

TELEPHONE HANDSET DRIVER

P3143

Features

- * Subminiature case size
- * Current drive - easy to interface
- * Easily programmable
- * ½ watt output power
- * ON/OFF control
- * IEC 950, EN 60950 and EN 41003 certified

Applications

- * Powering telephone handsets
- * Voice modems
- * PABX least cost routers
- * ISDN analogue handset driver

DESCRIPTION

P3143 is a safety-isolating programmable current source intended to power telephone handsets across a supplementary insulation barrier.

The current source provides a high output impedance, greatly simplifying its use since current can be injected at a chosen level without loading an associated circuit.

The current source of P3143 is programmed by a single external low-power resistor and will drive up to 30mA into loads at up to 15Vdc, and up to 40mA into loads at up to 12Vdc.

P3143 also provides a control pin which switches the current source on/off across the safety barrier.

P3143 is powered from a standard +12V supply, commonly found in telephone and computer equipment.

P3143 is certified to IEC 950, EN 60950 and EN 41003 Equipment incorporating P3143 is capable of approval worldwide.

SPECIFICATIONS

Electrical

At ambient temperature = 25°C and test circuit as Fig 1 unless otherwise stated.

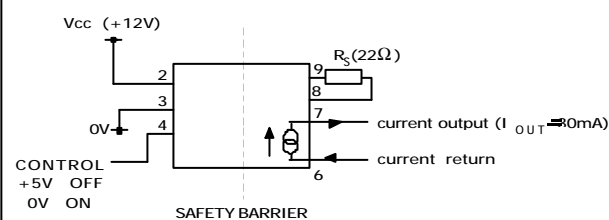
TABLE 1

Parameter	Conditions	Min	Typ	Max	Units
Output current I_{OUT}	(as Fig 1) Load = 300Ω	27	-	33	mA
Output impedance	200 – 4000Hz	10	20	-	kΩ
Vcc supply voltage range	To specification Operational	11.3 9	- -	12.7 15	V V
Supply current	$I_{OUT} = 30\text{mA}$ $I_{OUT} = 40\text{mA}$	- -	70 80	- -	mA mA
Quiescent current	Control (pin 4) OFF. Standby	-	6	10	mA
No load	Control (pin 4) ON. Load disconnected.	-	32	-	mA
Sensitivity of I_{OUT} to Vcc		-	+1.1	-	mA/V
Sensitivity of I_{OUT} to ambient temperature	(operating range)	-	-0.07	-	mA/°C
ON/OFF control ⁽¹⁾	Pin 4				
OFF		4.0	-	-	V
ON		-	-	0.7	V
Control input sink current	Pin 4 = 0.7V	-	0.7	-	mA
Open circuit voltage (pins 6-7)	Load disconnected	-	-	30	V
Temperature range:					
Operating		0	-	+70	°C
Storage		-25	-	+85	°C
Voltage isolation ⁽²⁾	50Hz dc	2.12 3.0	- -	- -	kVrms kV

Notes:

- Control voltages apply where voltage forcing is used. If pin 4 is left unconnected the control defaults to the ON condition. To guarantee turn OFF, driver sourcing current into control pin 4 should be capable of 1mA at 4.5V.
- Components are 100% tested at 3.25kV dc.

Fig. 1 Application Circuit



APPLICATION

A simplified treatment for 600Ω match and with an idealized signal transformer etc. is presented here.

