

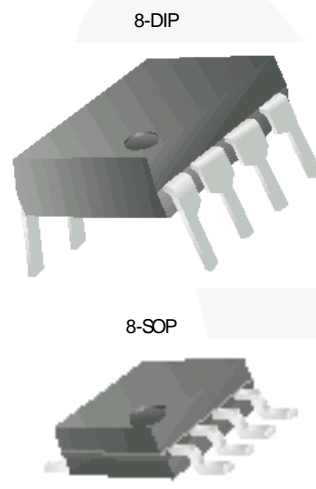
# MC34063A / MC33063A SMPS Controller

## Features


- Operation from 3.0 to 40V Input
- Short Circuit Current Limiting
- Low Standby Current
- Output Switch Current of 1.5A Without External Transistors
- Adjustable Output Voltage
- Frequency of Operation from 100Hz to 100KHz
- Step-up, Step Down, or Inverting Switching Regulators


## Description

The MC34063A/MC33063A is a monolithic regulator subsystem intended for a DC to DC converter. The device contains a temperature-compensated bandgap reference, a duty cycle control oscillator, driver, and high-current output switch. It can be used for step-down, step-up, or inverting switching and series pass regulators.



## Ordering Information

Part Number	Operating Temperature Range	 Eco Status	Package
MC34063AP	0 ~ +70°C	RoHS	8-DIP
MC34063AD	0 ~ +70°C	RoHS	8-SOP
MC33063AP	-40 ~ +85°C	RoHS	8-DIP
MC33063AD	-40 ~ +85°C	RoHS	8-SOP

 For Fairchild's definition of "green" Eco Status, please visit: [http://www.fairchildsemi.com/company/green/rohs\\_green.html](http://www.fairchildsemi.com/company/green/rohs_green.html).

## Block Diagram

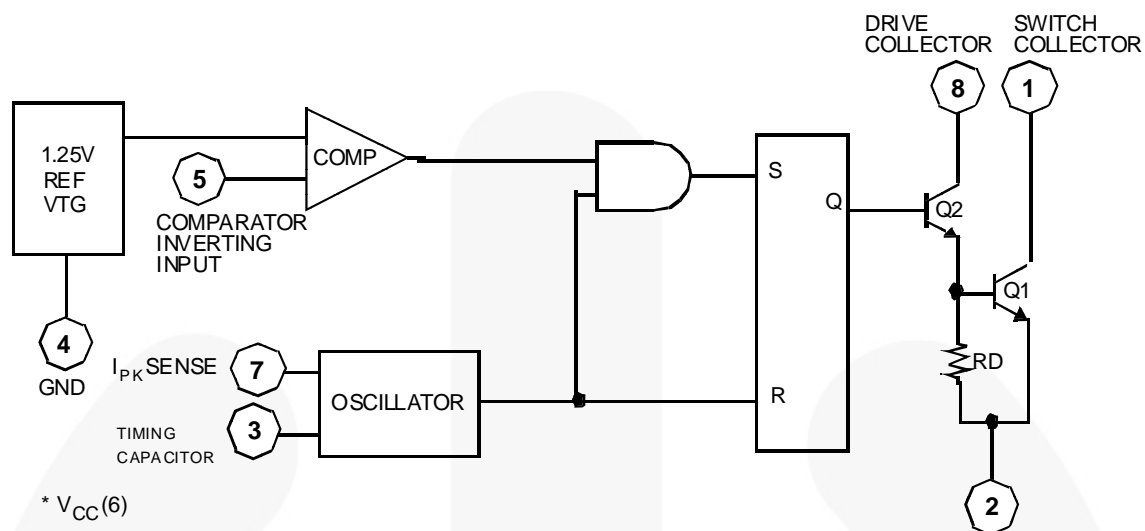


Figure 1. Block Diagram

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Min.	Max.	Unit
$V_{CC}$	Supply Voltage		40	V
$V_{I(Comp)}$	Comparator Input Voltage Range	-0.3	+40	V
$V_{C(SW)}$	Switch Collector Voltage		40	V
$V_{E(SW)}$	Switch Emitter Voltage		40	V
$V_{CE(SW)}$	Switch Collector to Emitter Voltage		40	V
$V_{C(DR)}$	Driver Collector Voltage		40	V
$I_{SW}$	Switch Current		1.5	A
$T_{STG}$	Storage Temperature Range	-65	+150	°C
$P_D$	Power Dissipation	SOP	0.8	W
		DIP	1	

