

# TLE6250

## High Speed CAN-Transceiver

Automotive Power



Never stop thinking

**Edition 2008-04-28**

**Published by  
Infineon Technologies AG  
81726 Munich, Germany**

**© 2004 Infineon Technologies AG  
All Rights Reserved.**

#### **Legal Disclaimer**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

#### **Information**

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

#### **Warnings**

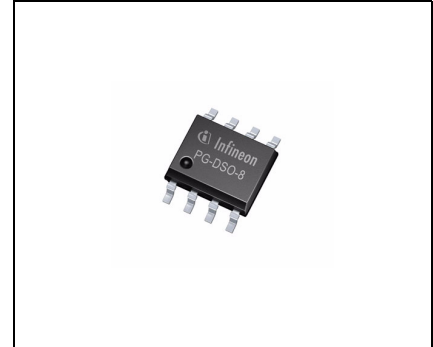
Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.



## Features

- CAN data transmission rate up to 1 Mbaud
- Receive-only Mode and Stand-by Mode
- Suitable for 12 V and 24 V applications
- Excellent EMC performance (very high immunity and very low emission)
- Version for 5 V and 3.3 V microcontrollers
- Bus pins are short circuit proof to ground and battery voltage
- Overtemperature protection
- Very wide temperature range (-40 °C up to 150 °C)
- Green Product (RoHS compliant)
- AEC Qualified



## Description

The HS CAN-transceiver family TLE6250 (TLE6250G and TLE6250GV33) are monolithic integrated circuits that are available as bare die as well as in a PG-DSO-8 package. The ICs are optimized for high speed differential mode data transmission in automotive and industrial applications and they are compatible to ISO/DIS 11898. They work as an interface between the CAN protocol controller and the physical differential bus in both, 12 V and 24 V systems.

The ICs are based on the **Smart Power Technology SPT<sup>®</sup>** which allows bipolar and CMOS control circuitry in accordance with DMOS power devices existing on the same monolithic circuit. The TLE6250G is designed to withstand the severe conditions of automotive applications and provides excellent EMC performance.

*Note: There are two versions available (refer to next page).*

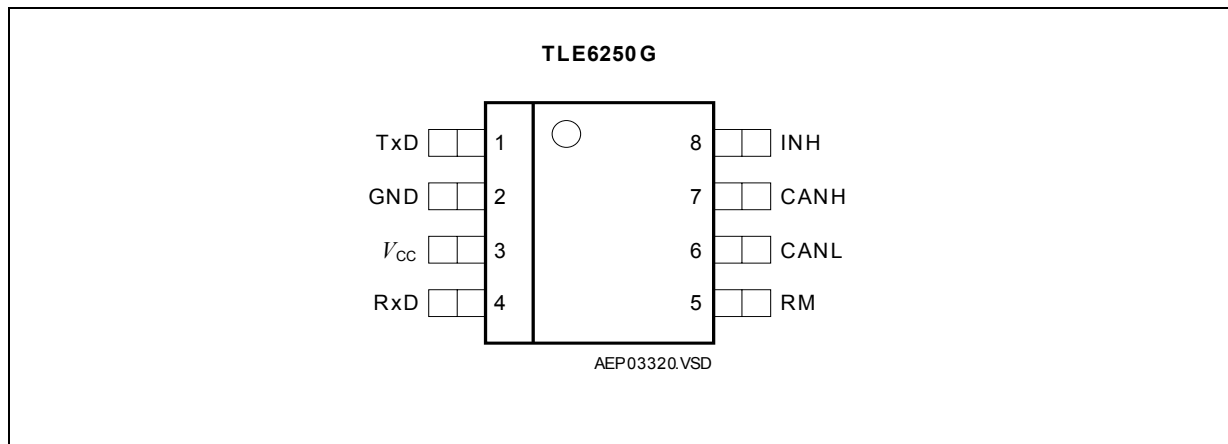
Type	Package
TLE6250G	PG-DSO-8
TLE6250C	(chip)
TLE6250GV33	PG-DSO-8
TLE6250CV33	(chip)

