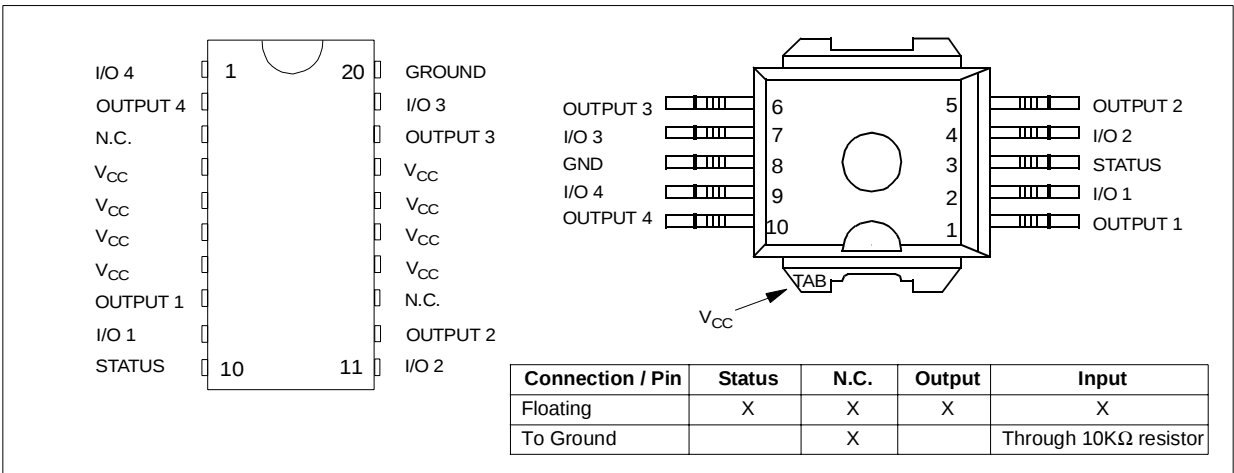


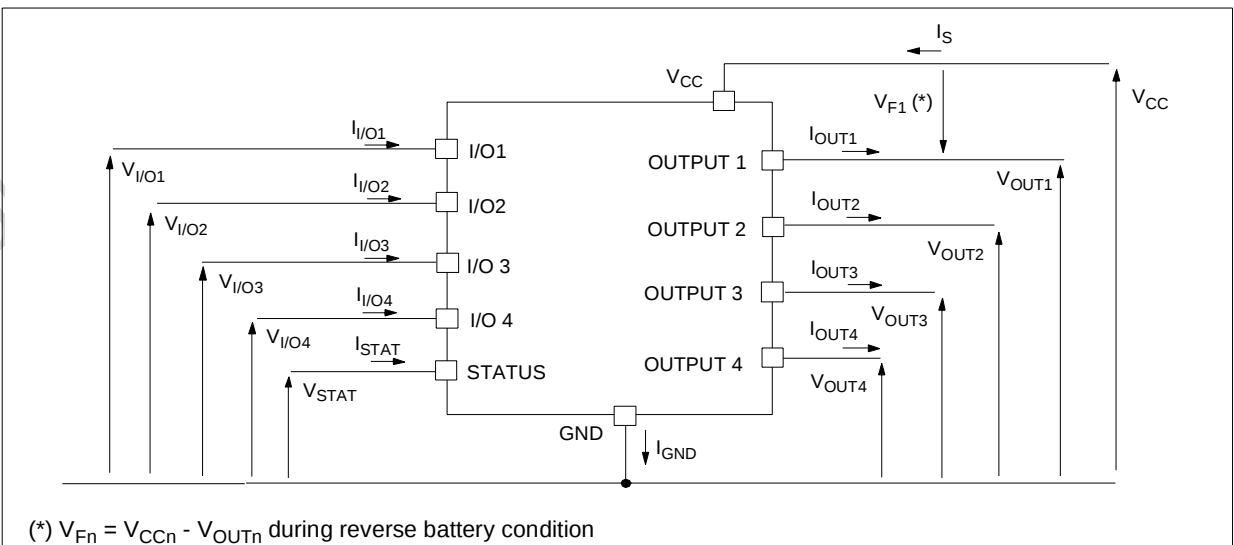
ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value		Unit
		SO-20	PowerSO-10	
V_{CC}	DC supply voltage	41		V
$-V_{CC}$	Reverse DC supply voltage	- 0.3		V
$-I_{GND}$	DC reverse ground pin current	- 200		mA
I_{OUT}	DC output current	Internally Limited		A
$-I_{OUT}$	Reverse DC output current	- 2		A
I_{IN}	DC Input current	+/- 10		mA
V_{IN}	Input voltage range	-3/+ V_{CC}		V
V_{STAT}	DC Status voltage	+ V_{CC}		V
V_{ESD}	Electrostatic discharge (R=1.5 K Ω ; C=100 pF)	2000		V
P_{tot}	Power dissipation $T_C=25^{\circ}C$	16	90	W
T_j	Junction operating temperature	Internally Limited		$^{\circ}C$
T_C	Case operating temperature	- 40 to 150		$^{\circ}C$
T_{stg}	Storage temperature	- 55 to 150		$^{\circ}C$

