FAST HIGH VOLTAGE TRANSISTOR SWITCHES

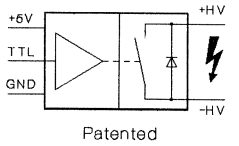
Description

This solid-state switch has been designed for high voltage, high speed switching applications such as acceleration and deflection grid drivers, pockels cell drivers, power tube drivers and high-voltage pulse generators. In contrast to conventional high voltage switches like thyratrons, the HTS 121 is a very universal, small and light-weight switching element, which does not need heating power or a complex drive circuitry. The HTS 121 has a very short recovery time, a high repetition rate, a low jitter and a lifetime typical of semiconductor devices. The power part of switch is made up of a large number of MOSFET connected in parallel and in series which are controlled absolutely synchronously by a special driver circuit. The on-time of the switch is proportional to the input signal and can be controlled between 150 ns and infinity. That means the switch remains turned on as long as the TTL control input is set at high. The turn-on rise time depends essentially on the operating voltage and the load capacitance. Due to the galvanic isolation of more than 18 kVDC, the HTS 121 can be used as high-side switch for positive as well as for negative voltages without any isolation transformer or opto coupler. The device is protected from thermal overload by means of an internal temperature sensor. Further protection is afforded against too high a signal frequency, unsuitable control signals and an unsuitable auxiliary supply.

For detailed design recommendations please refer to the "General Instructions for Use".

HTS 121

12000 Volts / 30 Amps



Patented

Variable On-Time
Simple Connection
Compact Design

NEW

SPECIFICATION	SYMBOL	CONDITION / COMMENT		HTS 121	UNIT
Maximum Operating Voltage	$V_{O(max)}$			±12000	VDC
Switch Breakdown Voltage	V_{br}	I_{off} = 1 mADC, T_{case} = 70°C		>14000	VDC
Isolation Voltage	V_I	HV side against control side		>18000	VDC
Maximum Peak Current	$I_{P(max)}$	t_p < 10 µs, duty cycle < 1%		30	ADC
Max. Continuous Load Current	I_L	T_{case} = 25°C (Surface temperature)		0.8	ADC
Static On-Resistance	R_{stat}	I_L = 0.1 x $I_{P(max)}$		30	
		I_L = $I_{P(max)}$		90	Ω
Maximum Off-State Current	I_{off}	0.8 x V_O		<15	µADC
Turn-On Delay Time	$t_{d(on)}$	0.8 x V_O, C_L = 20 pF, R_S=51Ω		100	ns
Turn-On Rise Time	$t_{r(on)}$		0.5 x V_O, C_L = 20 pF	7	
		R_L=10K	0.8 x V_O, C_L = 20 pF	10	
		R_S=51Ω	0.8 x V_O, C_L = 100 pF	28	
			0.8 x V_O, C_L = 500 pF	75	ns
Turn-Off Time	$t_{(off)}$	Actual trailing edge is determined by R_LxC_L		<10	ns
Typical Turn-On Jitter	$t_{j(on)}$	V_{aux}=5.0 VDC, V_{tr}=5VDC, f=1kHz		100	ps
On-Time Range	t_{on}			150 ns to infinity	
Maximum Burst Frequency	$f_{b(max)}$	Use option 01 for > 20 pulses / 20µs burst		3	MHz
Maximum Continuous Frequency	$f_{c(max)}$	@ V_{aux} = 5.00 VDC, note $P_{d(max)}$ limitations		20	kHZ
Continuous Power Dissipation	$P_{d(max)}$	T_{case}= 25 °C, derating 0.44 W/°C above 25°C		20	Watts
Temperature Range	T_O	Extented temperature range on request		-30 to +70	°C
Switch Natural Capacitance	C_N	Capacitance between switch poles at $V_{O(max)}$		30	pF
Coupling Capacitance	C_C	Power side against control side		25	pF
Diode Reverse Recovery Time	t_{rrc}	@ I_F=6A, Caution: Diode must not be used!		1	µs
Auxiliary Supply Voltage	V_{aux}	Stabilized to ± 5%		5	VDC
Auxiliary Supply Current	I_{aux}	@ $fc_{(max)}$		400	mADC
Control Voltage	V_{tr}			2-10	VDC
Dimensions		Case only, see drawing		135x64x27	mm^3
Weight				400	g