## Electrical Characteristics

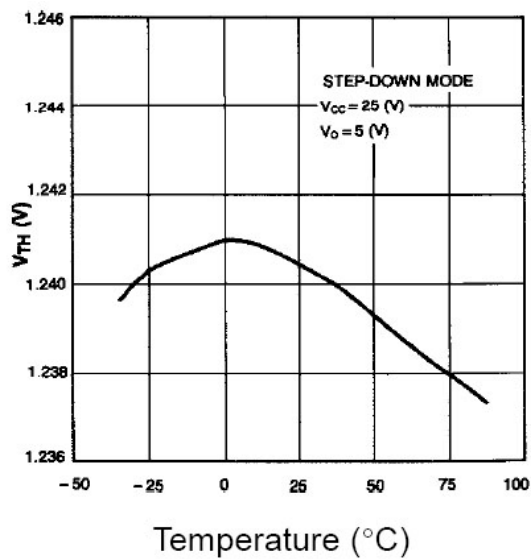
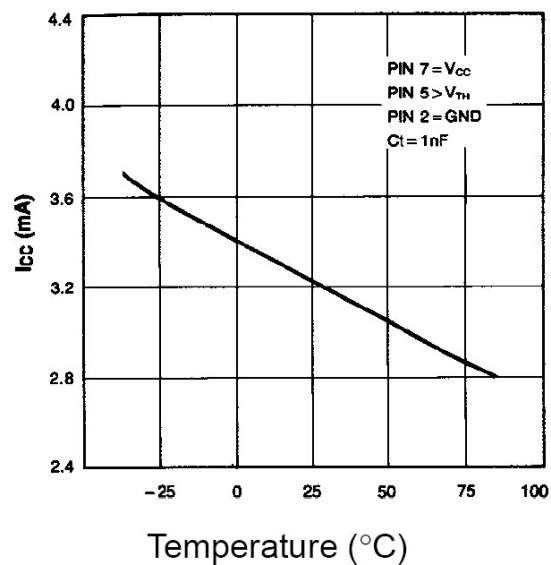
$V_{CC} = 5.0V$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$  for MC34063,  $T_A = -40^\circ C$  to  $+85^\circ C$  for MC33063, unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units	
Oscillator							
I <sub>CHG</sub>	Charging Current	V <sub>CC</sub> =5 to 40V, T <sub>A</sub> =25°C	22	31	42	μA	
I <sub>DISCHG</sub>	Discharging Current	V <sub>CC</sub> =5 to 40V, T <sub>A</sub> =25°C	140	190	260	μA	
V <sub>(OSC)</sub>	Oscillator Amplitude	T <sub>A</sub> =25°C		0.5		V	
K	Discharge-to-Charge Current Ratio	V <sub>7</sub> =V <sub>CC</sub> , T <sub>A</sub> =25°C	5.2	6.1	7.5		
V <sub>SENSE(CL)</sub>	Current Limit Sense Voltage	I <sub>CHG</sub> =I <sub>DISCHG</sub> , T <sub>A</sub> =25°C	250	300	350	mV	
Output Switch							
V <sub>CE(SAT)1</sub>	Saturation Voltage 1 <sup>(1)</sup>	I <sub>SW</sub> =1.0A, V <sub>C(driver)</sub> =V <sub>C(SW)</sub>		0.95	1.30	V	
V <sub>CE(SAT)2</sub>	Saturation Voltage 2 <sup>(1)</sup>	I <sub>SW</sub> =1.0A, V <sub>C(driver)</sub> =50mA		0.45	0.70	V	
G <sub>I(DC)</sub>	DC Current Gain <sup>(1)</sup>	I <sub>SW</sub> =1.0A, V <sub>CE</sub> =5.0V, T <sub>A</sub> =25°C	50	180			
I <sub>C(OFF)</sub>	Collector Off-State Current <sup>(1)</sup>	V <sub>CE</sub> =40V, T <sub>A</sub> =25°C		0.01	100.00	μA	
Comparator							
V <sub>TH</sub>	Threshold Voltage		1.21	1.24	1.29	V	
ΔV <sub>TH</sub>	Threshold Voltage Line Regulation	V <sub>CC</sub> =3 to 40V		2	5	mV	
I <sub>BIAS</sub>	Input Bias Current	V <sub>I</sub> =0V		50	400	nA	
Total Device							
I <sub>CC</sub>	Supply Current	MC34063	V <sub>CC</sub> =5 to 40V, C <sub>T</sub> =0.001μF,			4	mA
		MC33063	V <sub>7</sub> =V <sub>CC</sub> , V <sub>5</sub> >V <sub>TH</sub> , pin 2=GND			5	

