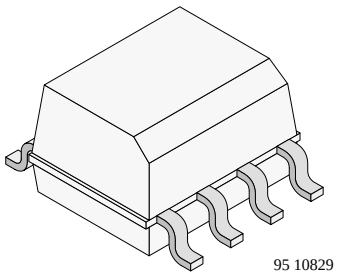
MOC211–213

Surface Mount Optocoupler with Phototransistor Output

Order Nos. and Classification table is on sheet 2.

Description

The MOC series consists of a phototransistor optically coupled to a gallium arsenide infrared-emitting diode in an 8-lead plastic dual inline packages (small outline).



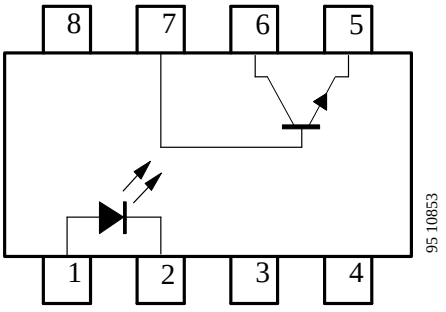
Applications

- Computer peripheral interface
- Microprocessor system interface
- Low power DC/DC converter
- Hybride substrates that require high density mounting

Features

- **C**urrent **T**ransfer **R**atio (CTR) selected into 3 groups, specified at I_F = 10 mA
- MOC211 minimum 20%
MOC212 minimum 50%
MOC213 minimum 100%
- Test isolation voltage between input and output V_{IO} (RMS): 2.5 kV
- 8-lead package, similar to SOIC-8
- Minimum $V_{(BR)CEO}$ of 90 V guaranteed
- Soldering methods according to CECC 00802 in table 1, class B or C
- Low temperature coefficient of CTR
- Base connected
- Suitable for cleaning process without chemical solvent
- **U**nderwriters **L**aboratory (UL) recognized-file No. E-76222 *

Pin Connection



* is applied

Order Schematic

Part Numbers	CTR-Ranking
MOC211/ MOC211-GS12	<20%
MOC212/ MOC212-GS12	<50%
MOC213/ MOC213-GS12	>100%

Suffix: GS12 = Taped and reeled version

Absolute Maximum Ratings

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		V_R	5	V
Forward current		I_F	60	mA
Forward surge current	$t_p \le 10$ µs	I_{FSM}	3	A
Power dissipation	$T_{amb} \le 25°C$	P_{tot}	100	mW
Junction temperature		T_j	125	°C

Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Collector base voltage		V_{CBO}	90	V
Collector emitter voltage		V_{CEO}	90	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5$, $t_p \le 10$ ms	I_{CM}	100	mA
Power dissipation	$T_{amb} \le 25°C$	P_{tot}	150	mW
Junction temperature		T_j	125	°C

Coupler

Parameters	Test Conditions	Symbol	Value	Unit
AC isolation test voltage (RMS)		V_{IO}	2.5	kV
Total power dissipation	$T_{amb} \le 25°C$	P_{tot}	250	mW
Ambient temperature range		T_{amb}	–55 to +100	°C
Storage temperature range		T_{stg}	–55 to +125	°C
Soldering classification	single wave, $t \le 10$ s	T_{sd}	260	°C

1) Related standard climate 23/50 DIN 50014

Electrical Characteristics

Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	I_F = 50 mA	V_F		1.25	1.6	V
Breakdown voltage	I_R = 100 µA	$V_{(BR)}$	5			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		50		pF

Output (Detector)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector base breakdown voltage	I_C = 100 µA	$V_{(BR)C80}$	90			V
Emitter collector breakdown voltage	I_C = 1 mA	$V_{(BR)CEO}$	90			V
Emitter collector breakdown voltage	I_E = 100 µA	$V_{(BR)ECO}$	7			V
Collector emitter cut-off current	V_{CE} = 10 V, I_f = 0, E = 0	I_{CEO}			50	nA

Coupler

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
AC isolation test voltage (RMS)	f = 50 Hz, t = 1 s	V_{IO}	2.5			kV
Collector emitter saturation voltage	I_F = 10 mA, I_C = 1 mA	V_{CEsat}			0.3	V
Cut-off frequency	I_F = 10 mA, V_{CE} = 5 V, R_L = 100 Ω	f_C		110		kHz
Coupling capacitance	f = 1 MHz	C_k		0.3		pF

