Contents

1 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	DC supply voltage	45	V
$-I_{GND}$	DC ground pin reverse current TRAN ground pin reverse current (pulse duration < 1 ms)	-250 -6	mA A
V_{IN}	Digital voltage on input pin	5.5	V
I_{OUT}	DC output current	Internally limited	A
$-I_{OUT}$	Reverse DC output current	-2	A
I_{IN}	DC input current	± 10	mA
V_{ESD}	Electrostatic discharge (R = 1.5 kΩ; C = 100 pF)	2000	V
P_{TOT}	Power dissipation at T_c = 25 °C	96	W
EAS	Single pulse avalanche energy per channel 8 channels driven simultaneously (T_{AMB} = 125 °C, I_{OUT} = 0.6 A per channel)	1.15	J
T_J	Junction operating temperature	Internally limited	°C
T_C	Case operating temperature	Internally limited	°C
T_{STG}	Storage temperature	-40 to 150	°C

Table 2. Thermal data

Symbol	Parameter		Value	Unit
$R_{th(JC)}$	Thermal resistance junction-case	Max.	1.3	°C/W
$R_{th(JA)}$	Thermal resistance junction-ambient (1)	Max.	50	°C/W

1. When mounted on FR4 printed circuit board with 0.5 cm^2 of copper area (at least 35 µm think) connected to all TAB pins.

2 Electrical characteristics

(10.5 V < V_{CC} < 32 V; -40 °C < T_J < 125 °C; unless otherwise specified)

Table 3. Power section

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{CC}	Operating supply voltage		10.5		45	V
V_{USD}	Undervoltage shutdown		7		10.5	V
R_{ON}	On-state resistance	I_{OUT} = 0.5 A; T_J = 25 °C I_{OUT} = 0.5 A; T_J = 125 °C			160 280	mΩ mΩ
I_S	Supply current	Off-state; V_{CC} = 24 V; T_{CASE} = 25 °C On-state (all channels ON); V_{CC} = 24 V, T_{CASE} = 100 °C			150 12	µA mA
I_{LGND}	Output current at turn-off	V_{CC} = V_{STAT} = V_{IN} = V_{GND} = 24 V V_{OUT} = 0 V			1	mA
$I_{L(off)}$	Off-state output current	V_{IN} = V_{OUT} = 0 V	0		5	µA
$V_{OUT(off)}$	Off-state output voltage	V_{IN} = 0 V, I_{OUT} = 0 A			3	V
$t_{d(Vccon)}$	Power-on delay time from V_{CC} rising edge	*Figure 8 on page 12*		1		ms

Table 4. Switching (V_{CC} = 24 V)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{ON}	Turn-on time	R_L = 48 Ω from 80% V_{OUT} (see *Figure 4*)	-	50	100	µs
t_{OFF}	Turn-off time	R_L = 48 Ω to 10% V_{OUT} (see *Figure 4*)	-	75	150	µs
dVOUT/dt(on)	Turn-on voltage slope	R_L = 48 Ω from V_{OUT} = 2.4 V to V_{OUT} = 19.2 V (see *Figure 4*)	-	0.7		V/µs
dVOUT/dt(off)	Turn-off voltage slope	R_L = 48 Ω from V_{OUT} = 21.6 V to V_{OUT} = 2.4 V (see *Figure 4*)	-	1.5		V/µs

Table 5. Input pin

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{INL}	Input low level				1.25	V
I_{INL}	Low level input current	V_{IN} = 1.25 V	1			µA
V_{INH}	Input high level		2.25			V
I_{INH}	High level input current	V_{IN} = 2.25 V			10	µA
$V_{I(HYST)}$	Input hysteresis voltage		0.25			V
V_{ICL}	Input clamp voltage	I_{IN} = 1 mA I_{IN} = -1 mA	6.0	6.8 -0.7	8.0	V V

Table 6. Protections

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
T_{CSD}	Case shutdown temperature		125	130	135	°C
T_{CR}	Case reset temperature		110			°C
T_{CHYST}	Case thermal hysteresis		7	15		°C
T_{TSD}	Junction shutdown temperature		150	175	200	°C
T_R	Junction reset temperature		135			°C
T_{HYST}	Junction thermal hysteresis		7	15		°C
I_{lim}	DC short-circuit current	V_{CC} = 24 V; R_{LOAD} = 10 mΩ	1		1.7	A
V_{demag}	Turn-off output clamp voltage	I_{OUT} = 0.5 A; L = 6 mH	V_{CC}-57	V_{CC}-52	V_{CC}-47	V

Table 7. Status pin

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{HSTAT}	High level output current	V_{CC} = 18 to 32 V; R_{STAT} = 1 kΩ (Fault condition)	2	3	4	mA
I_{LSTAT}	Leakage current	Normal operation; V_{CC} = 32 V			0.1	µA
V_{CLSTAT}	Clamp voltage	I_{STAT} = 1 mA I_{STAT} = -1 mA	6.0	6.8 -0.7	8.0	V V