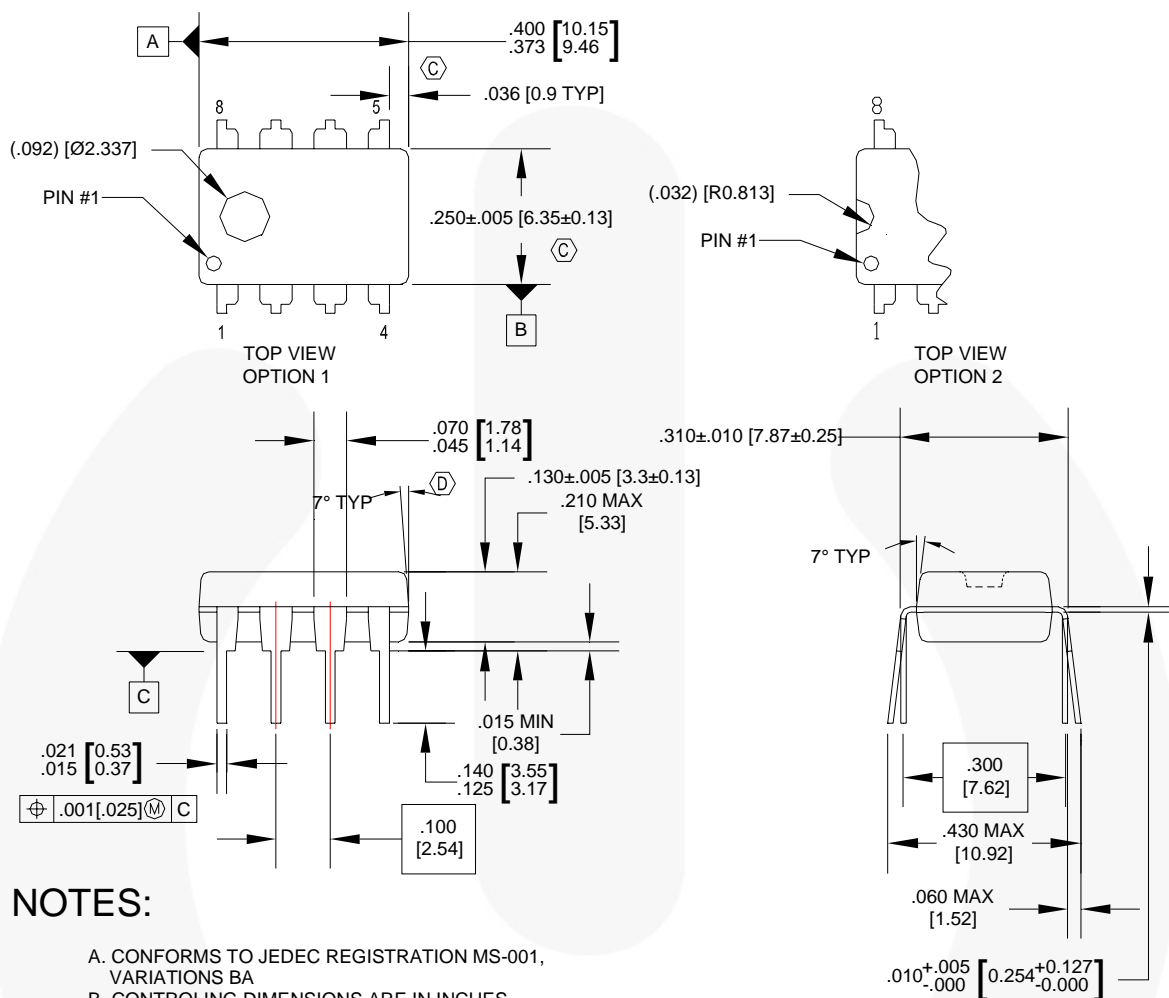
### Note:

