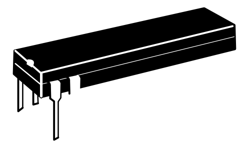
MC33033, NCV33033

Brushless DC Motor Controller



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MAXIMUM RATINGS

Rating	Symbol	Value	Unit
	–		
		–	

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max

ELECTRICAL CHARACTERISTICS (continued)

Characteristic	Symbol	Min	Typ	Max	Unit
OSCILLATOR SECTION					
	Δ Δ	−			
		−			
				−	
LOGIC INPUTS					
		−		−	
		− −	− −	− −	
		− −	− −	− −	
CURRENT−LIMIT COMPARATOR					
		−		−	
		−	−	−	
OUTPUTS AND POWER SECTIONS					
		−			
−		−			
		− −			

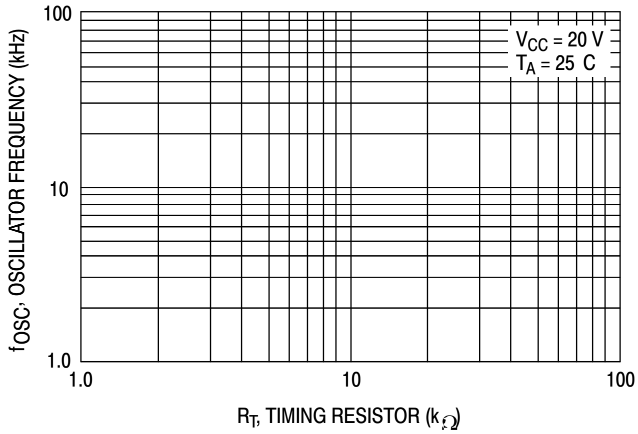


Figure 2. Oscillator Frequency versus Timing Resistor

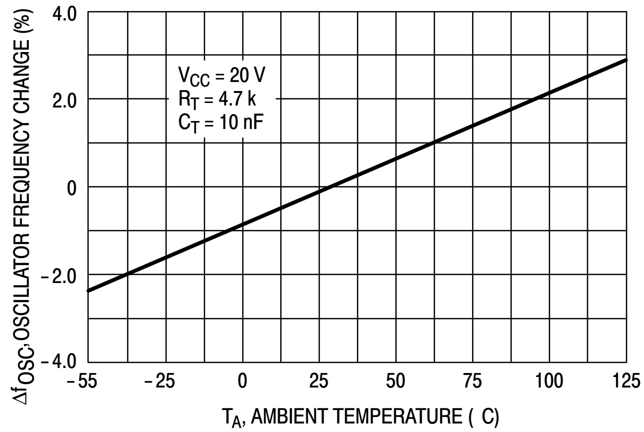


Figure 3. Oscillator Frequency Change versus Temperature

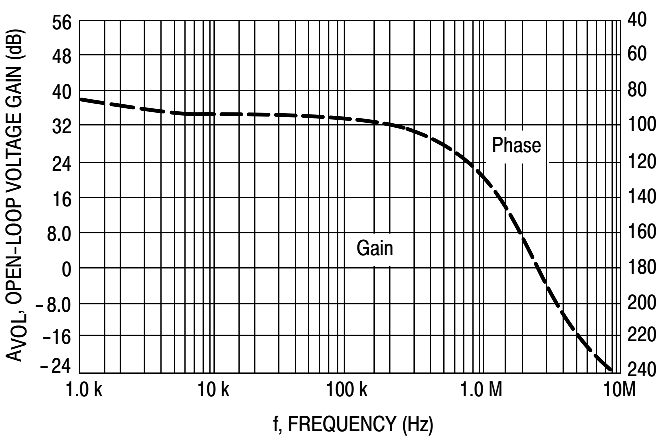


Figure 4. Error Amp Open Loop Gain and Phase versus Frequency