CONFIGURATION DIAGRAM (TOP VIEW) & SUGGESTED CONNECTIONS FOR UNUSED AND N.C. PINS



CURRENT AND VOLTAGE CONVENTIONS



THERMAL DATA

Symbol	Parameter	Value		Unit
		SO-20	PowerSO-10	
$R_{thj-amb}$	Thermal resistance junction-pins (MAX)	8	-	$^{\circ}\text{C/W}$
$R_{thj-case}$	Thermal resistance junction-ambient (MAX)	58	52 ⁽¹⁾	$^{\circ}\text{C/W}$
			37 ⁽²⁾	$^{\circ}\text{C/W}$
$R_{thj-pin}$	Thermal resistance junction-case (MAX)	-	1.4	$^{\circ}\text{C/W}$

⁽¹⁾ When mounted on FR4 printed circuit board with 0.5cm² of copper area (at least 35μ thick) connected to all V_{CC} pins.

⁽²⁾ When mounted on FR4 printed circuit board with 6cm² of copper area (at least 35μ thick) connected to all V_{CC} pins.

ELECTRICAL CHARACTERISTICS (8V<V_{CC}<36V; -40°C<T_j<150°C; unless otherwise specified)

POWER

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V _{CC}	Operating supply voltage		5.5		36	V
V _{USD}	Undervoltage shut-down		3	4	5.5	V
V _{OV}	Overvoltage shut-down		36	42	48	V
R _{ON}	On state resistance (per channel)	I _{OUT} =0.25A; T _j =25°C			270	mΩ
		I _{OUT} =0.25A			540	mΩ
I _S	Supply current	Off state; V _{CC} =24V; T _c =25°C		70	120	μA
		On state (all channels on)		5	10	mA
I _{LGND}	Output current	V _{CC} -V _{STAT} =V _{IN} =V _{GND} =24V V _{OUT} =0V			1	mA
I _{L(off)}	Off state output current	V _{IN} =V _{OUT} =0V	0		10	μA
I _{OUTleak}	Off state output leakage current	V _{IN} =V _{GND} =0V; V _{CC} =V _{OUT} =24V; T _{amb} =25°C			240	μA
I _{OUTleak}	Off state output leakage current	V _{IN} =V _{GND} =0V; V _{CC} =24V; V _{OUT} =10V; T _{amb} =25°C			100	μA

SWITCHING (V_{CC}=24V) (Per channel)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t _{D(on)}	Turn-on delay time	R _L =96Ω from V _{IN} rising edge to V _{OUT} =2.4V		10		μs
t _{D(off)}	Turn-off delay time	R _L =96Ω from V _{IN} falling edge to V _{OUT} =21.6V		40		μs
(dV _{OUT} /dt) _{on}	Turn-on voltage slope	R _L =96Ω from V _{OUT} =2.4V to 19.2V		0.75		V/μs
(dV _{OUT} /dt) _{off}	Turn-off voltage slope	R _L =96Ω from V _{OUT} =21.6V to 2.4V		0.25		V/μs

PROTECTIONS (Per channel)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I _{lim}	Current limitation		0.35	0.7	1.1	A
T _(hyst)	Thermal hysteresis		7	15		$^{\circ}\text{C}$
T _{TSD}	Thermal shut-down temperature		150	175	200	$^{\circ}\text{C}$
T _R	Reset temperature		135			$^{\circ}\text{C}$
V _{demag}	Turn-off output clamp voltage	I _{OUT} =0.25A	V _{CC} -47	V _{CC} -52	V _{CC} -59	V

ELECTRICAL CHARACTERISTICS (continued)

LOGIC INPUT (Per channel)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IL}	Low level input voltage				1.25	V
I_{IL}	Low level input current	$V_{IN}=1.25V$	1			μA
V_{IH}	High level input voltage		3.25			V
I_{IH}	High level input current	$V_{IN}=3.25V$			10	μA
$V_{I(hyst)}$	Input hysteresis Voltage		0.5			V
I_{IN}	Input current	$V_{IN}=V_{CC}=36V$			200	μA
V_{OL}	I/O Output voltage	$I_{IN}=5mA$ (Fault condition)			1	V

STATUS PIN

Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
V_{STAT}	Status low output voltage	$I_{STAT}=5mA$ (Fault condition)			1	V
I_{LSTAT}	Status leakage current	Normal operation; $V_{STAT}=V_{CC}=36V$			10	μA
C_{STAT}	Status pin input capacitance	Normal operation; $V_{STAT}=5V$			100	pF

