

Selection Guide

Part Number	Package	Packing	Ambient Temperature (°C)
A6276EA-T	24-pin DIP	15 per tube	-40 to 85
A6276ELPTR-T*	24-pin TSSOP	4000 per reel	-40 to 85
A6276ELWTR-T	24-pin SOICW	1000 per reel	-40 to 85
A6276SLWTR-T*	24-pin SOICW	1000 per reel	-20 to 85

*Variant is in production but has been determined to be LAST TIME BUY. This classification indicates that the variant is obsolete and notice has been given. Sale of the variant is currently restricted to existing customer applications. The variant should not be purchased for new design applications because of obsolescence in the near future. Samples are no longer available. Status date change November 1, 2008. Deadline for receipt of LAST TIME BUY orders is April 25, 2009.

Absolute Maximum Ratings*

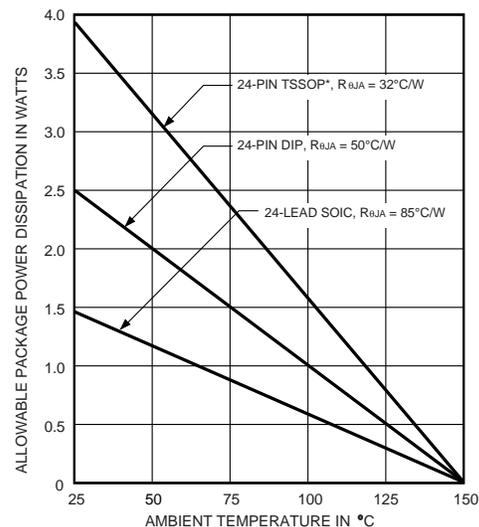
Characteristic	Symbol	Notes	Rating	Units
Supply Voltage	V_{DD}		7.0	V
Output Voltage	V_O		-0.5 to 17	V
Input Voltage	V_{ROUT}		-0.4 to $V_{DD} + 0.4$	V
Output Current	I_O		90	mA
Ground Current	I_{GND}		1475	mA
Operating Ambient Temperature	T_A	Range S	-20 to 85	°C
		Range E	-40 to 85	°C
Maximum Junction Temperature	$T_J(\text{max})$		150	°C
Storage Temperature	T_{stg}		-55 to 150	°C

*Caution: These CMOS devices have input static protection (Class 2) but are still susceptible to damage if exposed to extremely high static electrical charges.

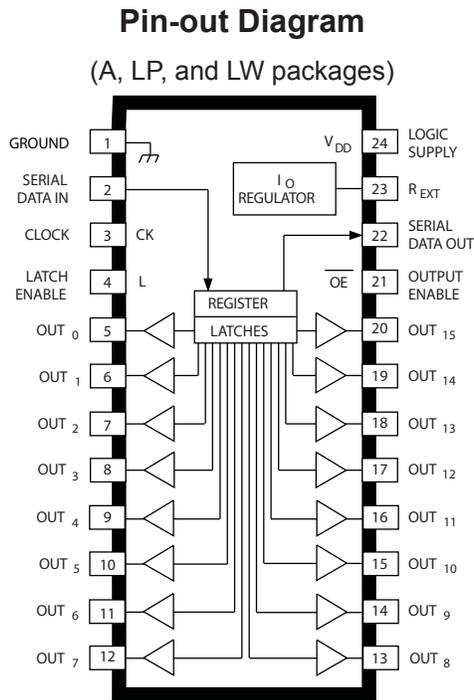
Thermal Characteristics may require derating at maximum conditions, see application information

Characteristic	Symbol	Test Conditions*	Value	Units
Package Thermal Resistance	$R_{\theta JA}$	Package A, 1-layer PCB based on JEDEC standard	50	°C/W
		Package LP, 2-layer PCB with 3.8 in ² copper area each side	32	°C/W
		Package LW, 1-layer PCB based on JEDEC standard	85	°C/W

*Additional thermal information available on the Allegro website

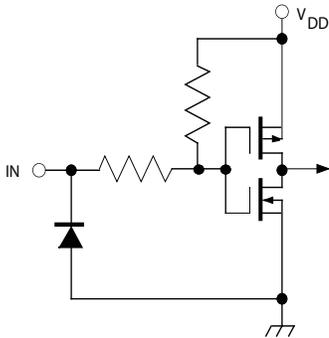


*Mounted on single-layer, two-sided PCB, with 3.8 in² copper each side; additional information on Allegro Web site