- Output switch tests are performed under pulsed conditions to minimize power dissipation.

## Typical Performance Characteristics

Figure 2. Temperature Drift ( $V_{TH}$ )Figure 3. Temperature Drift ( $I_{OC}$ )

## Physical Dimensions



## NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MS-001, VARIATIONS BA
- B. CONTROLLING DIMENSIONS ARE IN INCHES  
REFERENCE DIMENSIONS ARE IN MILLIMETERS
- C. DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS.  
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCHES OR 0.25MM.
- D. DOES NOT INCLUDE DAMBAR PROTRUSIONS.  
DAMBAR PROTRUSIONS SHALL NOT EXCEED .010 INCHES OR 0.25MM.
- E. DIMENSIONING AND TOLERANCING  
PER ASME Y14.5M-1994.

N08EREVG

Figure 4. 8-Lead PDIP, JEDEC MS-001

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:  
<http://www.fairchildsemi.com/packaging/>

## Physical Dimensions

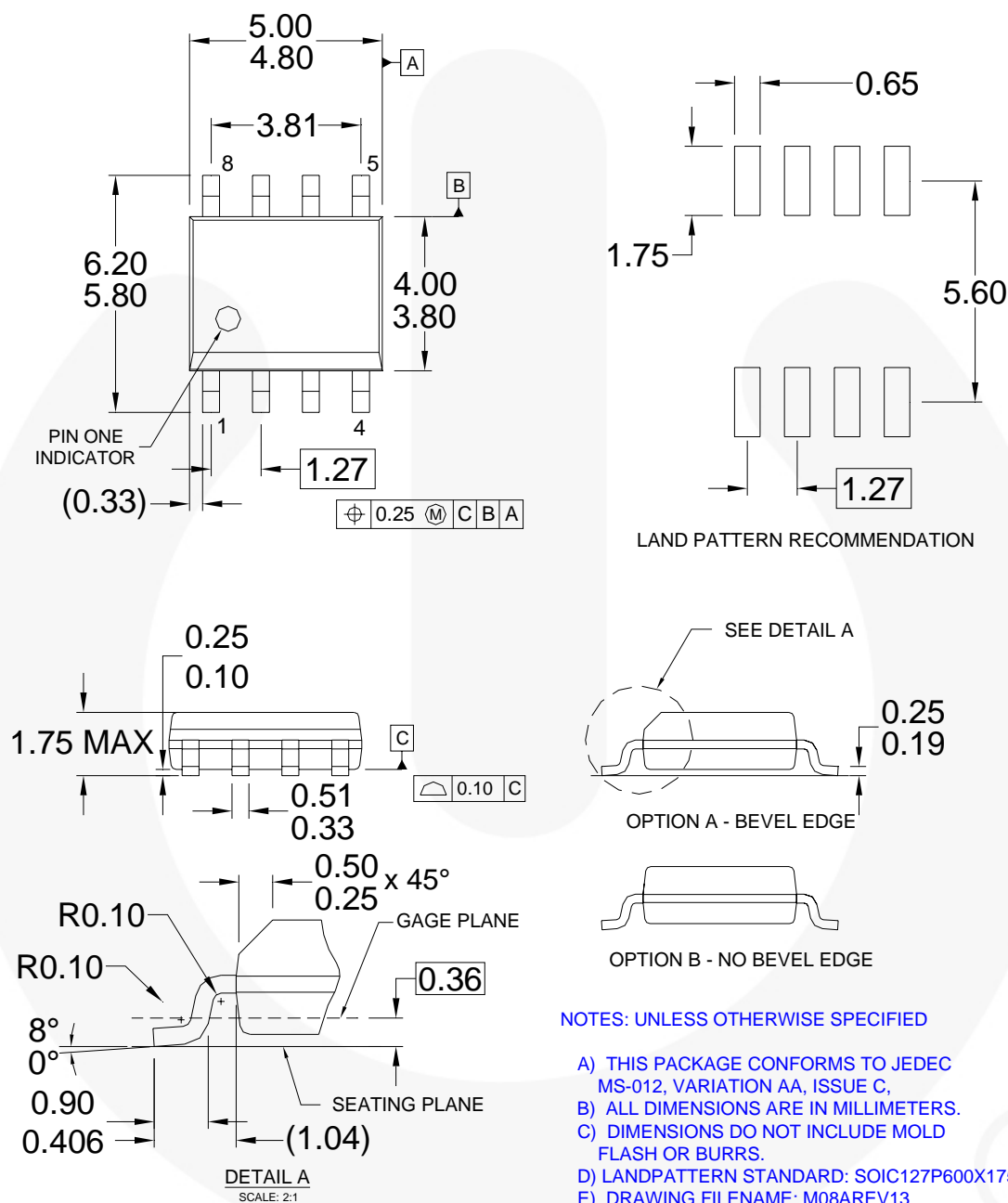


Figure 5. 8-Lead, SOIC, JEDEC MS-012, .150 inch Narrow Body

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:

<http://www.fairchildsemi.com/packaging/>




## TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

Build it Now™  
