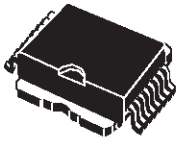
TDA7475A

ELECTRO-LUMINESCENT DISPLAY DRIVER

- INTERNAL CLOCK GENERATION
- STAND-BY FUNCTION
- VOLTAGE SET-UP CONVERSION FUNCTION
- ANTI-RADIATION TRAPEZOIDAL WAVE FOR E.L. DISPLAY DRIVING
- CONSTANT CURRENT CHARGE/DISCHARGE OF E.L. DISPLAY
- 2-STEP BRIGHTNESS CONTROL (NORMAL OR DIMMED LUMINANCE)
- PROTECTIONS WITH AUTOMATIC RESET:
  - COIL-SWITCHING MOS OVERCURRENT
  - CHIP OVERTEMPERATURE

BCD OFF-LINE TECHNOLOGY



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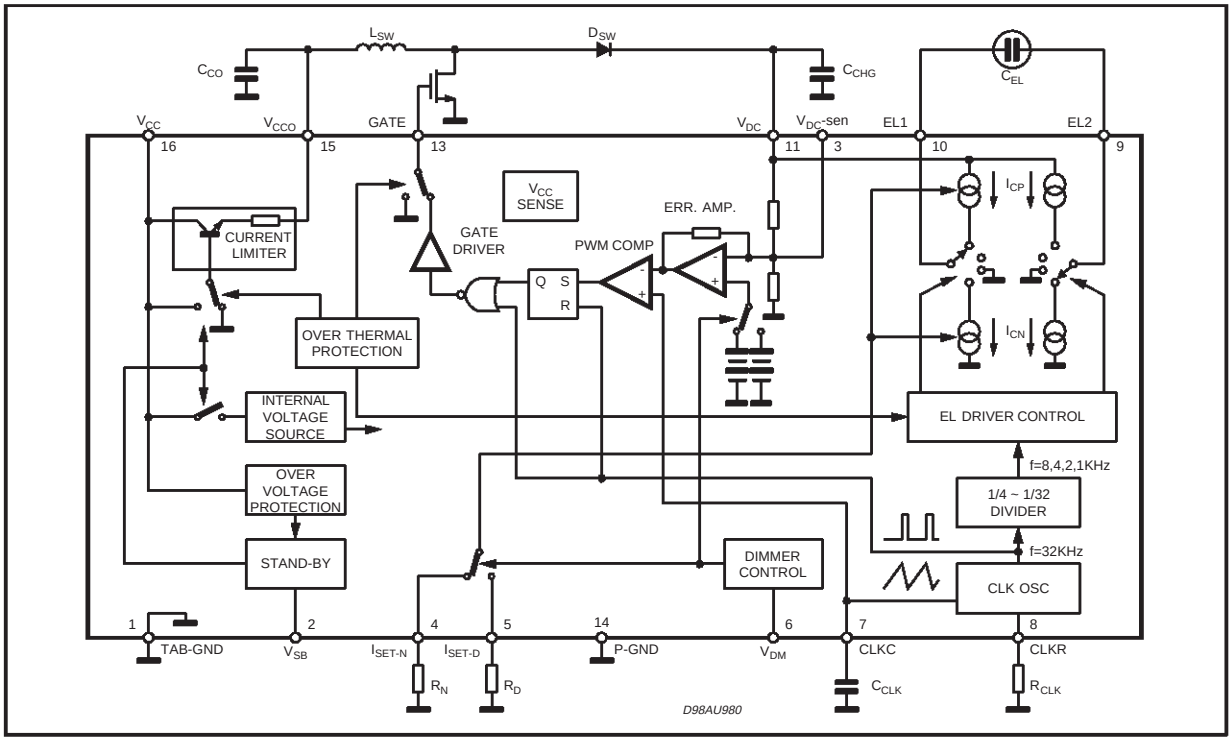
ORDERING NUMBER: TDA7475A

DESCRIPTION

The TDA7475 is a new BCD OFF-LINE technology device intended for EL display lighting in car-radio applications. Time-extended luminance is achieved by driving the display with constant-current pulses, which will automatically compensate for the ageing-related capacitance loss by providing more elevated voltage pulses.

