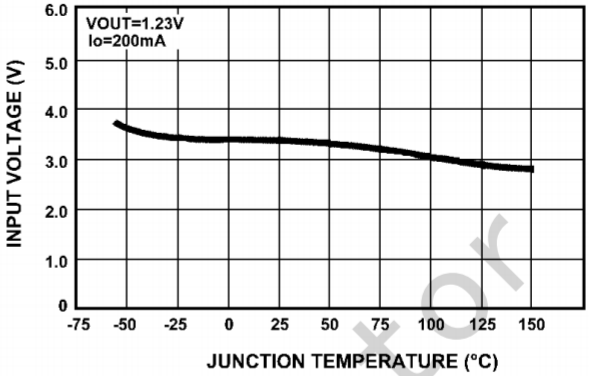
JSMICRO Semiconductor

Typical Characteristics - LM2575SX/T (Cont.)

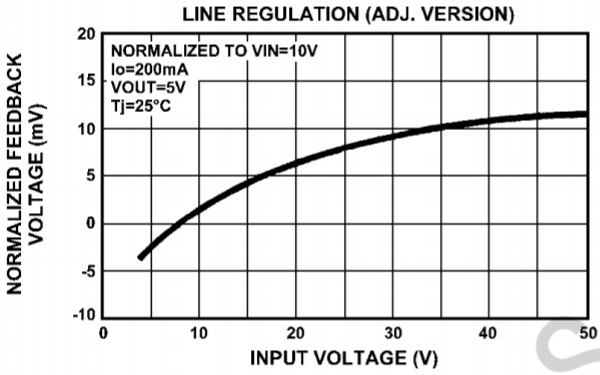
DROPOUT VOLTAGE



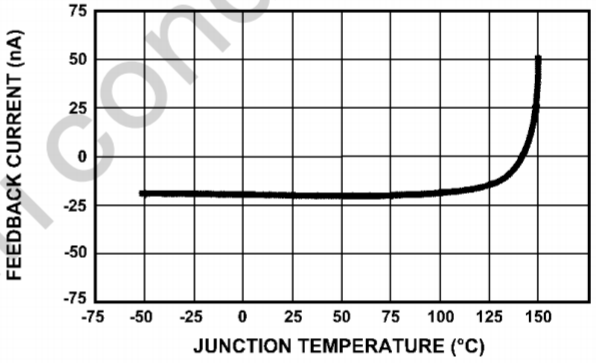
MINIMUM OPERATING VOLTAGE



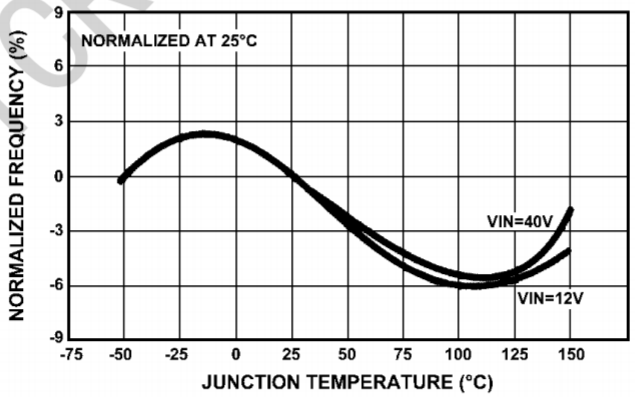
LINE REGULATION (ADJ. VERSION)