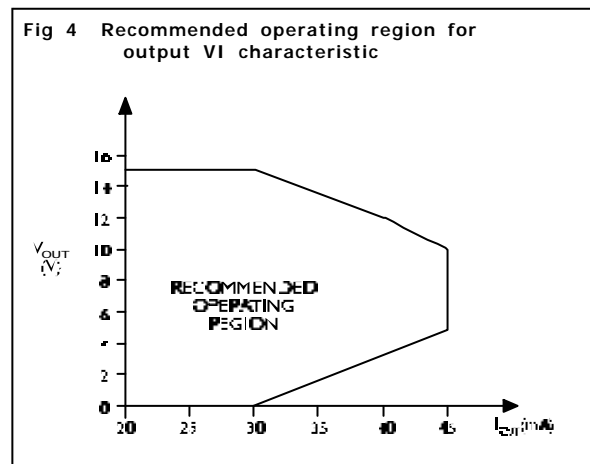
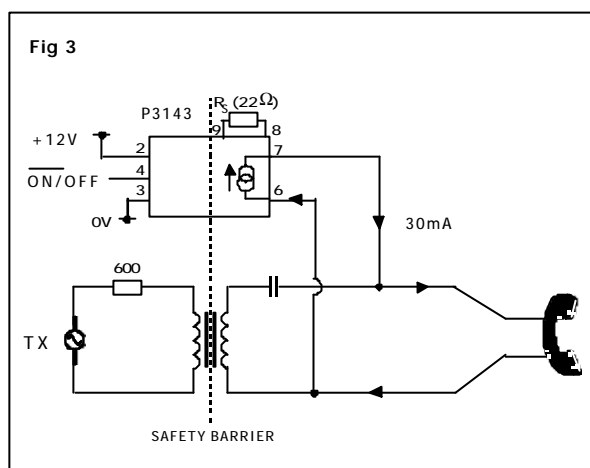
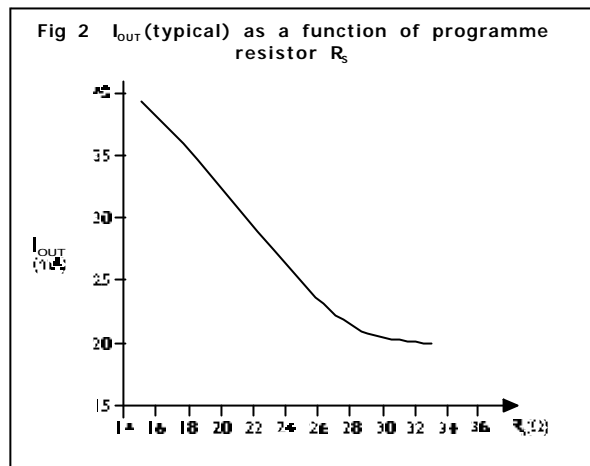
For a fuller description of P3143's application, refer to application notes (e.g. ETALDOC 561).

P3143 overcomes the traditional difficulties associated with voltage output dc-dc converters, (which unbalance matching circuits), by employing a safety-isolated constant current source. Current is set by a single programming resistor, R_S , which can be a miniature type of rating less than 50mW, in accordance with fig. 2.

P3143's output impedance is around 20kΩ across the voiceband, and therefore presents negligible loading to matching circuits.

Fig. 3, which assumes an ideal transformer and high value blocking capacitor, demonstrates the simplicity of a 600Ω match with 30mA current feed.

An approved handset driven at 25mA develops a voltage in accordance with regulatory requirements. Therefore, with current forcing, an acceptable operating point can always be established. The current source must be capable of driving a "worst case" handset, i.e. a handset which develops the highest voltage at the sourced current. In many countries a maximum permissible terminal voltage is imposed for terminal equipment driven at 25mA. P3143 will deliver 25mA at voltages in excess of 14V (see fig. 4), satisfying nearly all national requirements.



