

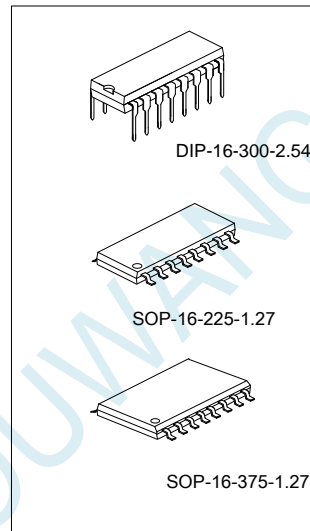
VOLTAGE-MODE PWM CONTROLLER

DESCRIPTION

The UTC3525 is a monolithic integrated circuit that included all of the control circuit necessary for a pulse width modulating regulator. There are a voltage reference, an error amplifier, a pulse width modulator, an oscillator, under-voltage lockout, soft start circuit, and output drivers in the chip.

FEATURES

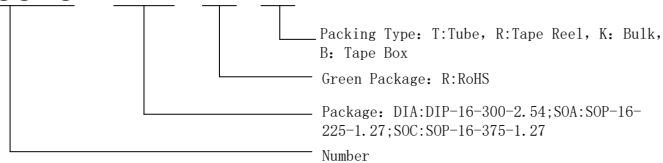
- * 5.1V± 1% Reference
- * Oscillator Sync Terminal
- * Internal Soft Start
- * Dead time Control
- * Under-Voltage Lockout



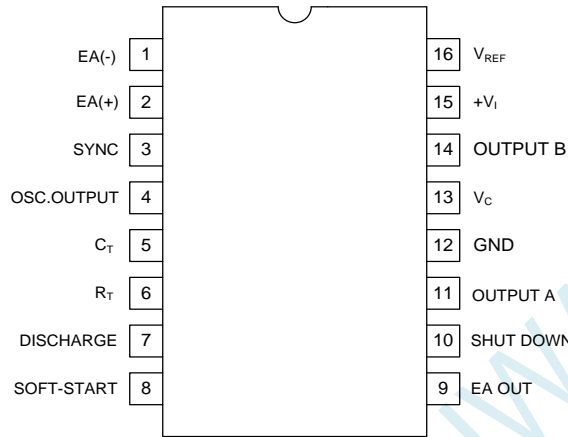
ORDERING INFORMATION

Ordering Number	Package	Print Number	Free	Packing
UTC3525-DIA-R-T	DIP-16-300-2.54	UTC3525D	RoHS	Tube
UTC3525-SOA-R-T	SOP-16-225-1.27	UTC3525E	RoHS	Tube
UTC3525-SOA-R-R	SOP-16-225-1.27	UTC3525E	RoHS	Tape Reel
UTC3525-SOC-R-T	SOP-16-375-1.27	UTC3525M	RoHS	Tube
UTC3525-SOC-R-R	SOP-16-375-1.27	UTC3525M	RoHS	Tape Reel