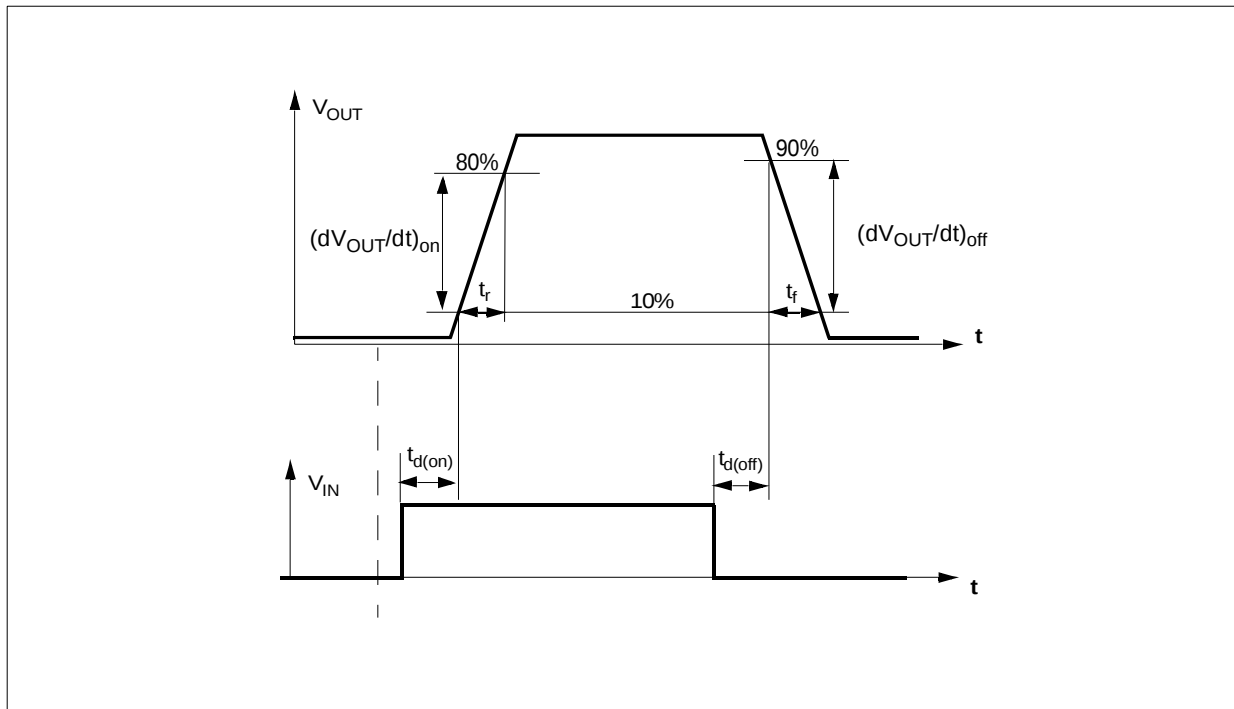
 V_{CC} - OUTPUT DIODE

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_F	Forward on Voltage	$-I_{OUT}=0.3A$; $T_j=150^\circ C$			0.6	V

TRUTH TABLE

CONDITIONS	MCOUTn	I/On	OUTPUTn	STATUS
Normal operation	L	L	L	H
	H	H	H	H
Current limitation	L	L	L	H
	H	H	X	H
Overtemperature	L	L	L	L
	H	Driven low	L	L
Undervoltage	L	L	L	X
	H	H	L	X
Overvoltage	L	L	L	H
	H	H	L	H

