3253

High Voltage half bridge driver

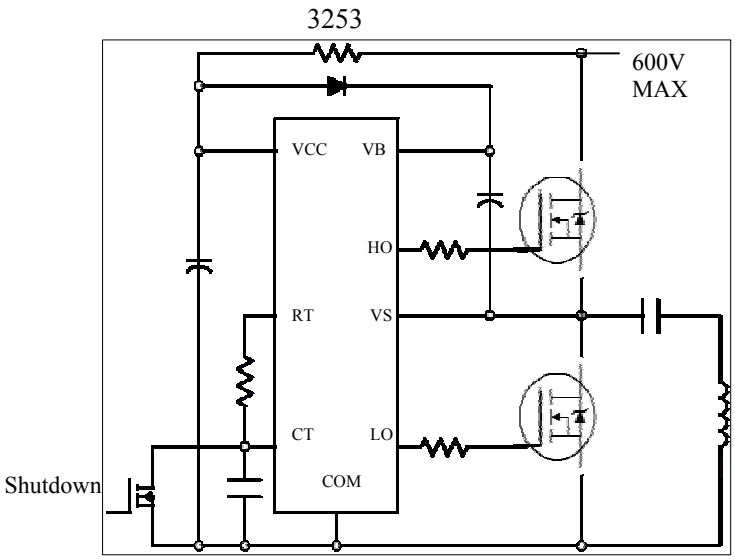
General Description

The 3253 are an high voltage half bridge driver which incor-porates a high voltage half-bridge gate driver with a front end oscillator similar to the industry standard CMOS 555 timer. The 3253 provides more functionality and is easier to use. A shutdown feature has been designed into the CT pin, so that both gate driver outputs can be dis-abled using a low voltage control signal. In addition, the gate driver output pulse widths are the same once the rising undervoltage lockout threshold on VCC has been reached, resulting in a more stable profile of fre-quency vs time at startup. Noise immunity has been im-proved significantly, both by lowering the peak di/dt of the gate drivers, and by increasing the undervoltage lock-out hysteresis to 1V. Finally, special attention has been payed to maximizing the latch immunity of the device, and providing comprehensive ESD protection on all pins.

Key Features

- Integrated 600V half-bridge gate driver
- 15.6V zener clamp on Vcc
- True micropower start up
- Tighter initial deadtime control
- Low temperature coefficient deadtime
- Shutdown feature (1/6th Vcc) on CT pin
- Increased undervoltage lockout Hysteresis (1V)
- Lower power level-shifting circuit
- Constant LO, HO pulse widths at startup
- Lower di/dt gate driver for better noise immunity
- Low side output in phase with RT
- Excellent latch immunity on all inputs and outputs
- ESD protection on all leads
- Also available LEAD-FREE

Typical Application



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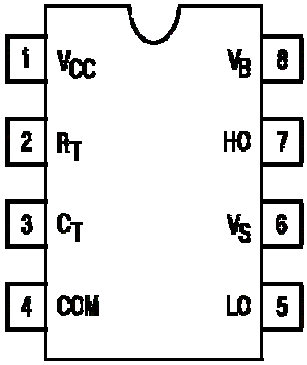
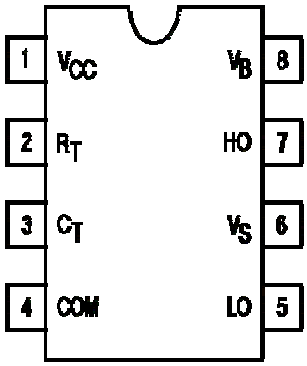
Pin Assignments

3253P



8 Lead PDIP

3253S



8 Lead SOIC

Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage param- eters are absolute voltages referenced to COM, all currents are defined positive into any lead. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Symbol	Definition		Min.	Max.	Units
VB	High side floating supply voltage		-0.3	625	V
VS	High side floating supply offset voltage		VB - 25	VB + 0.3	
VHO	High side floating output voltage		VS - 0.3	VB + 0.3	
VLO	Low side output voltage		-0.3	VCC + 0.3	
VRT	RT pin voltage		-0.3	VCC + 0.3	
VCT	CT pin voltage		-0.3	VCC + 0.3	
ICC	Supply current (note 1)		—	25	mA
IRT	RT pin current		-5	5	
dVs/dt	Allowable offset voltage slew rate		-50	50	V/ns
PD	Maximum power dissipation @ TA ≤ +25°C	(8 Lead DIP)	—	1.0	W
		(8 Lead SOIC)	—	0.625	
RthJA	Thermal resistance, junction to ambient	(8 Lead DIP)	—	125	°C/W
		(8 Lead SOIC)	—	200	
TJ	Junction temperature		-55	150	°C
TS	Storage temperature		-55	150	
TL	Lead temperature (soldering, 10 seconds)		—	300	

