


FEATURES

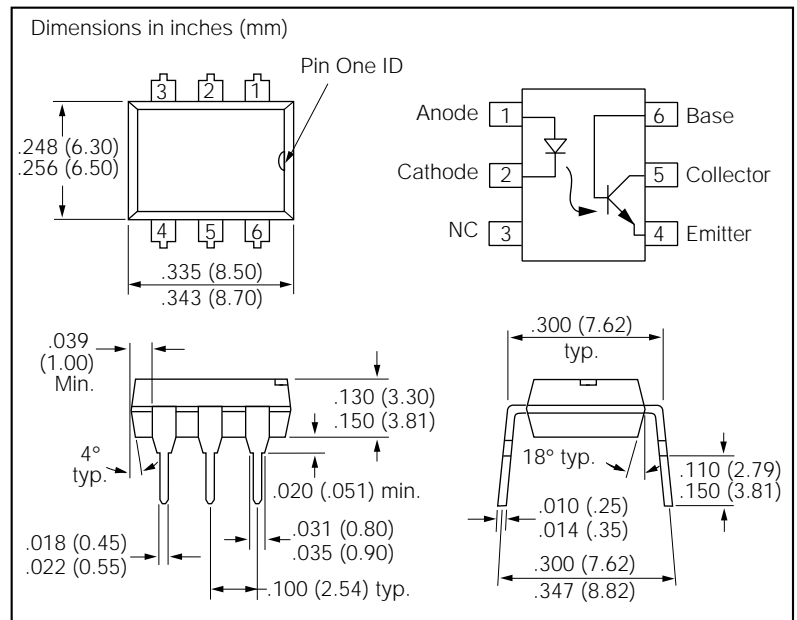
- CTR at I_F=10 mA, V_{CE}=10 V
SFH640-1, 40-80%
SFH640-2, 63-125%
SFH640-3*, 100-200%
- Good CTR Linearity with Forward Current
- Low CTR Degradation
- Very High Collector-Emitter Breakdown Voltage, BV_{CER}=300 V
- Isolation Test Voltage: 5300 VAC_{RMS}
- Low Coupling Capacitance
- High Common Mode Transient Immunity
- Phototransistor Optocoupler
6 Pin DIP Package with Base Connection
- Field Effect Stable: TRIOS⁺
-  VDE 0884 Available with Option 1
- Underwriters Lab File #E52744

DESCRIPTION

The SFH 640 is an optocoupler with very high BV_{CER}, a minimum of 300 volts. It is intended for telecommunications applications or any DC application requiring a high blocking voltage. The SFH640 is a "better than" replacement for H11D1.

*Supplies from this group can't always be guaranteed due to unforeseeable yield spread.

*TRIOS-Transparent IO Shield



Maximum Ratings (T_A=25°C)

Emitter

Reverse Voltage	6 V
DC Forward Current	60 mA
Surge Forward Current (t _p ≤10 μs)	2.5 A
Total Power Dissipation	100 mW

Detector

Collector-Emitter Voltage	300 V
Collector-Base Voltage	300 V
Emitter-Base Voltage	7 V
Collector Current	50 mA
Surge Collector Current (t _p ≤1 ms)	100 mA
Total Power Dissipation	300 mW