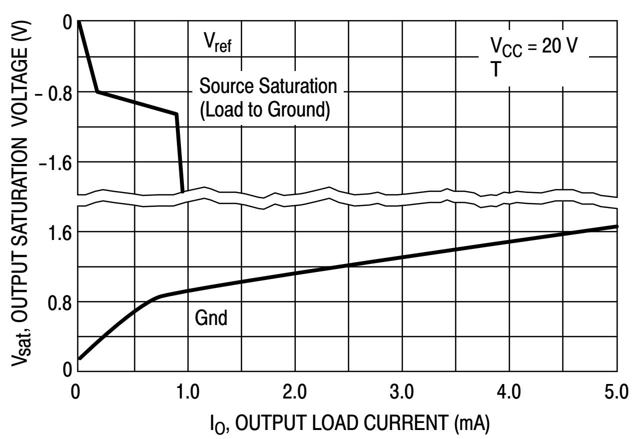


Figure 5. Error Amp Output Saturation Voltage versus Load Current

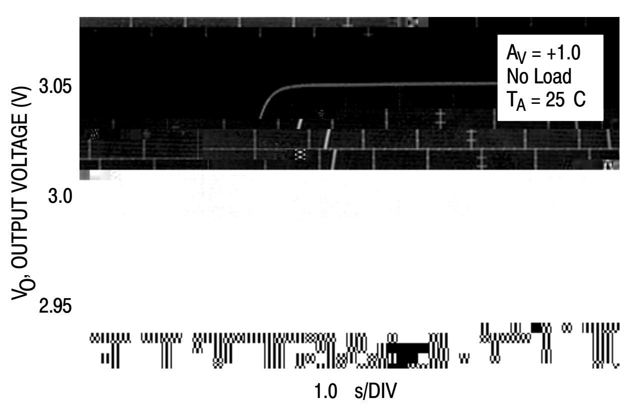


Figure 6. Error Amp Small−Signal Transient Response

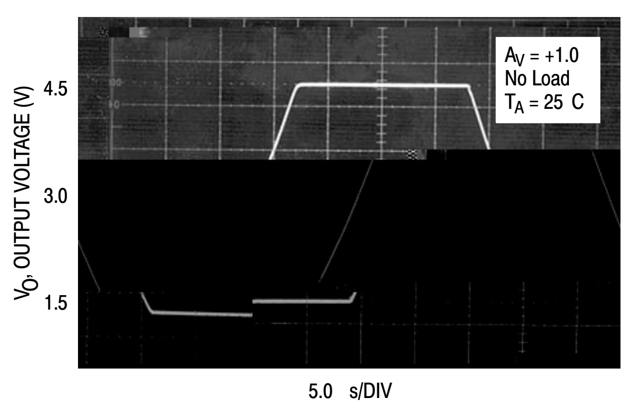


Figure 7. Error Amp Large−Signal Transient Response

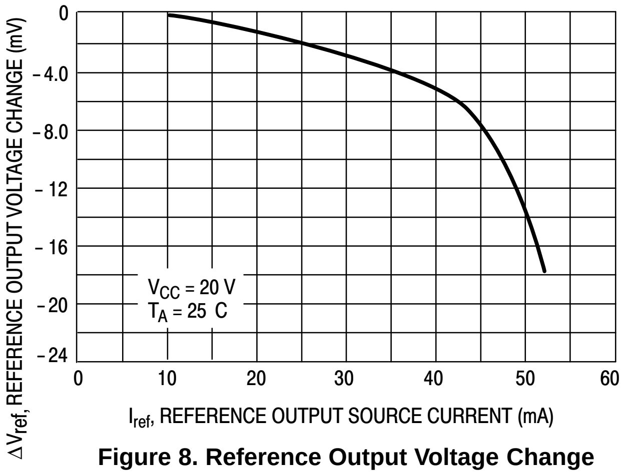


Figure 8. Reference Output Voltage Change versus Output Source Current

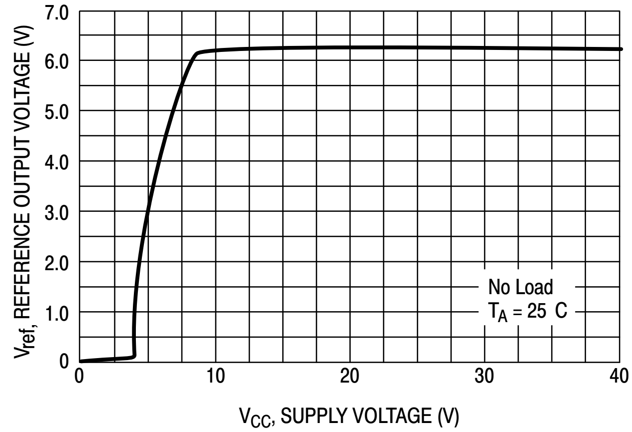