SWITCHING CHARACTERISTICS



Typical application schematic

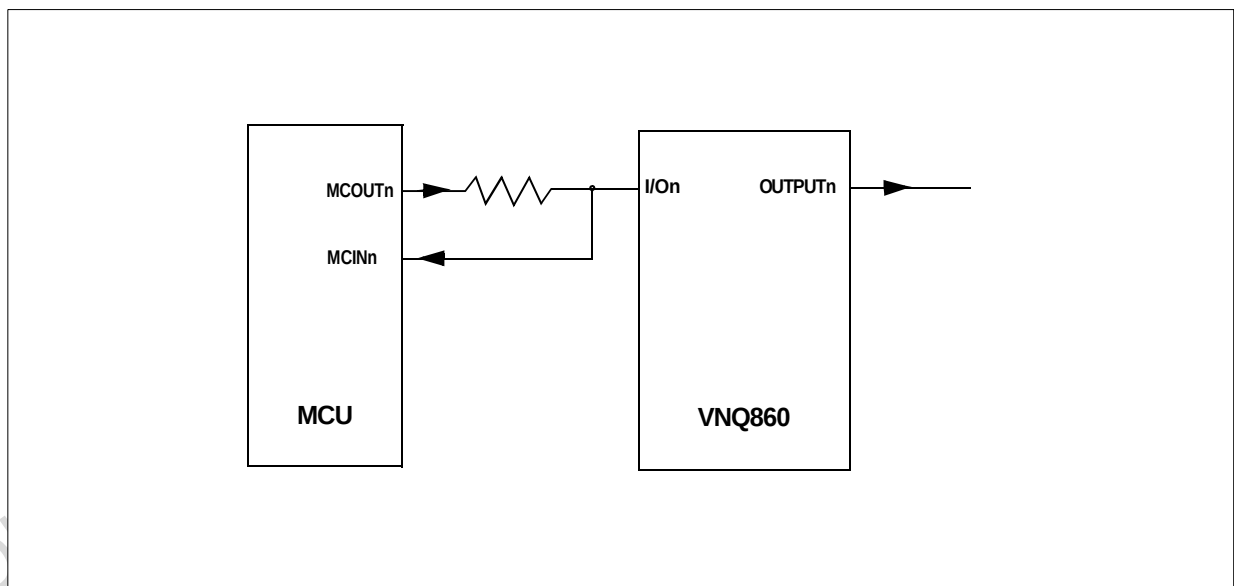
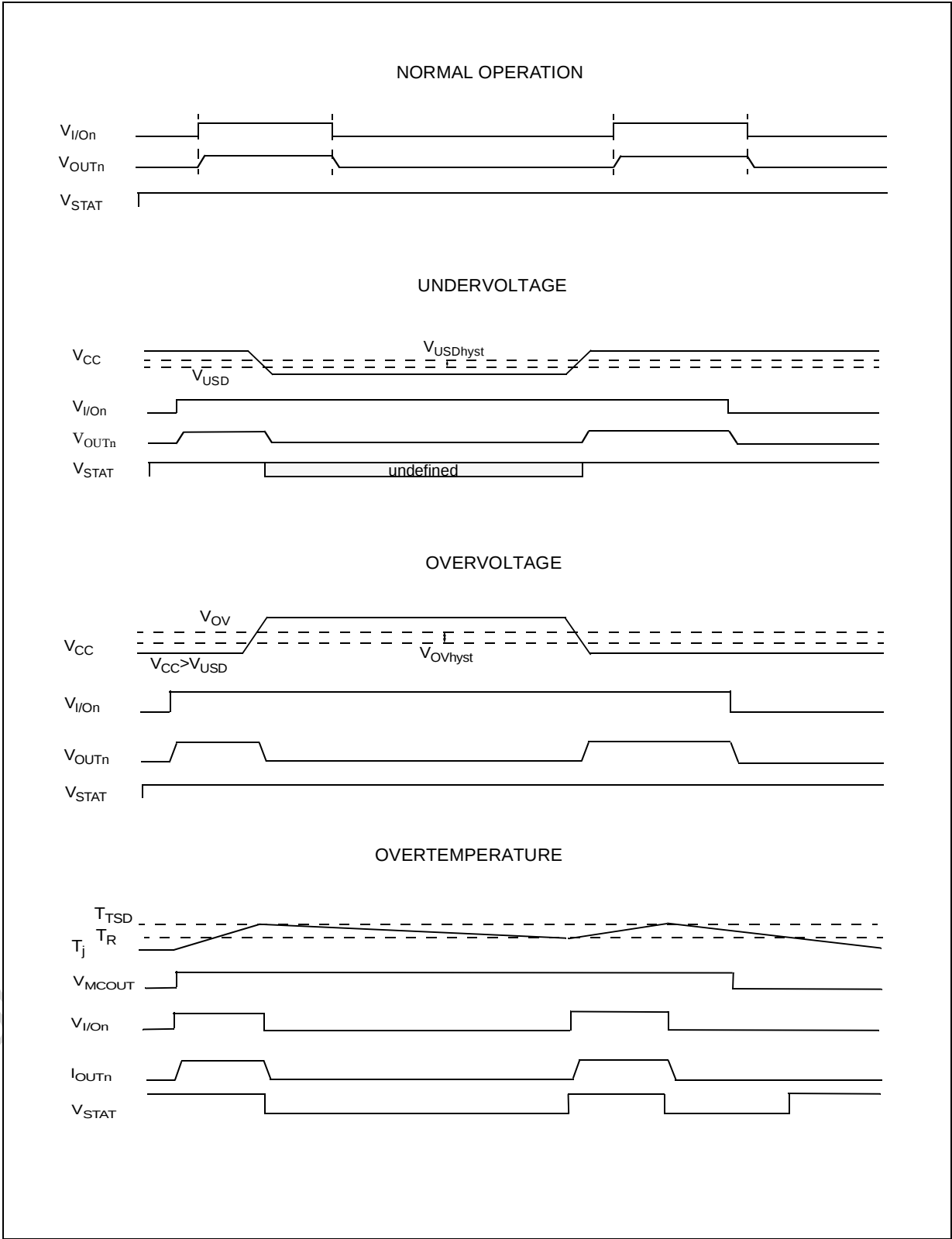
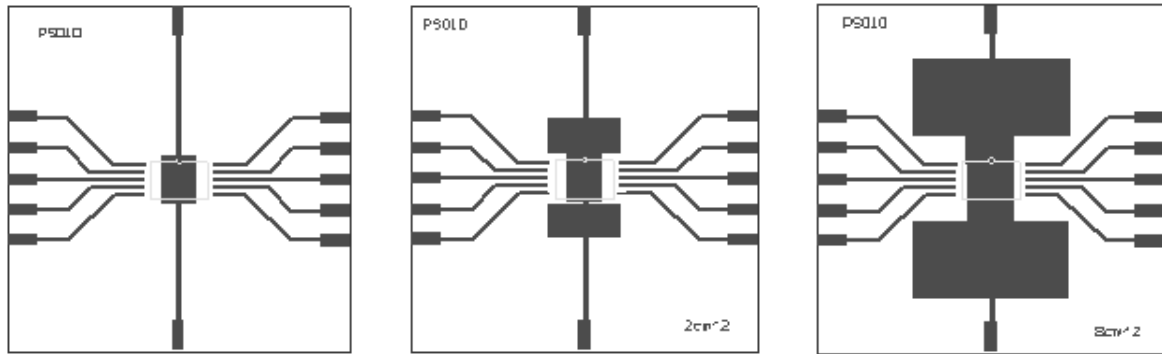