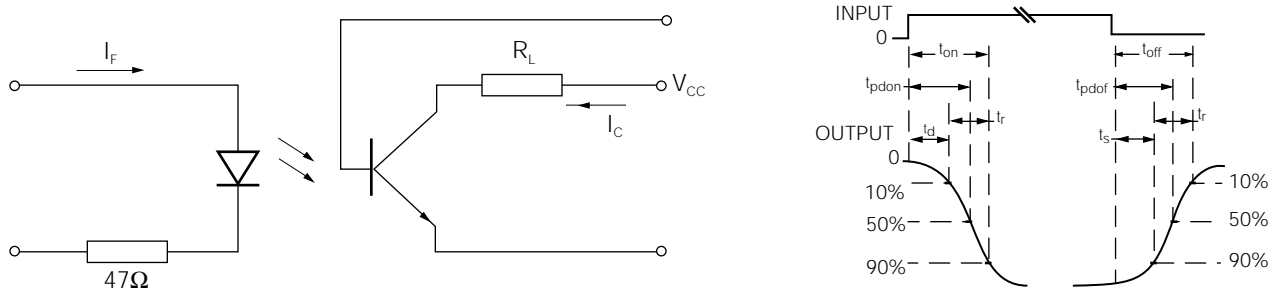
Package

Isolation Test Voltage (between emitter and detector, refer to climate DIN 40046 part 2 Nov. 74)	5300 VAC _{RMS} /7500 VAC _{PK}
Isolation Resistance	
V _{IO} =500 V, T _A =25°C	≥10 ¹² Ω
V _{IO} =500 V, T _A =100°C	≥10 ¹¹ Ω
Insulation Thickness between Emitter and Detector	≥0.4 mm
Creepage	≥7 mm
Clearance	≥7 mm
Comparative Tracking Index	
per DIN IEC 112/VDE 0303, part1	175
Storage Temperature Range	-55°C to +150°C
Operating Temperature Range	-55°C to +100°C
Junction Temperature	100°C
Soldering Temperature (max. 10 sec., dip soldering: distance to seating plane≥1.5 mm)	260°C

Characteristics ($T_A=25^\circ\text{C}$, unless otherwise specified)

	Symbol	Min	Typ	Max	Unit	Condition
Emitter						
Forward Voltage	V_F		1.1	1.5	V	$I_F=10\text{ mA}$
Reverse Voltage	V_R	6			V	$I_R=10\ \mu\text{A}$
Reverse Current	I_R		0.01	10	μA	$V_R=6\text{ V}$
Capacitance	C_O		25		pF	$V_R=0\text{ V}$, $f=1\text{ MHz}$
Thermal Resistance	R_{thJA}		750		K/W	
Detector						
Voltage Collector-Emitter Emitter-Base	BV_{CER} BV_{BEO}	300 7			V V	$I_{CE}=1\text{ mA}$, $R_{BE}=1\text{ M}\Omega$ $I_{EB}=10\ \mu\text{A}$
Capacitance	C_{CE} C_{CB} C_{EB}		7 8 38		pF pF pF	$V_{CE}=10\text{ V}$, $f=1\text{ MHz}$ $V_{CB}=10\text{ V}$, $f=1\text{ MHz}$ $V_{EB}=5\text{ V}$, $f=1\text{ MHz}$
Thermal Resistance	R_{thJA}		250		K/W	
Package						
Coupling Capacitance	C_C		0.6		pF	
Coupling Transfer Ratio SFH 640-1	I_C/I_F	40 13	30	80	%	$I_F=10\text{ mA}$, $V_{CE}=10\text{ V}$ $I_F=1\text{ mA}$, $V_{CE}=10\text{ V}$
SFH 640-2	I_C/I_F	63 22	45	125	%	$I_F=10\text{ mA}$, $V_{CE}=10\text{ V}$ $I_F=1\text{ mA}$, $V_{CE}=10\text{ V}$
SFH 640-3	I_C/I_F	100 34	70	200	%	$I_F=10\text{ mA}$, $V_{CE}=10\text{ V}$ $I_F=1\text{ mA}$, $V_{CE}=10\text{ V}$
Saturation Voltage, Collector-Emitter SFH 640-1 SFH 640-2 SFH 640-3	V_{CEsat} V_{CEsat} V_{CEsat}		0.25 0.25 0.25	0.4 0.4 0.4	V V V	$I_F=10\text{ mA}$, $I_C=2\text{ mA}$ $I_F=10\text{ mA}$, $I_C=3.2\text{ mA}$ $I_F=10\text{ mA}$, $I_C=5\text{ mA}$
Leakage Current, Collector-Emitter	I_{CER}		1	100	nA	$V_{CE}=200\text{ V}$, $R_{BE}=1\text{ M}\Omega$

Figure 1. Switching times measurement-test circuit and waveform



Switching Times (Typical)

$I_C=2\text{ mA}$ (to adjust by I_F), $R_L=100\ \Omega$, $T_A=25^\circ\text{C}$, $V_{CC}=10\text{ V}$

Description	Symbol	Values	Unit
Turn-On Time	t_{ON}	5	μs
Rise Time	t_R	2.5	μs
Turn-Off Time	t_{OFF}	6	μs
Fall Time	t_F	5.5	μs

Figure 2. Current transfer ratio (typ.)
 $V_{CE}=10\text{ V}$, $T_A=25^\circ\text{C}$, normalized to
 $I_F=10\text{ mA}$, $NCTR=f(I_F)$