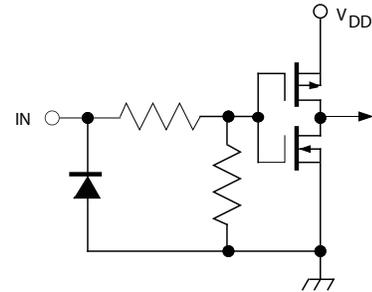
Terminal Description

Terminal No.	Terminal Name	Function
1	GND	Reference terminal for control logic.
2	SERIAL DATA IN	Serial-data input to the shift-register.
3	CLOCK	Clock input terminal for data shift on rising edge.
4	LATCH ENABLE	Data strobe input terminal; serial data is latched with high-level input.
5-20	OUT ₀₋₁₅	The 16 current-sinking output terminals.
21	OUTPUT ENABLE	When (active) low, the output drivers are enabled; when high, all output drivers are turned OFF (blanked).
22	SERIAL DATA OUT	CMOS serial-data output to the following shift-register.
23	R _{EXT}	An external resistor at this terminal establishes the output current for all sink drivers.
24	SUPPLY	(V _{DD}) The logic supply voltage (typically 5 V).



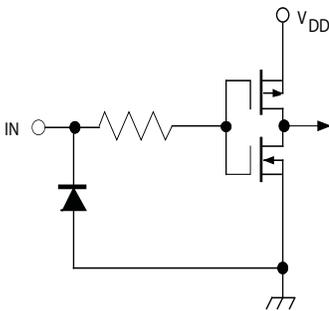
Dwg. EP-010-11

OUTPUT ENABLE (active low)



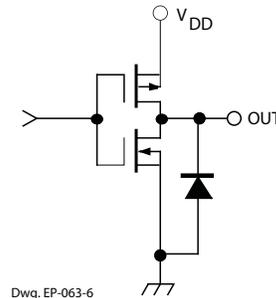
Dwg. EP-010-12

LATCH ENABLE



Dwg. EP-010-13

CLOCK and SERIAL DATA IN



Dwg. EP-063-6

SERIAL DATA OUT

TRUTH TABLE

Serial Data Input	Clock Input	Shift Register Contents						Serial Data Output	Latch Enable Input	Latch Contents						Output Enable Input	Output Contents					
		I ₁	I ₂	I ₃	...	I _{N-1}	I _N			I ₁	I ₂	I ₃	...	I _{N-1}	I _N		I ₁	I ₂	I ₃	...	I _{N-1}	I _N
H		H	R ₁	R ₂	...	R _{N-2}	R _{N-1}	R _{N-1}														
L		L	R ₁	R ₂	...	R _{N-2}	R _{N-1}	R _{N-1}														
X		R ₁	R ₂	R ₃	...	R _{N-1}	R _N	R _N														
		X	X	X	...	X	X	X	L	R ₁	R ₂	R ₃	...	R _{N-1}	R _N							
		P ₁	P ₂	P ₃	...	P _{N-1}	P _N	P _N	H	P ₁	P ₂	P ₃	...	P _{N-1}	P _N	L	P ₁	P ₂	P ₃	...	P _{N-1}	P _N
										X	X	X	...	X	X	H	H	H	...	H	H	

L = Low Logic (Voltage) Level H = High Logic (Voltage) Level X = Irrelevant P = Present State R = Previous State

ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{DD} = 5\text{ V}$ (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Unit
Supply Voltage Range	V_{DD}	Operating	4.5	5.0	5.5	V
Under-Voltage Lockout	$V_{DD(UV)}$	$V_{DD} = 0\text{--}5\text{ V}$	3.4	–	4.0	V
Output Current (any single output)	I_O	$V_{CE} = 0.7\text{ V}$, $R_{EXT} = 250\ \Omega$	64.2	75.5	86.8	mA
		$V_{CE} = 0.7\text{ V}$, $R_{EXT} = 470\ \Omega$	34.1	40.0	45.9	mA
Output Current Matching (difference between any two outputs at same V_{CE})	ΔI_O	$0.4\text{ V } V_{CE(A)} = V_{CE(B)}\ 0.7\text{ V}$: $R_{EXT} = 250\ \Omega$	–	± 1.5	± 6.0	%
		$R_{EXT} = 470\ \Omega$	–	± 1.5	± 6.0	%
Output Leakage Current	I_{CEX}	$V_{OH} = 15\text{ V}$	–	1.0	5.0	μA
Logic Input Voltage	V_{IH}		$0.7V_{DD}$	–	V_{DD}	V
	V_{IL}		GND	–	$0.3V_{DD}$	V
SERIAL DATA OUT Voltage	V_{OL}	$I_{OL} = 500\ \mu\text{A}$	–	–	0.4	V
	V_{OH}	$I_{OH} = -500\ \mu\text{A}$	4.6	–	–	V
Input Resistance	R_I	ENABLE Input, Pull Up	150	300	600	$\text{k}\Omega$
		LATCH Input, Pull Down	100	200	400	$\text{k}\Omega$
Supply Current	$I_{DD(OFF)}$	$R_{EXT} = \text{open}$, $V_{OE} = 5\text{ V}$	–	0.8	1.4	mA
		$R_{EXT} = 470\ \Omega$, $V_{OE} = 5\text{ V}$	3.5	6.0	8.0	mA
		$R_{EXT} = 250\ \Omega$, $V_{OE} = 5\text{ V}$	6.5	11	15	mA
	$I_{DD(ON)}$	$R_{EXT} = 470\ \Omega$, $V_{OE} = 0\text{ V}$	7.0	13	20	mA
		$R_{EXT} = 250\ \Omega$, $V_{OE} = 0\text{ V}$	10	22	32	mA

Typical Data is at $V_{DD} = 5\text{ V}$ and is for design information only.