3 Pin connections

Figure 2. Connection diagram (top view)

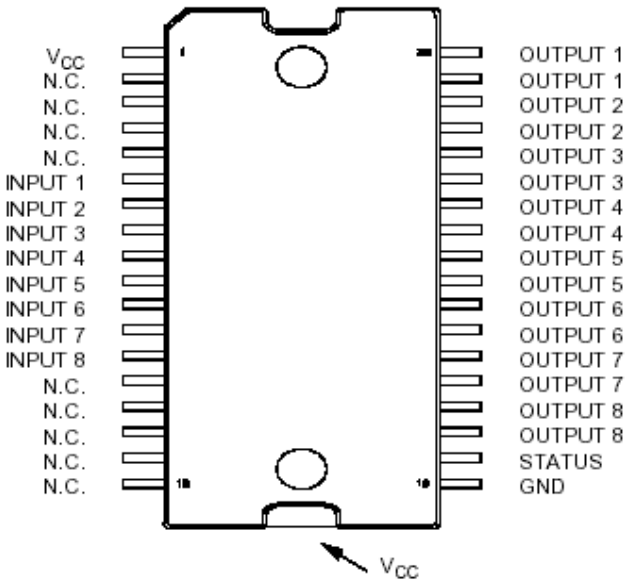


Table 8. Pin functions

Pin	Symbol	Function
TAB	V_{CC}	Positive power supply voltage
1	V_{CC}	Positive power supply voltage
2,3,4,5	NC	Not connected
6	Input 1	Input of channel 1
7	Input 2	Input of channel 2
8	Input 3	Input of channel 3
9	Input 4	Input of channel 4
10	Input 5	Input of channel 5
11	Input 6	Input of channel 6
12	Input 7	Input of channel 7
13	Input 8	Input of channel 8
14,15,16,17,18	NC	Not connected
19	GND	Logic ground
20	STATUS	Common open source diagnostic for overtemperature
21,22	Output 8	High-side output of channel 8
23,24	Output 7	High-side output of channel 7
25,26	Output 6	High-side output of channel 6

Table 8. Pin functions (continued)

Pin	Symbol	Function
27.28	Output 5	High-side output of channel 5
29,30	Output 4	High-side output of channel 4
31,32	Output 3	High-side output of channel 3
33,34	Output 2	High-side output of channel 2
35,36	Output 1	High-side output of channel 1

4 Current, voltage conventions and truth table

Figure 3. Current and voltage conventions

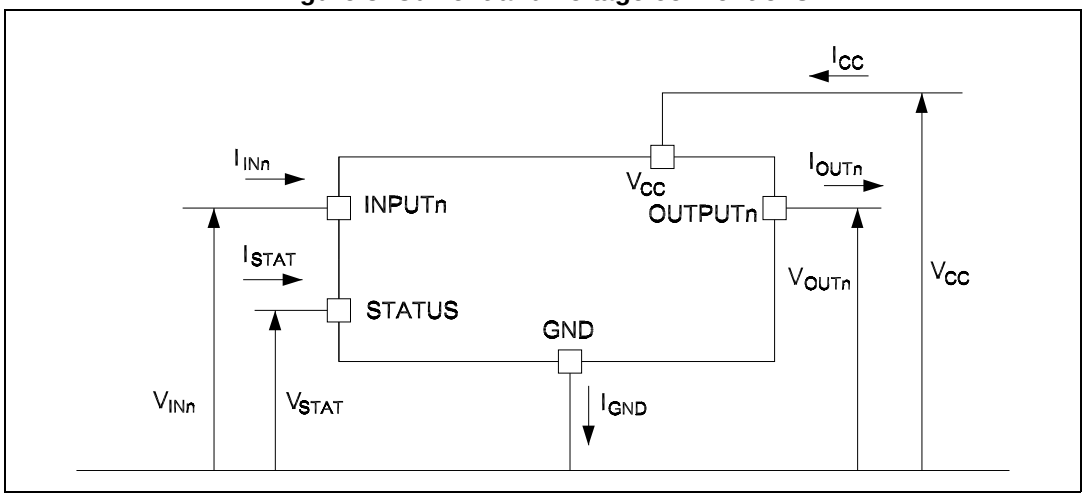


Table 9. Truth table

Conditions	INPUTn	OUTPUTn	STATUS
Normal operation	L H	L H	L L
Current limitation	L H	L X	L L
Overtemperature (see waveforms 3, 4 *Figure 6*) -> $T_J > T_{TSD}$	L H	L L	L H
Undervoltage	L H	L L	X X