Current Transfer Ratio (CTR)

Parameters	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
I_C/I_F	V_{CE} = 10 V, I_F = 10 mA	MOC211	CTR	0.2	0.5		
		MOC212	CTR	0.5	1		
		MOC213	CTR	1	2		

Switching Characteristics (Typical Values)

V_S = 10 V

Type	R_L = 100 Ω (see figure 1)						
	t_d[µs]	t_r[µs]	t_{on}[µs]	t_s[µs]	t_f[µs]	t_{off}[µs]	I_C[mA]
MOC211/ MOC211–GS12	0.90	1.10	2.00	0.10	1.80	1.90	2
MOC212/ MOC212–GS12	1.60	1.80	3.40	0.10	2.60	2.70	2
MOC213/ MOC213–GS12	2.20	2.80	5.00	0.20	4.10	4.30	2

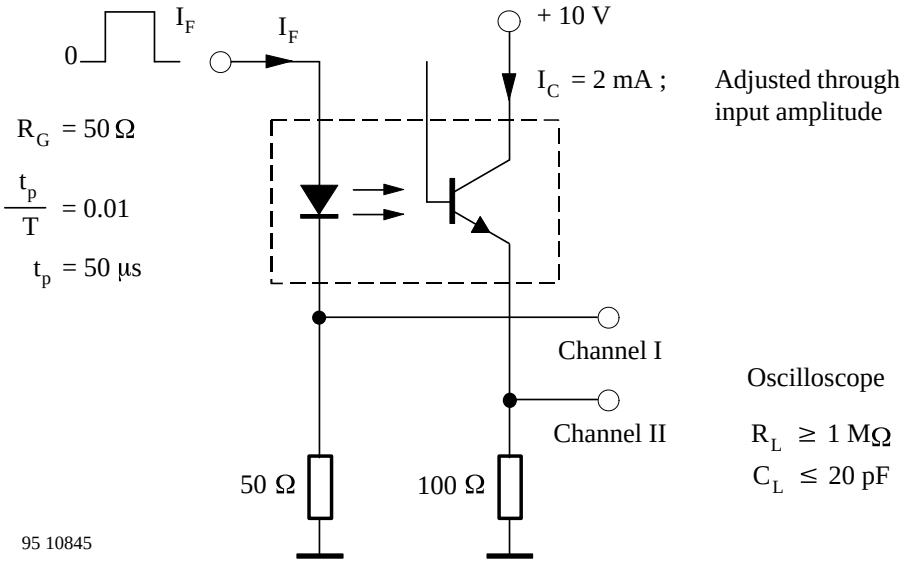


Figure 1. Test circuit, non-saturated operation

Typical Characteristics (T_{amb} = 25°C, unless otherwise specified)

