Electrical Characteristics at Ta = 25°C, V_{CC} = 7.2V

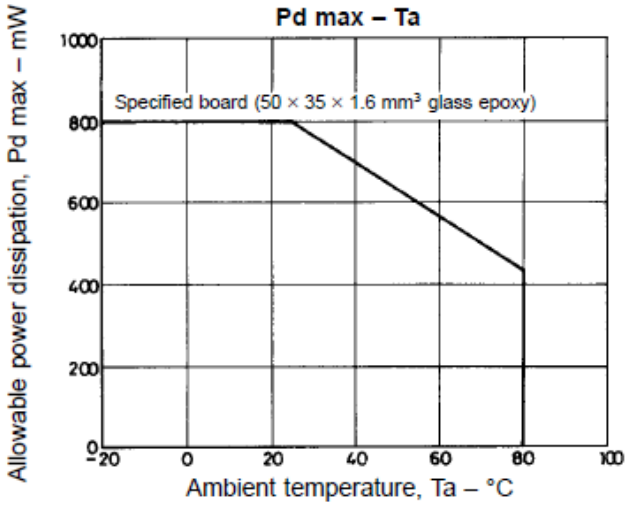
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	$I_{CC}0$	During standby		0.1	10	μA
	$I_{CC}1$	During bidirectional operation, no load		9	13	mA
	$I_{CC}2$	During braking		12	18	mA
Output saturation voltage (upper side + lower side)	$V_{sat}1$	I_{OUT} = 200mA (upper side + lower side)		0.20	0.30	V
	$V_{sat}2$	I_{OUT} = 400mA (upper side + lower side)		0.40	0.60	V
Reference voltage	V_{ref}	$I_V$ref = 1mA	1.85	2.0	2.15	V
Set output current	I_{limit}	Resistance between V_{CC} and V_M = 1Ω, when LIR = 2V	165	185	205	mA
Input current	I_{IN}	V_{IN} = 5V		90	150	μA
RD saturation voltage	V_{RD}sat	I_o = 1mA			0.3	V

Output current limit is determined by the following equation (Rf is the sensing resistance between V_{CC} and V_M):

I limit = V_{LIR} / 10Rf (A)

The input range for V_{LIR} is 0.5 to V_{CC} – 1.0(V)