FEEDBACK PIN CURRENT

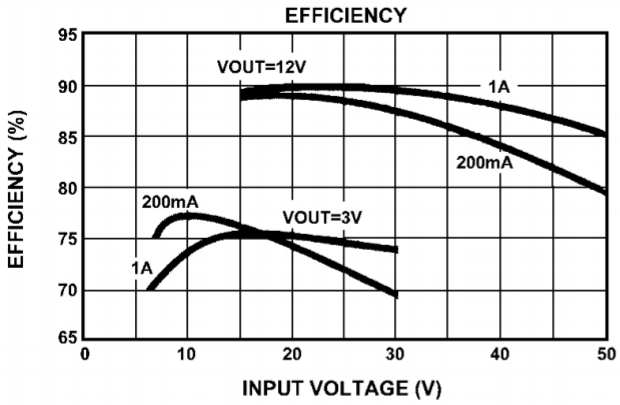


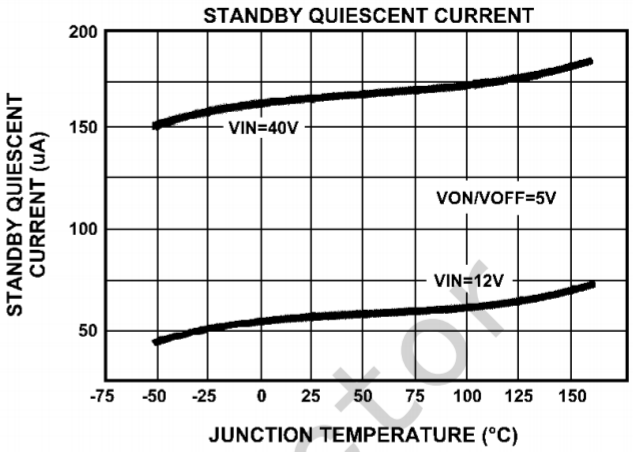
OSCILLATOR FREQUENCY

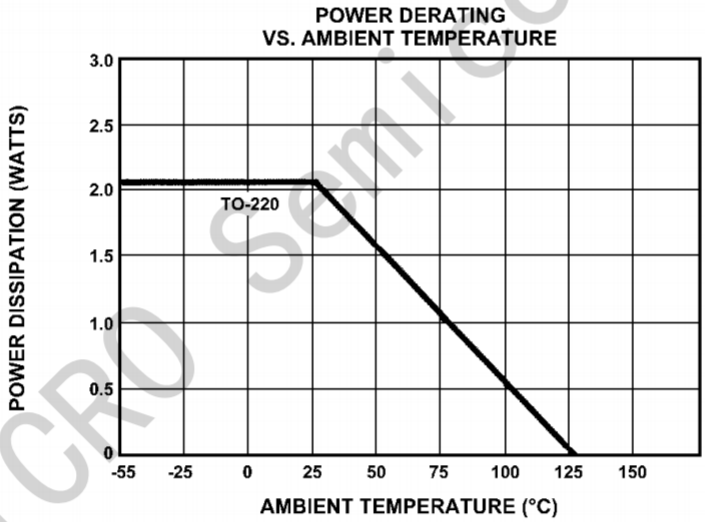


JSMICRO Semiconductor

Typical Characteristics - LM2575SX/T (Cont.)