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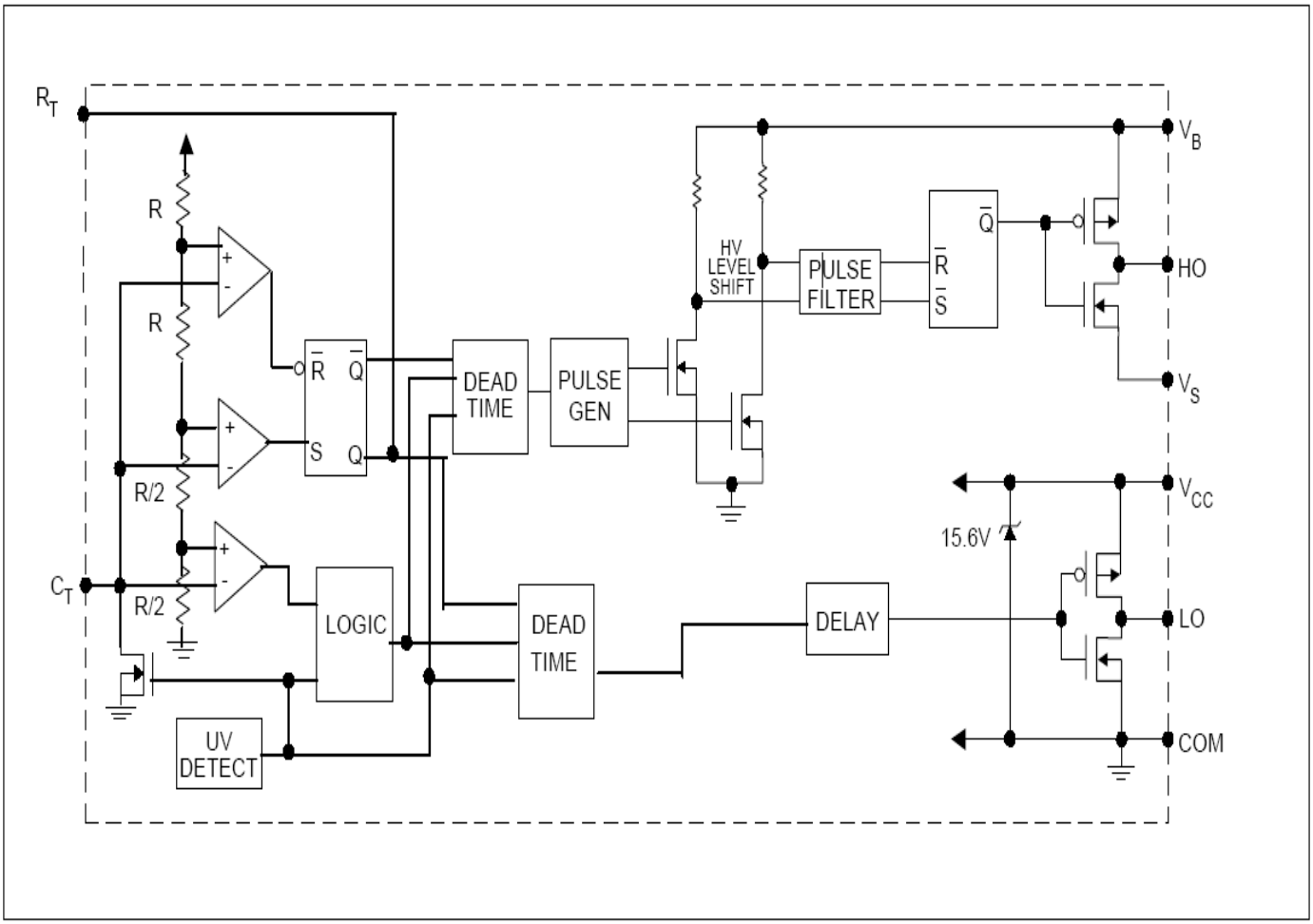
Block Diagram