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



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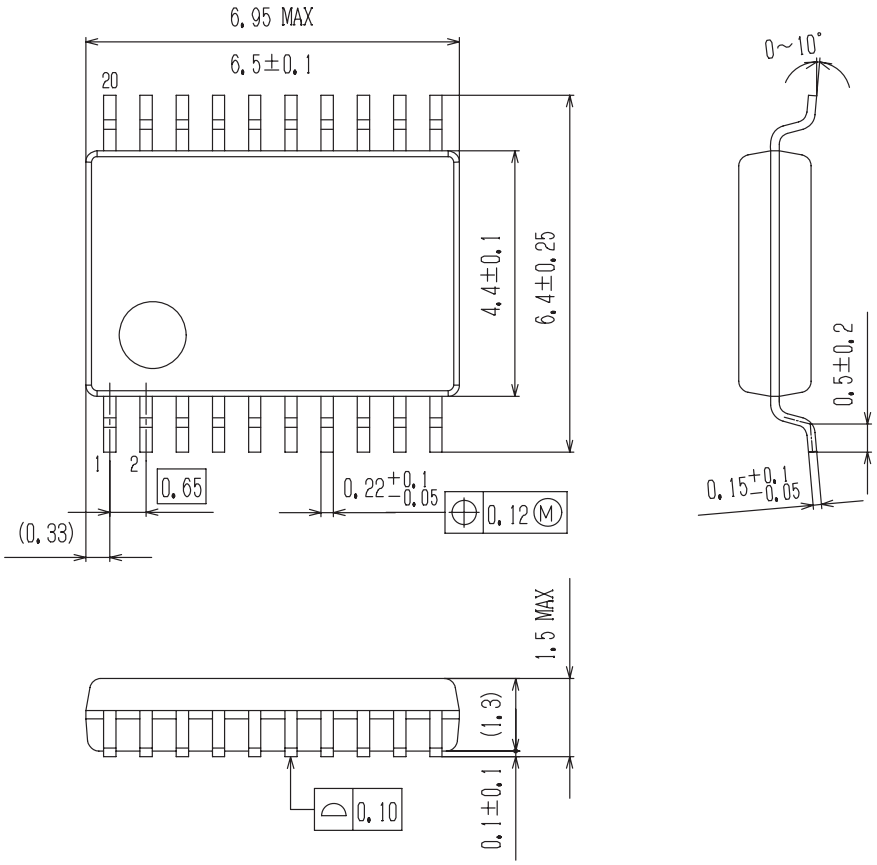
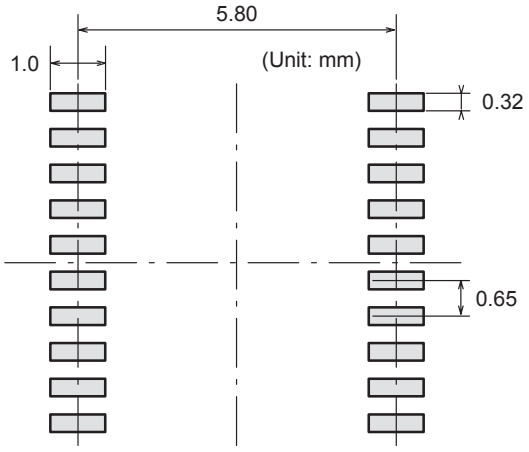
Package Dimensions

SSOP20 (225mil)
CASE 565AN
ISSUE A



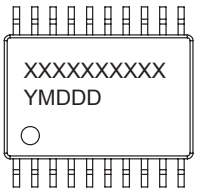
SOLDERING FOOTPRINT*



NOTE: The measurements are not to guarantee but for reference only.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
Y = Year
M = Month
DDD = Additional Traceability Data

