ISO 9001 Registered

IMP5226
18-Line SCSI Terminator

DESCRIPTION

The IMP5226 SCSI terminator is part of IMP's family of high-performance, adaptive, non-linear mode SCSI products, which are designed to deliver true UltraSCSI performance in SCSI applications. The low-voltage BiCMOS architecture employed in its design offers performance superior to older linear passive and active techniques. IMP's architecture employs high-speed adaptive elements for each channel, thereby providing the fastest response possible — typically 35MHz, which is 100 times faster than the older linear regulator/terminator approach used by other manufacturers. Products using this older linear regulator approach have bandwidths which are dominated by the output capacitor and which are limited to 500KHz (see further discussion in the Functional Description section). The IMP architecture also eliminates the output compensation capacitor required in earlier terminator designs. Each is approved for use with SCSI-1, -2, -3, UltraSCSI and beyond — providing the highest performance alternative available today.

The IMP5226 architecture is much more tolerant of marginal system integrations. A key improvement offered by the IMP5226 lies in its ability to insure reliable, error-free communications even in systems which do not adhere to recommended SCSI hardware design guidelines, such as the use of improper cable lengths and impedances. Frequently, this situation is not controlled by the peripheral or host designer and, when problems occur, they are the first to be made aware of the problem.

To enter the disconnect mode, the disconnect pin must be driven high, thereby disconnecting the IMP5226 from the SCSI bus. Quiescent current is typically less than 200µA in this mode, while the output capacitance is less than 3pF.

Reduced component count is also inherent in the IMP5226 architecture. Traditional termination techniques require large stabilization and transient protection capacitors of up to 20µF in value and size. The IMP5226 architecture does not require these components, allowing all the cost savings associated with inventory, board space, assembly, reliability, and component costs.

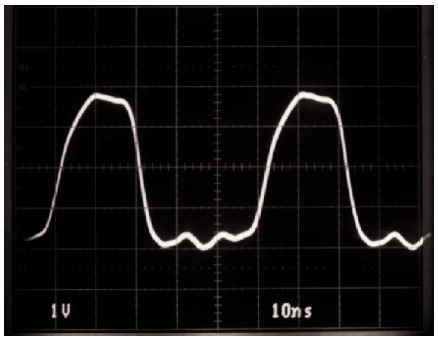
The IMP5226 is a superior pin-for-pin replacement for the LX5207, the UC5601/5602/5608/5610/5618 and the Burr Brown REG5608/5618.

KEY FEATURES

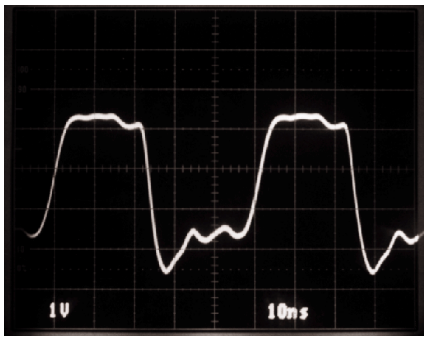
- ULTRA-FAST RESPONSE FOR FAST-20 SCSI APPLICATIONS
- 35MHz CHANNEL BANDWIDTH
- 3.3V OPERATION
- LESS THAN 3pF (TYP.) OUTPUT CAPACITANCE
- SLEEP-MODE CURRENT LESS THAN 200µA
- THERMALLY SELF-LIMITING
- NO EXTERNAL COMPENSATION CAPACITORS
- COMPATIBLE WITH ACTIVE NEGATION DRIVERS (60mA / CHANNEL)
- COMPATIBLE WITH PASSIVE AND ACTIVE TERMINATIONS
- APPROVED FOR USE WITH SCSI 1, 2, 3 AND ULTRA SCSI
- HOT-SWAP COMPATIBLE
- PIN-FOR-PIN COMPATIBLE WITH LX5207, UC5601/5602/5610/5618 AND BURR BROWN REG5608/5618

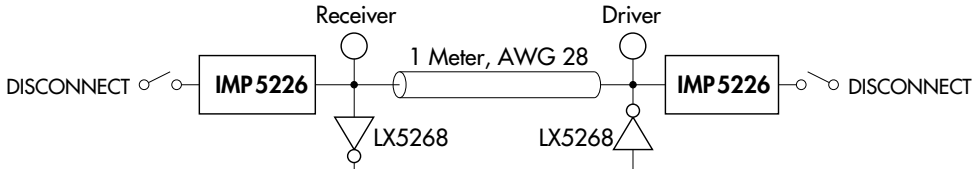
PRODUCT HIGHLIGHT

RECEIVING WAVEFORM - 20MHz



DRIVING WAVEFORM - 20MHz





PACKAGE ORDER INFORMATION

T_A (°C)	DB Plastic SSOP 28-pin	DWP Plastic SOWB 28-pin, Power
0 to 70	IMP5226CDB	IMP5226CDWP