INSTALLATION

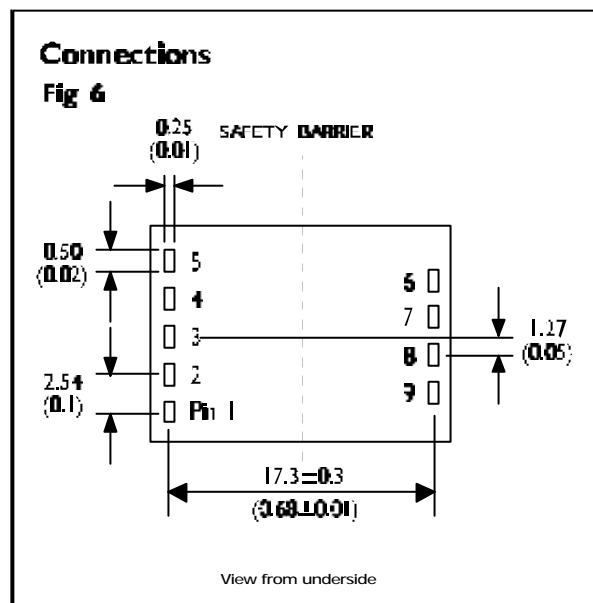
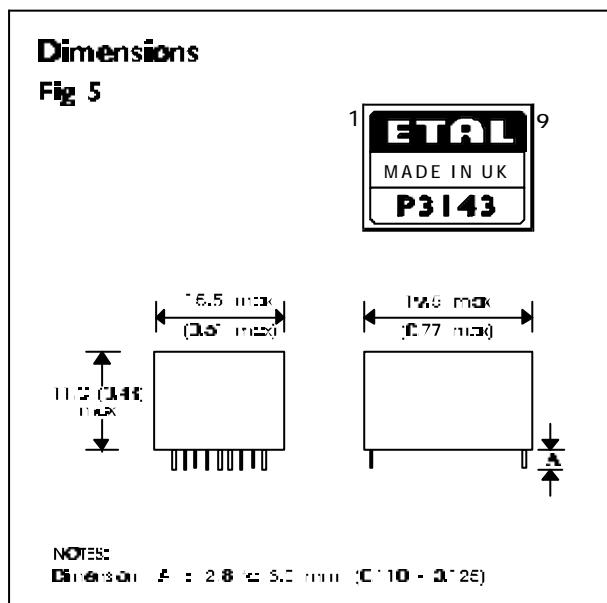
Whilst P3143 suppresses supply voltage ripple by around 20dB with a typical handset, excessive audio frequency ripple (e.g. 120Hz ripple from a poorly regulated rectified ac supply) will inevitably cause some breakthrough to the handset. In such cases, adding supply smoothing capacitors of reasonable size may be ineffective. However, P3143 permits an economical method of additional suppression with capacitance (e.g. 47 μ F 35V) added between pins 6 and 9 (positive terminal of capacitor to pin 9).

Note: do not connect capacitance across current output terminals (pins 6-7) as this will severely impair the high output impedance of P3143.

In common with all power switching devices, P3143 switches relatively high voltages and currents. The associated fields are unlikely to be troublesome, but normal precautions should be taken with sensitive magnetic components to avoid coupling local fields. Such components should not be sited within 3mm of the P3143 outline.

Observe prudent layout practices with power switching devices. Do not run power tracks close to sensitive signal tracks. Avoid siting sensitive analogue components (eg. signal transformers) close to power switching devices. If additional decoupling/suppression is necessary, position capacitors close to the component to be decoupled.

CONSTRUCTION



Dimensions shown are in millimetres (inches)

PIN	FUNCTION
1	DO NOT CONNECT
2	+12V, V _{cc}
3	0V
4	Control: +5V OFF, 0V ON
5	DO NOT CONNECT
6	Current return
7	Current output
8	Current set resistor pin
9	Current set resistor pin

SAFETY

Manufactured from materials conforming to flammability requirements of UL94V-0 and EN 60950:1992 (BS7002:1992) sub-clause 1.2.13.2 (V0).

Distance through solid insulation 0.4mm minimum.
Constructed and fully encapsulated in accordance with EN 60950:1992 (BS7002:1992) (Supplementary insulation), 250Vrms working voltage, flammability class V-0.

CERTIFICATION

Certified by BSI (Certificate 8175) to EN 60950:1992 (BS7002:1992) up to and including amendment 5, and IEC950:1991, sub-clauses 2.2.2, 2.9.1, 4.4.3 (V-0), and 5.3 for supplementary insulation for a mains supply voltage not exceeding 250Vrms (working voltage 250Vrms) and a maximum operating temperature of 85°C in a Pollution Degree 2 environment, and BS EN 41003:1997 sub-clause 4.5.3.

Additionally, Profec Technologies certifies all devices as providing voltage isolation of 2.12kVrms, 3.0kV dc minimum. All shipments are supported by a certificate of conformity to current applicable safety standards.

ABSOLUTE MAXIMUM RATINGS

(Ratings of components independent of circuit).

Vcc (pin 2)	+ 15V
Control (pin 4)	+ 6V
Minimum current set resistance	10Ω
Short term isolation voltage (1s)	3.0kVdc 2.12kVrms
Storage temperature	-25°C to +85°C
Lead temperature (10s)	260°C
Short circuit duration (pins 6-7)	
$I_{OUT} \leq 30\text{mA}$	Indefinite
$30\text{mA} < I_{OUT} \leq 40\text{mA}$	10s
$40\text{mA} < I_{OUT} \leq 45\text{mA}$	1s

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