Figure 1: Waveforms



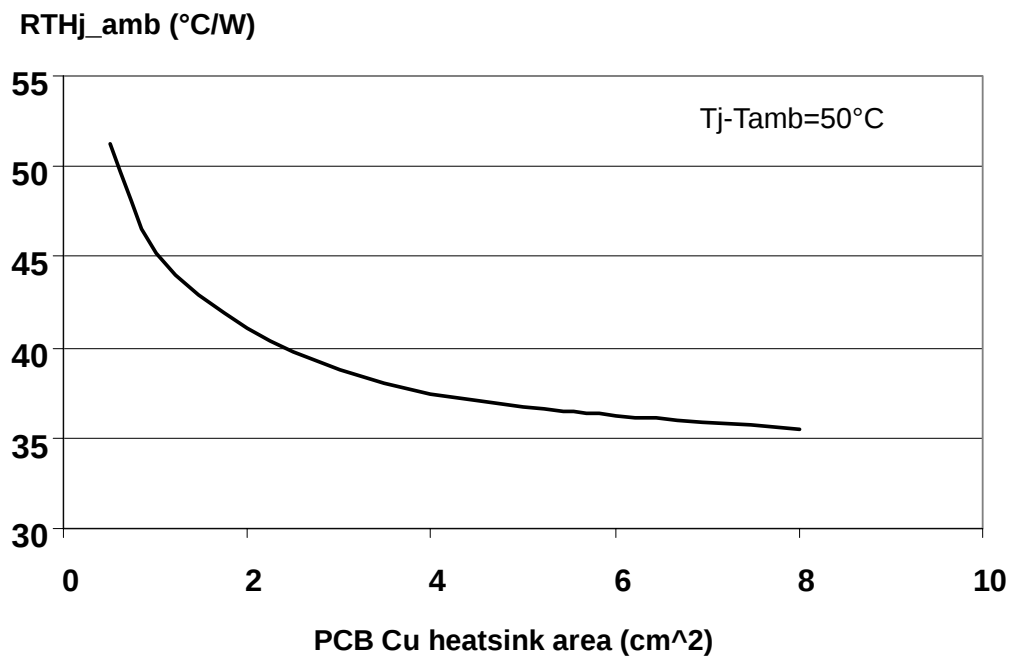
PowerSO-10™ THERMAL DATA

PowerSO-10™ PC Board



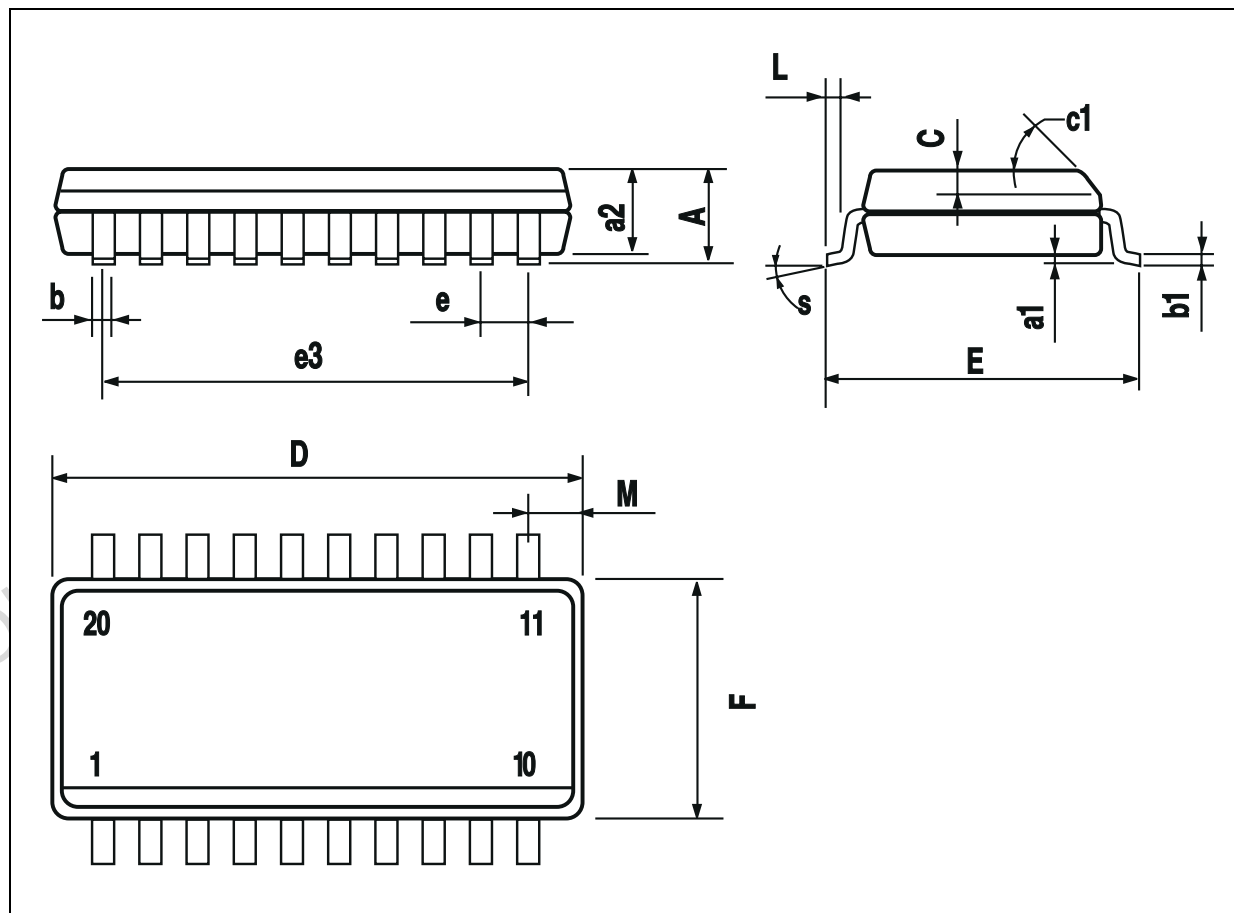
Layout condition of R_{th} and Z_{th} measurements (PCB FR4 area= 58mm x 58mm, PCB thickness=2mm, Cu thickness=35 μ m, Copper areas: from minimum pad lay-out to 8cm²).