**TLE6250G**

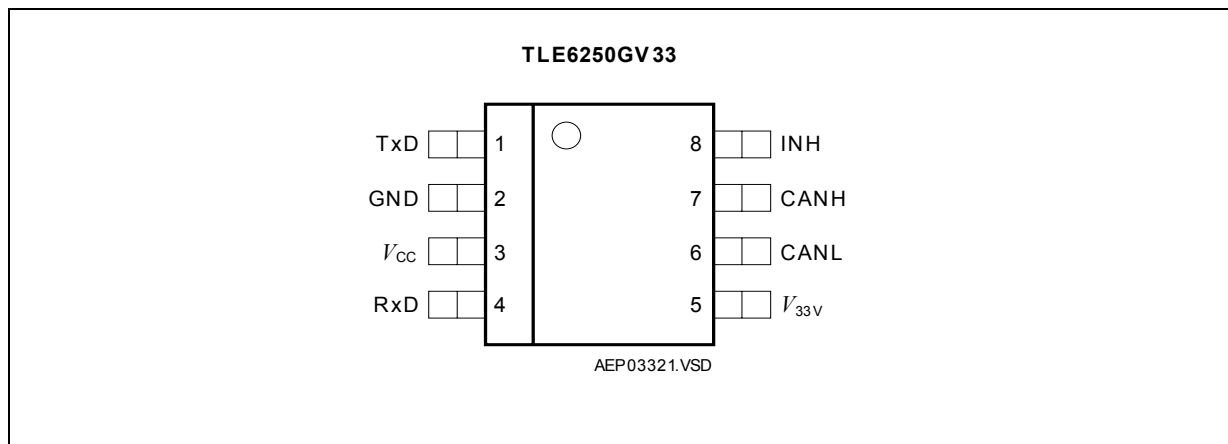
5 V logic I/O version: RxD, TxD, INH, RM. Two Control pins (RM, INH) and 3 operation modes: Normal Mode, Stand-by Mode and Receive Only Mode.

**TLE6250GV33**

3.3 V logic I/O version (logic I/O voltage adaptive to  $V_{33}$  pin within the range 3.3 V to 5 V): RxD, TxD, INH. One control pin (INH) and two operation modes: Normal Mode and Standby Mode.

**Pin Configuration**


**Figure 1 Pin Configuration TLE6250G (top view)**



**Figure 2 Pin Configuration TLE6250GV33 (top view)**

**Table 1 Pin Definitions and Functions TLE6250G**

Pin No.	Symbol	Function
1	TxD	<b>CAN transmit data input</b> ; 20 kΩ pull-up, LOW in dominant state
2	GND	<b>Ground</b>
3	V <sub>CC</sub>	<b>5 V Supply input</b>
4	RxD	<b>CAN receive data output</b> ; LOW in dominant state, integrated pull-up
5	RM	<b>Receive-only input</b> ; control input, 20 kΩ pull-up, set low to activate RxD-only mode
6	CANL	<b>Low line I/O</b> ; LOW in dominant state
7	CANH	<b>High line I/O</b> ; HIGH in dominant state
8	INH	<b>Inhibit Input</b> ; control input, 20 kΩ pull, set LOW for normal mode

**Table 2 Pin Definitions and Functions TLE6250GV33**

Pin No.	Symbol	Function
1	TxD	<b>CAN transmit data input</b> ; 20 kΩ pull-up, LOW in dominant state
2	GND	<b>Ground</b>
3	V <sub>CC</sub>	<b>5 V Supply input</b>
4	RxD	<b>CAN receive data output</b> ; LOW in dominant state, integrated pull-up
5	V <sub>33V</sub>	<b>Logic supply input; 3.3 V OR 5 V</b> microcontroller logic supply can be connected here! The digital I/Os of the TLE6250GV33 adopt to the connected microcontroller logic supply at V <sub>33V</sub>
6	CANL	<b>Low line I/O</b> ; LOW in dominant state
7	CANH	<b>High line I/O</b> ; HIGH in dominant state
8	INH	<b>Inhibit Input</b> ; control input, 20 kΩ pull, set LOW for normal mode