Note: All surface-mount packages are available in Tape & Reel.
Append the letter "T" to part number. (i.e. IMP5226CDWPT)

ABSOLUTE MAXIMUM RATINGS (Note 1)

TermPwr Voltage ..... +7V
Signal Line Voltage ..... 0V to +7V
Regulator Output Current 1.2A
Operating Junction Temperature
Plastic (DB, DWP Packages) ..... 150°C
Storage Temperature Range ..... -65°C to 150°C
Lead Temperature (Soldering, 10 seconds) ..... 300°C

Note 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

THERMAL DATA

DB PACKAGE:

THERMAL RESISTANCE-JUNCTION TO AMBIENT, Θ_{JA} ..... 117°C/W

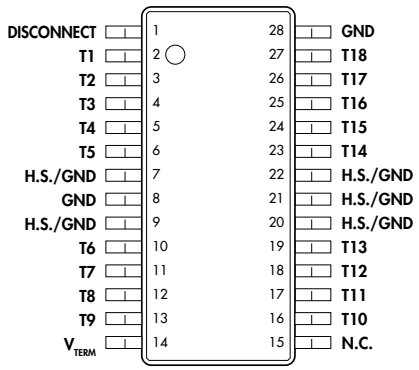
DWP PACKAGE:

THERMAL RESISTANCE-JUNCTION TO LEADS, Θ_{JL} ..... 18°C/W

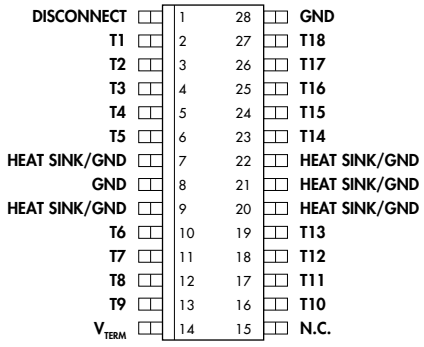
THERMAL RESISTANCE-JUNCTION TO AMBIENT, Θ_{JA} ..... 40°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system.
All of the above assume no ambient airflow.

PACKAGE PIN OUTS



DB PACKAGE
(Top View)



DWP PACKAGE
(Top View)

RECOMMENDED OPERATING CONDITIONS (Note 2)

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Termpwr Voltage	V_{TERM}	3.0		5.5	V
Signal Line Voltage		0		5	V
Disconnect Input Voltage		0		V_{TERM}	V
Operating Virtual Junction Temperature Range					
IMP5226C		0		125	°C

Note 2. Range over which the device is functional.

ELECTRICAL CHARACTERISTICS

Term Power = 4.75V unless otherwise specified. Unless otherwise specified, these specifications apply at the recommended operating ambient temperature of T_A = 25°C. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.

Parameter	Symbol	Test Conditions	IMP5226			Units
			Min.	Typ.	Max.	
Output High Voltage	V_{OUT}		2.65	2.85		V
TermPwr Supply Current	I_{CC}	All data lines = open	10		18	mA
		All data lines = 0.5V		400	450	mA
		DISCONNECT Pin > 2.0V		200		µA
Output Current	I_{OUT}	V_{OUT} = 0.5V	-21	-23	-24	mA
DISCONNECT Input Current	I_{IN}	DISCONNECT Pin = 0V		-90		µA
		DISCONNECT Pin = 4.75V		10		nA
Output Leakage Current	I_{OL}	DISCONNECT Pin = > 2.0V, V_O = 0.5V		10		nA
Capacitance in DISCONNECT Mode	C_{OUT}	V_{OUT} = 0V, frequency = 1MHz		3		pF
Channel Bandwidth	BW			35		MHz
Termination Sink Current, per Channel	I_{SINK}	V_{OUT} = 4V		60		mA

FUNCTIONAL DESCRIPTION

Cable transmission theory suggests that in order to optimize signal speed and quality, the termination should act both as an ideal voltage reference when the line is released (deasserted) and as an ideal current source when the line is active (asserted). Common active terminators, which consist of Linear Regulators in series with resistors (typically 110Ω), are a compromise. As the line voltage increases, the amount of current decreases linearly by the equation V = I * R. The IMP5226, with its unique new architecture, applies the maximum amount of current regardless of line voltage until the termination high threshold (2.85V) is reached.

