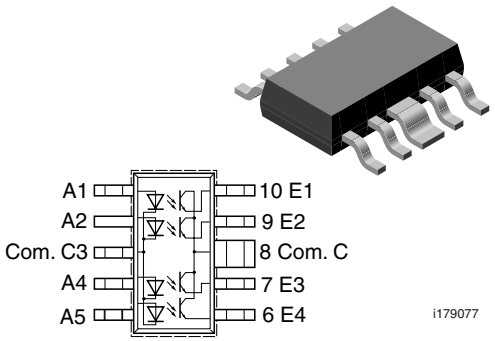
Optocoupler, Phototransistor Output, SOT-223/10, Quad Channel



DESCRIPTION

The SFH6943A is a four channel mini-optocoupler suitable for high density packaged PCB application. It has a minimum of 1768 V_{RMS} isolation from input to output. The device consists of four phototransistors as detectors. Each channel is individually controlled. The optocoupler is housed in a SOT-223/10 package. All the cathodes of the input LEDs and all the collectors of the output transistors are common enabling a pin count reduction from 16 pins to 10 pins a significant space savings as compared to four channels that are electrically isolated individually.

FEATURES

- Transistor optocoupler in SOT-223/10 package
- End stackable, 1.27 mm spacing
- Low current input
- Good CTR linearity versus forward current
- Minor CTR degradation
- High collector emitter voltage, V_{CEO} = 70 V
- Low coupling capacitance
- High common mode transient immunity
- Isolation test voltage: 1768 V_{RMS}
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free
e3
RoHS COMPLIANT

APPLICATIONS

- Telecommunication
- SMT
- PCMCIA
- Instrumentation

AGENCY APPROVALS

- UL1577, file no. E52744 system code V
- CSA 93751

ORDER INFORMATION	
PART	**REMARKS**
SFH6943A-2	CTR 63 % to 200 %, SMD-10
SFH6943A-3	CTR 100 % to 320 %, SMD-10

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	3	V
DC forward current		I_F	3	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	100	mA
Total power dissipation		P_{diss}	10	mW
OUTPUT				
Collector emitter voltage		V_{CE}	70	V
Emitter collector voltage		V_{EC}	7	V
Collector current		I_C	10	mA
Surge collector current	$t_p < 1$ ms	I_{FSM}	20	mA
Total power dissipation		P_{diss}	20	mW

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation test voltage between emitter and detector	t = 1 s	V_{ISO}	1768	V_{RMS}
Creepage distance			≥ 4	mm
Clearance distance			≥ 4	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1		CTI	175	
Isolation resistance	V_{IO} = 100 V, T_{amb} = 25 °C	R_{IO}	≥ 10^{11}	Ω
	V_{IO} = 100 V, T_{amb} = 100 °C	R_{IO}	≥ 10^{10}	Ω
Storage temperature range		T_{stg}	- 55 to + 150	°C
Ambient temperature range		T_{amb}	- 55 to + 100	°C
Junction temperature		T_j	100	°C
Soldering temperature, dip soldering plus reflow soldering processes (2)	t = 10 s maximum	T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °C, unless otherwise specified.
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(2) Refer to reflow profile for soldering conditions for surface mounted devices.

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F = 3 mA	V_F		1.25		V
Reverse current	V_R = 3 V	I_R		0.01	10	µA
Capacitance	V_R = 0 V, f = 1 MHz	C_O		5		pF
Thermal resistance		R_{thja}		1000		K/W
OUTPUT						
Collector emitter voltage	I_{CE} = 10 µA	V_{CEO}	70			V
Emitter collector voltage	I_{EC} = 10 µA	V_{ECO}	7			V
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz	C_{CE}		6		pF
Thermal resistance		R_{thja}		500		K/W
Collector emitter leakage current	V_{CE} = 10V	I_{CEO}		50		nA
COUPLER						
Coupling capacitance		C_C		1		pF

Note

T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Coupling transfer ratio	I_F = 1 mA, V_{CE} = 1.5 V	SFH6943A-2	I_E/I_F	63		200	%
		SFH6943A-3	I_E/I_F	100		320	%
	I_F = 0.5 mA, V_{CC} = 5 V	SFH6943A-2	I_E/I_F	32	100		%
		SFH6943A-3	I_E/I_F	50	160		%

SWITCHING CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	I_E = 2 mA, R_E = 100 Ω, V_{CC} = 5 V	t_{on}		3		µs
Rise time	I_E = 2 mA, R_E = 100 Ω, V_{CC} = 5 V	t_r		2.6		µs
Turn-off time	I_E = 2 mA, R_E = 100 Ω, V_{CC} = 5 V	t_{off}		3.1		µs
Fall time	I_E = 2 mA, R_E = 100 Ω, V_{CC} = 5 V	t_f		2.8		µs

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

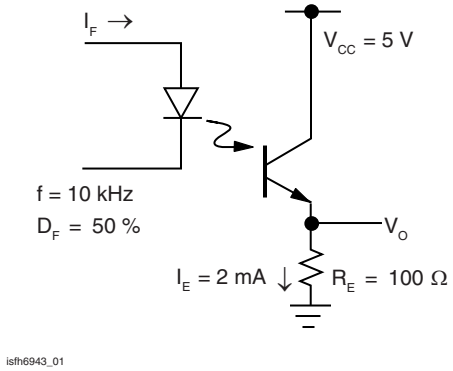


Fig. 1 - Switching times (typ.)

