

### Technical Document

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### Features

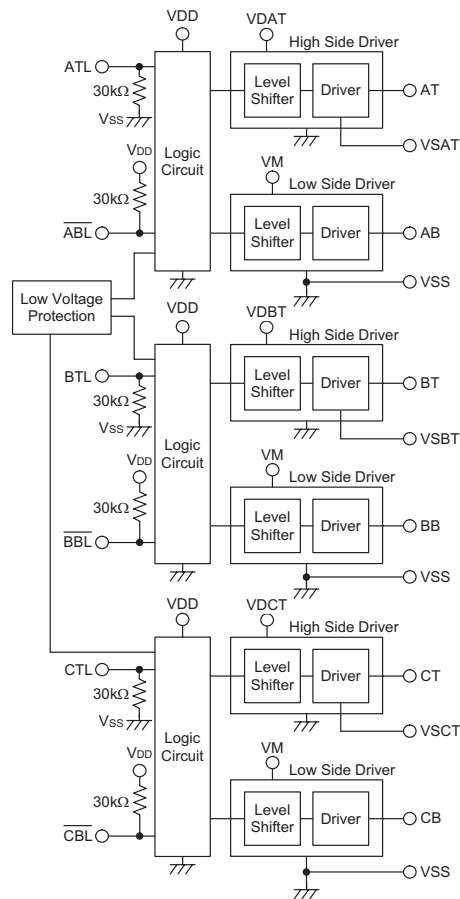
- Three low side and high side MOSFET driver
- Low side drive supply range from 9V~20V with low voltage protection
- High side driver output maximum voltage is 80V
- Input logic supply range from 4.5V~5.5V
- Low voltage protection function
- 24-pin SKDIP/SOP package

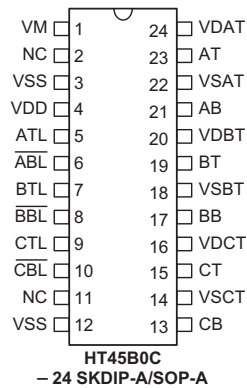
### General Description

The devices are for power MOSFET gate drivers, which interface directly to driver the power MOSFET. There are three high side drivers and three low side drivers to driver six N-channel power MOSFET.

The high side driver operates up to 80 Volts. The input logic power is from VDD, so it can easy to interface with microcontroller.

### Block Diagram



**Pin Assignment**

**Pin Description**

Pin Name	I/O	Description
V DAT V DBT V DCT	—	Upper side power MOSFET gate driver positive power supply
A T B T C T	O	High side high voltage drive output
V SAT V SBT V SCT	—	Upper side power MOSFET gate driver negative power supply
A B B B C B	O	Low side high voltage drive output
A TL B TL C TL	I	Logic input for high side gate driver output (AT, BT, CT)
$\overline{A}BL$ $\overline{B}BL$ $\overline{C}BL$	I	Logic input for low side gate driver output (AB, BB, CB)
V M	—	Low side driver power supply and power supply for V DAT/V SAT, V DBT/V SBT, V DCT/V SCT charging capacitors
V DD	—	Logic power supply
V SS	—	Negative power supply, ground

**Absolute Maximum Ratings**

VDD Supply Voltage .....	$V_{SS}-0.3V$ to $V_{SS}+6.0V$
VM Supply Voltage .....	$V_{SS}-0.3V$ to $V_{SS}+20V$
V DAT, V DBT, V DCT Supply Voltage .....	$V_{SS}-0.3V$ to $V_{SS}+80V$
VSAT, VSBT, VSCT Supply Voltage .....	$V_{SS}-0.3V$ to $V_{SS}+70V$
Input Voltage .....	$V_{SS}-0.3V$ to $V_{DD}+0.3V$
Storage Temperature .....	$-50^{\circ}C$ to $125^{\circ}C$
Operating Temperature.....	$-40^{\circ}C$ to $85^{\circ}C$
$I_{OL}$ Total .....	150mA
$I_{OH}$ Total.....	-100mA
Total Power Dissipation .....	500mW