$R_{thj-amb}$ Vs PCB copper area in open box free air condition



SO-20 MECHANICAL DATA

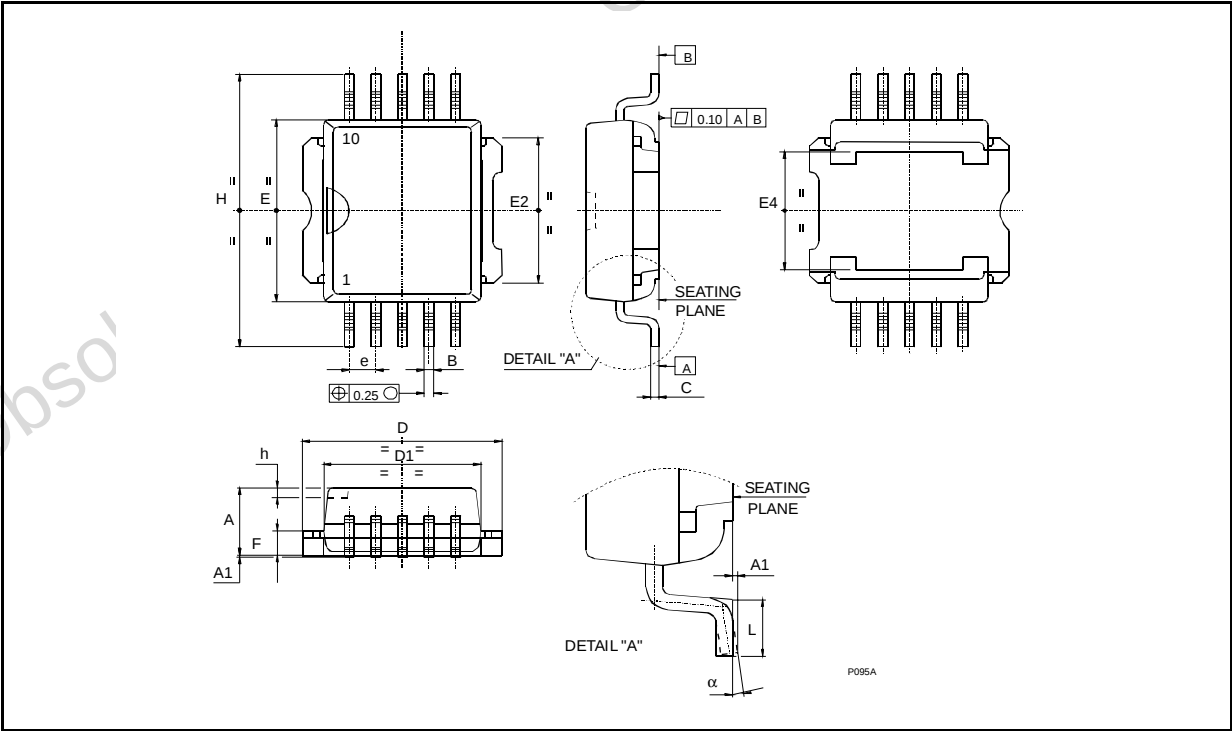
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.10		0.20	0.004		0.007
a2			2.45			0.096
b	0.35		0.49	0.013		0.019
b1	0.23		0.32	0.009		0.012
C		0.50			0.020	
c1	45° (typ.)					
D	12.60		13.00	0.496		0.512
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
F	7.40		7.60	0.291		0.299
L	0.50		1.27	0.19		0.050
M			0.75			0.029
S	8° (max.)					