Figure 9. Reference Output Voltage versus Supply Voltage

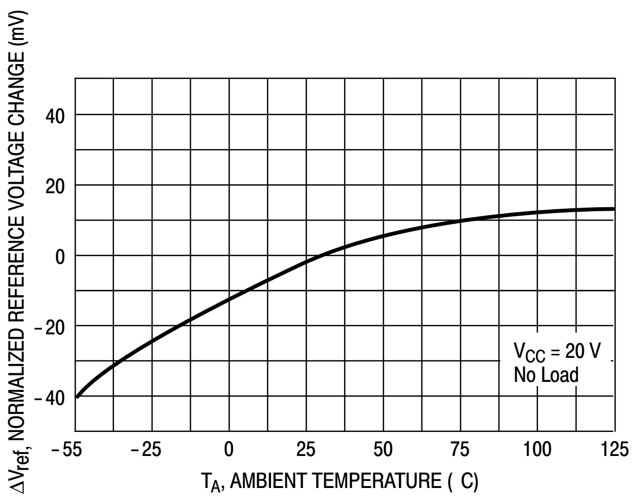


Figure 10. Reference Output Voltage versus Temperature

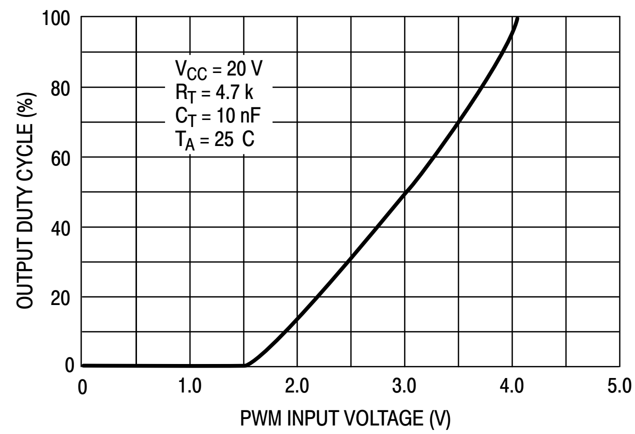


Figure 11. Output Duty Cycle versus PWM Input Voltage

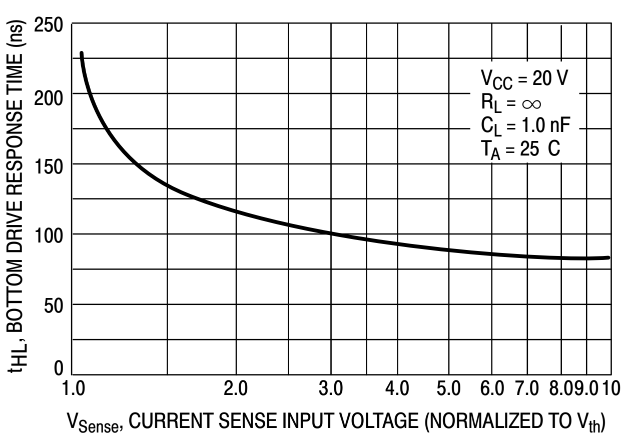


Figure 12. Bottom Drive Response Time versus Current Sense Input Voltage

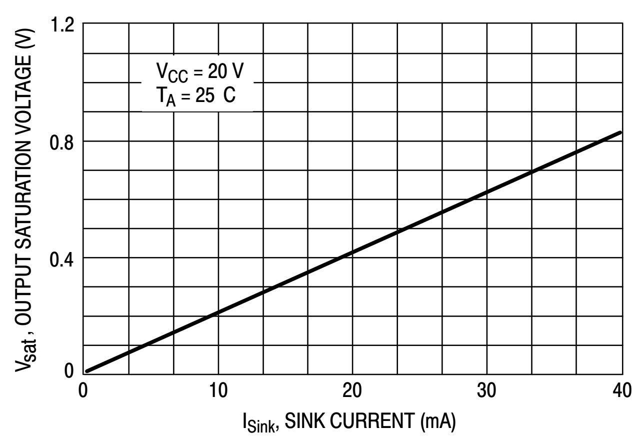