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

**D.C. Characteristics**
 $T_a=25^{\circ}C$ 

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>DD</sub>	Conditions				
V <sub>DD</sub>	Operating Voltage	—	—	4.5	—	5.5	V
V <sub>M</sub>	Low Side Driver Power Supply	—	—	V <sub>LVH</sub>	—	20	V
V <sub>LVH</sub>	V <sub>M</sub> Low Voltage Protection Voltage	—	High going	8	9	10	V
V <sub>LVL</sub>	V <sub>M</sub> Low Voltage Protection Voltage	—	Low going	7	8	9	V
I <sub>DD</sub>	V <sub>DD</sub> Operating Current	5V	No load	—	1	2	mA
I <sub>VM</sub>	V <sub>M</sub> Operating Current	—	V <sub>M</sub> =20V	—	0.5	1	mA
V <sub>IL</sub>	Input Low Voltage for ATL, BTL, CTL, ABL, BBL, CBL	5V	—	0	—	0.3V <sub>DD</sub>	V
V <sub>IH</sub>	Input High Voltage for ATL, BTL, CTL, ABL, BBL, CBL	5V	—	0.7V <sub>DD</sub>	—	V <sub>DD</sub>	V
I <sub>OL</sub>	AT, AB, BT, BB, CT and CB Sink Current	—	V <sub>M</sub> and V <sub>DxT</sub> -V <sub>SxT</sub> =15V, V <sub>OL</sub> =1.5V	25	40	—	mA
I <sub>OH</sub>	AT, AB, BT, BB, CT and CB Source Current	—	V <sub>M</sub> and V <sub>DxT</sub> -V <sub>SxT</sub> =15V, V <sub>OH</sub> =13.5V	-12.5	-20	—	mA
I <sub>OLS</sub>	AT, AB, BT, BB, CT and CB Output Low Short Circuit Pulsed Current	—	V <sub>M</sub> and V <sub>DxT</sub> -V <sub>SxT</sub> =15V, V <sub>O</sub> =15V, V <sub>IN</sub> =V <sub>IL</sub> , pulse width ≤10μs	—	380	—	mA
I <sub>OHS</sub>	AT, AB, BT, BB, CT and CB Output High Short Circuit Pulsed Current	—	V <sub>M</sub> and V <sub>DxT</sub> -V <sub>SxT</sub> =15V, V <sub>O</sub> =0V, V <sub>IN</sub> =V <sub>IH</sub> , pulse width ≤10μs	—	-165	—	mA
R <sub>PH</sub>	Pull-high Resistance of ABL, BBL, CBL	5V	—	10	30	50	kΩ
R <sub>PL</sub>	Pull-low Resistance of ATL, BTL, CTL	5V	—	10	30	50	kΩ

Note: V<sub>DxT</sub> is V<sub>DAT</sub>, V<sub>DBT</sub> or V<sub>DCT</sub>

V<sub>SxT</sub> is V<sub>SAT</sub>, V<sub>SBT</sub> or V<sub>SCT</sub>

The I<sub>OLS</sub> and I<sub>OHS</sub> parameters have been characterised but not 100% production tested.

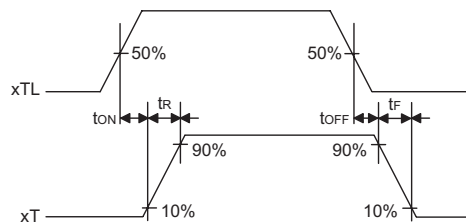
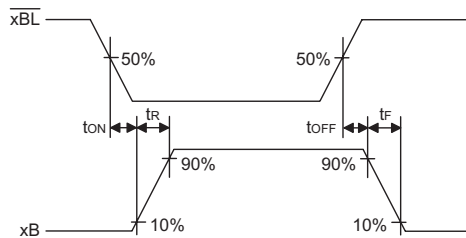
**A.C. Characteristics**

