

# PHOTO-TRANSISTORS FOR INDUSTRIAL AND COMMERCIAL APPLICATIONS



## Phototransistors – VTT Series – CR Series

### Applications

- Coin counters
- Position sensors
- Remote controllers
- Ambient light sensing
- Street light switching
- Oil burner flame monitoring
- Safety shields
- Margin control-printers
- Monitor paper position and stack height

### Features and Benefits

- Low cost visible and near IR photo detection
- Low dark current
- Available in package with integrated visible filtering
- Available in package with integrated IR filtering
- Available in a wide range of packages
- RoHs compliant

### Product Description

Phototransistors are photodiode-amplifier combinations integrated within a single silicon chip. The phototransistor can be viewed as a photodiode whose output current is fed into the base of a conventional transistor.

These photodiode-amplifier combinations are put together to overcome the major limitation of photodiodes: unity gain. The typical gain of a phototransistor can range from 100 to over 1500. Many applications demand a greater output than can be generated by a photodiode alone. Even though the signal of a photodiode can be amplified through external circuitry (operational amplifier for example) this is not always cost effective. In such cases, phototransistors provide a lower cost alternative.

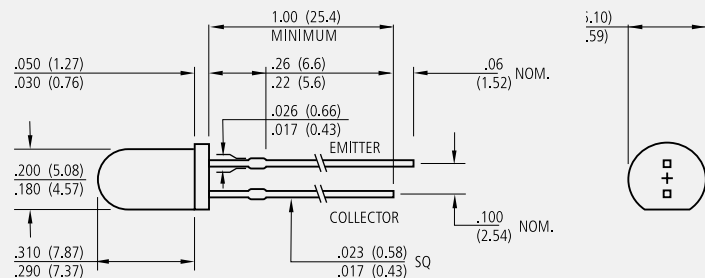
### CR50TE



- Surface mounting device
- Solid state ceramic chip
- High thermal conductivity
- Special type (CR50TE-DLF) with daylight filter on request