Figure 13. Top Drive Output Saturation Voltage versus Sink Current

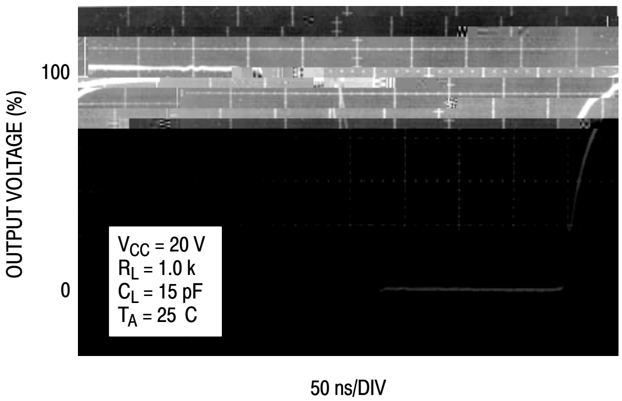


Figure 14. Top Drive Output Waveform

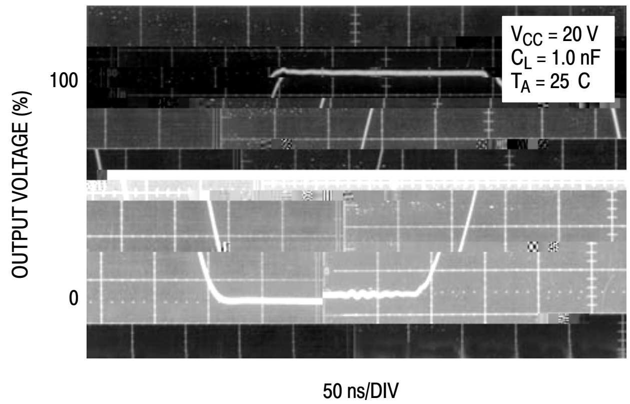


Figure 15. Bottom Drive Output Waveform

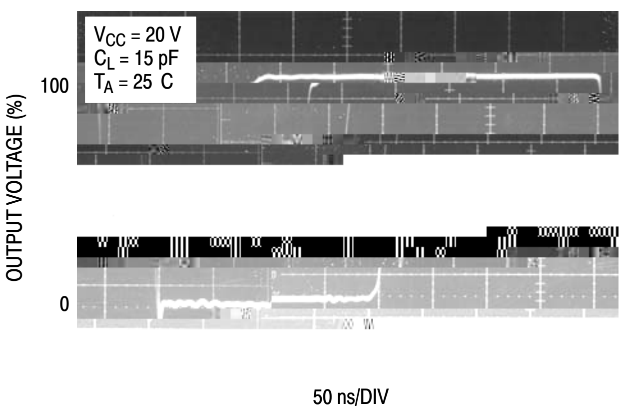


Figure 16. Bottom Drive Output Waveform

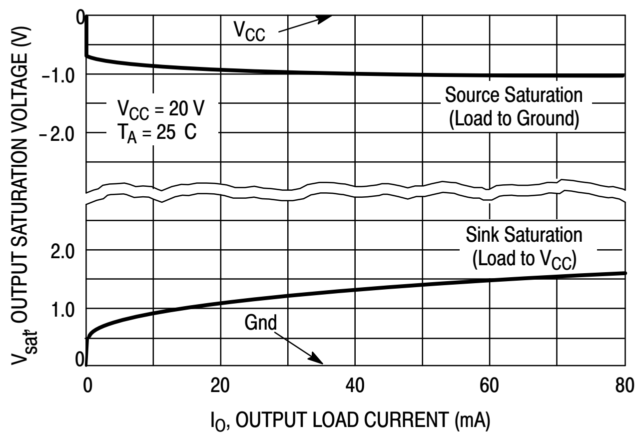


Figure 17. Bottom Drive Output Saturation Voltage versus Load Current

