

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Range	Unit
Power supply pin	V _{DD}	40	V
DMG voltage to GND	V _{DMG}	-0.3 to 40	V
OUT voltage to GND	V _{OUT}	-0.3 to 40	V
RT voltage to GND	V _{RT}	-0.3 to 5	V
CS voltage to GND	V _{CS}	-0.3 to 5	V
COM voltage to GND	V _{COM}	-0.3 to 5	V
VINT voltage to GND	V _{VINT}	-0.3 to 5	V
Operating junction temperature rang	T _J	-40 to +125	°C
Operating ambient temperature rang	T _{OPA}	-40 to +85	°C
Storage temperature rang	T _{STG}	-65 to +150	°C
Lead temperature (Soldering 5 sec)	T _{LEAD}	260	°C
Power dissipation @TA=25 °C	P _D	0.4	W
Thermal resistance junction to ambient	θ _{JA}	160	°C/W
ESD rating (Human body mode)	V _{ESD}	2	kV

Electrical Characteristics (V_{CC}=15 , T_A=25°C, unless otherwise specified.)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Turn-on voltage	V _{CC_ON}		17.2	18.2	19.2	V
Turn-off voltage	V _{CC_OFF}		9.5	10	10.5	V
Quiescent current	I _Q		--	25	35	uA
Normal current consumption	I _{CC}		--	1	2	mA

PROTECTION

VCC voltage protection	V _{OVPA}		31	32	33	V
Output voltage protection	V _{OVPS}		10	10.5	11	V
CS limit voltage	V _{OCPH}		1.2	1.25	1.3	V
CS limit voltage(Short Circuit)	V _{OCPL}		0.3	0.33	0.36	V

OSCILLATOR

Start up timer	T _{STR}	R _{RT} =50Kohm	--	240	--	us
Switch timer(with jitter)	T _S	R _{RT} =50Kohm	--	24	--	us

MULTIPLY

Multiply gain	K _P		--	12.5	--	V
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ERROR AMPLIFIER

Transconductance	G _M		84	120	156	umho
Reference voltage	V _{REF}		2.475	2.5	2.525	V
Maximum sink current	I _{COM_SINK}		--	55	--	uA
Maximum source current	I _{COM_SOUR}		--	55	--	uA

Application Information

Function Description

The TS19704 is a constant current Flyback controller with primary side control and PFC function for LED lighting applications. Which controller is DCM operation with constant on time based regulator design. In other to achieve high power factor and good EMI performance. This control algorithm fix I_{CS_PK} in wide range variation of Line voltage. We can design transformer critically by $I_{CS(Limit)}$ function. The TS19704 are built-in functions of VCC over voltage protection, open LED protection, short LED protection, over temperature protection, and primary side current limit, and gate clamp within. The TS19704 sense switch current from CS voltage Multiplier by TDIS to provide the integral result(VINT). The avarge VINT is finally 2.5V(Vref) by the system close loop feedback. The avarge output current can express as below.

$$I_{O_avg} = \frac{N_P}{N_S} \times \frac{2.5}{2 \times K_P \times R_S}$$

Pin Detail Description

RT

Switch timer(T_s) and Start up timer(T_{str}) setup $T_{str} = 10T_s$:

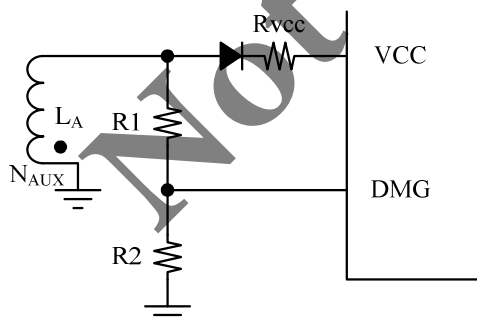
$$T_s(\mu s) = \frac{R_T}{2250}$$

$$T_{STR}(\mu s) = \frac{R_T}{225}$$

DMG

The Output voltage is reflected by the auxiliary winding(NAUX) voltage of Flyback transformer, the DMG pin can sense output information to depart from start up voltage(V_{O_STR}) and protection voltage(V_{O_OVP}).