CorePLUS™  
CorePOWER™  
CROSSVOLT™  
CTL™  
Current Transfer Logic™  
EcoSPARK®  
EfficientMax™  
EZSWITCH™ \*  
  
  
Fairchild®  
Fairchild Semiconductor®  
FACT Quiet Series™  
FACT®  
FAST®  
FastvCore™  
FlashWriter® \*

FPST™  
F-PFST™  
FRFET®  
Global Power Resource™  
Green FPST™  
Green FPST™ e-Series™  
GTO™  
IntelliMAX™  
ISOPLANAR™  
MegaBuck™  
MICROCOUPLER™  
MicroFET™  
MicroPak™  
MillerDrive™  
MotionMax™  
Motion-SPM™  
OPTOLOGIC®  
OPTOPLANAR®

PDP SPM™  
Power-SPM™  
PowerTrench®  
Programmable Active Droop™  
QFET®  
QST™  
Quiet Series™  
RapidConfigure™  
Saving our world, 1mW at a time™  
SmartMax™  
SMART START™  
SPM®  
STEALTH™  
SuperFET™  
SuperSOT™.3  
SuperSOT™.6  
SuperSOT™.8  
SupreMOS™  
SyncFET™  


The Power Franchise®

  
TinyBoost™  
TinyBuck™  
TinyLogic®  
TINYOPTO™  
TinyPower™  
TinyPWM™  
TinyWire™  
μSerDes™  
  
UHC®  
Ultra FRFET™  
UniFET™  
VCX™  
VisualMax™

\* EZSWITCH™ and FlashWriter® are trademarks of System General Corporation, used under license by Fairchild Semiconductor.

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy: Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. 135