SWITCHING CHARACTERISTICS at $T_A = 25^\circ\text{C}$, $V_{DD} = V_{IH} = 5\text{ V}$, $V_{CE} = 0.4\text{ V}$, $V_{IL} = 0\text{ V}$,
 $R_{EXT} = 470\ \Omega$, $I_O = 40\text{ mA}$, $V_L = 3\text{ V}$, $R_L = 65\ \Omega$, $C_L = 10.5\text{ pF}$.

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Unit
Propagation Delay Time	t_{pHL}	CLOCK-OUT _n	–	350	1000	ns
		LATCH-OUT _n	–	350	1000	ns
		ENABLE-OUT _n	–	350	1000	ns
		CLOCK-SERIAL DATA OUT	–	40	–	ns
Propagation Delay Time	t_{pLH}	CLOCK-OUT _n	–	300	1000	ns
		LATCH-OUT _n	–	300	1000	ns
		ENABLE-OUT _n	–	300	1000	ns
		CLOCK-SERIAL DATA OUT	–	40	–	ns
Output Fall Time	t_f	90% to 10% voltage	150	350	1000	ns
Output Rise Time	t_r	10% to 90% voltage	150	300	600	ns

RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{DD}		4.5	5.0	5.5	V
Output Voltage	V_O		–	1.0	4.0	V
Output Current	I_O	Continuous, any one output	–	–	90	mA
	I_{OH}	SERIAL DATA OUT	–	–	-1.0	mA
	I_{OL}	SERIAL DATA OUT	–	–	1.0	mA
Logic Input Voltage	V_{IH}		$0.7V_{DD}$	–	$V_{DD} + 0.3$	V
	V_{IL}		-0.3	–	$0.3V_{DD}$	V
Clock Frequency	f_{CK}	Cascade operation	–	–	10	MHz

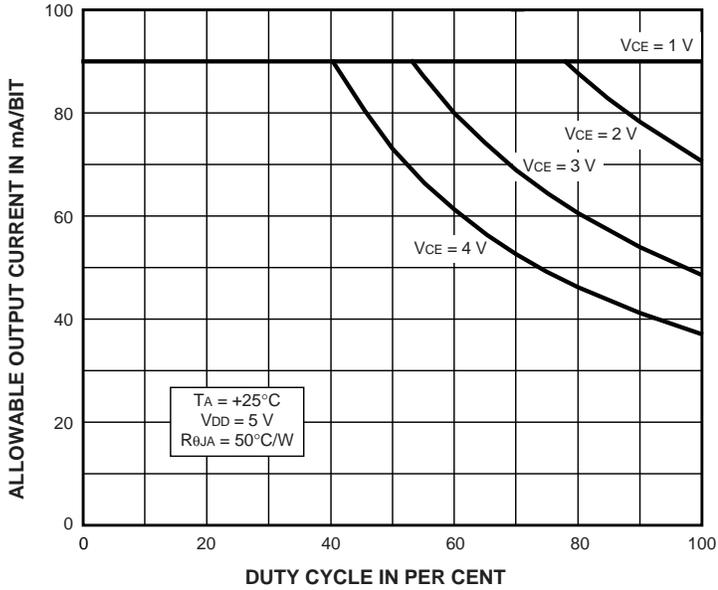
A6276

*16-Bit Serial Input, Constant-Current
Latched LED Driver*



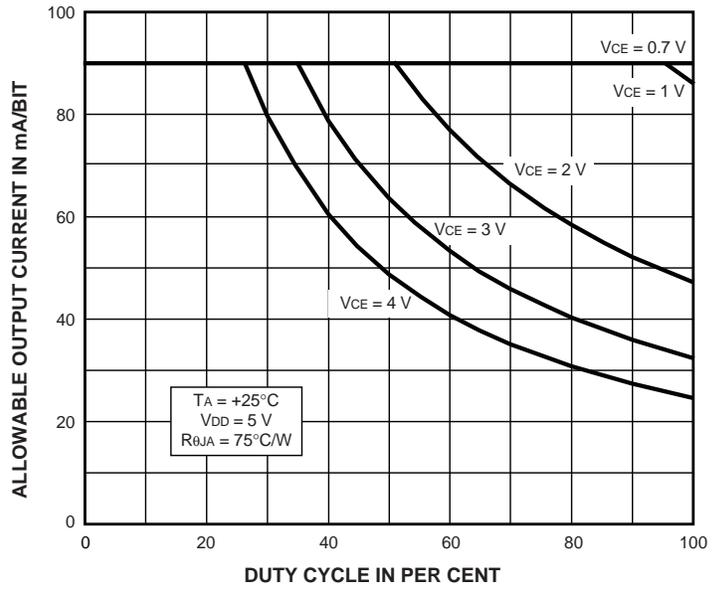
ALLOWABLE OUTPUT CURRENT AS A FUNCTION OF DUTY CYCLE