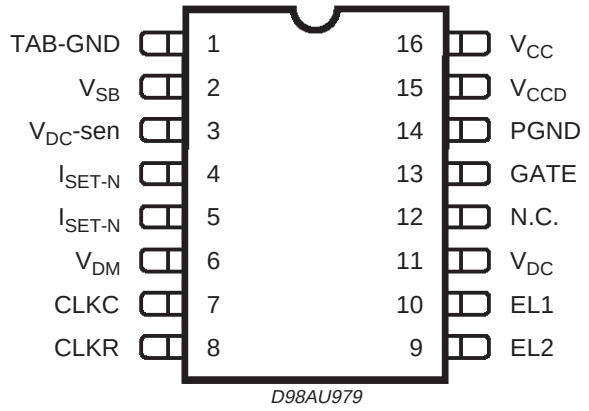
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}(DC)	DC supply voltage	25	V
V_{CC}(pk)	Peak supply voltage	50	V
V_{SB}	Input voltage of V_{SB} pin	18	V
V_{DM}	Input voltage of VDM pin	18	V
V_{DC}	Step up voltage	490	V
$V_{o(min)}$	Minimum Output Voltage (pin 9, 10)	-0.2	V
T_{opr}	Operating temperature range	-40 to +85	°C
T_{stg}	Storage temperature range	-55 to +150	°C
T_j	Junction temperature	160	°C

PIN CONNECTION



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THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Thermal resistance Junction-case	Max.	3	°C/W

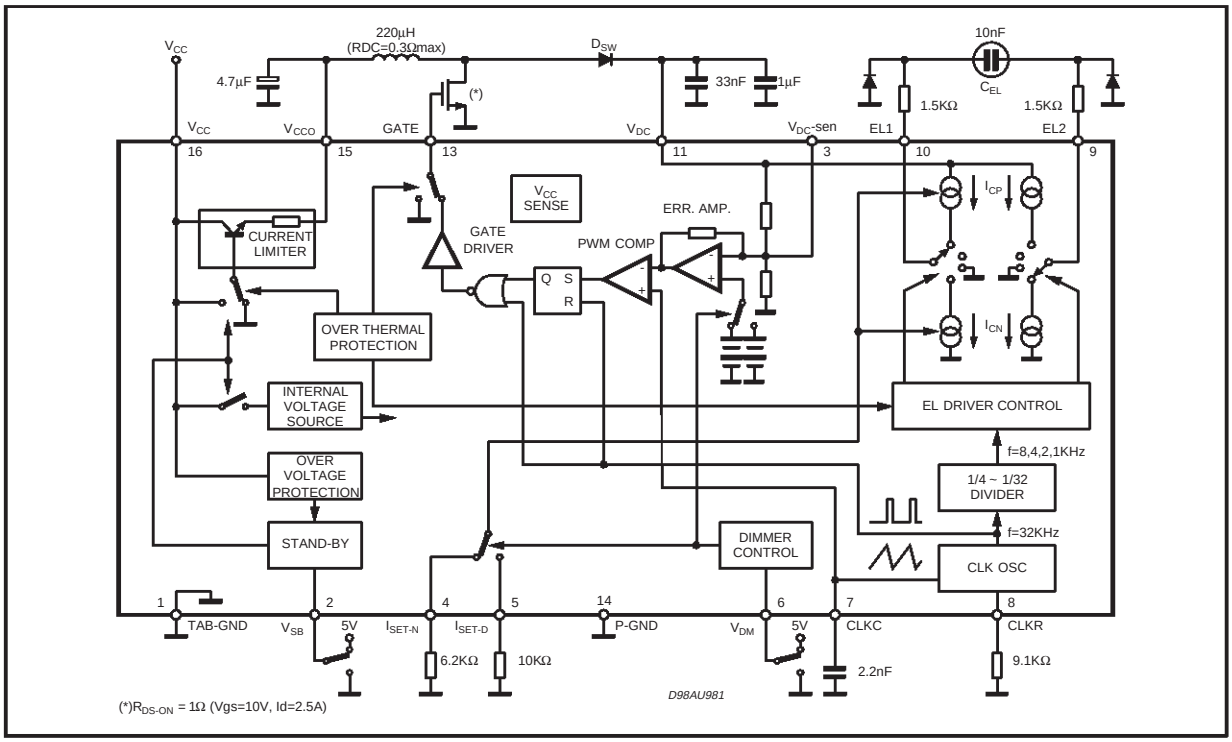
ELECTRICAL CHARACTERISTICS (Refer to the test and application circuit, V_{CC} = 13.2V, T_{amb} = 25°C, unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
OPERATING CONDITIONS						
V_{CC}	Operating supply voltage		10	13.2	17	V
V_{SB}(off) V_{SB}(on)	Input voltage of V_{SB} pin	V_{SB}: L V_{SB}: H	0 3.5		1.5 V_{CC}	V V
I_{SB1}(on) I_{SB2}(on)	Input current of V_{SB} pin	V_{SB} = 5V V_{CC} = 14.4V, V_{SB} = 14.4V			10 200	µA µA
V_{DM}(off) V_{DM}(on)	Input voltage V_{DM} pin	V_{DM}: L (Normal) V_{DM}: H (Dimmer)	0 3.5		1.5 V_{CC}	V V
I_{DM1}(on) I_{DM2}(on)	Input current of V_{DM} pin	V_{DM} = 5V V_{CC} = 14.4V, V_{DM} = 14.4V			10 200	µA µA
STEP UP VOLTAGE						
V_{DC-N1}	V_{DC} voltage	V_{DM}:L (Normal)	440	460	480	V
V_{DC-N2}		V_{DM}: H (Dimmed)	400	420	445	V
EL OUTPUT BLOCK						
I_{CP-N1}	EL charge current	V_{DM}:L (Normal)	14.5		17.5	mA
I_{CP-N4}		V_{CC} = 10V	14.5		17.5	mA
I_{CP-N5}		V_{CC} = 17V	14.5		17.5	mA
I_{CP-D1}		V_{DM}:H (Dimmer)	9		11	mA
N1/P1-N	I_{CN1-N} to I_{CP1-N} ratio	V_{DM}:L (Normal)	2.05	2.45	2.7	—
N2/P2-N	I_{CN2-N} to I_{CP2-N} ratio		2.05	2.45	2.7	—
N1/P1-D	I_{CN1-D} to I_{CP1-D} ratio	V_{DM}:H (Dimmer)	2.05	2.45	2.7	—
N2/P2-D	I_{CN2-D} to I_{CP2-D} ratio		2.05	2.45	2.7	—
T_{ON}	Output time of I_{CP}		118	125	132	µs
f_{EL}	EL switching frequency		900	1000	1100	Hz
V_{DIF}	V_{DC}-V_{EL}(peak)	C_{EL}: 4nF		2.5	5	V
V_{EL-G}	V_{EL} of GND side voltage	When EL charge		2.5	5	V
OSCILLATION CIRCUIT						
f_{CLK}	Internal oscillation frequency		29	32	35	kHz
GATE CONTROL CIRCUIT						
Duty	Switching FET on-time maximum ratio		70	75	80	%
V_{g-on}	High voltage for external switching FET on		10	11.8	V_{CC}-0.5	V
V_{g-off}	Low voltage for external switching FET on				1.5	V