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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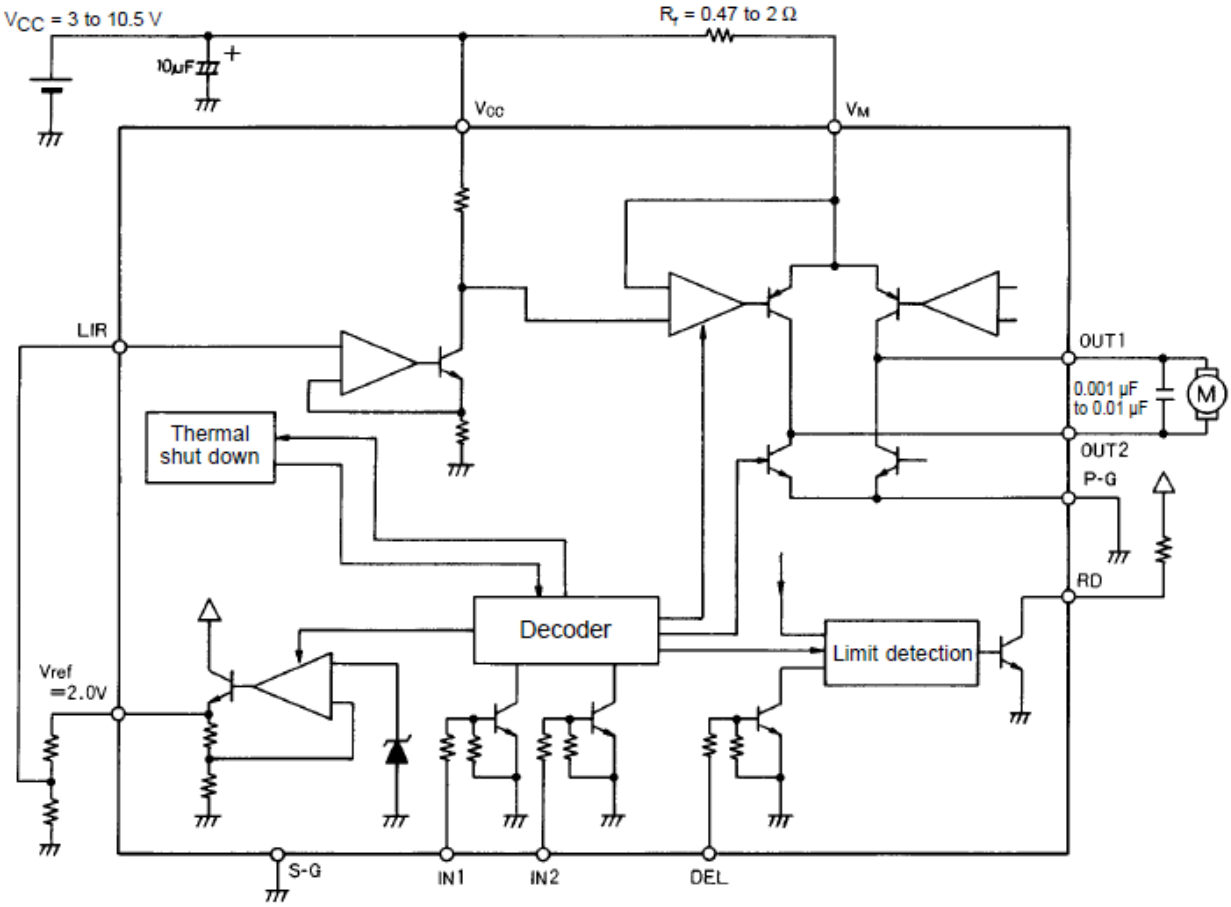
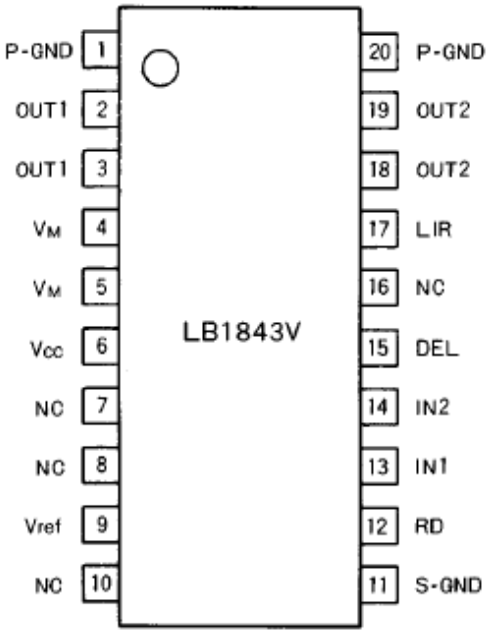
Block Diagram and Sample Application Circuit



Pin Assignment



Top view

Notes:
- Connect both V_M pins (motor power supply/sensing pins).
- Connect both P-GND pins (motor power supply GND pins).
- Connect S-GND (control power supply GND pin) to the microcontroller's GND.