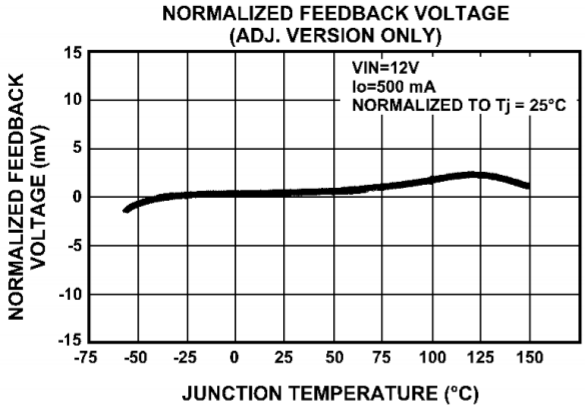


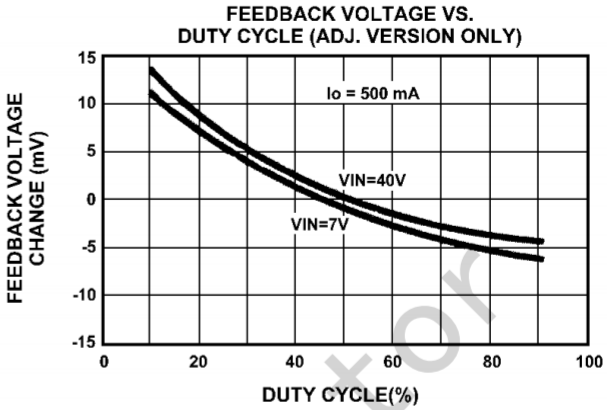


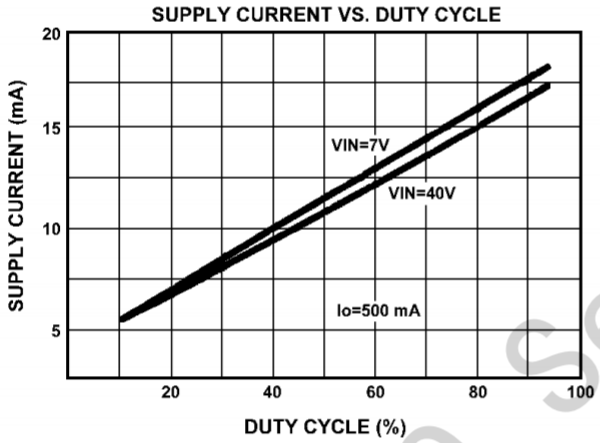


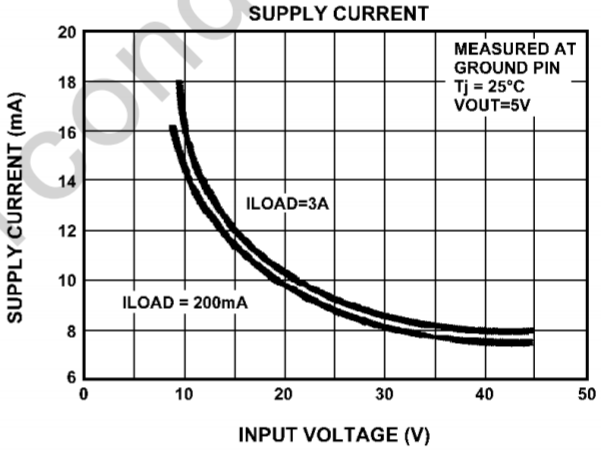
JSMICRO Semiconductor

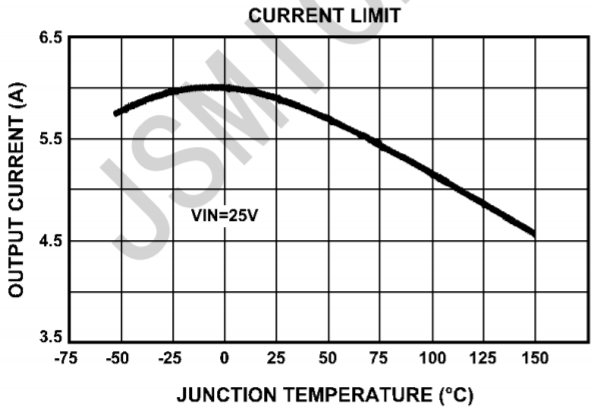
Typical Characteristics - LM2576SX/T