A6276EA

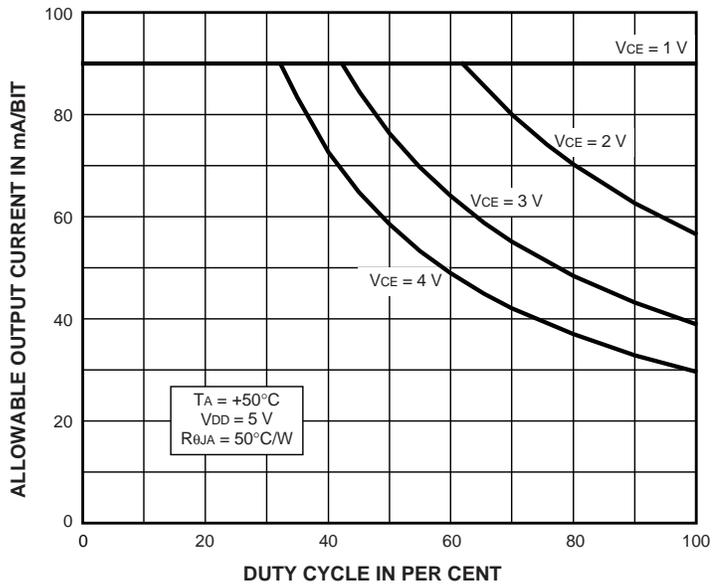


Dwg. GP-062-11

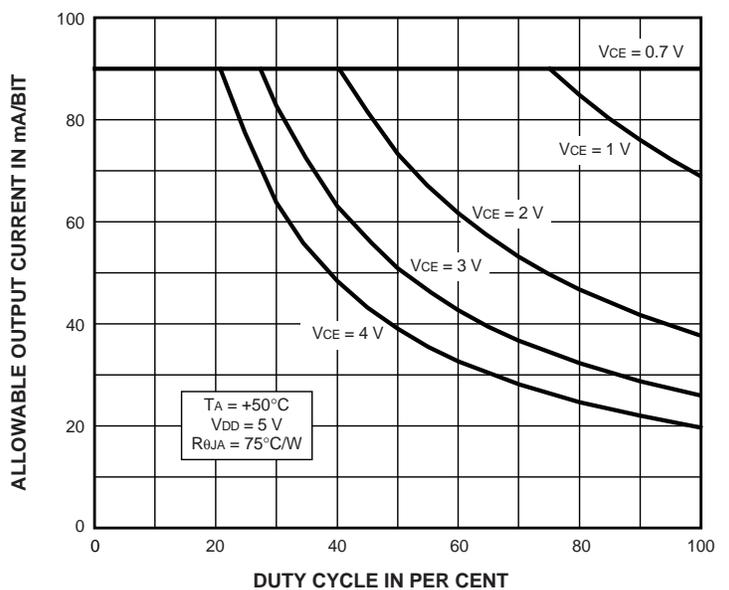
A6276ELW



Dwg. GP-062-6



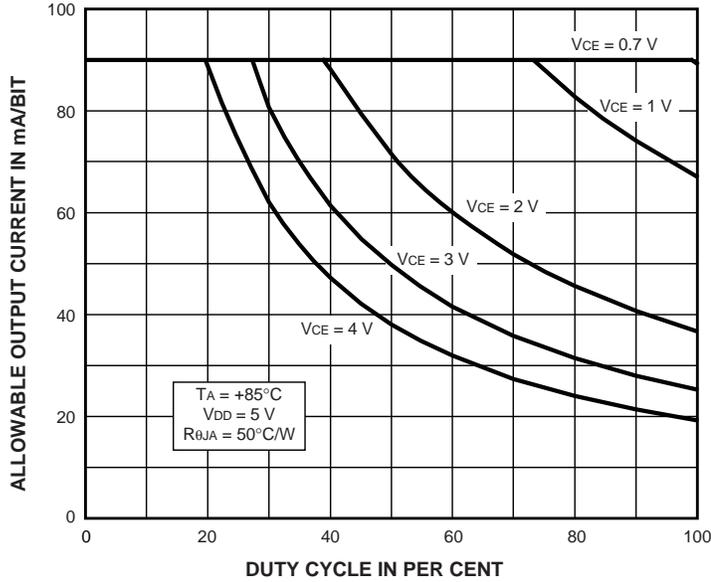
Dwg. GP-062-10



Dwg. GP-062-7

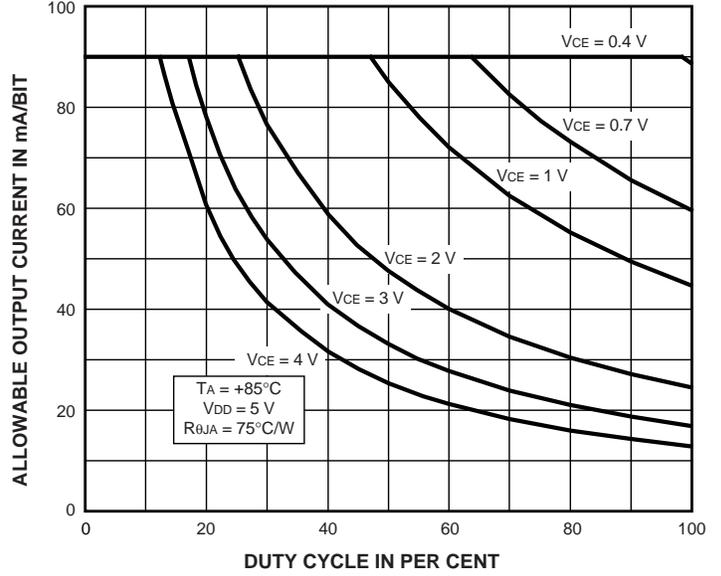