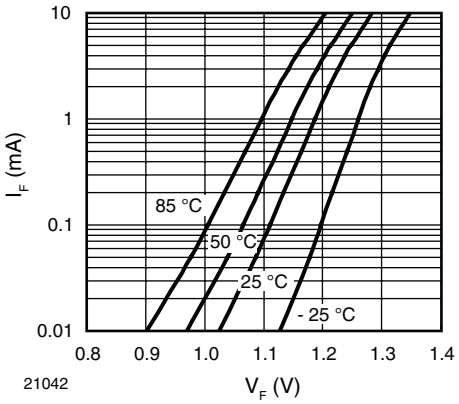


Fig. 3 - LED Current vs. LED Voltage

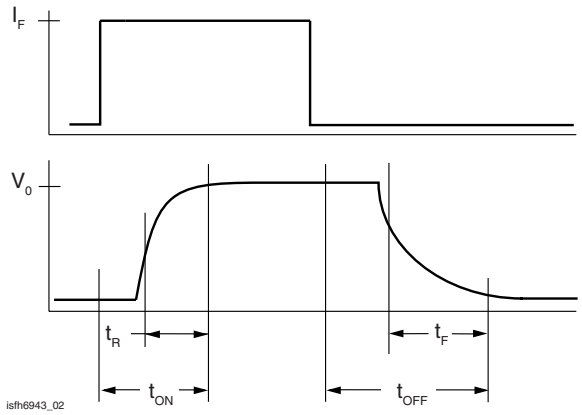


Fig. 2 - Switching Waveform

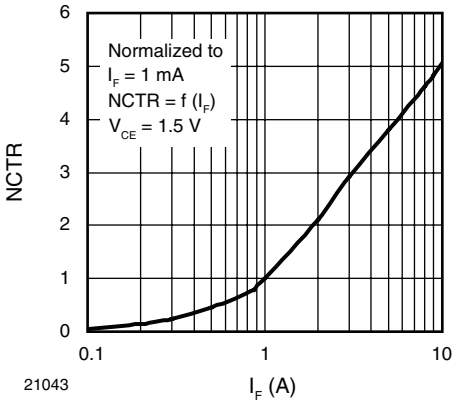


Fig. 4 - Non-Saturated Current Transfer

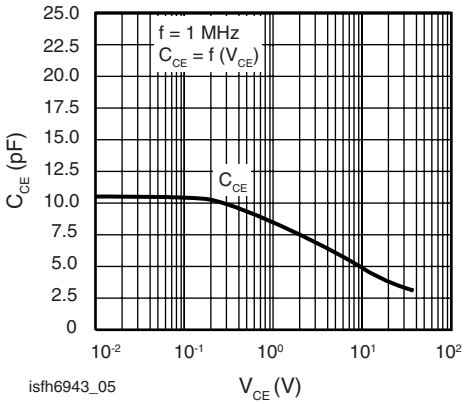


Fig. 5 - Transistor Capacitances (Typ.)

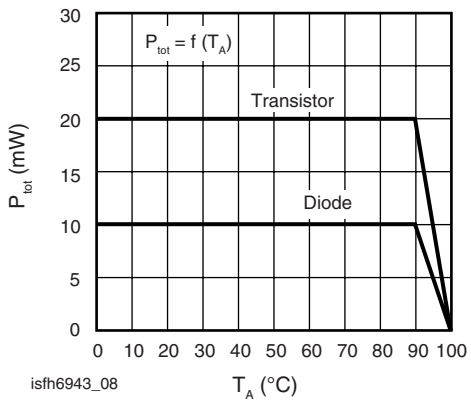


Fig. 8 - Permissible Power Dissipation

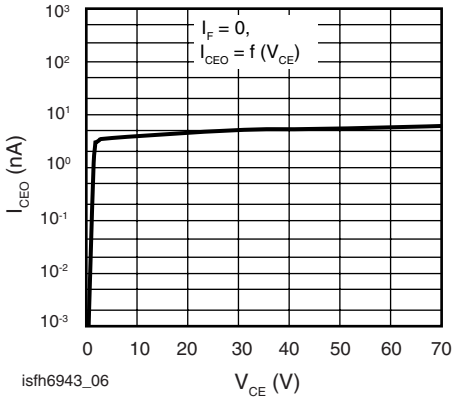


Fig. 6 - Collector Emitter Leakage Current (typ.)