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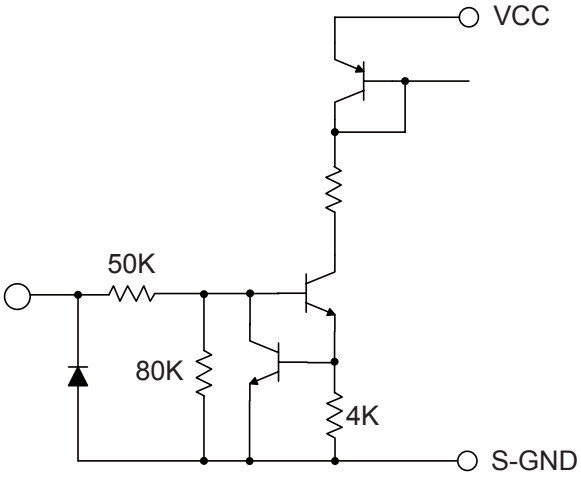
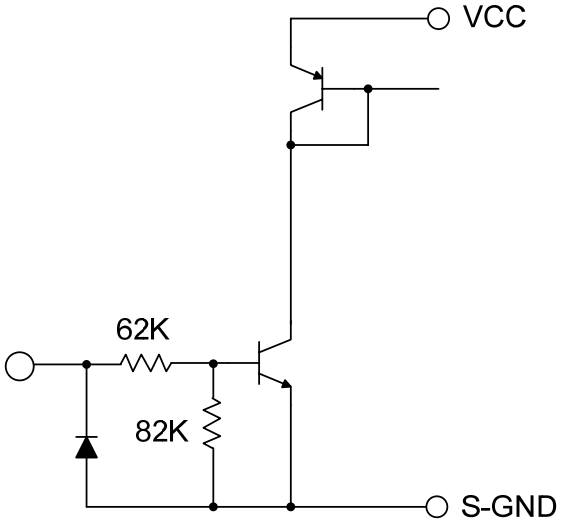
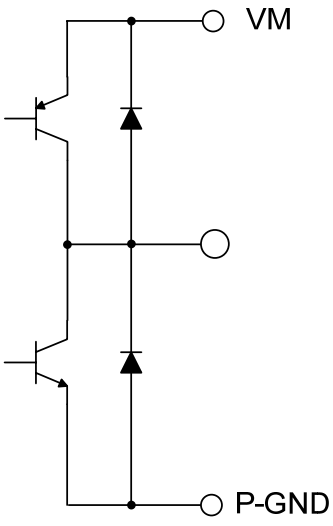
Pin Functions

Pin No.	Pin name	Pin Function	Equivalent Circuit
13 14	IN1 IN2	Control signal input pin Control signal input pin	
15	DEL	Control signal input pin	
4,5 2,3 18,19	VM OUT1 OUT2	Output current detect pin Out pin Out pin	

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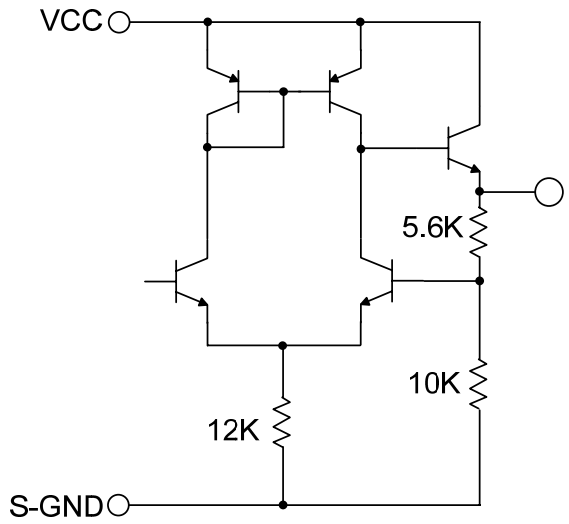
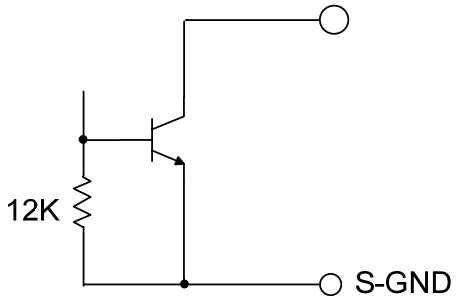
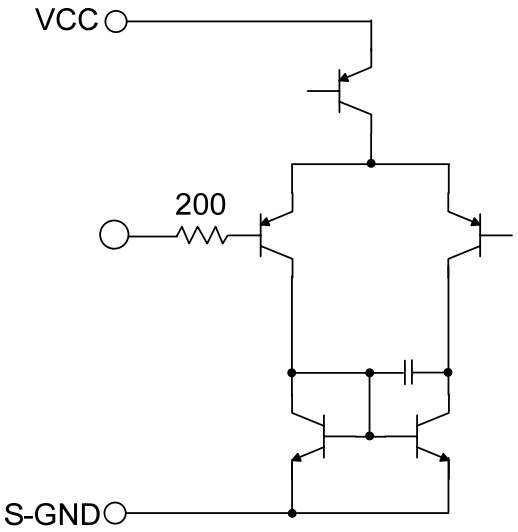
9	Vref	Reference voltage output pin	
12	RD	Lock detect signal output pin	
17	LIR	Output current setting pin	
6	V_{CC}	Power supply voltage pin	
11	S-GND	Signal ground pin	
1,20	P-GND	Power ground pin	
7,8,10,16	NC	No connect	