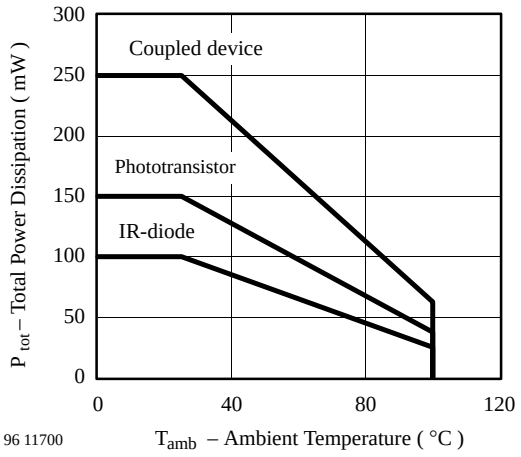


Figure 1. Total Power Dissipation vs. Ambient Temperature

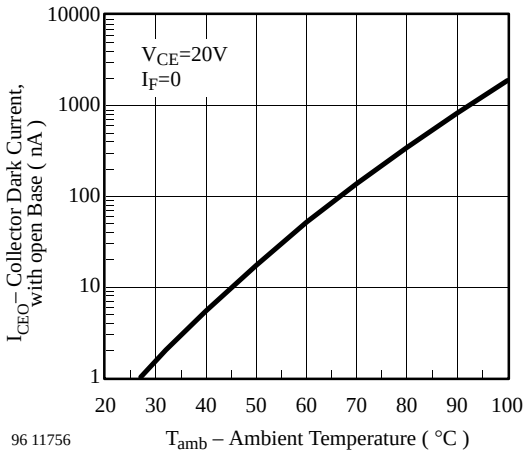


Figure 4. Collector Dark Current vs. Ambient Temperature

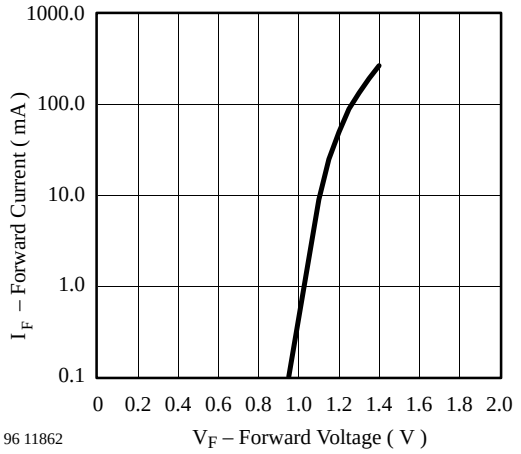


Figure 2. Forward Current vs. Forward Voltage

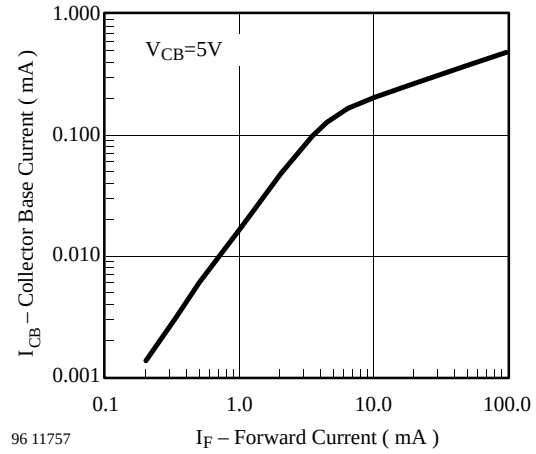


Figure 5. Collector Base Current vs. Forward Current

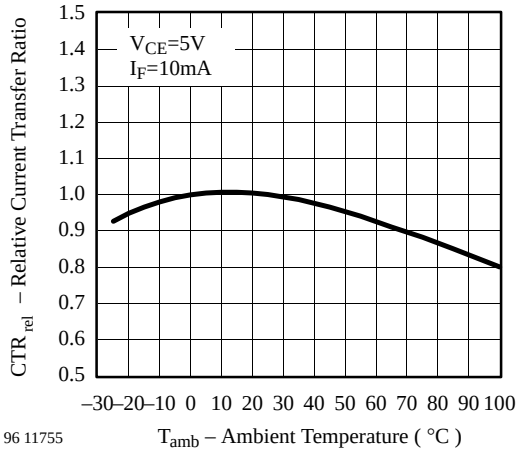


Figure 3. Rel. Current Transfer Ratio vs. Ambient Temp.

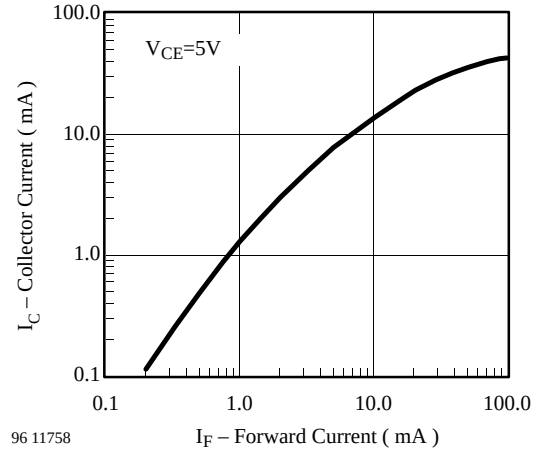


Figure 6. Collector Current vs. Forward Current

Typical Characteristics (T_{amb} = 25°C, unless otherwise specified)