Functional Block Diagram for 3253



Electrical Characteristic

V_{BIAS} (V_{CC}, V_{BS}) = 12V, CL = 1000 pF, CT = 1 nF and TA = 25°C unless otherwise specified. The V_{IN}, V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Low Voltage Supply Characteristics						
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{CCUV+}	Rising V_{CC} undervoltage lockout threshold	8.1	9.0	9.9	V	
V_{CCUV-}	Falling V_{CC} undervoltage lockout threshold	7.2	8.0	8.8		
V_{CCUVH}	V_{CC} undervoltage lockout Hysteresis	0.5	1.0	1.5		
I_{QCCUV}	Micropower startup VCC supply current	—	75	150	μA	$V_{CC} \leq V_{CCUV-}$
I_{QCC}	Quiescent VCC supply current	—	500	950		
V_{CLAMP}	V_{CC} zener clamp voltage	14.4	15.6	16.8	V	I_{CC} = 5mA
Floating Supply Characteristics						
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
I_{QBSUV}	Micropower startup VBS supply current	—	0	10	μA	$V_{CC} \leq V_{CCUV-}$
I_{QBS}	Quiescent VBS supply current	—	30	50		
V_{BSMIN}	Minimum required VBS voltage for proper functionality from RT to HO	—	4.0	5.0	V	$V_{CC}=V_{CCUV+}$ + 0.1V
I_{LK}	Offset supply leakage current	—	—	50	μA	VB = VS = 600V
Oscillator I/O Characteristics						
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
fosc	Oscillator frequency	19.4	20	20.6	kHz	RT = 36.9kW
		94	100	106		RT = 7.43kW
d	RT pin duty cycle	48	50	52	%	fo < 100kHz
ICT	CT pin current	—	0.001	1.0	uA	
ICTUV	UV-mode CT pin pulldown current	0.30	0.70	1.2	mA	VCC = 7V
VCT+	Upper CT ramp voltage threshold	—	8.0	—	V	
VCT-	Lower CT ramp voltage threshold	—	4.0	—		
VCTSD	CT voltage shutdown threshold	1.8	2.1	2.4		
VRT+	High-level RT output voltage, VCC - VRT	— —	10 100	50 300	mV	IRT = 100μA IRT = 1mA
VRT-	Low-level RT output voltage	— —	10 100	50 300		IRT = 100μA IRT = 1mA
VRTUV	UV-mode RT output voltage	—	0	100		Vcc≤Vccuv-
VRTSD	SD-Mode RT output voltage, VCC - VRT	—	10	50		I_{RT} = 100μA V_{CT} = 0V
		—	10	300		I_{RT} = 1mA V_{CT} = 0V

Electrical Characteristic (Continued)

Gate Driver Output Characteristics						
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
VOH	High level output voltage, VBIAS -Vo	—	0	100	mV	Io = OA
VOL	Low-level output voltage, VO	—	0	100		Io = OA
VOL_-UV	UV-mode output voltage, VO	—	0	100		Io=OA Vcc≤Vccuv-
tr	Output rise time	—	80	150	nsec	
tf	Output fall time	—	45	100		
tsd	Shutdown propogation delay	—	660	—		
td	Output deadtime (HO or LO)	0.75	1.20	1.65	µsec	