5 Switching time waveforms

Figure 4. Turn-ON and turn-OFF

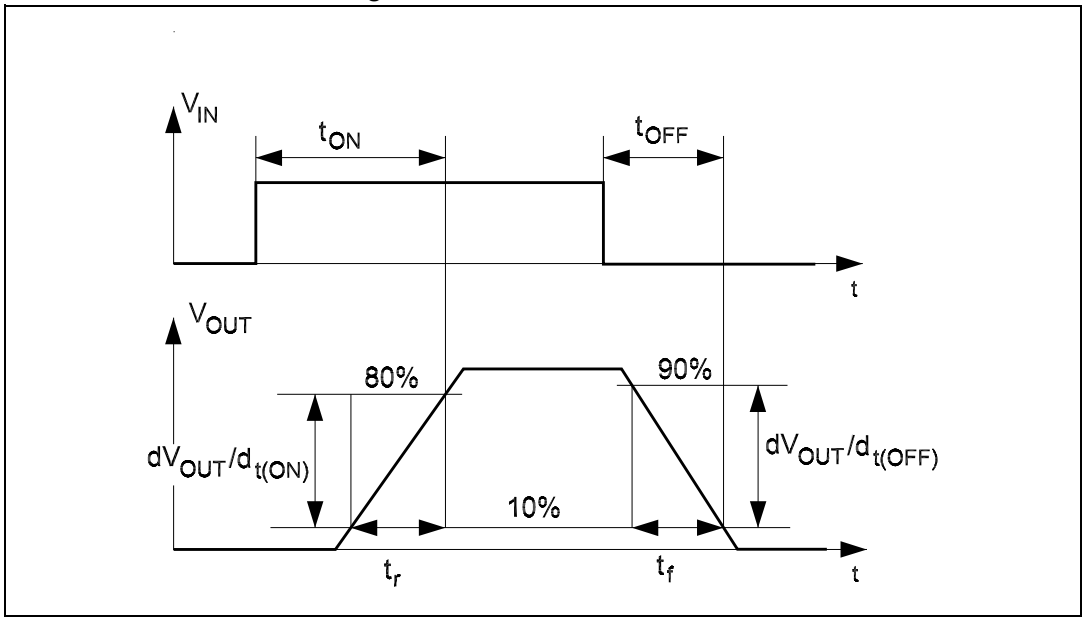


Figure 5. V_{CC} turn-ON