Ta=25°C

Symbol	Parameter	Test Conditions			Min.	Typ.	Max.	Unit
		V <sub>DD</sub>	V <sub>M</sub>	Conditions				
t <sub>ON</sub>	Turn-on Propagation Delay	5V	15V	C <sub>L</sub> =1000pF, VDxT-VSxT=15V, VDxT=80V	—	—	250	ns
t <sub>OFF</sub>	Turn-off Propagation Delay	5V	15V	C <sub>L</sub> =1000pF, VDxT-VSxT=15V, VDxT=80V	—	—	150	ns
t <sub>R</sub>	Turn-on Rising Time	5V	15V	C <sub>L</sub> =1000pF, VDxT-VSxT=15V, VDxT=80V	—	—	250	ns
t <sub>F</sub>	Turn-off Falling Time	5V	15V	C <sub>L</sub> =1000pF, VDxT-VSxT=15V, VDxT=80V	—	—	120	ns
t <sub>IN</sub>	Input Pulse Width for ATL, BTL, CTL, ABL, BBL, CBL	5V	15V	—	200	—	—	ns

Note: VDxT is VDAT, VDBT or VDCT

VSxT is VSAT, VSBT or VSCT



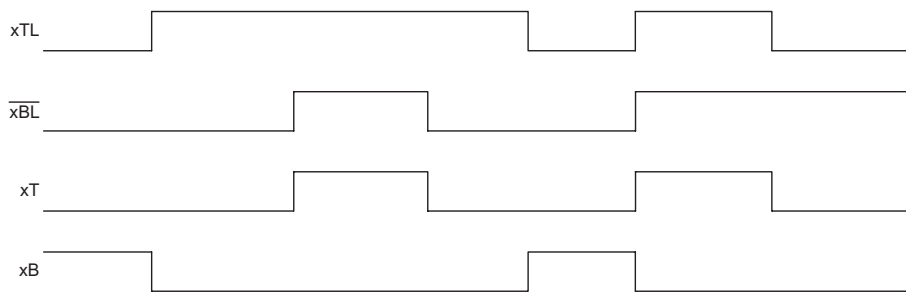
Note: x is A, B or C

**Functional Description**
**Input/Output Truth Table**

The output of the device is according the input pin. The true table is as follow:

ATL, BTL, CTL	$\overline{\text{ABL}}$ , $\overline{\text{BBL}}$ , $\overline{\text{CBL}}$	Low Voltage Protection	AT, BT, CT	AB, BB, CB
0	1	N	VSAT, VSBT, VSCT	VSS, VSS, VSS
0	0	N	VSAT, VSBT, VSCT	VM, VM, VM
1	1	N	VDAT, VDBT, VDCT	VSS, VSS, VSS
1	0	N	VSAT, VSBT, VSCT	VSS, VSS, VSS
—	—	Y	VSAT, VSBT, VSCT	VSS, VSS, VSS

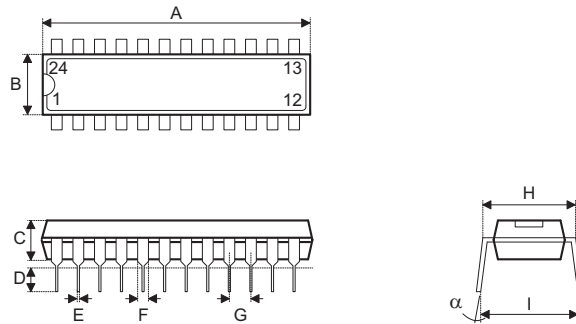
(ATL,  $\overline{\text{ABL}}$ ), (BTL,  $\overline{\text{BBL}}$ ) and (CTL,  $\overline{\text{CBL}}$ ) Truth Table

**Timing Diagrams**


Note: x is A, B or C

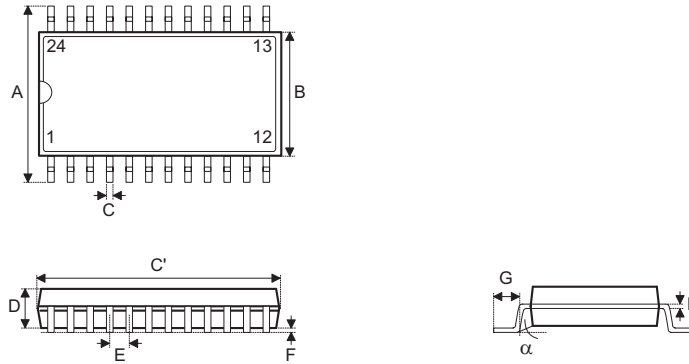
Package Information

24-pin SKDIP (300mil) Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	1235	—	1265
B	255	—	265
C	125	—	135
D	125	—	145
E	16	—	20
F	50	—	70
G	—	100	—
H	295	—	315
I	345	—	360
α	0°	—	15°