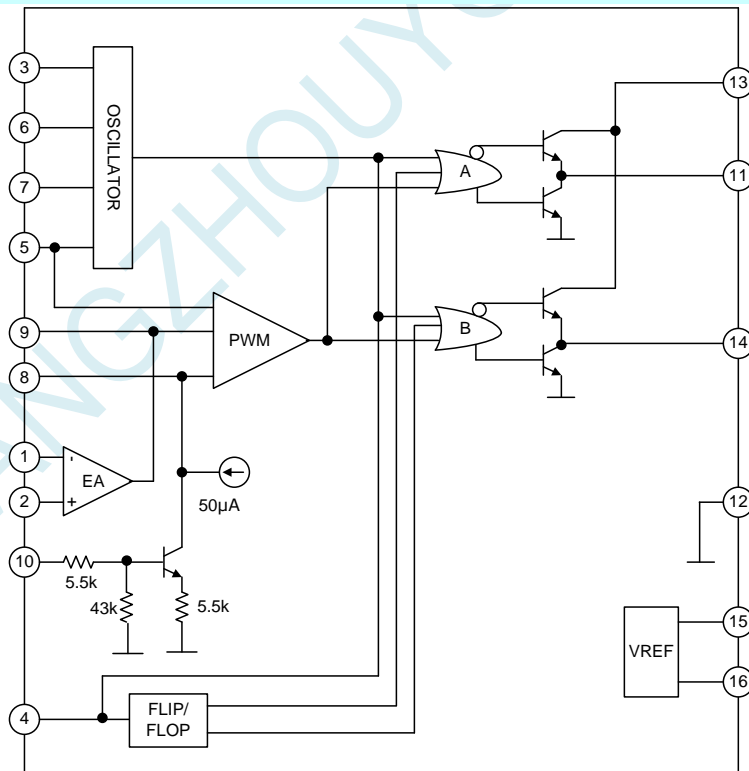
UTC3525 - DIA - R - T



PIN CONFIGURATIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	40	V
Collector Supply Voltage	V_C	40	V
Output Current, Sink or Source	I_O	500	mA
Reference Output Current	I_{REF}	50	mA
Oscillator Charging Current	$I_{CHG(OSC)}$	5	mA
Power Dissipation ($T_A = 25^\circ\text{C}$)	P_D	1000	mW
Junction Temperature	T_J	-40 ~ +125	$^\circ\text{C}$
Operating Ambient Temperature	T_{OPR}	0 ~ +70	$^\circ\text{C}$
Storage Temperature	T_{STG}	-65 ~ +150	$^\circ\text{C}$
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	+260	$^\circ\text{C}$

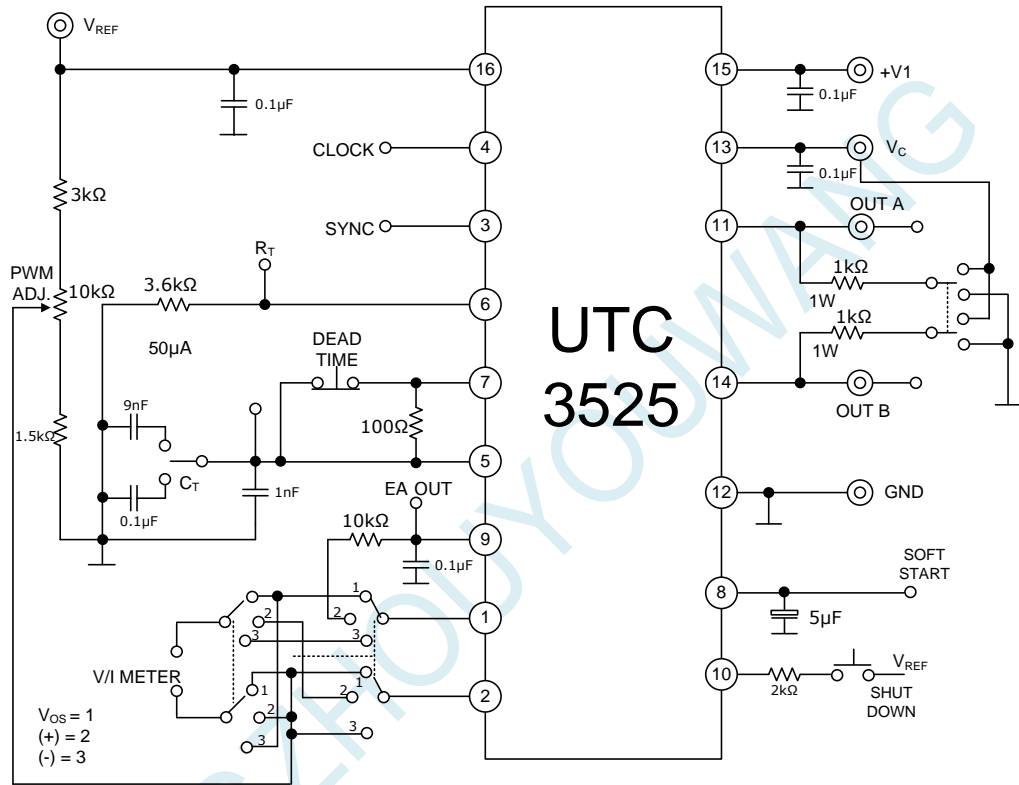
ELECTRICAL CHARACTERISTICS ($V_{CC} = 20\text{V}$, unless otherwise specified)