ALLOWABLE OUTPUT CURRENT AS A FUNCTION OF DUTY CYCLE (cont.)

A6276EA



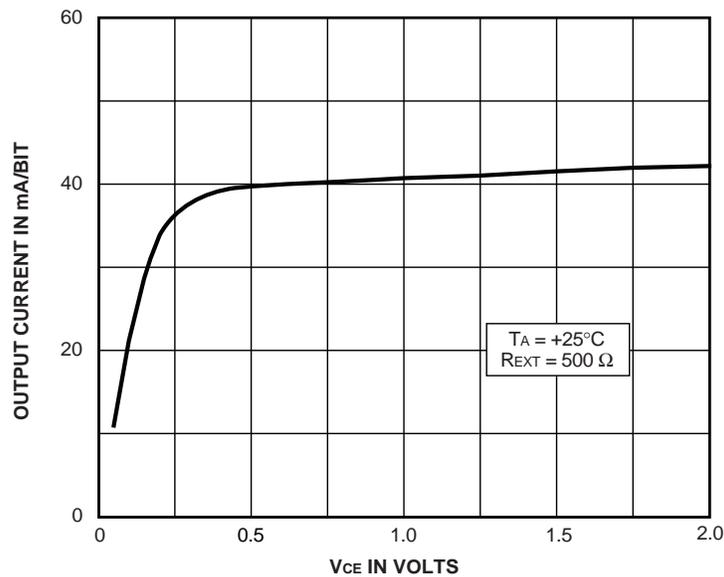
Dwg. GP-062-9

A6276ELW



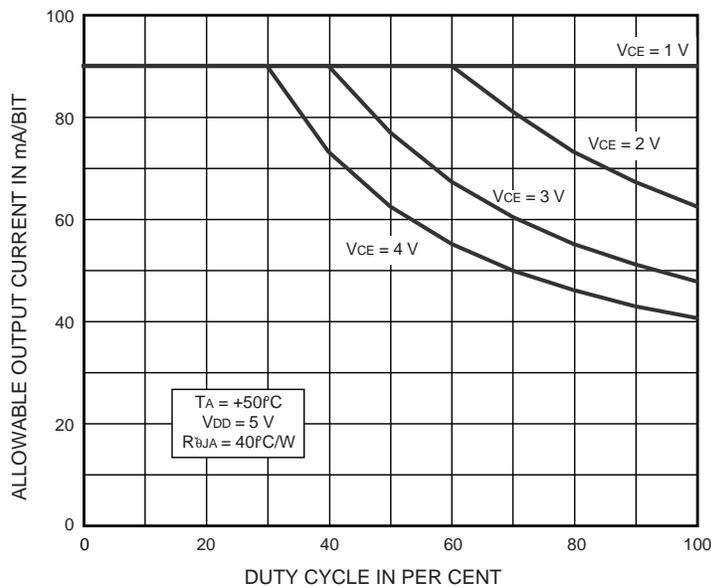
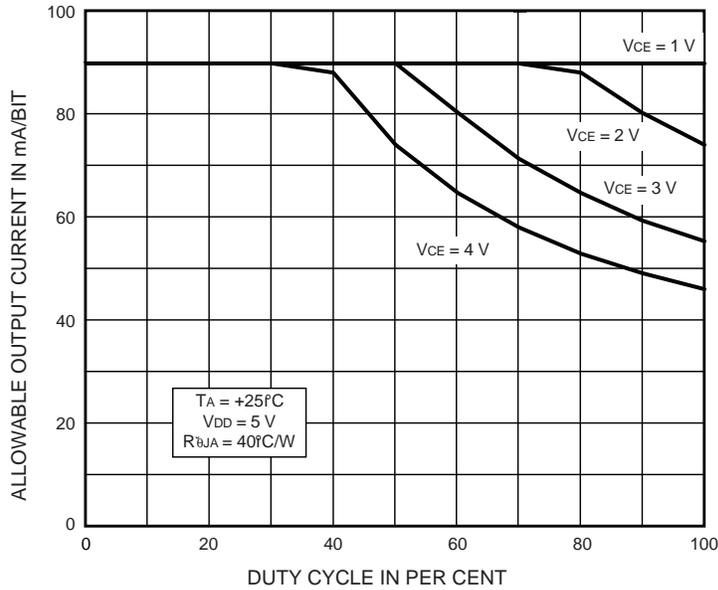
Dwg. GP-062-8