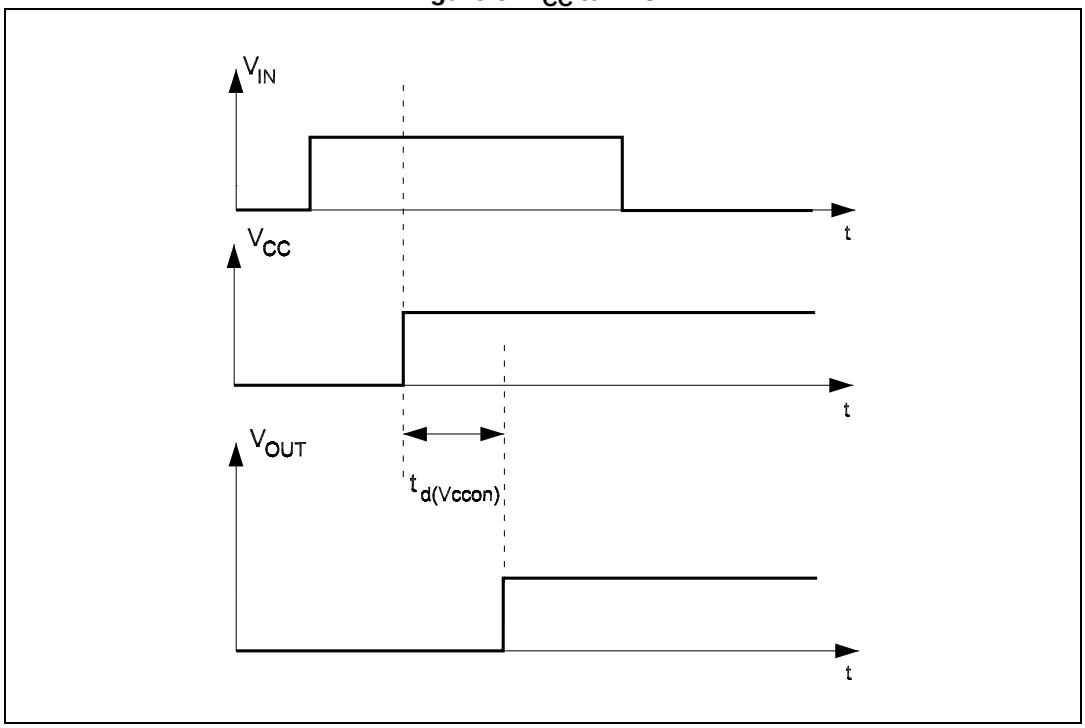


Figure 6. Waveforms

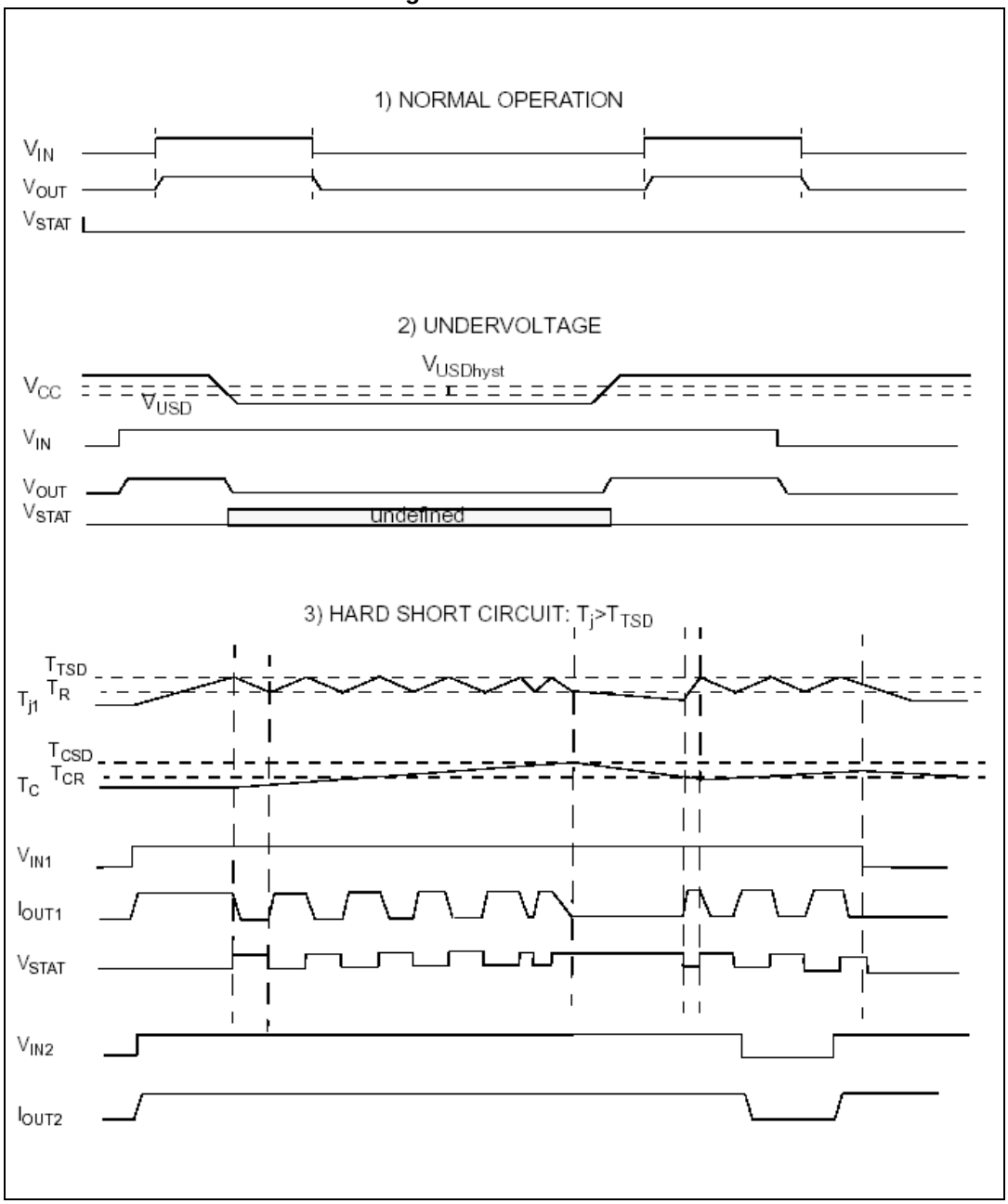
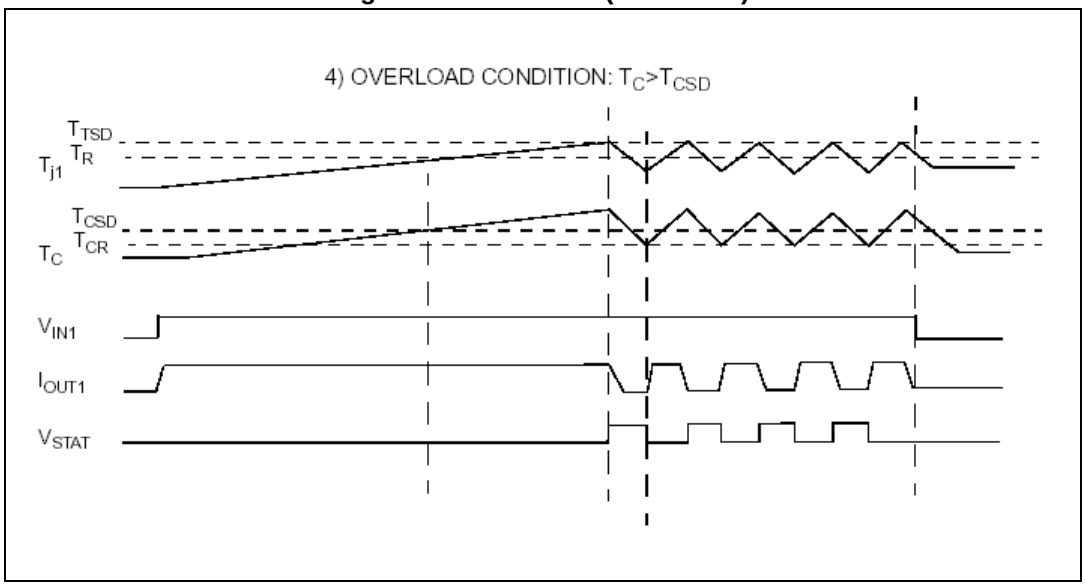