When DMG sense voltage under V_{O_STR} , the circuit will work on short circuit protection, $FSTR=1/T_{str}$, $V_{CS_PK}=0.35V$, When DMG sense voltage over V_{O_OVP} , the circuit will work on over voltage protection, it will latch out off until V_{CC} under V_{CC_OFF} .



$$V_{O_STR} = \frac{N_S}{N_A} \times 3 \times \frac{R_1 + R_2}{R_2}$$

$$V_{O_OVP} = \frac{N_S}{N_A} \times V_{OVPS} \times \frac{R_1 + R_2}{R_2}$$

Pin Detail Description (Continue)**VCC**

Power supply for the controller during normal operation. The controller will start up when V_{CC} reaches 18V (typical) and will shut-down when V_{CC} voltage is below 9.5V (typical). A decoupling capacitor should be connected between the V_{CC} and GND pin as close as possible. The TS19704 perform V_{CC} over voltage protection though V_{CC} pin. Once V_{CC} pin exceed in 32V, TS19704 turns off and latch out the MOSFET switcher until V_{CC} under V_{CC_OFF} .

OUT

Gate drive for external MOSFET switch. Gate clamp function within.

CS

MOSFET current signal sensing for Multiply(K_P)

$$I_{CS(Limit)} = \frac{1.25}{R_s}$$

GND

GND is the reference node of internal circuit.

COM

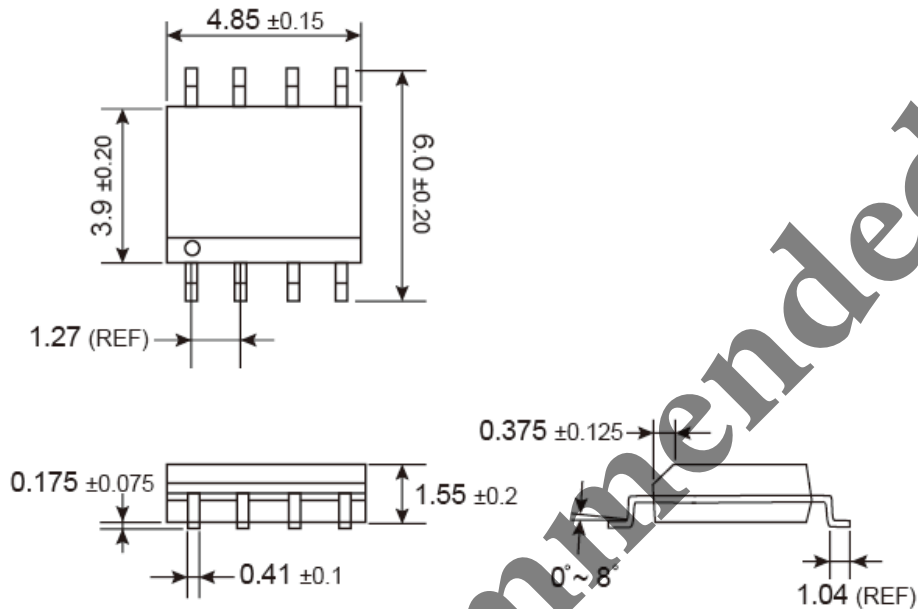
This is the output of the Gm amplifier. Connect with a suitable RC network to ground.

VINT

The VINT pin connect with a suitable Capacitor to ground. It saved the integral result of the VCS Multiplier by TDIS,

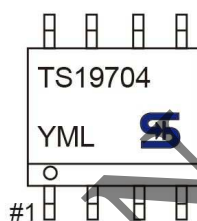
Not Recommended

SOP-8 Mechanical Drawing



Unit: Millimeters

Marking Diagram



Y = Year Code

M = Month Code for Halogen Free Product

(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep,

X=Oct, **Y**=Nov, **Z**=Dec)

L = Lot Code

Not Recommended

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