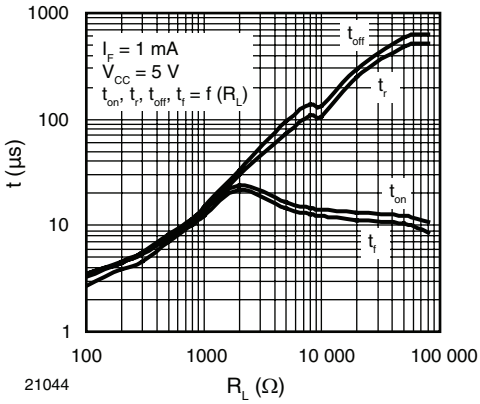


Fig. 9 - Switching Time

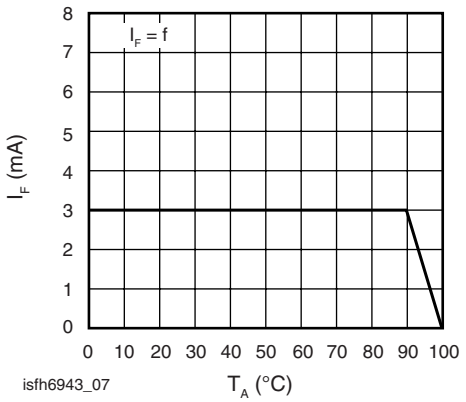


Fig. 7 - Permissible Forward Current Diode

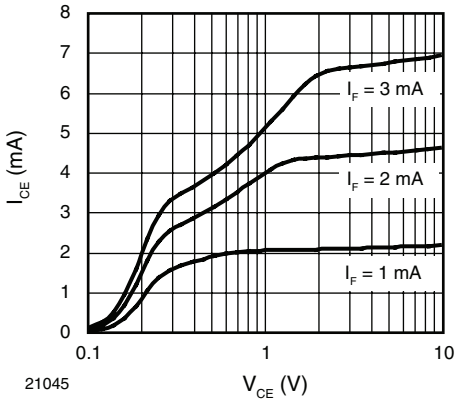
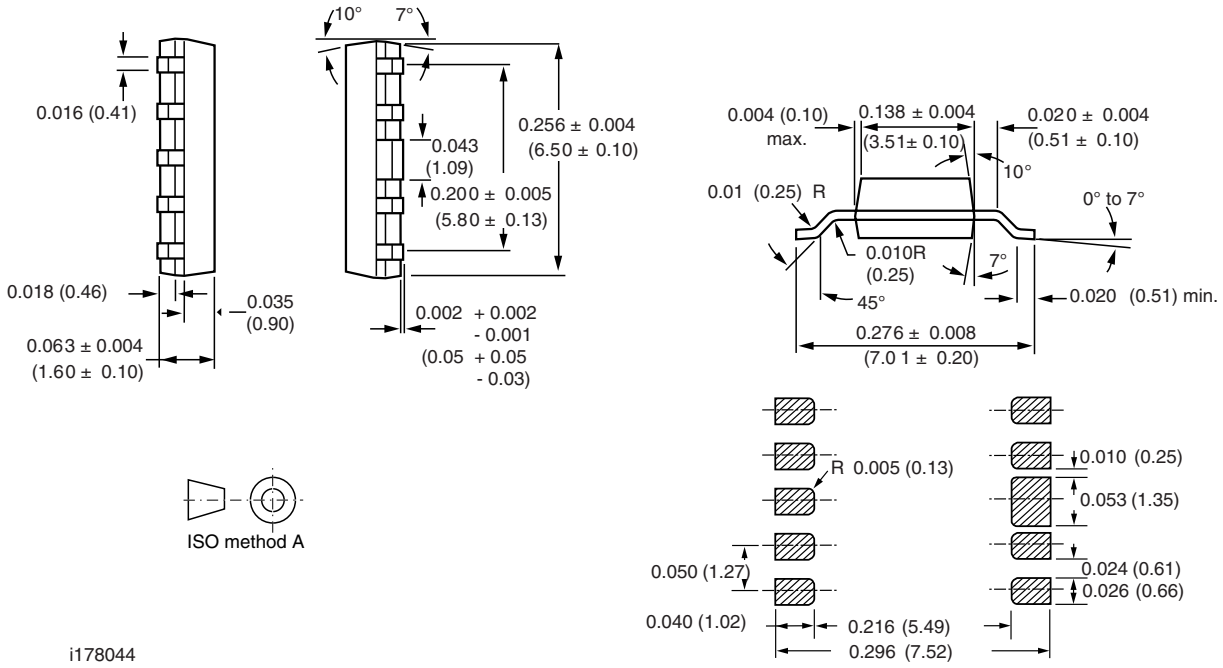


Fig. 10 - Transistor Output Characteristics

PACKAGE DIMENSIONS in inches (millimeters)



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