Figure 7. Waveforms (continued)



6 Reverse polarity protection

Reverse polarity protection can be implemented on board using two different solutions:

1. Placing a resistor (R_{GND}) between IC GND pin and load GND
2. Placing a diode between IC GND pin and load GND

If option 1 is selected, the minimum resistance value has to be selected according to the following equation:

Equation 1

$R_{GND} \geq V_{CC}/I_{GND}$

where I_{GND} is the DC reverse ground pin current and can be found in *Section 1: Maximum ratings* of this datasheet.

Power dissipated by R_{GND} (when $V_{CC} < 0$: during reverse polarity situations) is:

Equation 2

$P_D = (V_{CC})^2/R_{GND}$

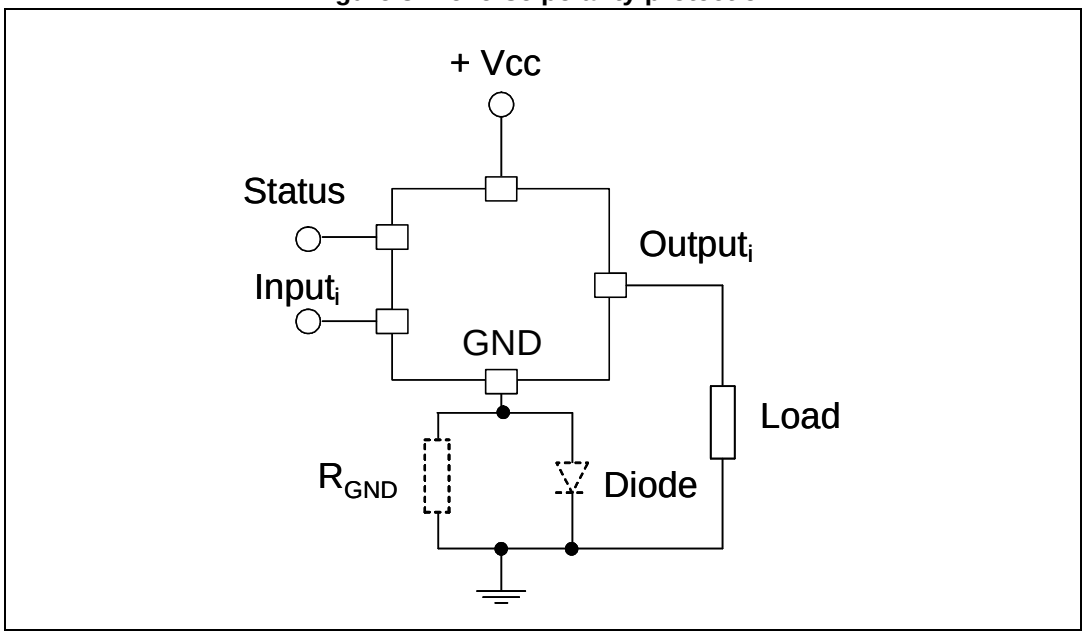
If option 2 is selected, the diode has to be chosen by taking into account VRRM >$|V_{cc}|$ and its power dissipation capability:

Equation 3

$P_D \geq I_S * V_f$

Note: In normal conditions (no reverse polarity) due to the diode, there is a voltage drop between GND of the device and GND of the system.

Figure 8. Reverse polarity protection



This schematic can be used with any type of load.