Figure 1

### Package Drawing – VTT Series – T-1 $\frac{3}{4}$ Package



Phototransistors – VTT Series – CR Series

Symbol	Package	Exposed Active Area	Light Current @ 100 fc, V <sub>CE</sub> = 5 V		Dark Current @ V <sub>CE</sub> = 10 V		Collector Breakdown @ I <sub>C</sub> = 100 μA, 0 fc	Emitter Breakdown @ I <sub>C</sub> = 100 μA, 0 fc	Saturation Voltage @ I <sub>C</sub> = 100 μA, 100 fc	Rise/Fall Time I <sub>C</sub> = 1.0 mA RL = 100 Ω	Angular Response	Spectral Range
			min	max	min	max	V <sub>BR(CEO)</sub>	V <sub>BR(CEO)</sub>	V <sub>CE(SAT)</sub>	Typical	Typical	λ <sub>RANGE</sub>
Unit		mm <sup>2</sup>	I <sub>C</sub>	I <sub>CEd</sub>	V <sub>BR(CEO)</sub>	V <sub>BR(CEO)</sub>	V <sub>CE(SAT)</sub>	τ <sub>r</sub> /τ <sub>f</sub>	Θ <sub>1/2</sub>	°	nm	
			mA	nA	V	V	V	μS				
VTT1222WH	T-1¾	0.19	1.9	10 @ VCE = 20V	50	6.0	0.25	2.0	±40	400-1050		
VTT1223WH	T-1¾	0.19	1.5	10 @ VCE = 20V	40	6.0	0.25	3.0	±40	400-1050		
VTT1225H	T-1¾	0.19	4.0	100	30	5.0	0.25	1.5	±5	400-1050		
VTT1226H	T-1¾	0.19	7.5	100	30	5.0	0.25	3.0	±5	400-1050		
VTT1227H	T-1¾	0.19	12.0	100	30	5.0	0.25	4.0	±5	400-1050		
VTT3122EH	Coax hermetic	0.19	1.2	100 @ VCE = 20V	40	6.0	0.25	2.5	±8	400-1050		
VTT3123EH	Coax hermetic	0.19	4.0	100	30	4.0	0.25	4.0	±8	400-1050		
VTT3323LAH	Long T-1	0.19	2.0 @ 20 fc	100	30	5.0	0.25	3.0	±10	400-1050		
VTT3324LAH	Long T-1	0.19	4.0 @ 20 fc	100	30	5.0	0.25	4.0	±10	400-1050		
VTT3325LAH	Long T-1	0.19	6.0 @ 20 fc	100	30	5.0	0.25	5.0	±10	400-1050		
VTT3423LAH	Long T-1	0.19	1.0 @ 20 fc	100	30	5.0	0.25	3.0	±10	700-1050		
VTT3424LAH	Long T-1	0.19	2.0 @ 20 fc	100	30	5.0	0.25	4.0	±10	700-1050		
VTT3425LAH	Long T-1	0.19	3.0 @ 20 fc	100	30	5.0	0.25	5.0	±10	700-1050		
VTT7122H	Lateral	0.19	1.0	100	30	5.0	0.25	2.0	±36	400-1050		
VTT7123H	Lateral	0.19	2.0	100	30	5.0	0.25	2.0	±36	400-1050		
VTT7125H	Lateral	0.19	4.5	100	30	5.0	0.25	2.0	±36	400-1050		
VTT7222H	Lateral	0.19	0.9	100	30	5.0	0.25	2.0	±36	700-1050		
VTT7223H	Lateral	0.19	1.8	100	30	5.0	0.25	2.0	±36	700-1050		
VTT7225H	Lateral	0.19	4.0	100	30	5.0	0.25	4.0	±36	700-1050		
VTT1212H	T-1¾	0.63	2.0 @ 20 fc	100	30	5.0	0.25	4.0	±10	400-1050		
VTT1214H	T-1¾	0.63	4.0 @ 20 fc	100	30	5.0	0.25	6.0	±10	400-1050		
VTT9002H	TO-106 flat	0.63	2.0	100	30	6.0	0.55	4.0	±50	400-1050		
VTT9003H	TO-106 flat	0.63	5.0	100	30	6.0	0.55	6.0	±50	400-1050		
VTT9102H	TO-106 lensed	0.63	6.0	100 @ VCE = 5V	30	4.0	0.55	6.0	±42	400-1050		
VTT9103H	TO-106 lensed	0.63	13.0	100 @ VCE = 5V	30	4.0	0.55	10.0	±42	400-1050		
VTT1015H	TO-46		0.4	25 @ VCE = 20V	40	6.0	0.40	5.0	±35	400-1050		
VTT1016H	TO-46		1.0	25 @ VCE = 20V	30	6.0	0.40	5.0	±35	400-1050		
VTT1017H	TO-46		2.5	25	20	4.0	0.40	8.0	±35	400-1050		
VTT1115H	TO-46 lensed		1.0 @ 20 fc	100	30	6.0	0.40	5.0	±15	400-1050		
VTT1116H	TO-46 lensed		2.0 @ 20 fc	100	30	4.0	0.40	8.0	±15	400-1050		
VTT1117H	TO-46 lensed		4.0 @ 20 fc	100	30	4.0	0.40	8.0	±15	400-1050		
VTT9812FH	T-1¾ flat	0.19	0.10	100	30	5.0	0.25	1.5	±56	450-700		
CR50TE	Ceramic SMD (A2)	0.18		400 @ VCE = 20V	40		0.3 @ I <sub>C</sub> = 2 mA	4.0 @ RL = 50 Ω	Wide viewing angle	400-1070		

Figure 2

Package Drawing – VTT Series – T-1 Package

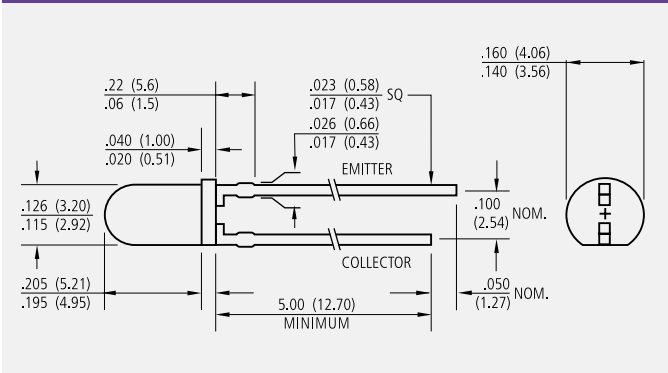
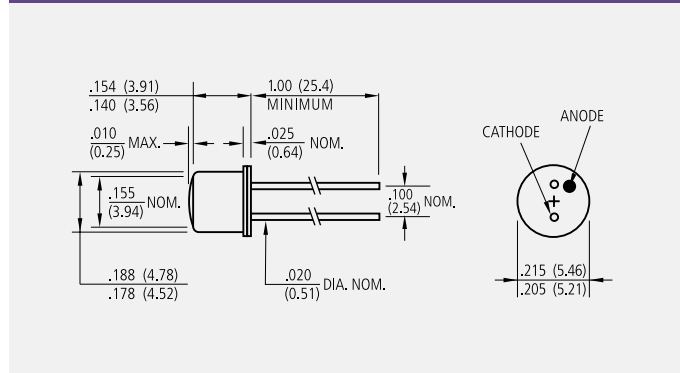