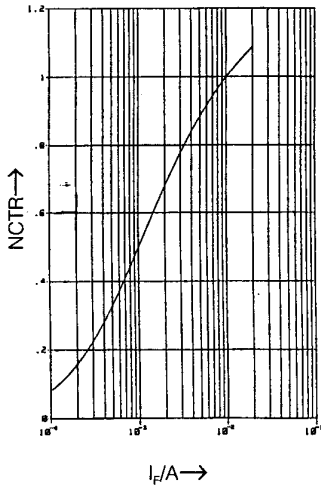


Figure 3. Diode forward voltage (typ.)
 $V_F=f(I_F, T_A)$

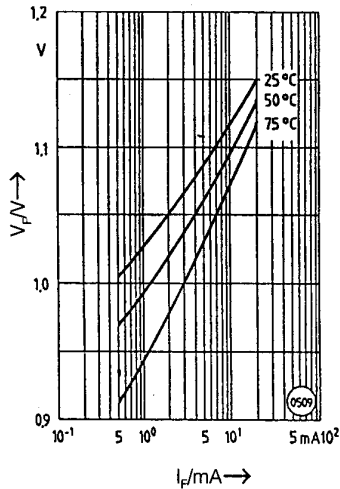


Figure 4. Output characteristics (typ.)
 $T_A=25^\circ\text{C}$, $I_{CE}=f(V_{CE}, I_B)$

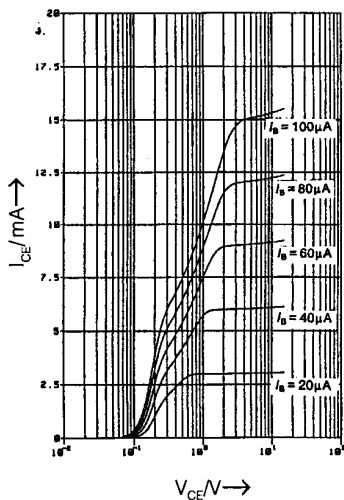


Figure 5. Output characteristics (typ.) $T_A=25^\circ\text{C}$, $I_{CE}=f(V_{CE}, I_F)$

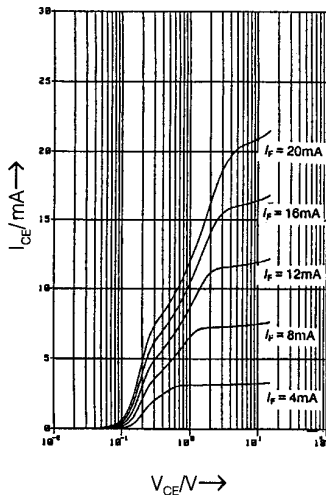


Figure 6. Transistor capacitances (typ.) $T_A=25^\circ\text{C}$, $f=1\text{ MHz}$, $C_{CE}=f(V_{CE})$
 $C_{CB}=f(V_{CB})$, $C_{EB}=f(V_{EB})$

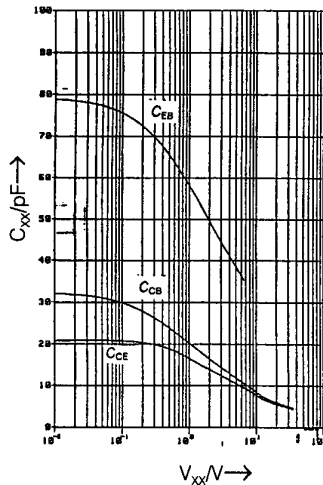


Figure 7. Collector-emitter leakage current (typ.) $I_F=0$, $R_{BE}=1\text{ MW}$,
 $I_{CER}=f(V_{CE})$

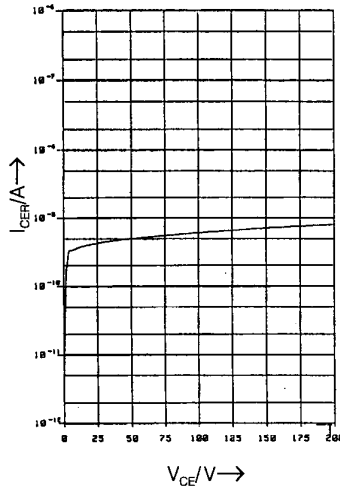


Figure 8. Permissible loss diode
 $I_F=f(T_A)$

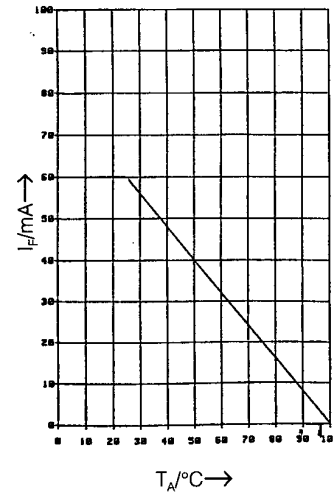


Figure 9. Permissible power dissipation $P_{TOT}=f(T_A)$