TYPICAL CHARACTERISTICS



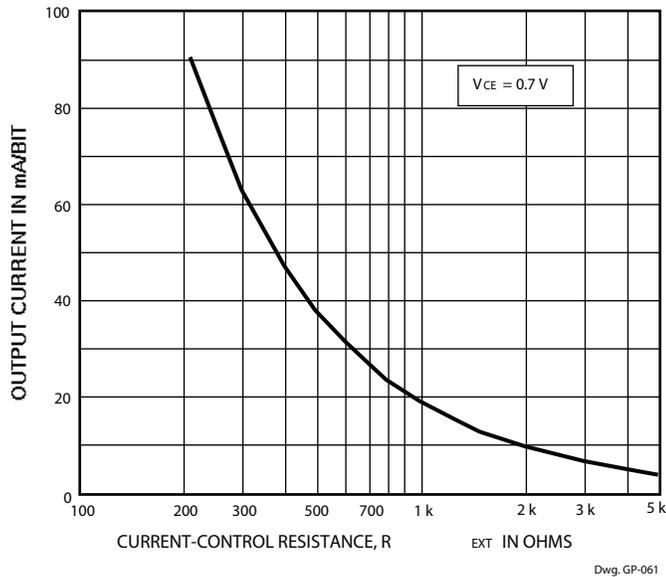
Dwg. GP-063

ALLOWABLE OUTPUT CURRENT AS A FUNCTION OF DUTY CYCLE (cont.)
A6276ELP



Applications Information

The load current per bit (I_O) is set by the external resistor (R_{EXT}) as shown in the figure below.



Package Power Dissipation (P_D). The maximum allowable package power dissipation is determined as

$$P_{D(max)} = (150 - T_A) / R_{\theta JA}$$

The actual package power dissipation is

$$P_{D(act)} = DC \cdot (V_{CE} \cdot I_O \cdot 16) + (V_{DD} \cdot I_{DD}),$$

where DC is the duty cycle.

When the load supply voltage is greater than 3 V to 5 V, considering the package power dissipating limits of these devices, or if $P_{D(act)} > P_{D(max)}$, an external voltage reducer (V_{DROP}) should be used.

Load Supply Voltage (V_{LED}). These devices are designed to operate with driver voltage drops (V_{CE}) of 0.4 V to 0.7 V with LED forward voltages (V_F) of 1.2 V to 4.0 V. If higher voltages are dropped across the driver, package power dissipation will be increased significantly. To minimize package power dissipation, it is recommended to use the lowest possible load supply voltage or to set any series dropping voltage (V_{DROP}) as

$$V_{DROP} = V_{LED} - V_F - V_{CE}$$

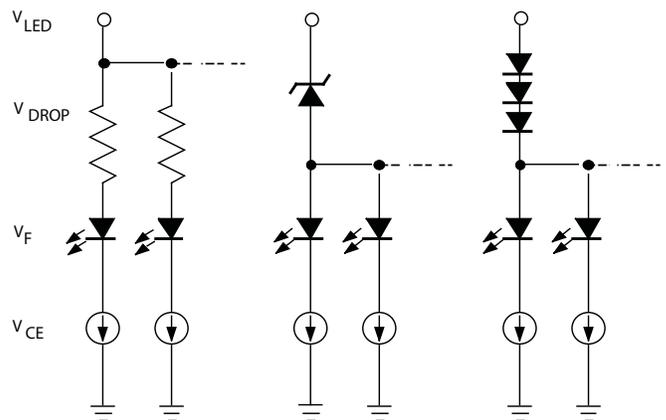
with $V_{DROP} = I_O \cdot R_{DROP}$ for a single driver, or a Zener

diode (V_Z), or a series string of diodes (approximately 0.7 V per diode) for a group of drivers. If the available voltage source will cause unacceptable dissipation and series resistors or diode(s) are undesirable, a regulator such as the Sanken Series SAI or Series SI can be used to provide supply voltages as low as 3.3 V.