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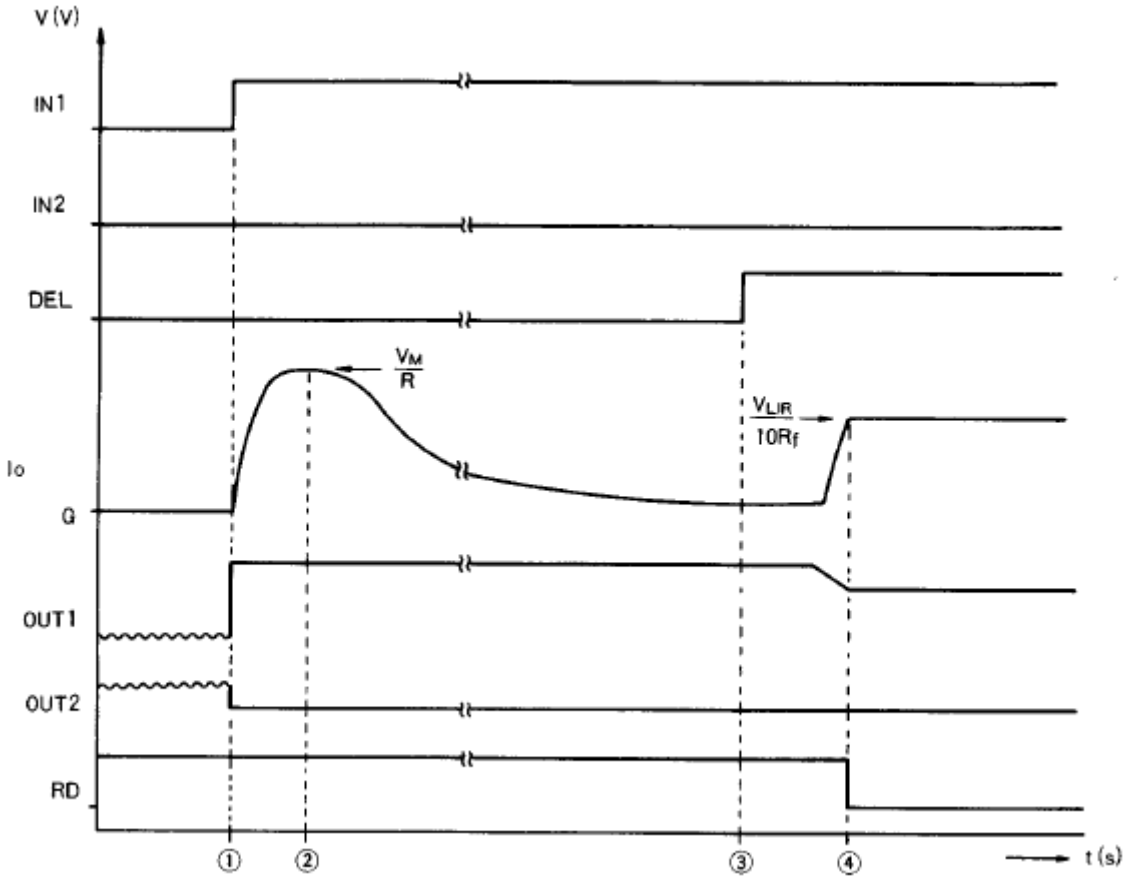
Truth Table