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
PROTECTION CIRCUIT						
I_{CL1}	Output current	$V_{CCO} \geq 5V$	1.0		1.8	A
I_{CL2}	Start and protection current		60	80	110	mA
I_{limit}	Detection current		1.0	1.5	2	A
T_{limit}	Detection time (ICL1 > Ilimit)		$4/f_{CLK}$		$8/f_{CLK}$	s
$V_{start}1$	V_{CCO} of starting I_{CL1}		4.5	5	5.5	V
$V_{start}2$	V_{CCO} of starting Gate		6.3	7	7.7	V
$T_{j\text{-}tsd}$	Tj of thermal shut down		135		145	°C
SUPPLY CURRENT						
I_{stby}	Stand-by current	V_{SB}:L		1	20	µA
I_C	V_{CC} supply mean current (including inductor current)		0.20	0.25	0.30	A

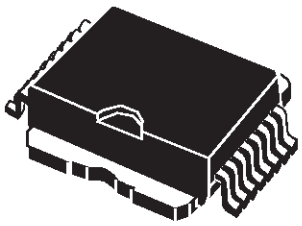
TEST AND APPLICATION CIRCUIT



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A1	0	0.05	0.1	0	0.002	0.004
A2	3.4	3.5	3.6	0.133	0.137	0.141
A3	1.2	1.3	1.4	0.048	0.05	0.052
A4	0.15	0.2	0.25	0.006	0.007	0.01
a		0.2			0.007	
b	0.27	0.35	0.43	0.011	0.013	0.017
c	0.23	0.27	0.32	0.009	0.01	0.012
D	9.4	9.5	9.6	0.37	0.374	0.377
D1	7.4	7.5	7.6	0.291	0.295	0.299
d		0.1			0.004	
E (1)	13.85	14.1	14.35	0.545	0.555	0.565
E1	9.3	9.4	9.5	0.366	0.37	0.374
E2	7.3	7.4	7.5	0.287	0.291	0.295
E3	5.9	6.1	6.3	0.232	0.24	0.248
e		0.8			0.031	
e1		5.6			0.22	
F		0.5			0.019	
G		1.2			0.047	
L	0.8	0.95	1.1	0.031	0.037	0.043
R1			0.25			0.01
R2		0.8			0.031	
T	2° (min.), 5° (typ.), 8° (max.)					
T1	6° (typ.)					
T2	10° (typ.)					

(1) Resin protrusions not included (max value: 0.1mm per side).

OUTLINE AND MECHANICAL DATA



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