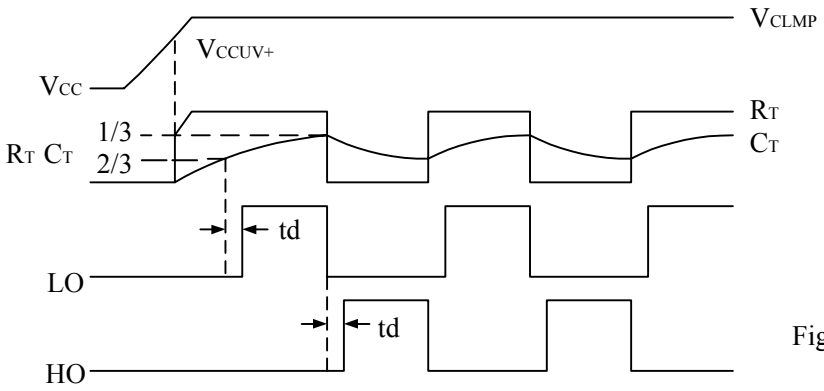


Figure 1. Input/Output Timing Diagram

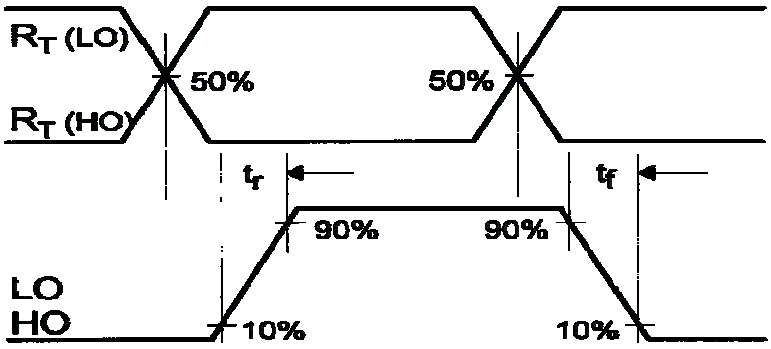


Figure 2. Switching Time Waveform Definitions

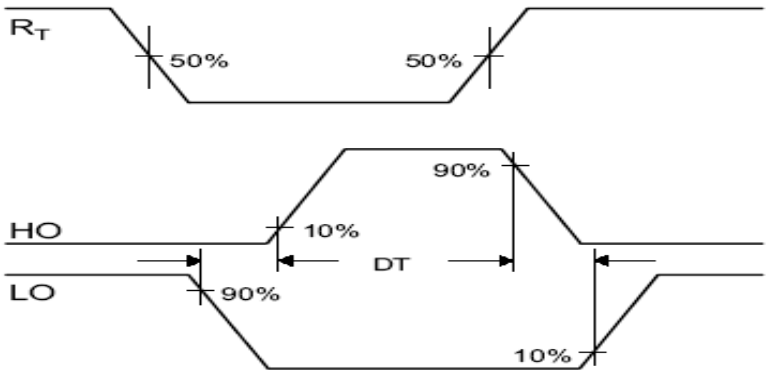


Figure 3. Deadtime Waveform Definitions

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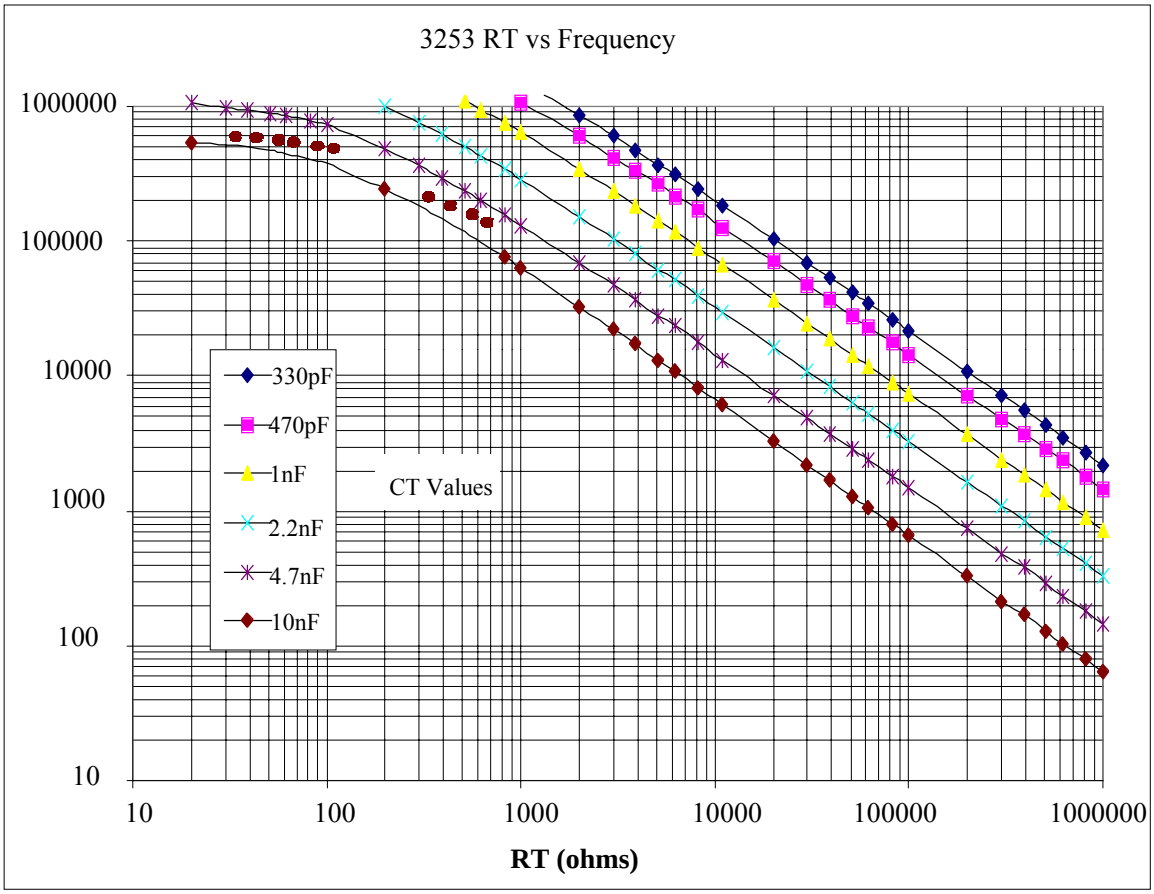
Ordering Information