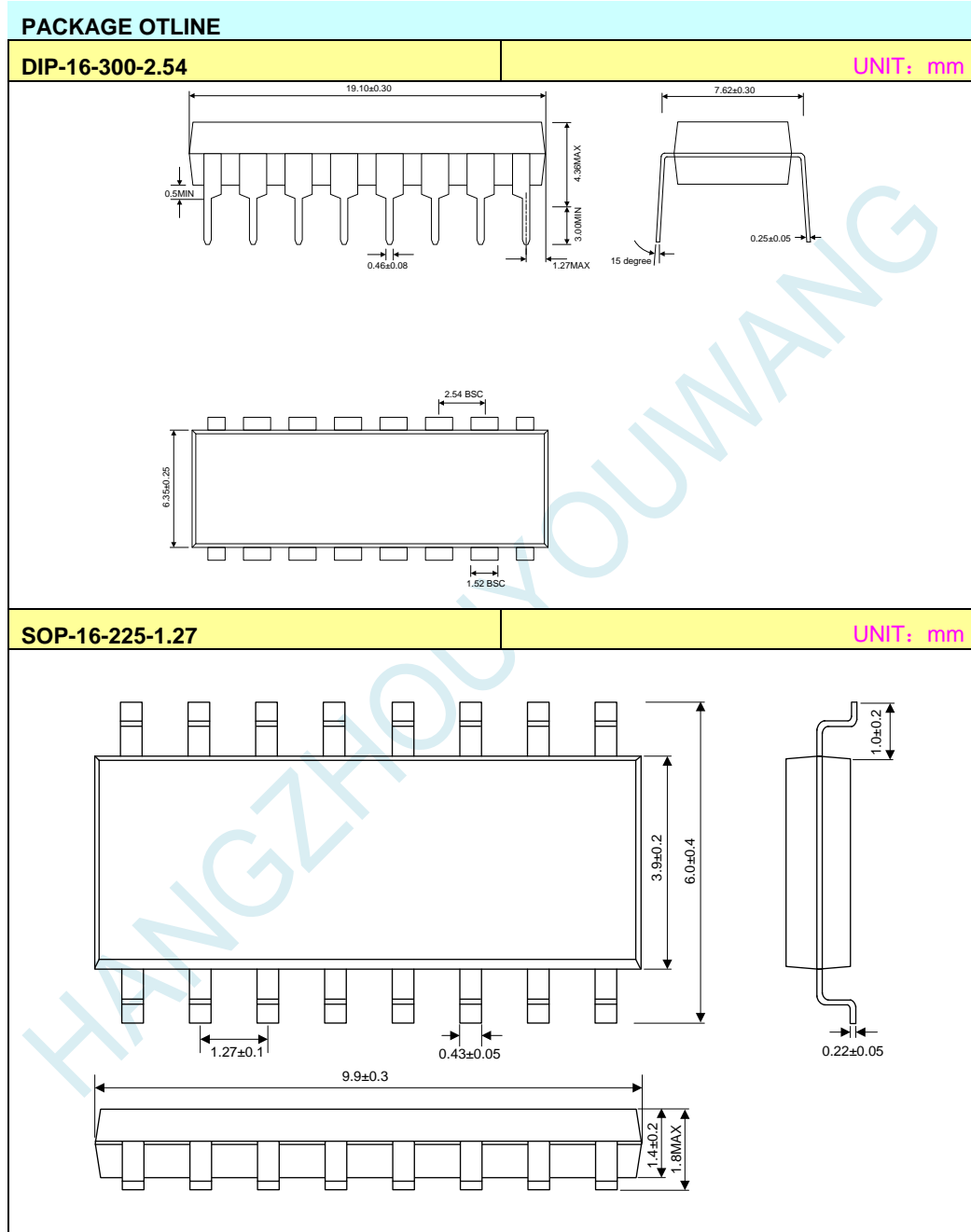
Characteristic	Symbol	Test Conditions	Min	Typ.	Max	Unit
REFERENCE SECTION						
Reference Output Voltage	V_{REF}	$T_J = 25^\circ\text{C}$	5.0	5.1	5.2	V
Line Regulation	ΔV_{REF}	$V_{CC} = 8 \text{ to } 35\text{V}$		9	20	mV
Load Regulation	ΔV_{REF}	$I_{REF} = 0 \text{ to } 20\text{mA}$		20	50	mV
Short Circuit Output Current	I_{SC}	$V_{REF} = 0, T_J = 25^\circ\text{C}$		80	100	mA
Total Output Variation (Note 1)	ΔV_{REF}	Line, Load and Temperature	4.95		5.25	V
Temperature Stability (Note 1)	ST_T			20	50	mV
Long Term Stability (Note 1)	ST	$T_J = 25^\circ\text{C}, 1 \text{ KHrs}$		20	50	mV
OSCILLATOR SECTION						
Initial Accuracy (Note 1, 2)	ACCUR	$T_J = 25^\circ\text{C}$		± 3	± 6	%
Frequency Change With Voltage	$\Delta f / V_{CC}$	$V_{CC} = 8 \text{ to } 35\text{V}$ (Note 1, 2)		± 0.8	± 2	%
Maximum Frequency	$f_{(MAX)}$	$R_T = 2\text{K}\Omega, C_T = 470\text{pF}$	400	430		KHz
Minimum Frequency	$f_{(MIN)}$	$R_T = 200\text{K}\Omega, C_T = 0.1\mu\text{F}$		60	120	Hz
Clock Amplitude (Note 1, 2)	$V_{(CLK)}$		3	4		V
Clock Width (Note 1, 2)	$t_{W(CLK)}$	$T_J = 25^\circ\text{C}$	0.3	0.6	1	μs
Sync Threshold	$V_{TH(SYNC)}$		1.2	2	2.8	V
Sync Input Current	$I_{I(SYNC)}$	Sync = 3.5V		1.3	2.5	mA
ERROR AMPLIFIER SECTION ($V_{CM} = 5.1\text{V}$)						
Input Offset Voltage	V_{IO}			1.5	10	mV
Input Bias Current	I_{BAIS}			1	10	μA
Input Offset Current	I_{IO}			0.1	1	μA
Open Loop Voltage Gain	G_{VO}	$R_L \geq 10\text{M}\Omega$	60	80		dB
Common Mode Rejection Ratio	CMRR	$V_{CM} = 1.5 \text{ to } 5.2\text{V}$	60	90		dB
Power Supply Rejection Ratio	PSRR	$V_{CC} = 8 \text{ to } 35\text{V}$	50	60		dB