Input		Output		Mode
IN1	IN2	OUT1	OUT2	
L	L	Off	Off	Standby
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake

Output Current Limitation and Detector Output

DEL	OUT output	RD
H	Limit	L
	Non-limit	Off
L	Saturated	Off

Sample Application Timing Chart



Sample application timing chart

1) Connect a DC motor (RL = R) between OUT1 and OUT2, and with the RD pin pulled up, input a forward rotation signal (IN1 = high, IN2 = low).
   Because the output is used in the saturated state at startup, set the DEL input to low.
2) The DC motor starts up, and the startup current (IST = VM/R) flows to the motor.
3) The DC motor rotates in the normal state. At this point, set the DEL input to high.
4) If the DC motor locks, the motor current IM increases to the point of Ilimit (= VLIR/(10Rf)), the output current limiter operates to limit the output current. At the same time, RD is output low from the set current detection circuit.

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Reference voltage (Vref)

The Vref output is linked to the input; if either IN1 or IN2 is high, the reference voltage is output.

Output current limiter

The schematic for the output current limiter is shown below.
The output set current is set according to the reference voltage VLIR applied to the LIR pin. When VLIR is applied, 1/10 of that voltage is generated at both ends of RS in the diagram; this voltage is input on the positive (+) side of the current setting amplifier.
The motor current IM generates voltage equal to (IM ´ Rf) at both ends of the external resistor Rf. This voltage is input to the negative (–) side of the same amplifier, and the differential amplifier functions and the output transistors are driven so that these inputs become equal.
The set current value in this instance is determined by the following equation:

Ilimit = VLIR/(10Rf) [A]

Set current detector

(1) When DEL = high

If the motor current IM has not reached the set current Ilimit, the input voltage on the negative (–) side of the amplifier is greater than the input voltage on the positive (+) side. As a result, the drive current increases and the output PNP transistors reach the saturation state. If this state is detected, the detection signal is sent to the set current detector, and the RD output goes high.

If the motor current IM reaches the set current Ilimit, the output PNP transistor enters the controlled state, and the RD output goes low.