Power Up / Power Down Function Table

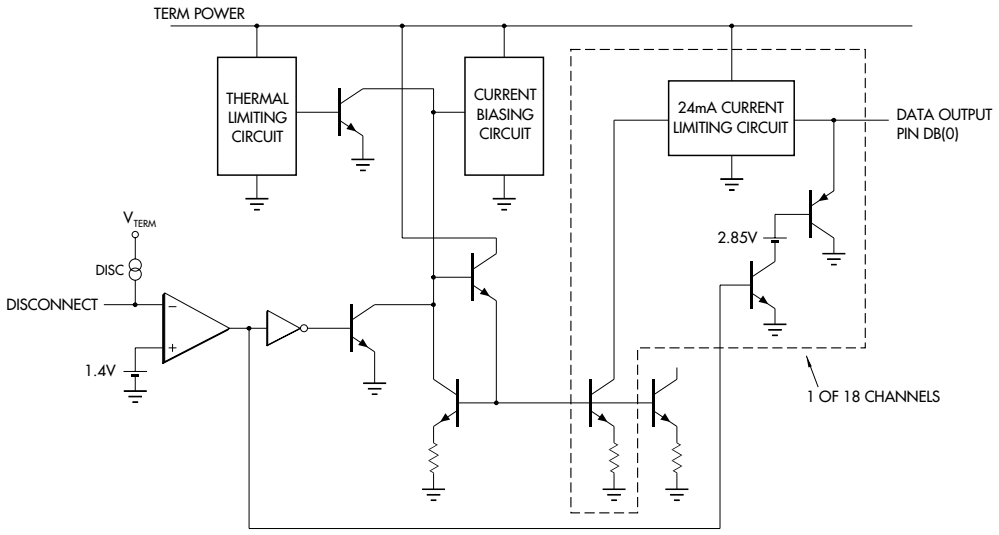
DISCONNECT	Outputs	Quiescent Current
L	Enabled	10mA
H	HI Z	200µA
Open	HI Z	200µA

Acting as a near ideal line terminator, the IMP5226 closely reproduces the optimum case when the device is enabled. To enable the device a DISCONNECT pin must be pulled Logic **Low**. During this mode of operation, quiescent current is 6mA and the device will respond to line demands by delivering 24mA on assertion and by imposing 2.85V on deassertion. In order to disable the device, the DISCONNECT pin must be driven logic **High**. This mode of operation places the device in a sleep state where a meager 200µA of quiescent current is consumed. Additionally, all outputs are in a Hi-Z (impedance) state. Sleep mode can be used for power conservation or to completely eliminate the terminator from the SCSI chain. In the second case, termination node capacitance is important to consider. The terminator will appear as a parasitic distributed capacitance on the line, which can detract from bus performance. For this reason, the IMP5226 has been optimized to have only 4pF of capacitance per output in the sleep state.

An additional feature of the IMP5226 is its compatibility with active negation drivers. The device handles up to 60mA of sink current for drivers which exceed the 2.85V output high.

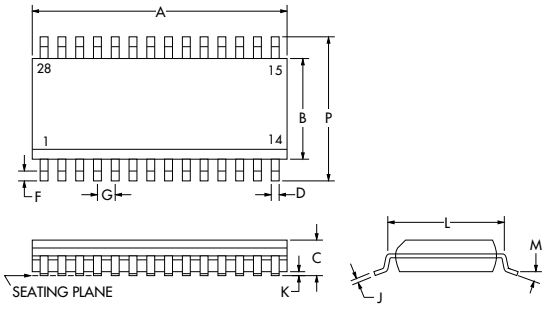
BLOCK DIAGRAM

FIGURE 1 — IMP5226 BLOCK DIAGRAM



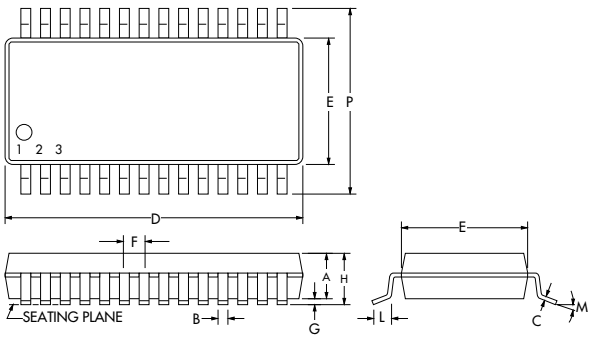
PACKAGE DIMENSIONS

DWP 28-Pin Plastic SOWB POWER



	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	17.73	17.93	0.698	0.705
B	7.40	7.60	0.291	0.299
C	2.44	2.64	0.096	0.104
D	0.36	0.46	0.014	0.018
F	0.51	1.01	0.020	0.040
G	1.27 BSC		0.050 BSC	
J	0.123	0.32	0.005	0.013
K	0.10	0.30	0.004	0.012
L	8.13	8.64	0.320	0.390
M	0°	8°	0°	8°
P	10.26	10.65	0.404	0.419

DB 28-Pin Shrink Small Outline Package (SSOP)



	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	1.73	1.99	0.068	0.078
B	0.25	0.38	0.009	0.015
C	0.13	0.22	0.005	0.008
D	10.07	10.33	0.396	0.407
E	5.20	5.38	0.205	0.212
F	0.65 BSC		0.025 BSC	
G	0.05	0.21	0.002	0.008
H	1.63	1.83	0.064	0.072
L	0.65	0.95	0.025	0.037
M	0°	8°	0°	8°
P	7.65	7.90	0.301	0.311

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