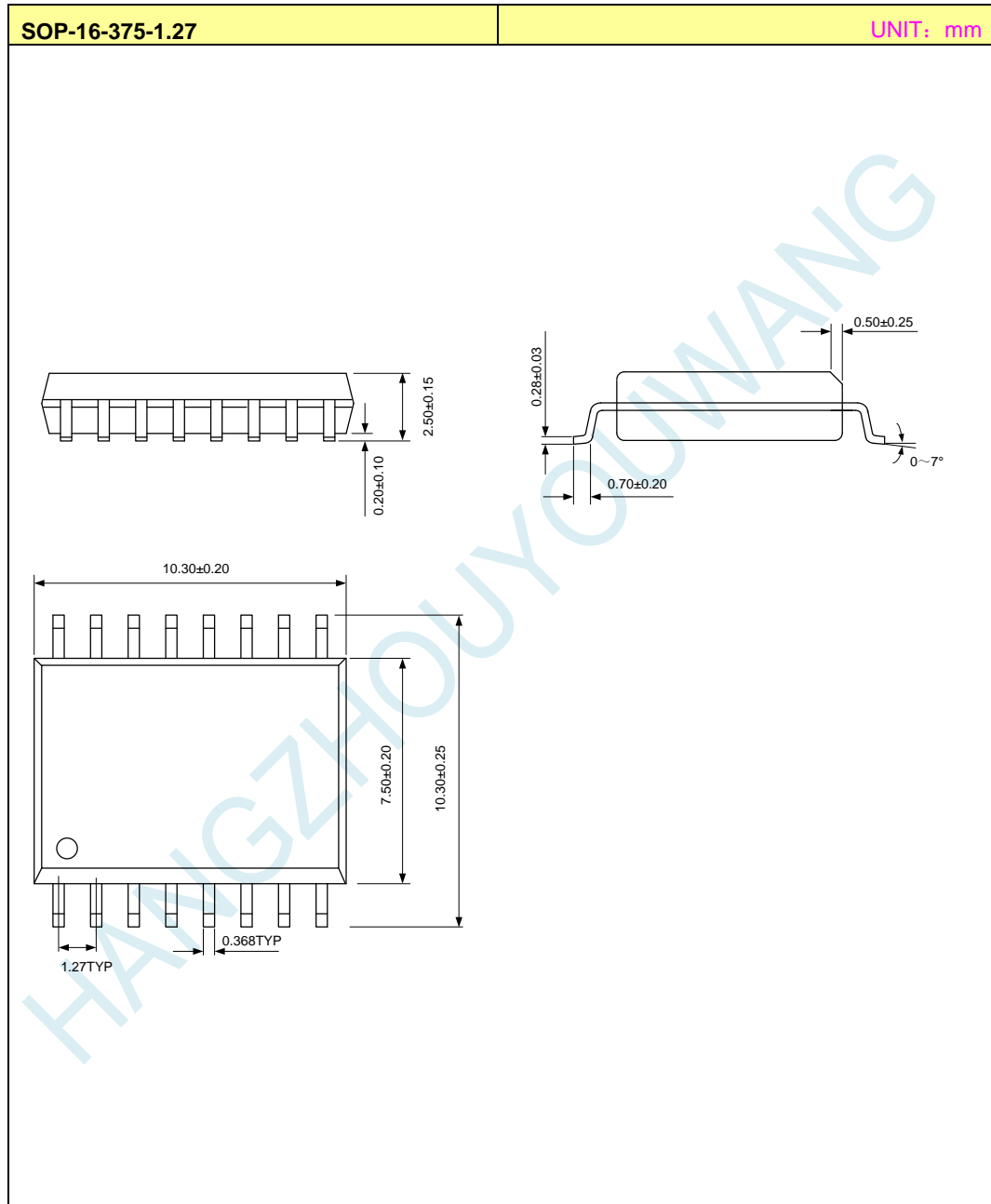
Characteristic	Symbol	Test Conditions	Min	Typ.	Max	Unit
PWM COMPARATOR SECTION						
Minimum Duty Cycle	$D_{(MIN)}$				0	%
Maximum Duty Cycle	$D_{(MAX)}$		45	49		%
Input Threshold Voltage (Note 2)	V_{TH1}	Zero Duty Cycle	0.7	0.9		V
Input Threshold Voltage (Note 2)	V_{TH2}	Max Duty Cycle		3.2	3.6	V
SOFT-START SECTION						
Soft Start Current	I_{SOFT}	$V_{SD} = 0V, V_{SS} = 0V$	25	51	80	μA
Soft Start Low Level Voltage	V_{SL}	$V_{SD} = 2.5V$		0.3	0.9	V
Shutdown Threshold Voltage	$V_{TH(SD)}$		0.7	1.3	2.0	V
Shutdown Input Current	$I_{N(SD)}$	$V_{SD} = 2.5V$		0.3	1	mA
OUTPUT SECTION						
Low Output Voltage I	$V_{OL I}$	$I_{SINK} = 20mA$		0.1	0.4	V
Low Output Voltage II	$V_{OL II}$	$I_{SINK} = 100mA$		0.5	2	V
High Output Voltage I	$V_{CH I}$	$I_{SOURCE} = 20mA$	18	19		V
High Output Voltage II	$V_{CH II}$	$I_{SOURCE} = 100mA$	17	18		V
Under Voltage Lockout	V_{UV}	V_8 and $V_9 = High$	6	7	8	V
Collector Leakage Current	I_{LKG}	$V_{CC} = 35V$		80	200	μA
Rise Time (Note 1)	t_R	$C_L = 1nF, T_J = 25^\circ C$		80	600	nS
Fall Time (Note 1)	t_F	$C_L = 1nF, T_J = 25^\circ C$		70	300	nS
STANDBY CURRENT						
Supply Current	I_{CC}	$V_{CC} = 35V$		12	20	mA

Note:1.These parameters, although guaranteed over the recommended operating conditions, are not 100% tested in production
 2.Tested at $f_{osc}=40$ KHz ($R_T=3.6K, C_T=0.01\mu F, R_D=0\Omega$).

TEST CIRCUIT







ELECTROSTATIC DISCHARGE CAUTION

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage handling to prevent electrostatic damage to the device.

NOTICE

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Attach

Revision History

Data	REV	Description	Page
2014.11.17	1.0	Original	
2017.11.06	1.1	Add "Electrostatic Discharge Caution" and "NOTICE"	
2019.06.11	1.2	添加SOP16-225封装及更改版面	
2020.06.12	1.3	添加SOP16-375封装和订购信息	
2021.03.02	1.4	添加结温温度，焊接温度300改为260，上升下降时间条件统一，外形尺寸图更改	

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