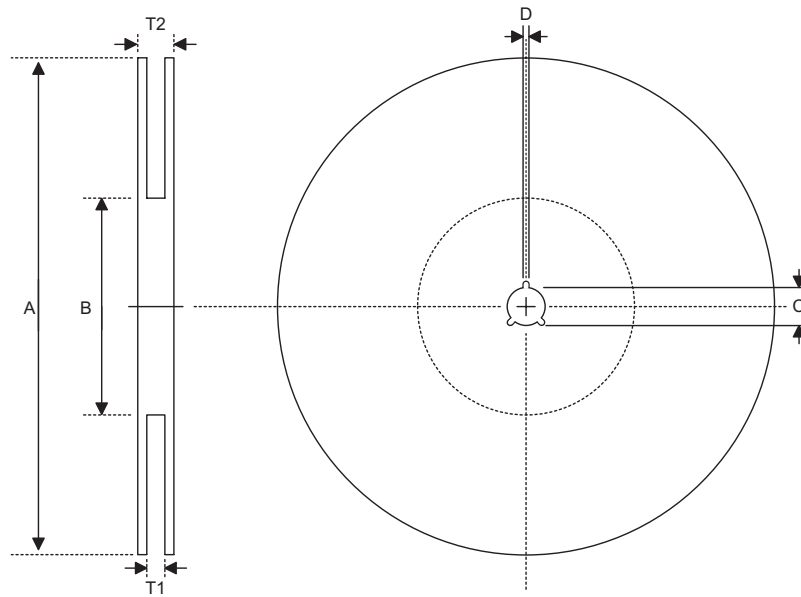
24-pin SOP (300mil) Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	394	—	419
B	290	—	300
C	14	—	20
C'	590	—	614
D	92	—	104
E	—	50	—
F	4	—	—
G	32	—	38
H	4	—	12
$\alpha$	0°	—	10°

**Product Tape and Reel Specifications**

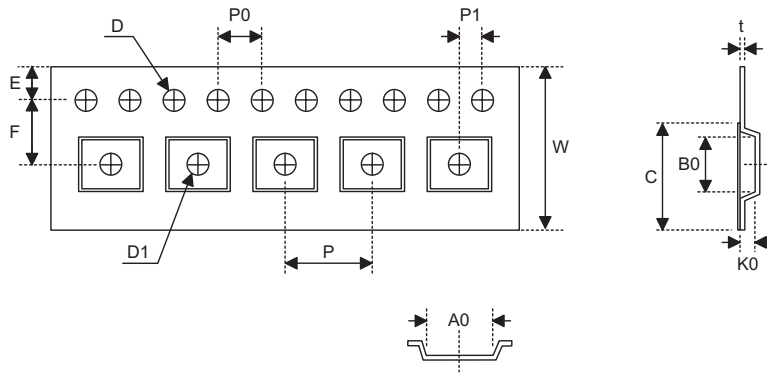
**Reel Dimensions**



SOP 24W

Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	330±1
B	Reel Inner Diameter	62±1.5
C	Spindle Hole Diameter	13+0.5 -0.2
D	Key Slit Width	2±0.5
T1	Space Between Flange	24.8+0.3 -0.2
T2	Reel Thickness	30.2±0.2



**Carrier Tape Dimensions**

**SOP 24W**

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	24±0.3
P	Cavity Pitch	12±0.1
E	Perforation Position	1.75±0.1
F	Cavity to Perforation (Width Direction)	11.5±0.1
D	Perforation Diameter	1.55±0.1
D1	Cavity Hole Diameter	1.5±0.25
P0	Perforation Pitch	4±0.1
P1	Cavity to Perforation (Length Direction)	2±0.1
A0	Cavity Length	10.9±0.1
B0	Cavity Width	15.9±0.1
K0	Cavity Depth	3.1±0.1
t	Carrier Tape Thickness	0.35±0.05
C	Cover Tape Width	21.3

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