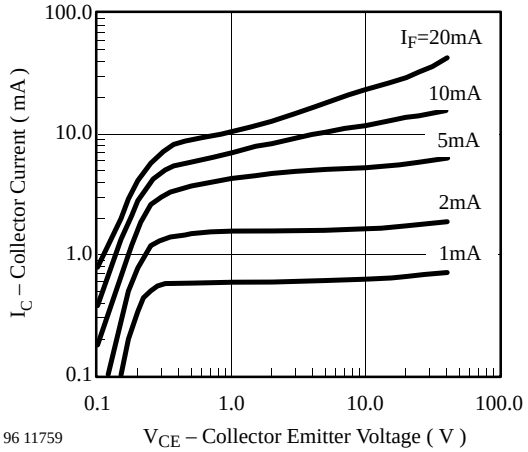


Figure 7. Collector Current vs. Collector Emitter Voltage

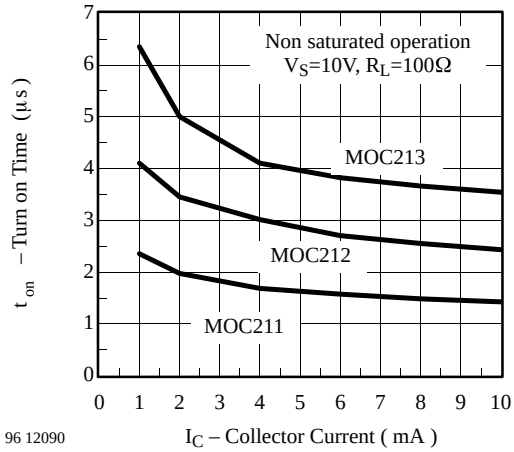


Figure 10. Turn on Time vs. Collector Current

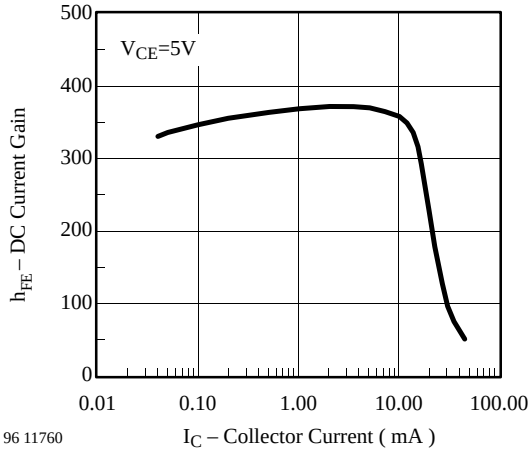


Figure 8. DC Current Gain vs. Collector Current

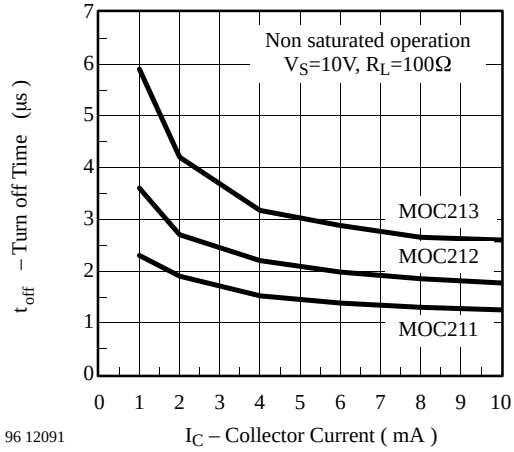


Figure 11. Turn off Time vs. Collector Current