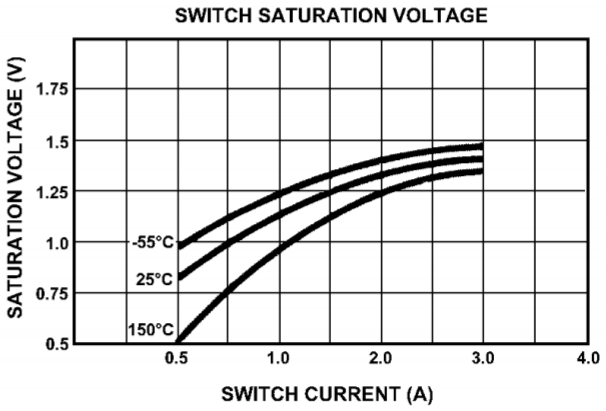






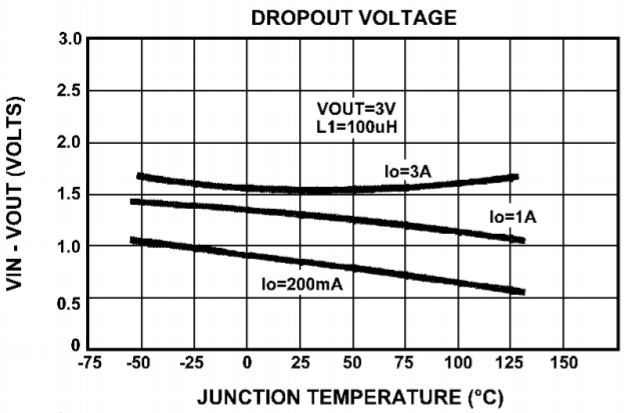


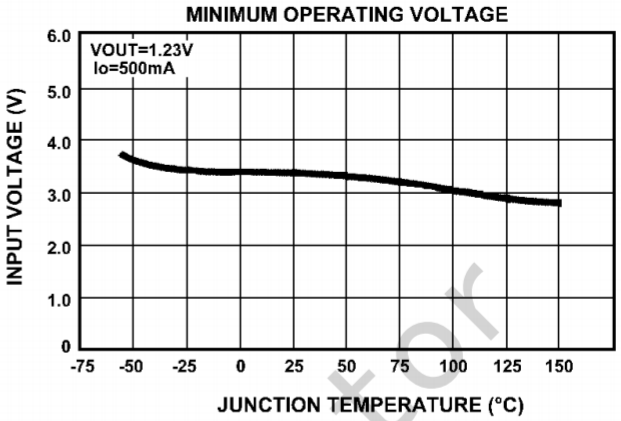


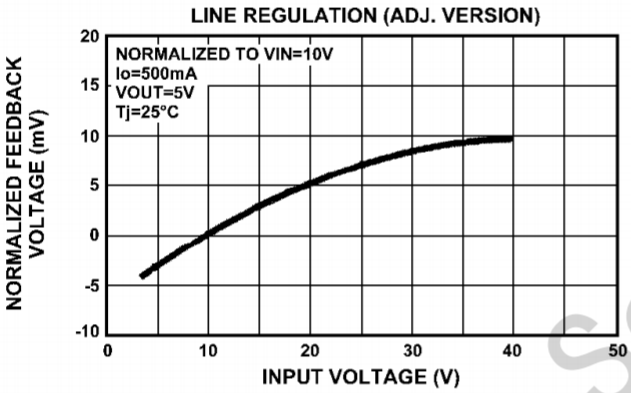


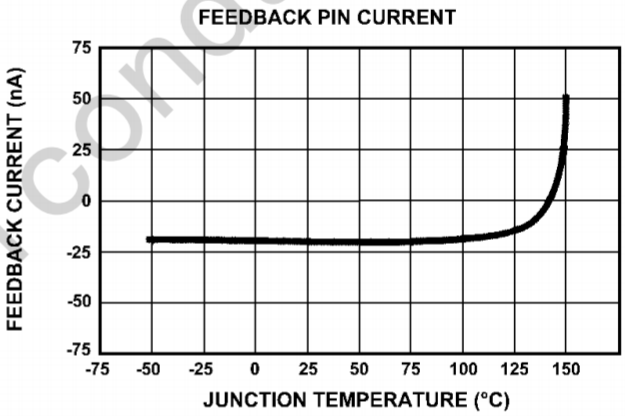
JSMICRO Semiconductor

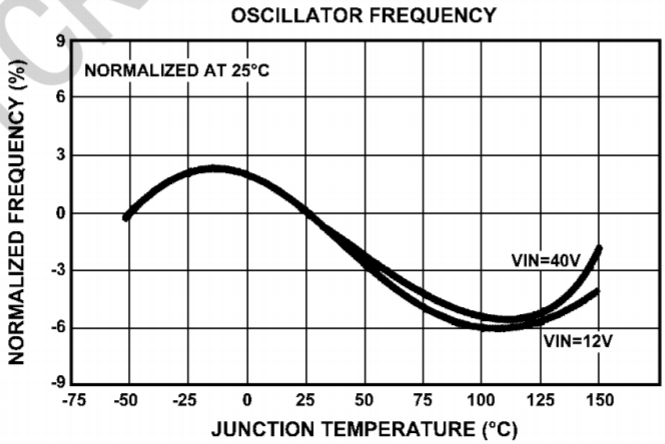