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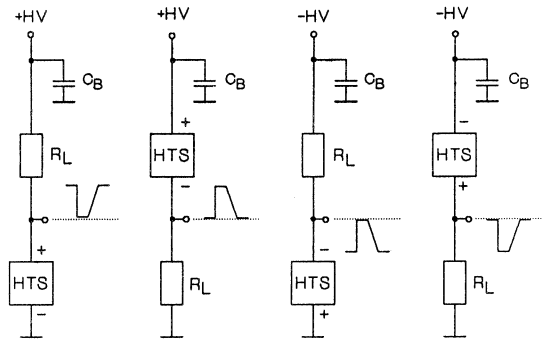
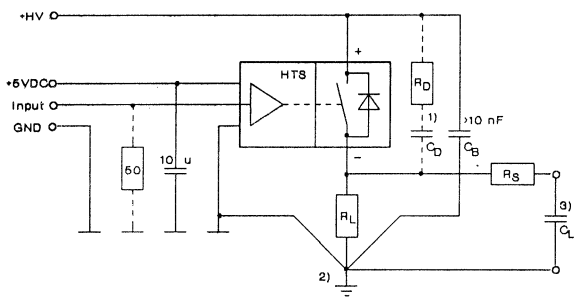
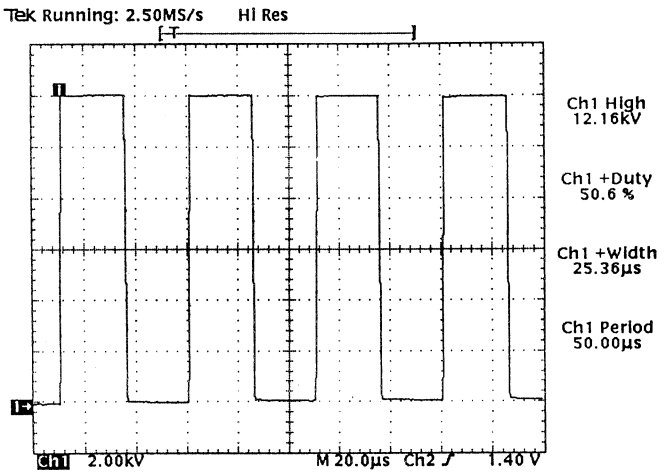
Basic Circuits

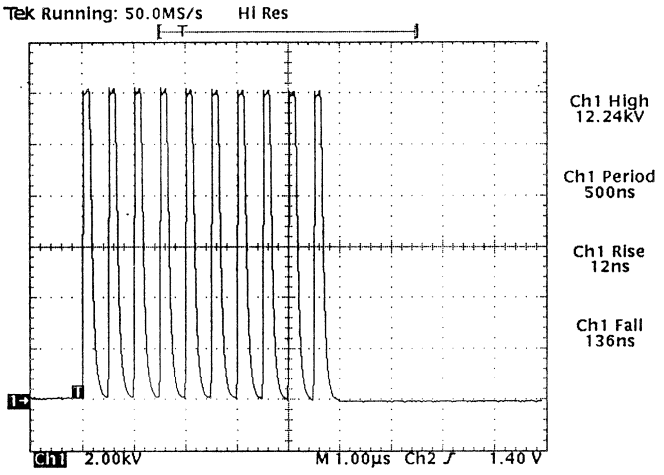


Test Circuit (High-Side Switch)



1) In case of flyback voltage peaks only
2) Star-type grounding at the earth terminal
3) Capacitive load element
All leads as short as possible !

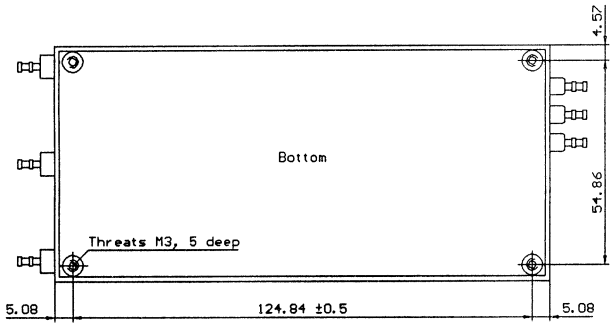




Burst ($R_L = 2k\Omega$, $C_L = 20pF$, $C_B = 2\mu F$)

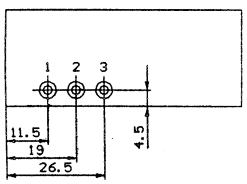
All dimensions in mm

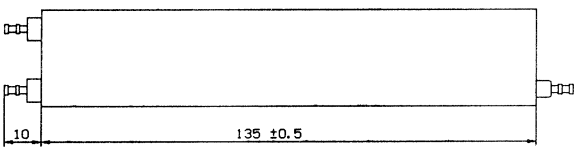
1 - Control input
2 - Return & shielding
3 - +5VDC / 400 mA

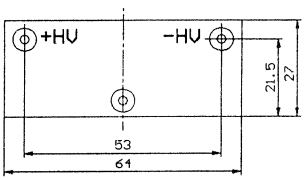


Case HTS 121

Standard case with soldering terminals. Soldering pins for mounting on printed circuit boards are optionally available.







Ordering Informations:

HTS 121	High Voltage Transistor Switch
Option 01	High Frequency Burst (Connections for external buffer capacitors)
Option 02	UL 94-VO Casting Resin
Option 03	Soldering Pins for PCB mounting

All data and specifications subject to change without notice. Custom designed devices on request.