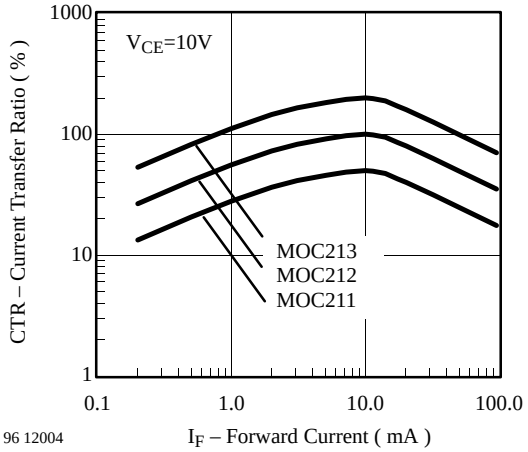
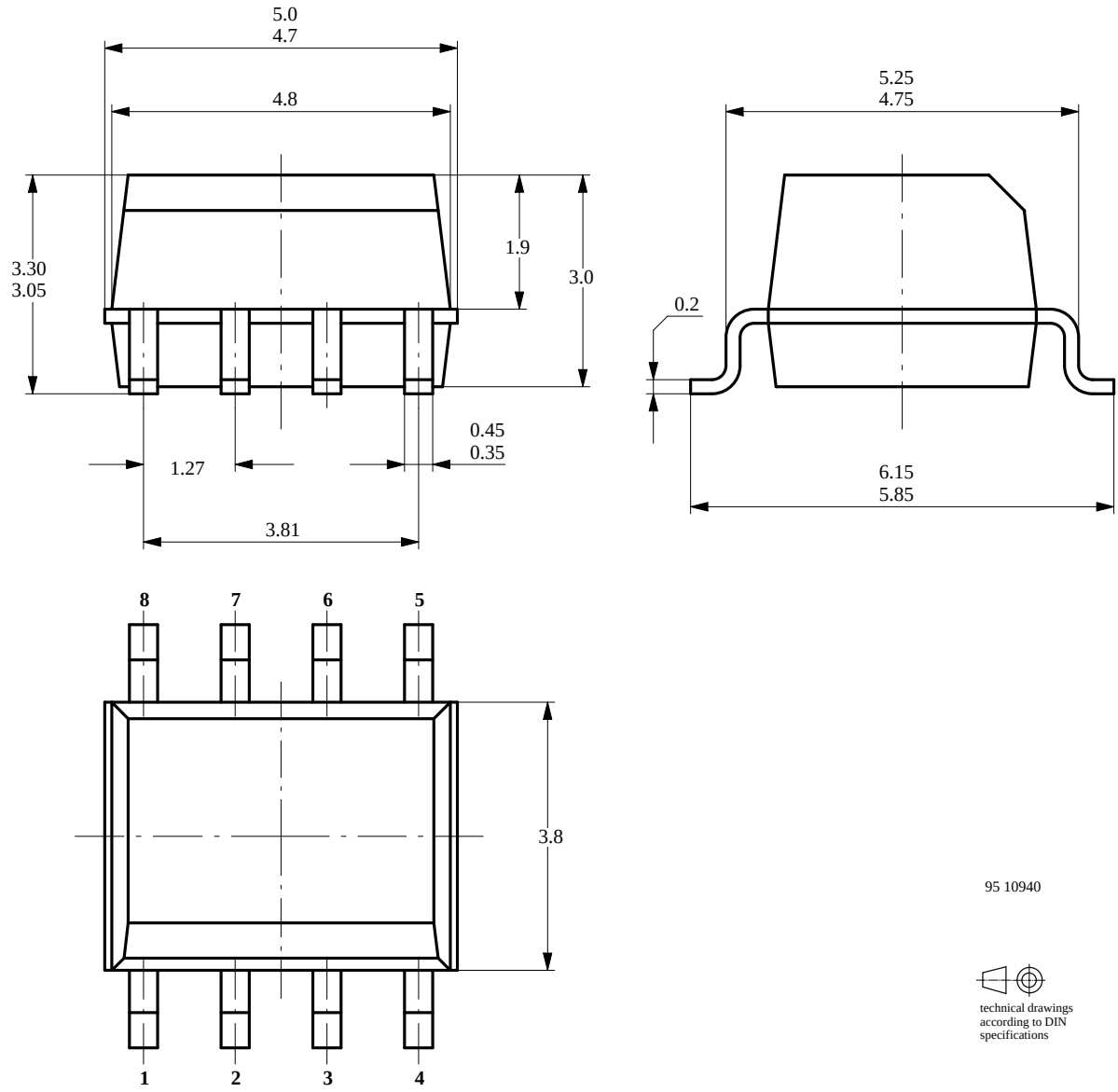


Figure 9. Current Transfer Ration vs. Forward Current

Dimensions in mm



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technical drawings
according to DIN
specifications

Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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