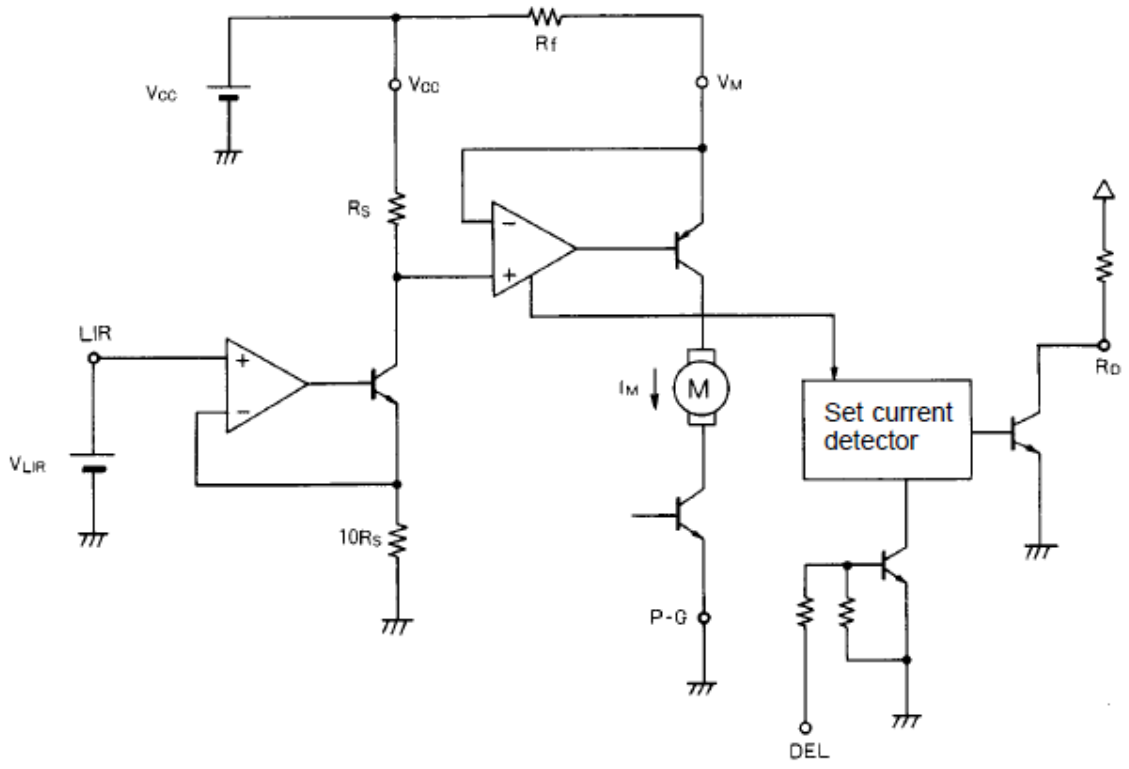
(2) When DEL = low

Because the operation of the current setting amplifier is cancelled when a low signal is input to the DEL pin, the output PNP transistors reach the saturation state and the RD output goes high, just as in the case described above.

The following table summarizes the states described above.

DEL	OUT output	RD
H	Limit	L
	Non-limit	Off
L	Saturated	Off

Output Current Limiter and Set Current Detector Block Diagram



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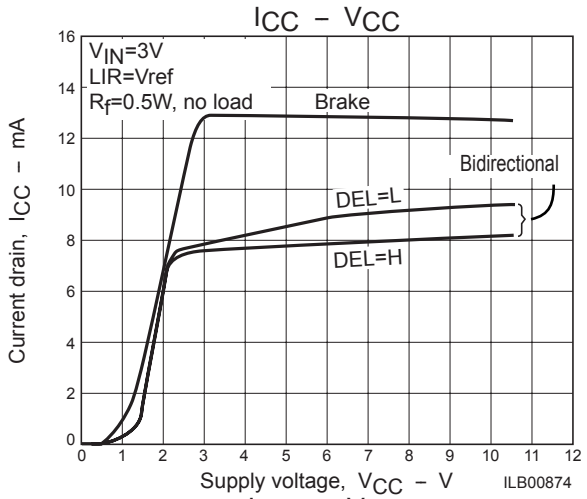