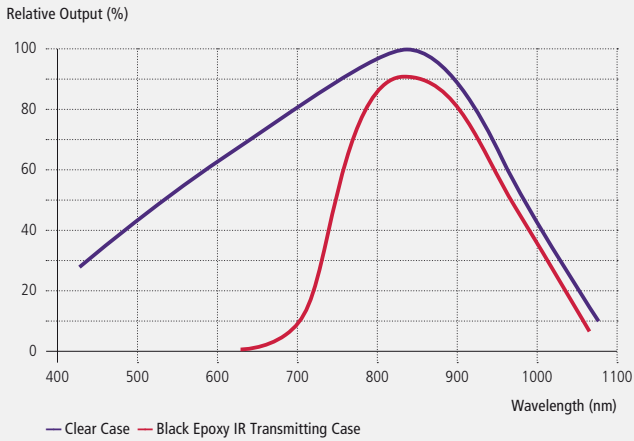
Figure 3

Package Drawing – VTT Series – TO-46 Package



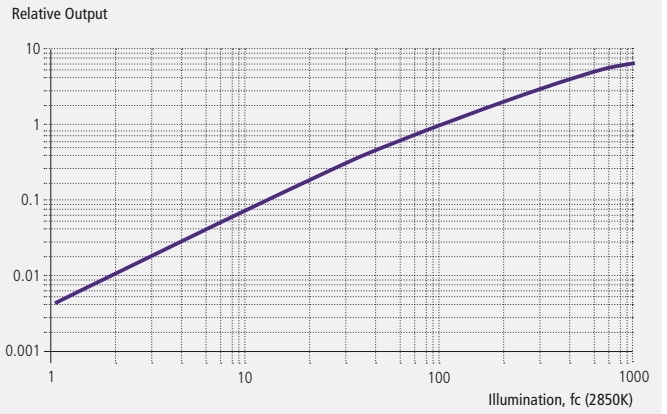
Graph 1

### Rel. Spectral Response (Referred to Peak Response of Clear Case)



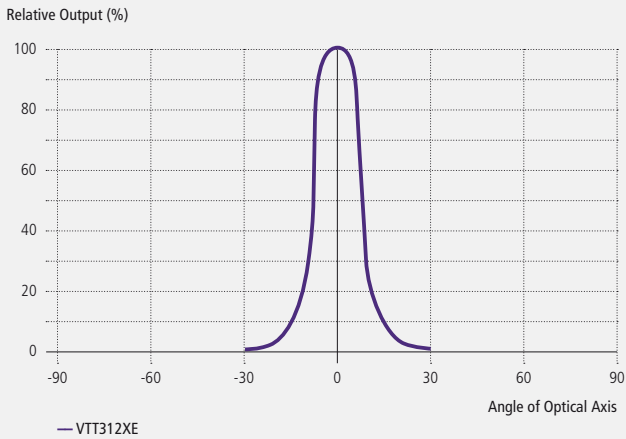
Graph 2

### Relative Output vs. Illumination (Normalized at 100 fc)



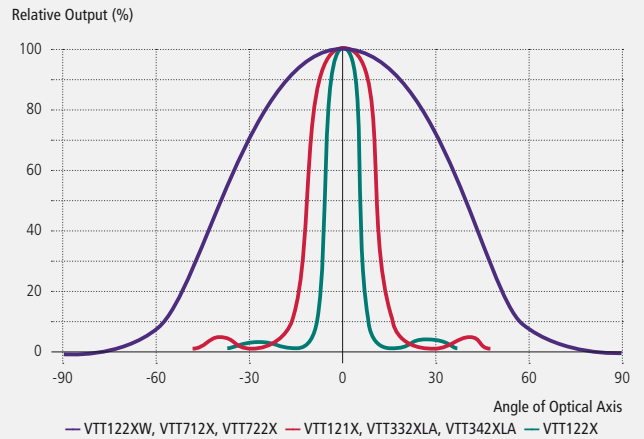
Graph 3

### Angular Response Coax Packages



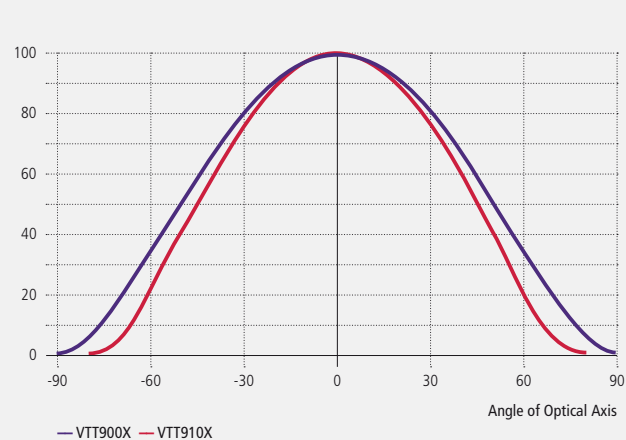
Graph 4

### Angular Response Molded Epoxy Packages



Graph 5

### Angular Response Ceramic Packages



Graph 6

### Angular Response 10-46 Packages