7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

Figure 9. PowerSO-36 drawings

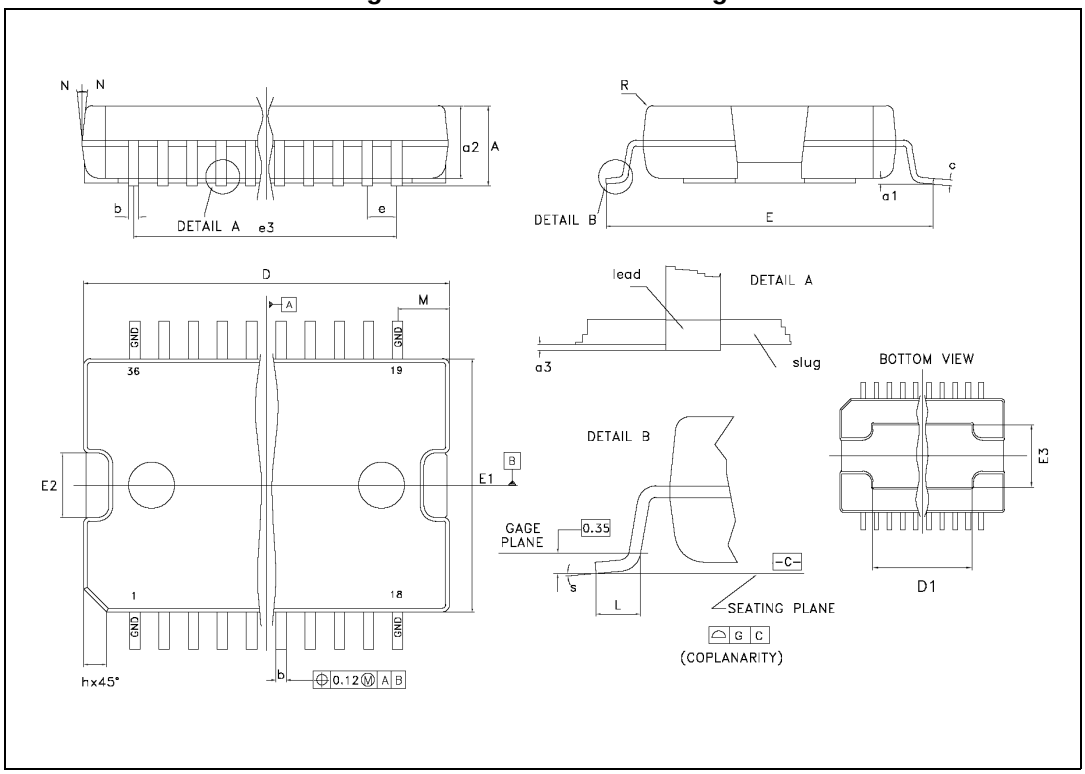


Table 10. PowerSO-36 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			3.60
a1	0.10		0.30
a2			3.30
a3	0		0.10
b	0.22		0.38
c	0.23		0.32
D (1)	15.80		16.00
D1	9.40		9.80
E	13.90		14.50
E1 (1)	10.90		11.10
E2			2.90
E3	5.8		6.2
e		0.65	
e3		11.05	
G	0		0.10
H	15.50		15.90
h			1.10
L	0.80		1.10
N			10°
S	0°		8°