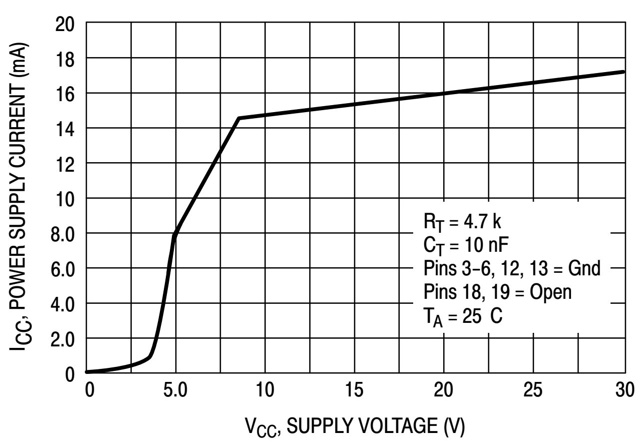


Figure 18. Supply Current versus Voltage

PIN FUNCTION DESCRIPTION

Pin	Symbol	Description

INTRODUCTION

Error Amplifier

FUNCTIONAL DESCRIPTION

Oscillator

Rotor Position Decoder

Pulse Width Modulator

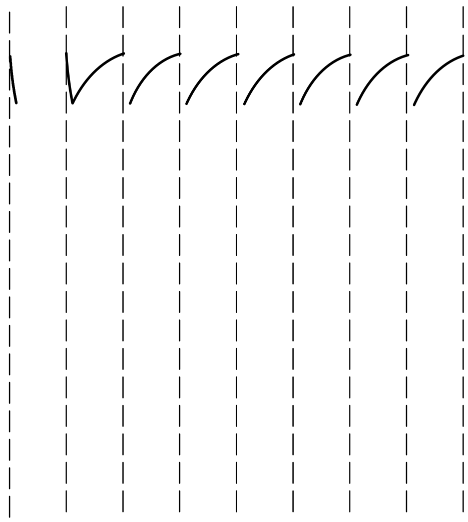


Figure 21. PWM Timing Diagram

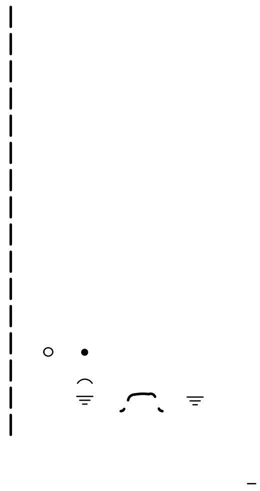


Figure 25. Current Waveform Spike Suppression