Leadfree Part	Leadfree Part
8-Lead PDIP 3253P order 3253P	8-Lead SOIC 3253S order 3253S

Recommended Component Values

Symbol	Component	Min.	Max.	Units
RT	Timing resistor value	10	—	kΩ
CT	CT pin capacitor value	330	—	pF



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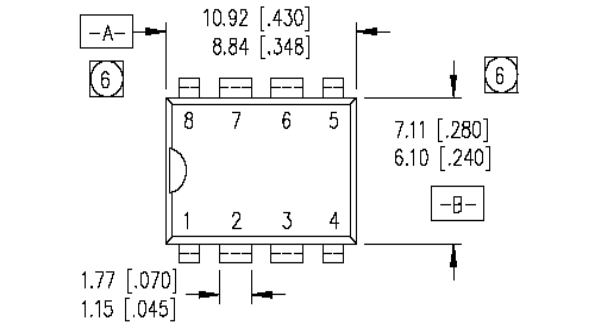
Mechanical Dimensions

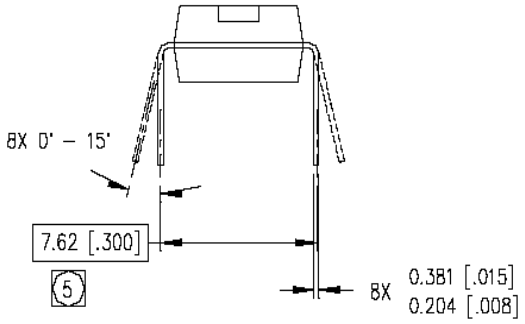


NOTES:

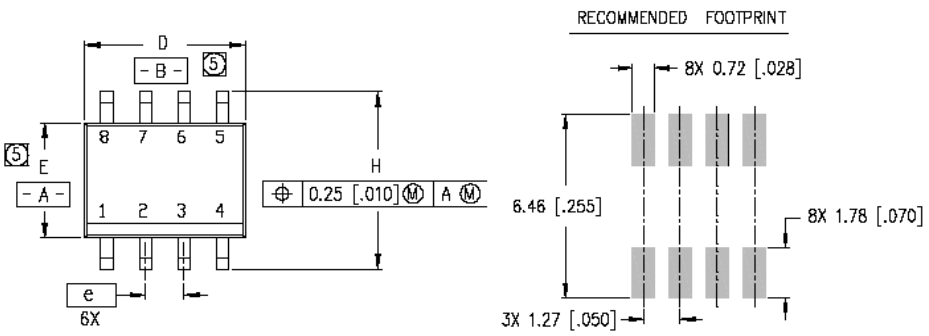
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M–1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS–001AB.

(5) MEASURED WITH THE LEADS CONSTRAINED TO BE PERPENDICULAR TO DATUM PLANE C.

(6) DIMENSION DOES NOT INCLUDE MOLD PROTUSIONS. MOLD PROTUSIONS SHALL NOT EXCEED 0.25 [.010].



8 Lead PDIP 01-3003 01



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	.016	.050	0.41	1.27
y	0°	8°	0°	8°

NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M–1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS–012AA.

(5) DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.006].

(6) DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

8 Lead SOIC 01-0021 08

版本：A