7.1 Footprint recommended data

Figure 10. Footprint recommended data

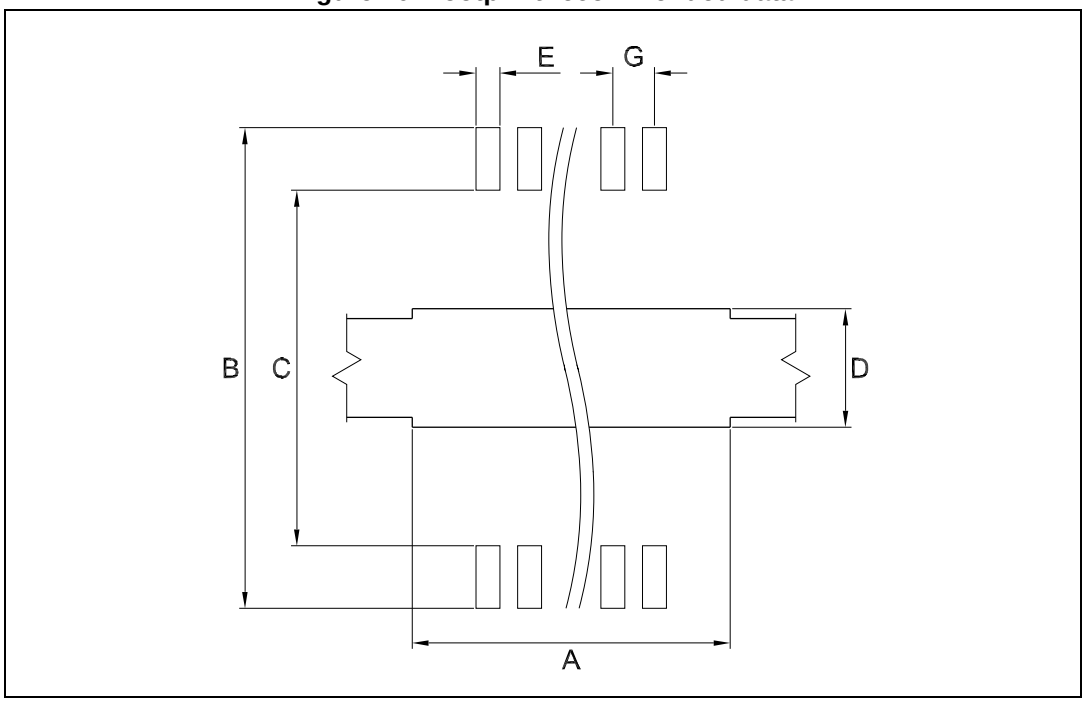


Table 11. Footprint data

Dim.	mm
A	9.5
B	14.7-15.0
C	12.5-12.7
D	6.3
E	0.42
G	0.65

7.2 Tube shipment information

Figure 11. Tube shipment information

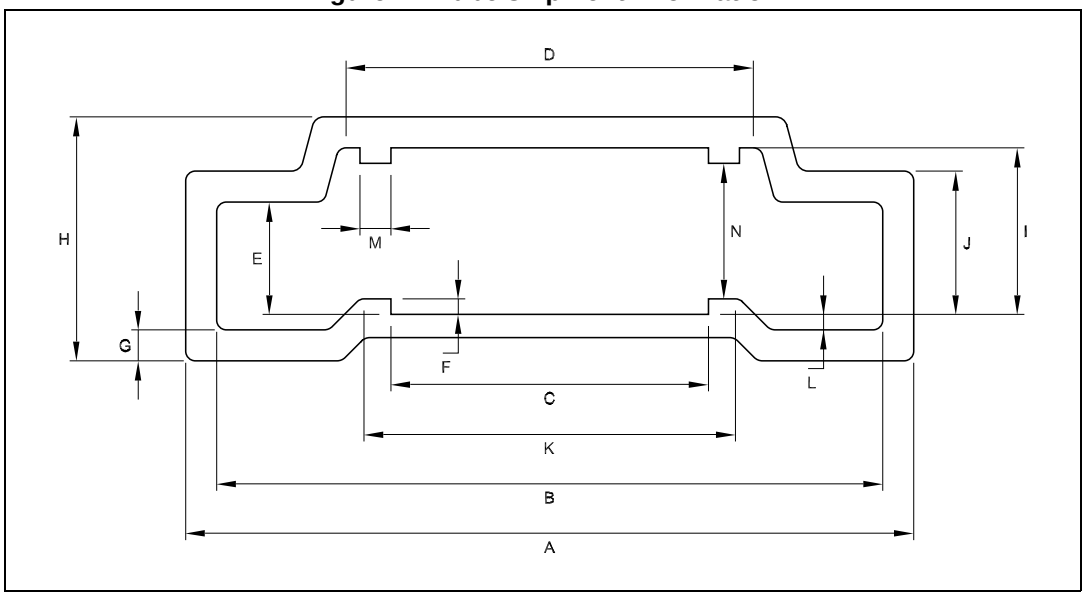


Table 12. Tube mechanical data

Dim.	mm
A	18.80
B	17.2 ±0.2
C	8.20 ±0.2
D	10.90 ±0.2
E	2.90 ±0.2
F	0.40
G	0.80
H	6.30
I	4.30 ±0.2
J	3.7 ±0.2
K	9.4
L	0.40
M	0.80
N	3.50 ±0.2