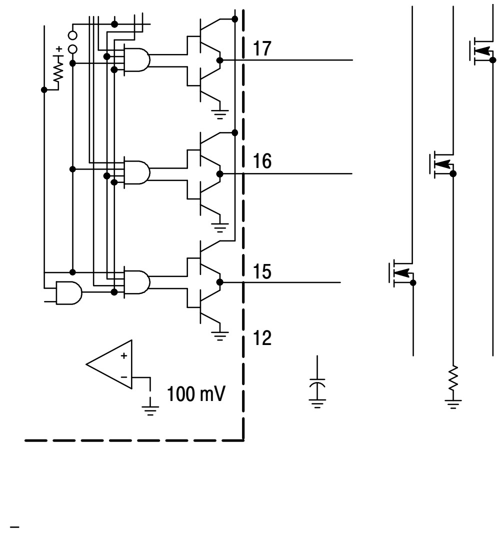


Figure 26. MOSFET Drive Precautions

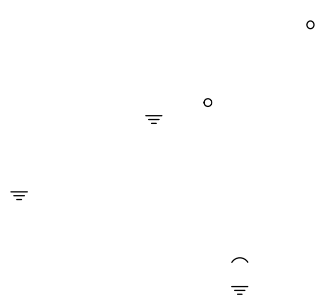


Figure 31. Controlled Acceleration/Deceleration

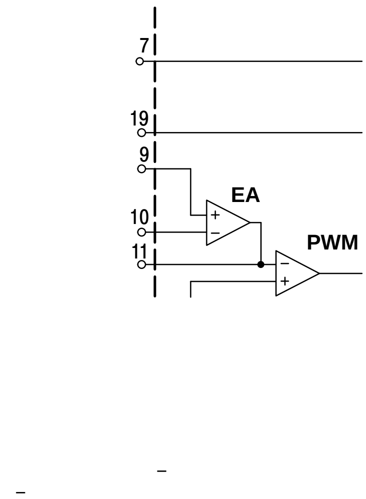


Figure 32. Digital Speed Controller

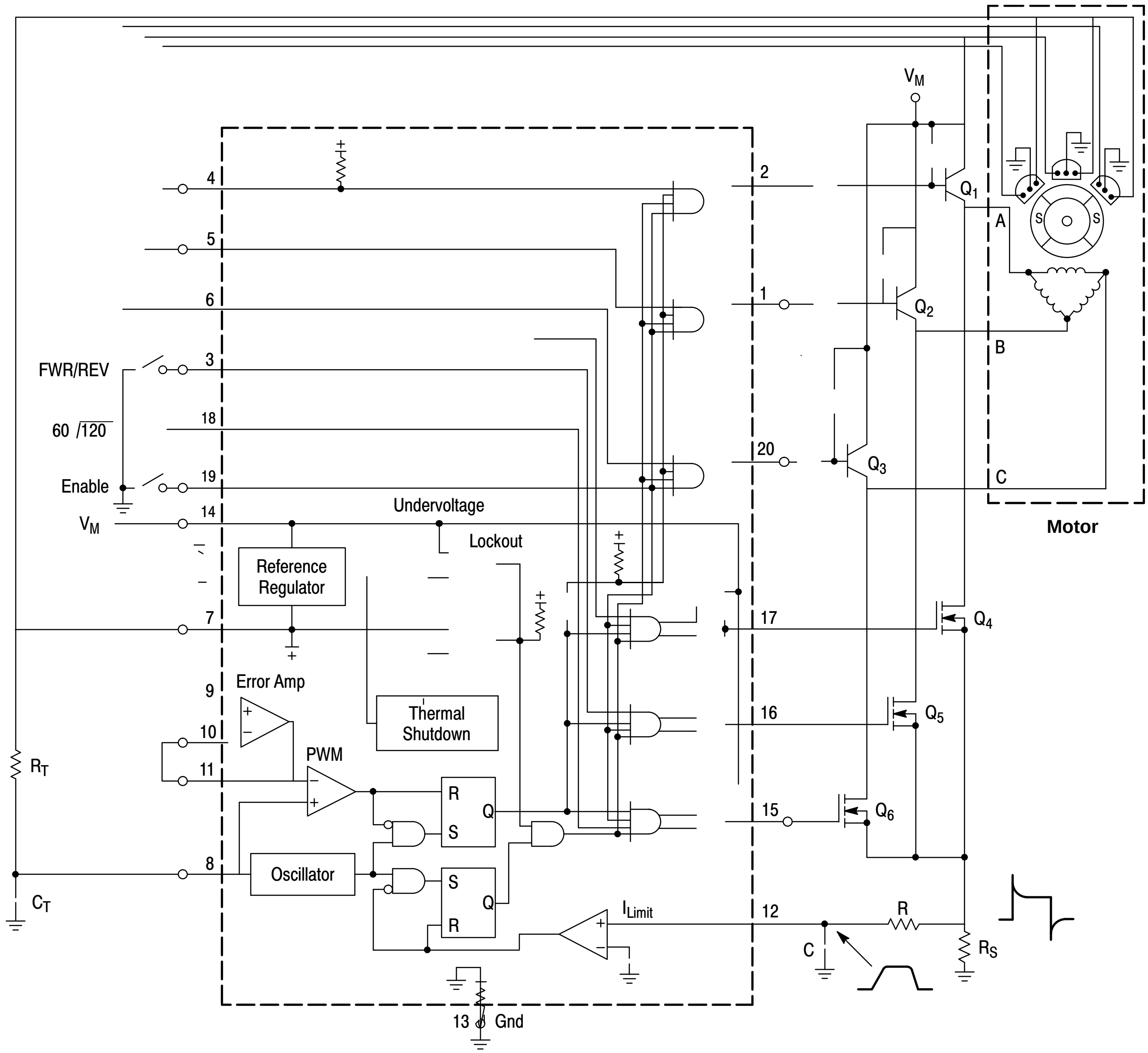


Figure 35. Three Phase, Six Step, Full Wave Motor Controller

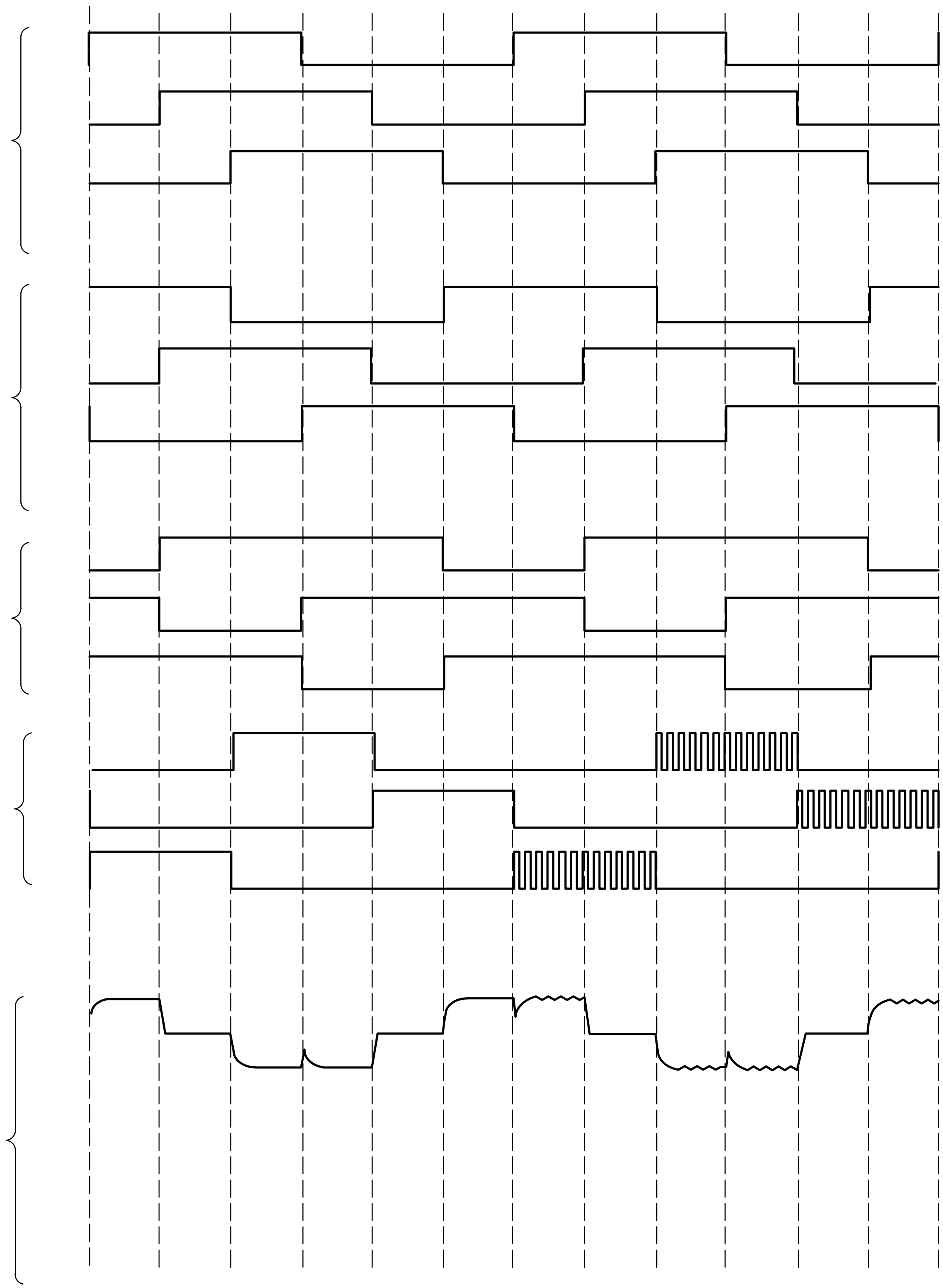
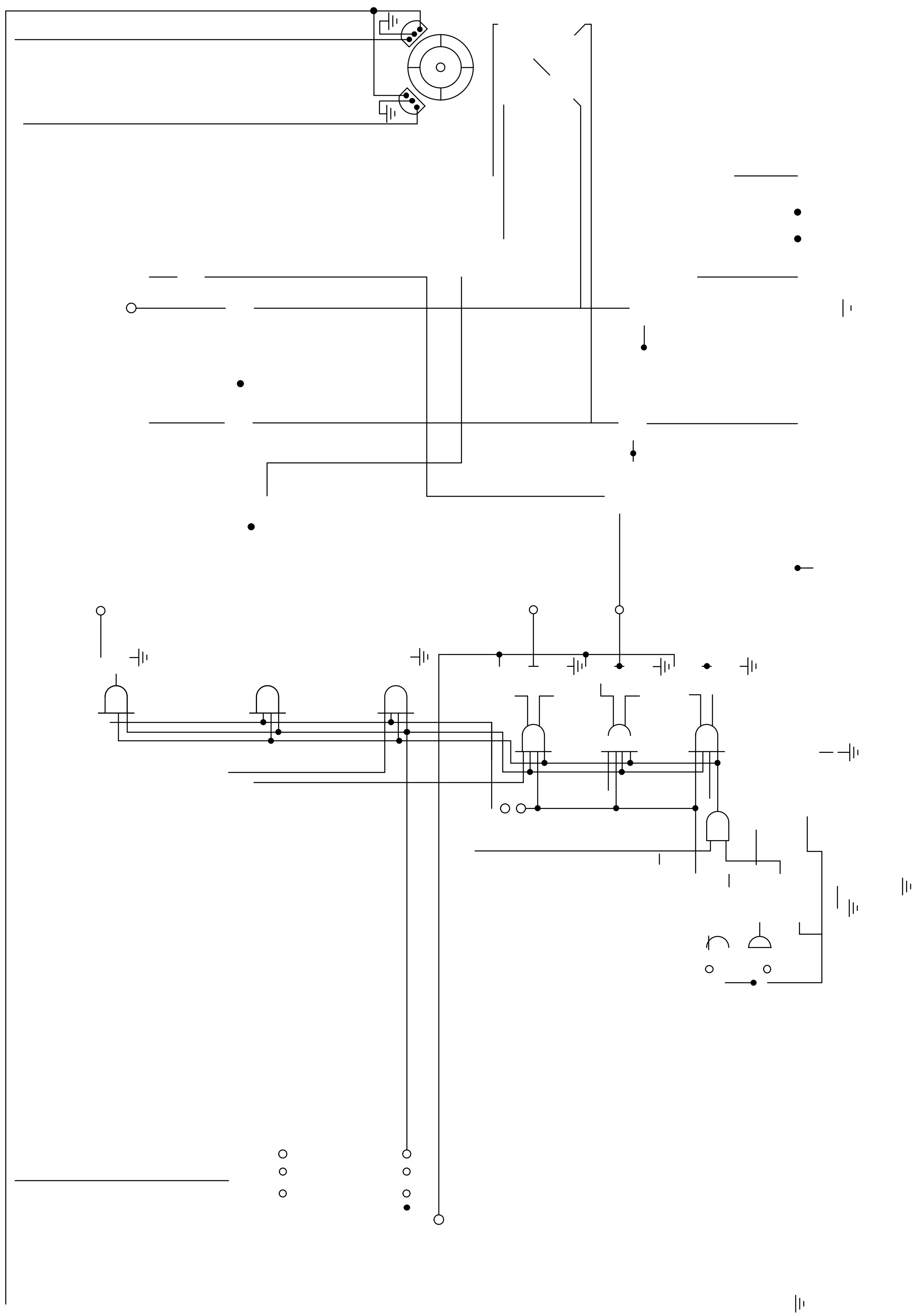