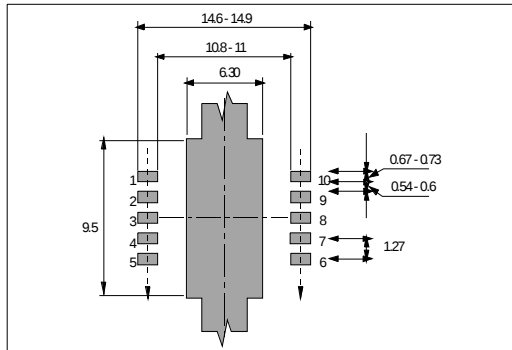
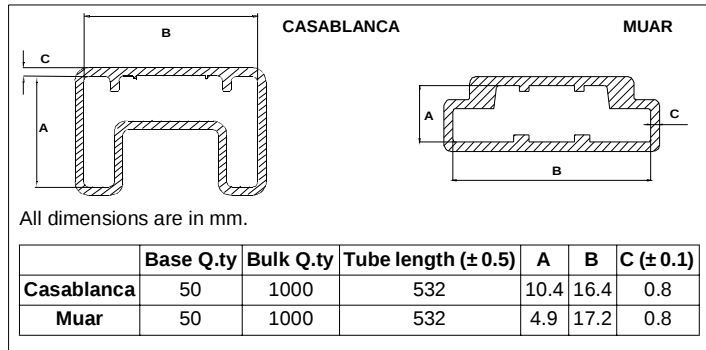
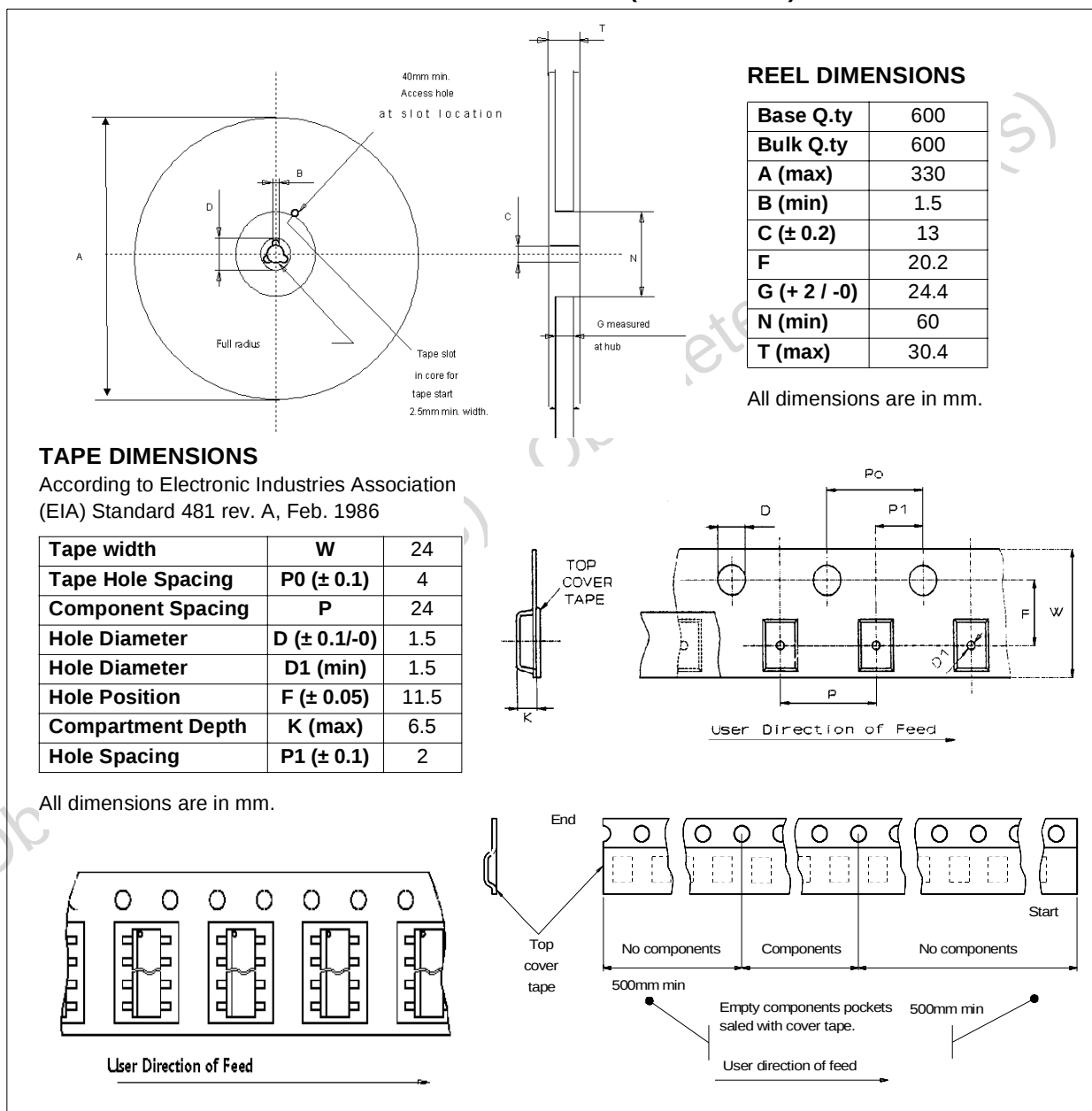