Typical Characteristics - LM2576SX/T (Cont.)











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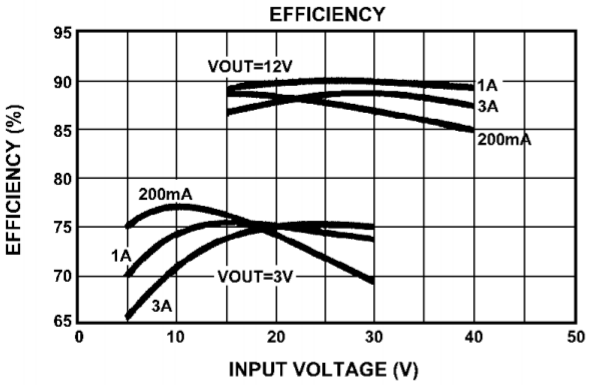
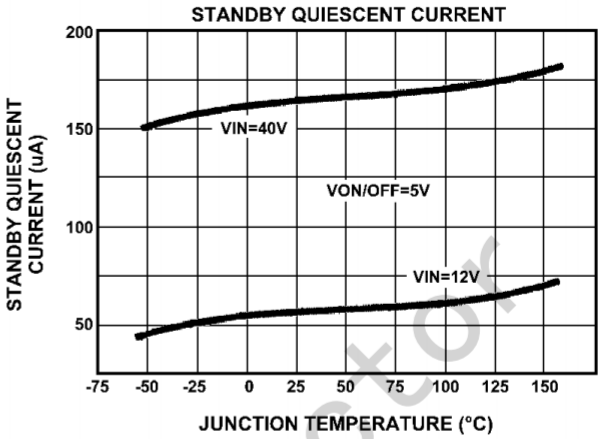
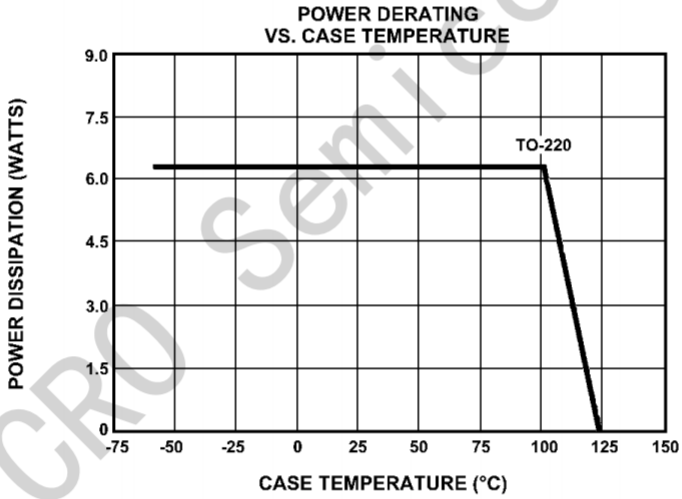
Typical Characteristics - LM2576SX/T (Cont.)