Figure 36. Three Phase, Six Step, Full Wave Commutation Waveforms

Three Phase Closed Loop Controller

Figure 38. Closed Loop Brushless DC Motor Control With the MC33033 Using the MC33039

Sensor Phasing Comparison



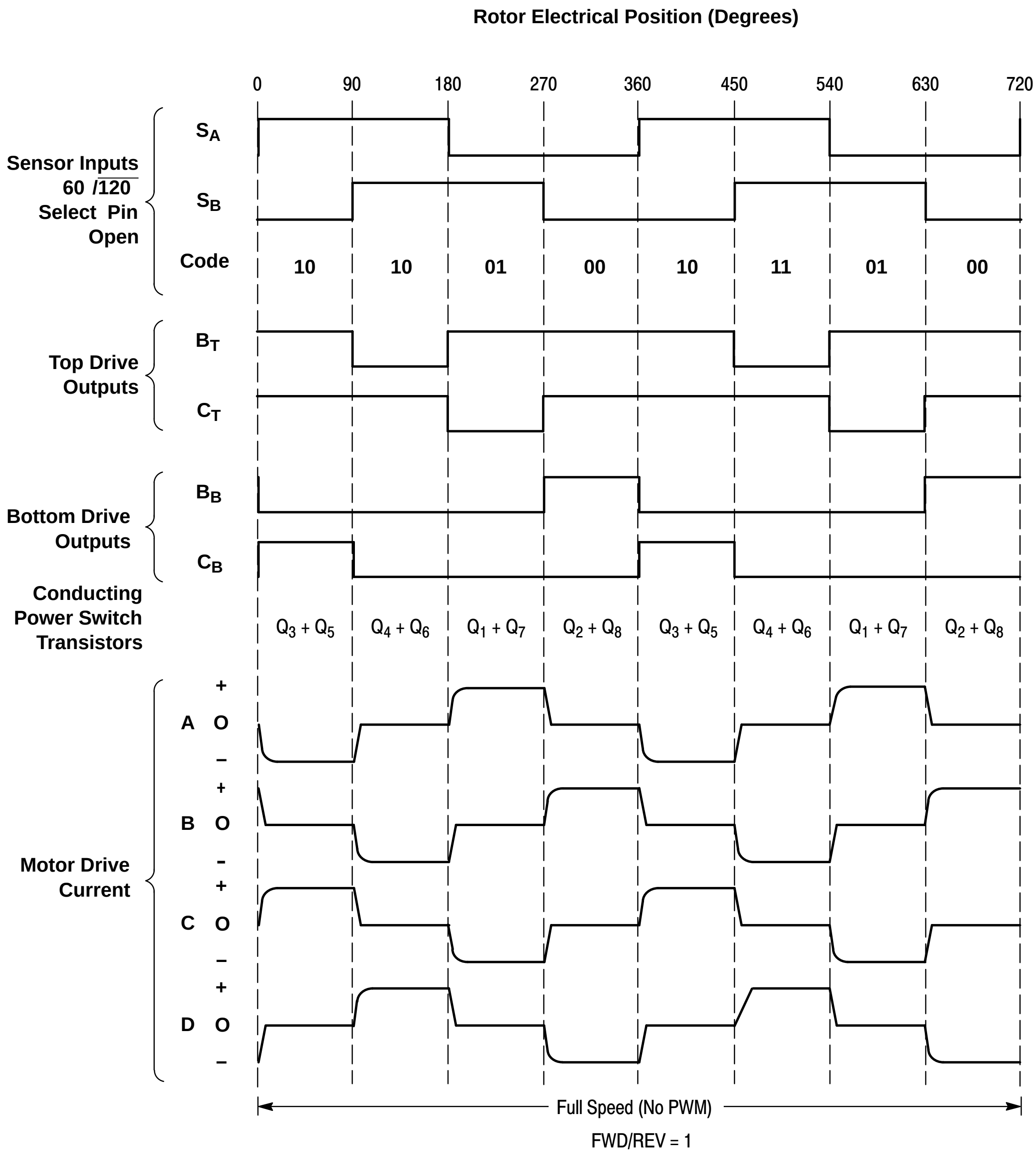
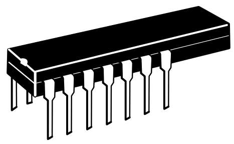
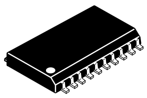


Figure 43. Four Phase, Four Step, Full Wave Commutation Waveforms

ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping
		–	
		– –	
		–	
	–	– –	
		–	
		– –	
	–	–	





CASE 751D−05
ISSUE H

DATE 22 APR 2015