PowerSO-10™ MECHANICAL DATA

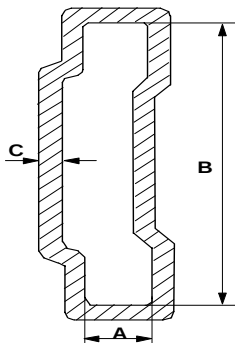
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	3.35		3.65	0.132		0.144
A (*)	3.4		3.6	0.134		0.142
A1	0.00		0.10	0.000		0.004
B	0.40		0.60	0.016		0.024
B (*)	0.37		0.53	0.014		0.021
C	0.35		0.55	0.013		0.022
C (*)	0.23		0.32	0.009		0.0126
D	9.40		9.60	0.370		0.378
D1	7.40		7.60	0.291		0.300
E	9.30		9.50	0.366		0.374
E2	7.20		7.60	0.283		300
E2 (*)	7.30		7.50	0.287		0.295
E4	5.90		6.10	0.232		0.240
E4 (*)	5.90		6.30	0.232		0.248
e		1.27			0.050	
F	1.25		1.35	0.049		0.053
F (*)	1.20		1.40	0.047		0.055
H	13.80		14.40	0.543		0.567
H (*)	13.85		14.35	0.545		0.565
h		0.50			0.002	
L	1.20		1.80	0.047		0.070
L (*)	0.80		1.10	0.031		0.043
α	0°		8°	0°		8°
α (*)	2°		8°	2°		8°

(*) Muar only POA P013P



PowerSO-10™ SUGGESTED PAD LAYOUT**TUBE SHIPMENT (no suffix)****TAPE AND REEL SHIPMENT (suffix "13TR")**

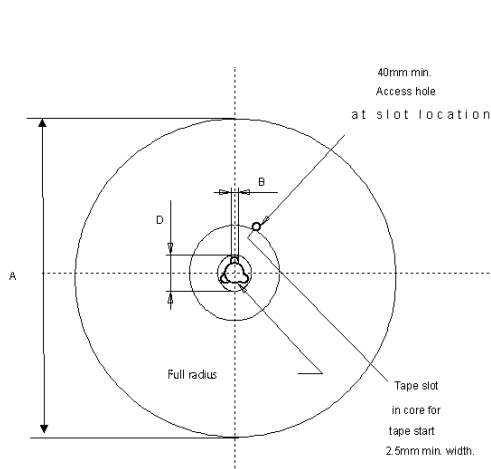
SO-20 TUBE SHIPMENT (no suffix)



Base Q.ty	40
Bulk Q.ty	800
Tube length (± 0.5)	532
A	3.5
B	13.8
C (± 0.1)	0.6

All dimensions are in mm.

TAPE AND REEL SHIPMENT (suffix "13TR")



REEL DIMENSIONS

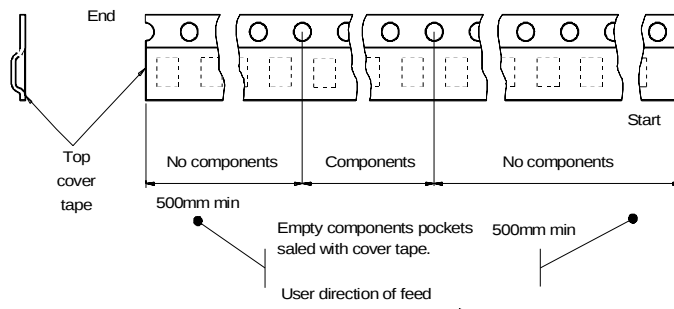
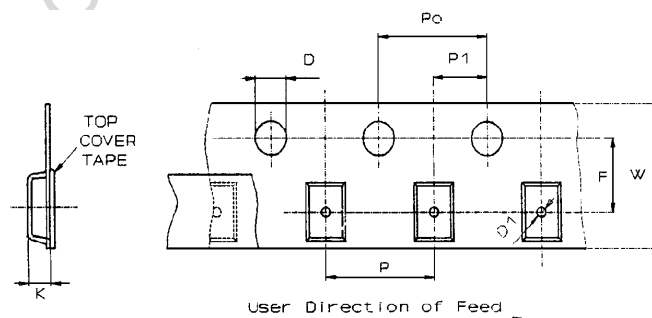
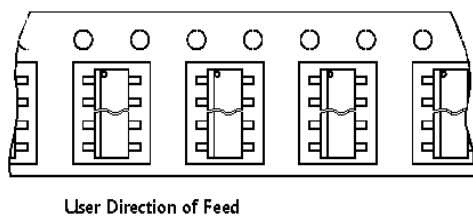
Base Q.ty	1000
Bulk Q.ty	1000
A (max)	330
B (min)	1.5
C (± 0.2)	13
F	20.2
G (+ 2 / -0)	24.4
N (min)	60
T (max)	30.4

TAPE DIMENSIONS

According to Electronic Industries Association (EIA) Standard 481 rev. A, Feb 1986

Tape width	W	24
Tape Hole Spacing	P0 (± 0.1)	4
Component Spacing	P	12
Hole Diameter	D ($\pm 0.1/-0$)	1.5
Hole Diameter	D1 (min)	1.5
Hole Position	F (± 0.05)	11.5
Compartment Depth	K (max)	6.5
Hole Spacing	P1 (± 0.1)	2

All dimensions are in mm.



REVISION HISTORY

Date	Revision	Description of Changes
Jul 2004	1	- Minor changes. - Order Codes table insertion (page 1). - Current and voltage convention update (page 2). - "Configuration diagram (top view) & suggested connections for unused and n.c. pins" insertion (page 2). - 6cm² Cu condition insertion in Thermal Data table (page 3). - V_{CC} - OUTPUT DIODE section insertion (page 4). - SO-20 Shipment Data insertion (page 11) - Revision History table insertion (page12). - Disclaimers update (page 13).

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