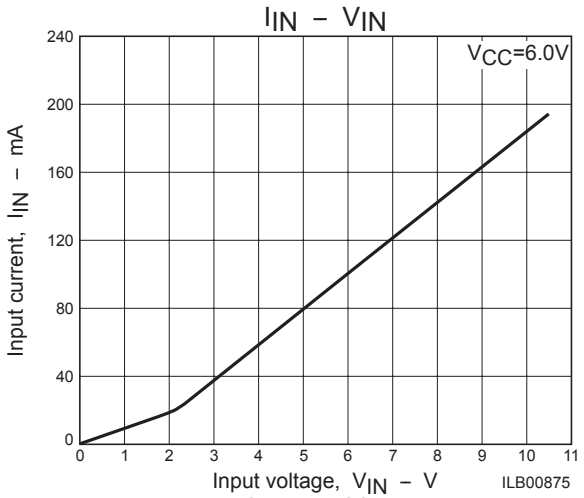

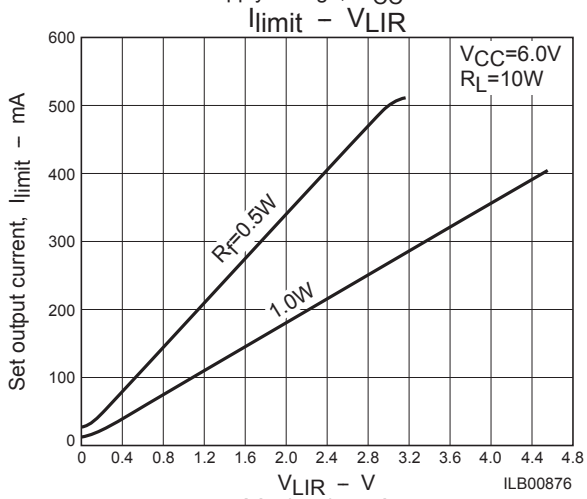

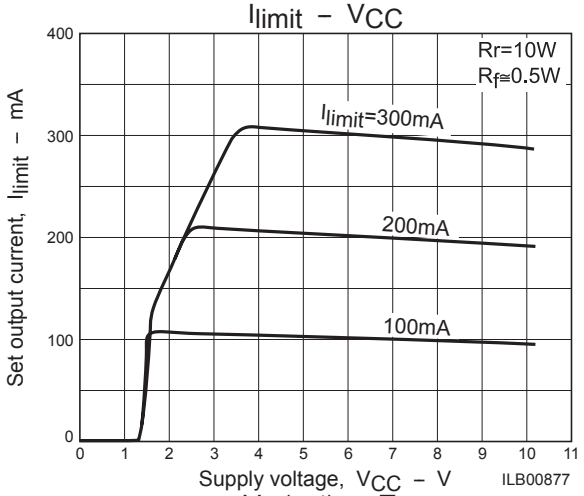

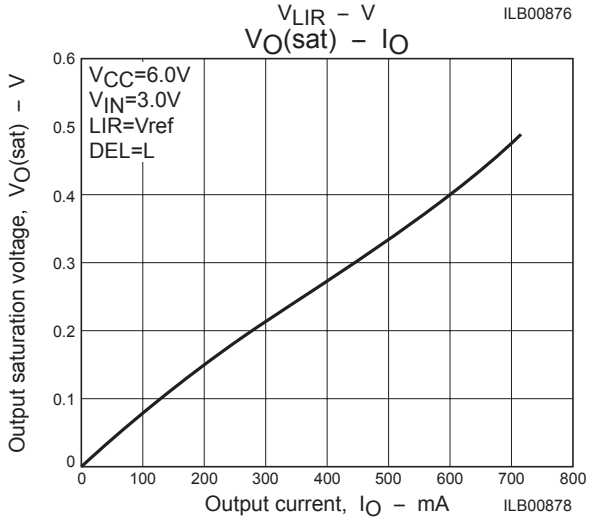

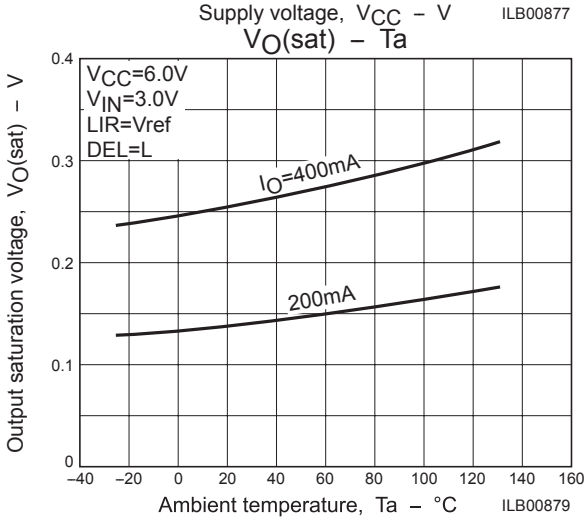

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ORDERING INFORMATION

Device	Package	Shipping (Qty / Packing)
LB1843V-MPB-E	SSOP20 (225mil) (Pb-Free / Halogen Free)	70 / Fan-Fold
LB1843V-TLM-E	SSOP20 (225mil) (Pb-Free / Halogen Free)	2000 / Tape & Reel

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