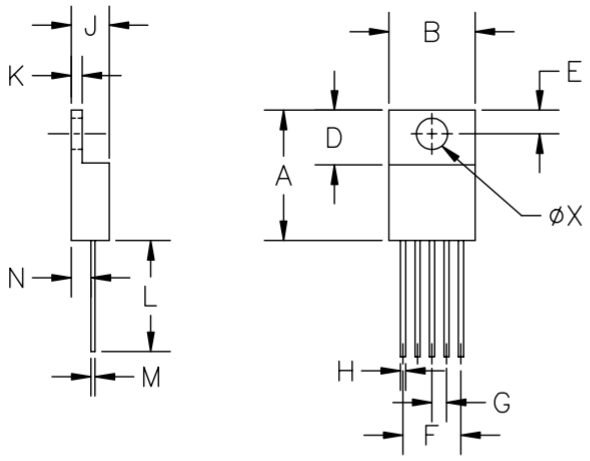






JSMICRO Semiconductor

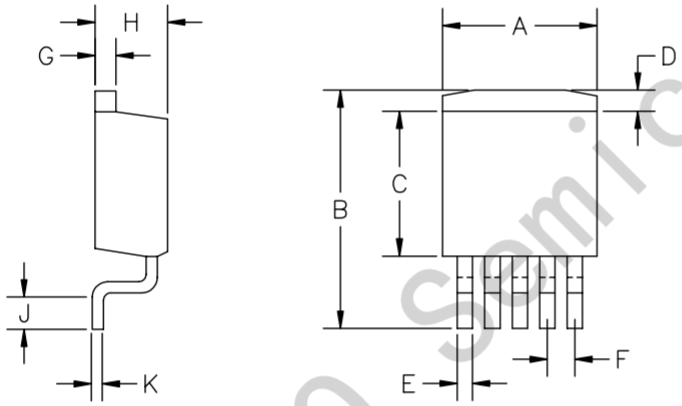
Outline Drawing - TO-220-5



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.560	.650	14.22	16.51	—
B	.380	.420	9.65	10.67	—
D	.230	.260	5.84	6.60	—
E	.100	.135	2.54	3.43	—
F	.263	.273	6.68	6.94	—
G	.062	.072	1.57	1.83	—
H	.025	.040	.63	1.02	—
J	.140	.190	3.55	4.83	—
K	.045	.055	1.14	1.40	—
L	.540	.560	13.72	14.22	—
M	.014	.022	.35	.56	—
N	.080	.120	2.03	3.05	—
øX	.139	.161	3.53	4.09	—

JEDEC TO-220

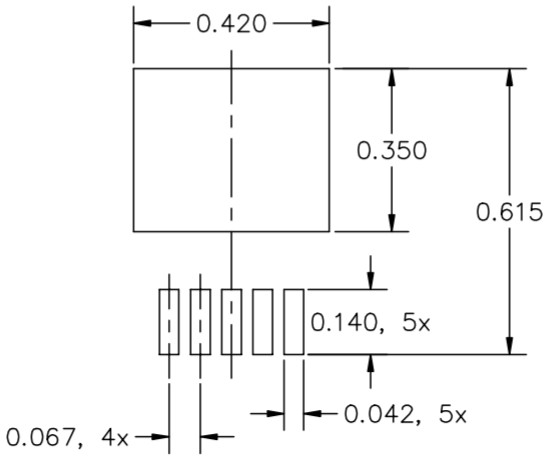
Outline Drawing - TO-263-5



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.380	.405	9.65	10.29	—
B	.575	.625	14.60	15.88	—
C	.325	.380	8.25	9.66	—
D	—	.055	—	1.40	—
E	.020	.039	.50	.99	—
F	.060	.072	1.52	1.83	—
G	.045	.055	1.14	1.40	—
H	.160	.190	4.06	4.83	—
J	.090	.110	2.28	2.80	—
K	.018	.029	.457	.736	—

JEDEC TO-263

Minimum Land Pattern - TO-263-5



NOTE: ALL DIMENSIONS ARE IN INCHES

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