For reference, typical LED forward voltages are:

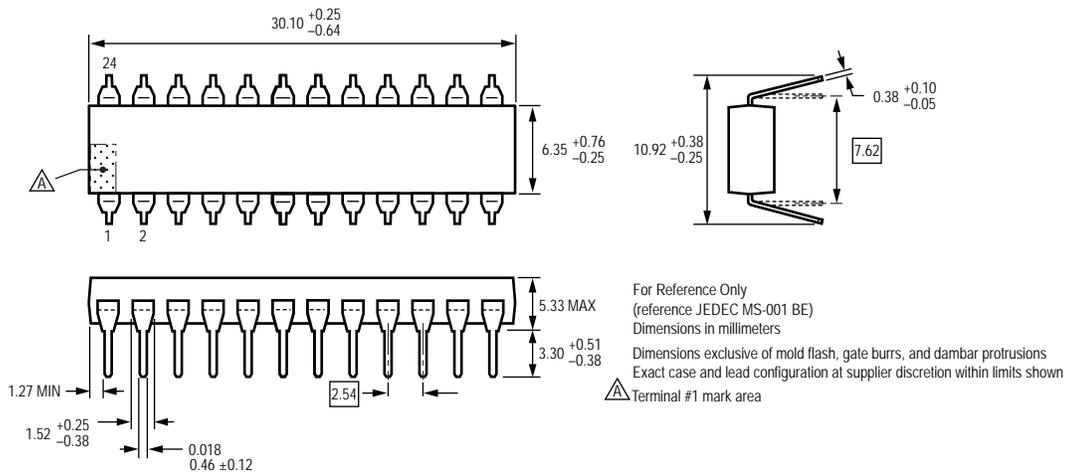
White	3.5 – 4.0 V
Blue	3.0 – 4.0 V
Green	1.8 – 2.2 V
Yellow	2.0 – 2.1 V
Amber	1.9 – 2.65 V
Red	1.6 – 2.25 V
Infrared	1.2 – 1.5 V

Pattern Layout. This device has a common logic-ground and power-ground terminal. If ground pattern layout contains large common-mode resistance, and the voltage between the system ground and the LATCH ENABLE or CLOCK terminals exceeds 2.5 V (because of switching noise), these devices may not operate correctly.