Base quantity 31 pcs

Bulk quantity 310 pcs

7.3 Tape and reel shipment information

Figure 12. Tape specifications

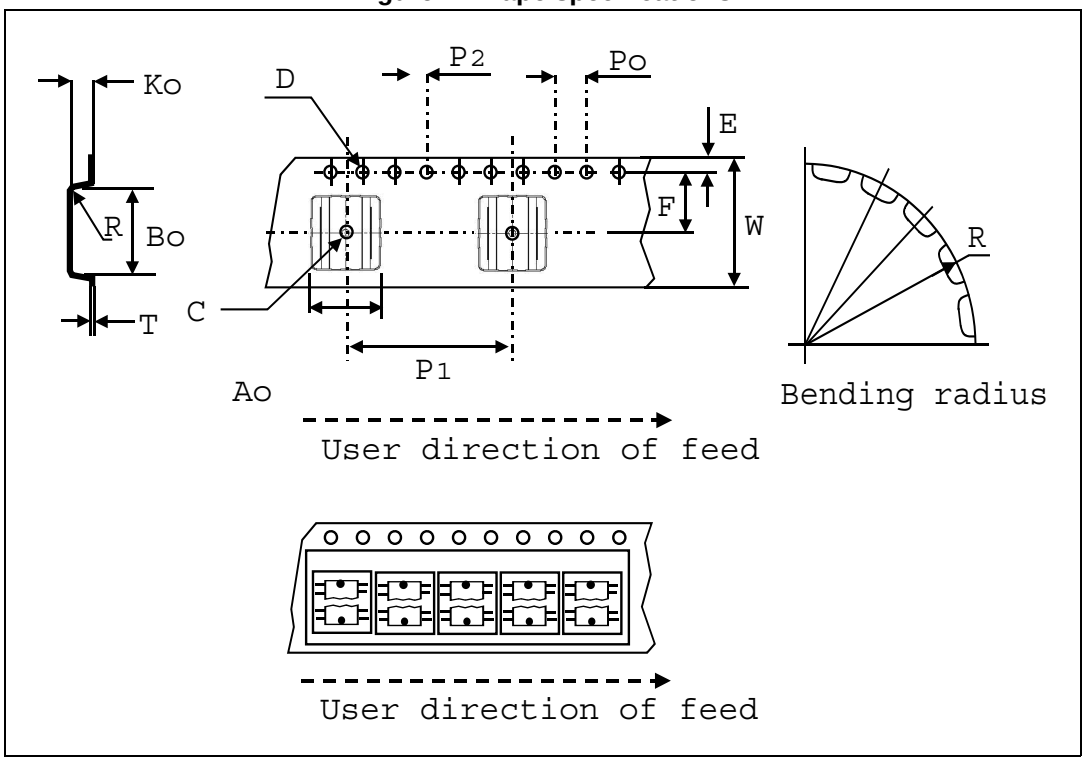


Table 13. Tape mechanical data

Dim.	mm
D	1.50 + 0.1/0
E	1.75 ± 0.1
Po	4.00 ± 0.1
T max.	0.40
D1 min.	1.50
F	11.5 ± 0.05
K max.	6.50
P2	2.00 ± 0.1
R	50
W	24.00 ± 0.30
P1	24.00
Ao, Bo, Ko	0.05 min. to 1.0 max.

Base quantity 600 pcs

Bulk quantity 600 pcs

Figure 13. Reel specifications

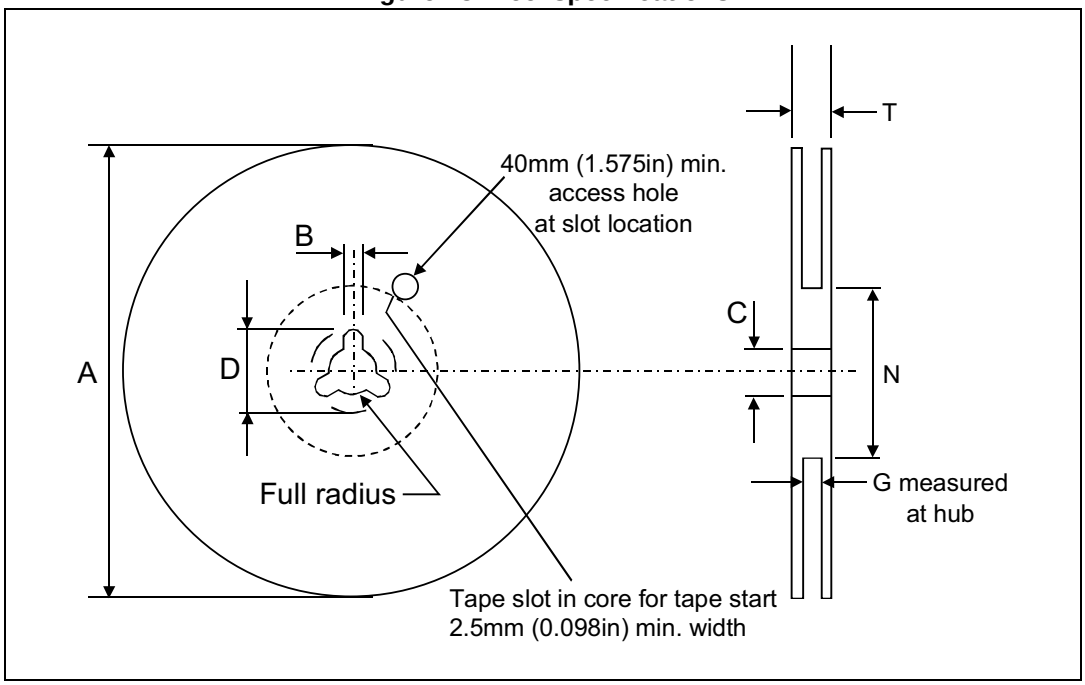


Table 14. Reel mechanical data

Dim.	mm
Tape size	24.0 ± 0.30
A max.	330.0
B min.	1.5
C	13.0 ± 0.20
D min.	20.2
N min.	60
G	24.4 +2/-0
T max.	30.4

8 Ordering information

Table 15. Order code

Order code	Package	Packaging
VN808CM-32-E	PowerSO-36	Tube
VN808CMTR-32-E	PowerSO-36	Tape and reel

9 Revision history

Table 16. Document revision history

Date	Revision	Changes
28-Jun-2006	1	Initial release
07-Aug-2008	2	Added *Section 7 on page 13*, *Figure 10: Footprint recommended data on page 15*
25-Aug-2009	3	Updated *Section 6: Reverse polarity protection*
25-Feb-2010	4	Updated *Section 7: Package mechanical data*
31-Jul-2013	5	Updated *Section 7.1: Footprint recommended data*.
19-Dec-2013	6	Updated V_{IN} in *Table 1*. Replaced L_{MAX} parameter by EAS parameter in *Table 1*. Added T_J condition to *Table 3*. Updated *Section 6*.

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