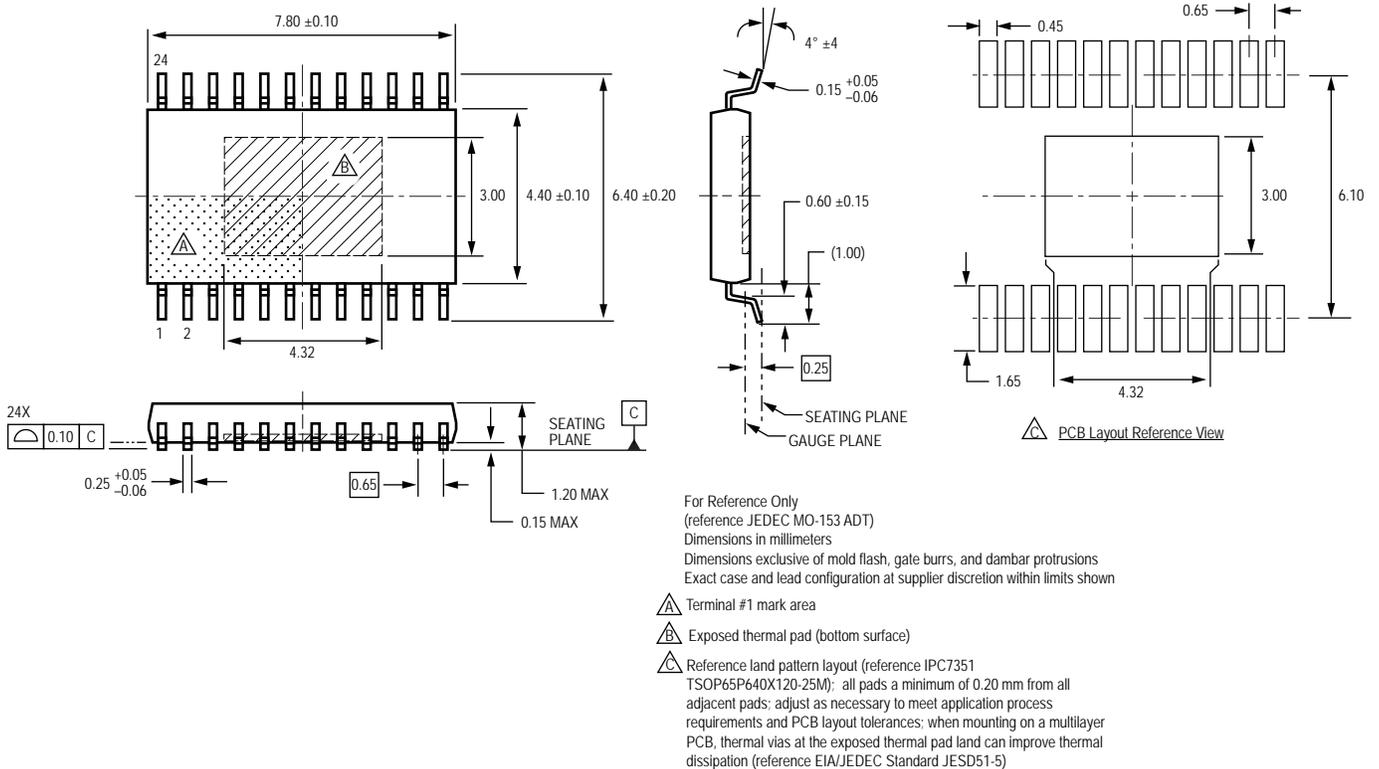


Dwg. EP-064

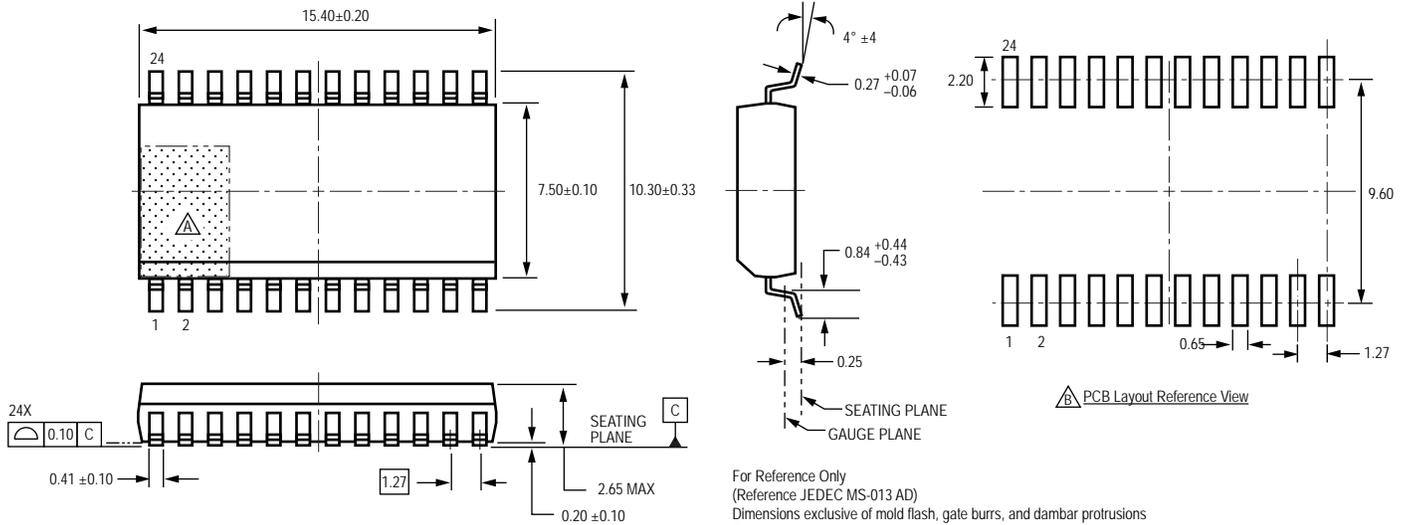
Package A, 24-pin DIP



Package A, 24-pin TSSOP with exposed thermal pad



Package LW, 24-pin SOICW



For Reference Only
 (Reference JEDEC MS-013 AD)
 Dimensions exclusive of mold flash, gate burrs, and dambar protrusions
 Exact case and lead configuration at supplier discretion within limits shown

- ⚠ Terminal #1 mark area
- ⚠ Reference pad layout (reference IPC SOIC127P1030X265-24M)
 All pads a minimum of 0.20 mm from all adjacent pads; adjust as necessary to meet application process requirements and PCB layout tolerances

Copyright ©2000-2008, Allegro MicroSystems, Inc.

The products described here are manufactured under one or more U.S. patents or U.S. patents pending.

Allegro MicroSystems, Inc. reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the performance, reliability, or manufacturability of its products. Before placing an order, the user is cautioned to verify that the information being relied upon is current.

Allegro's products are not to be used in life support devices or systems, if a failure of an Allegro product can reasonably be expected to cause the failure of that life support device or system, or to affect the safety or effectiveness of that device or system.

The information included herein is believed to be accurate and reliable. However, Allegro MicroSystems, Inc. assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.

For the latest version of this document, visit our website:

www.allegromicro.com