Functional Block Diagram

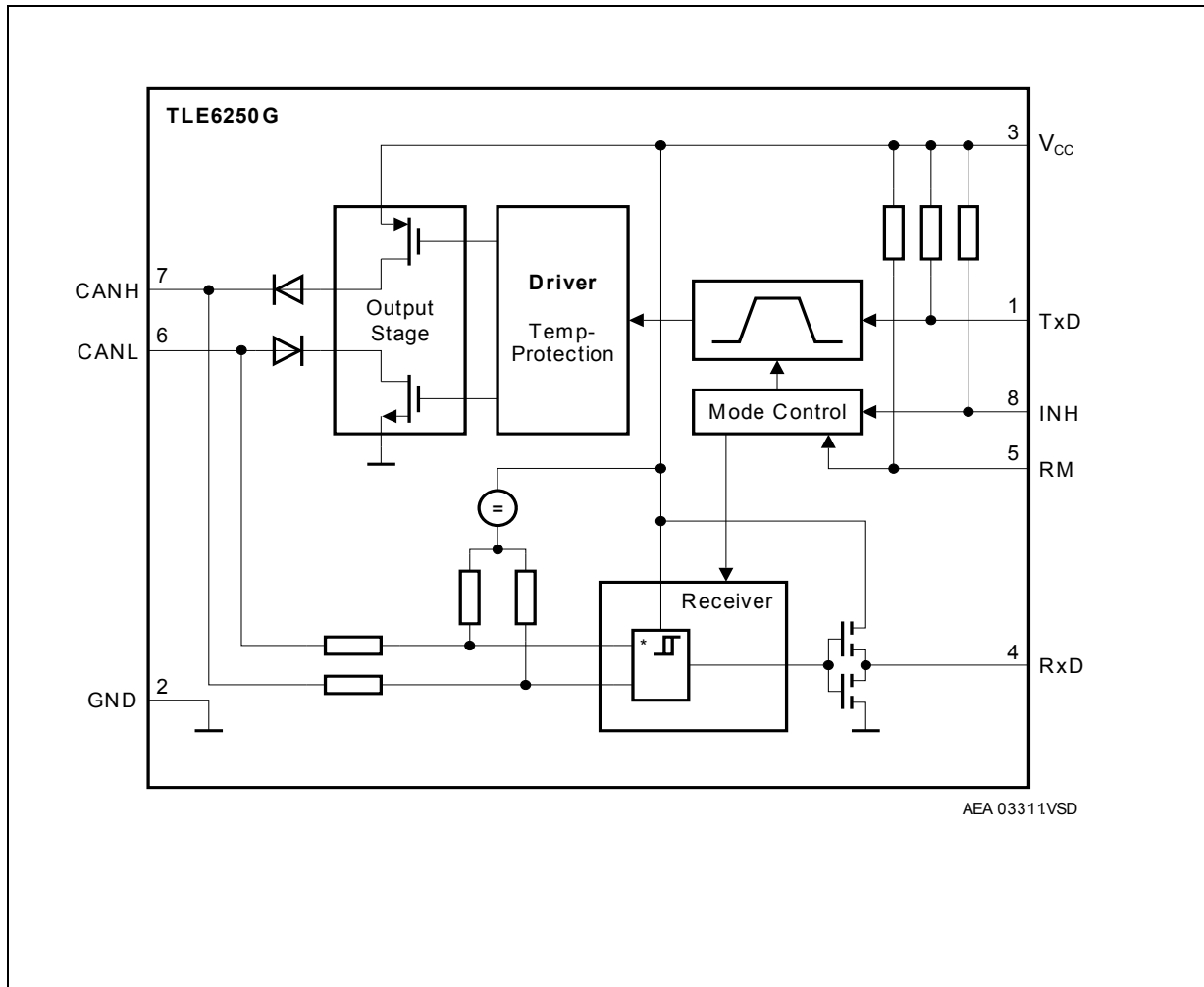
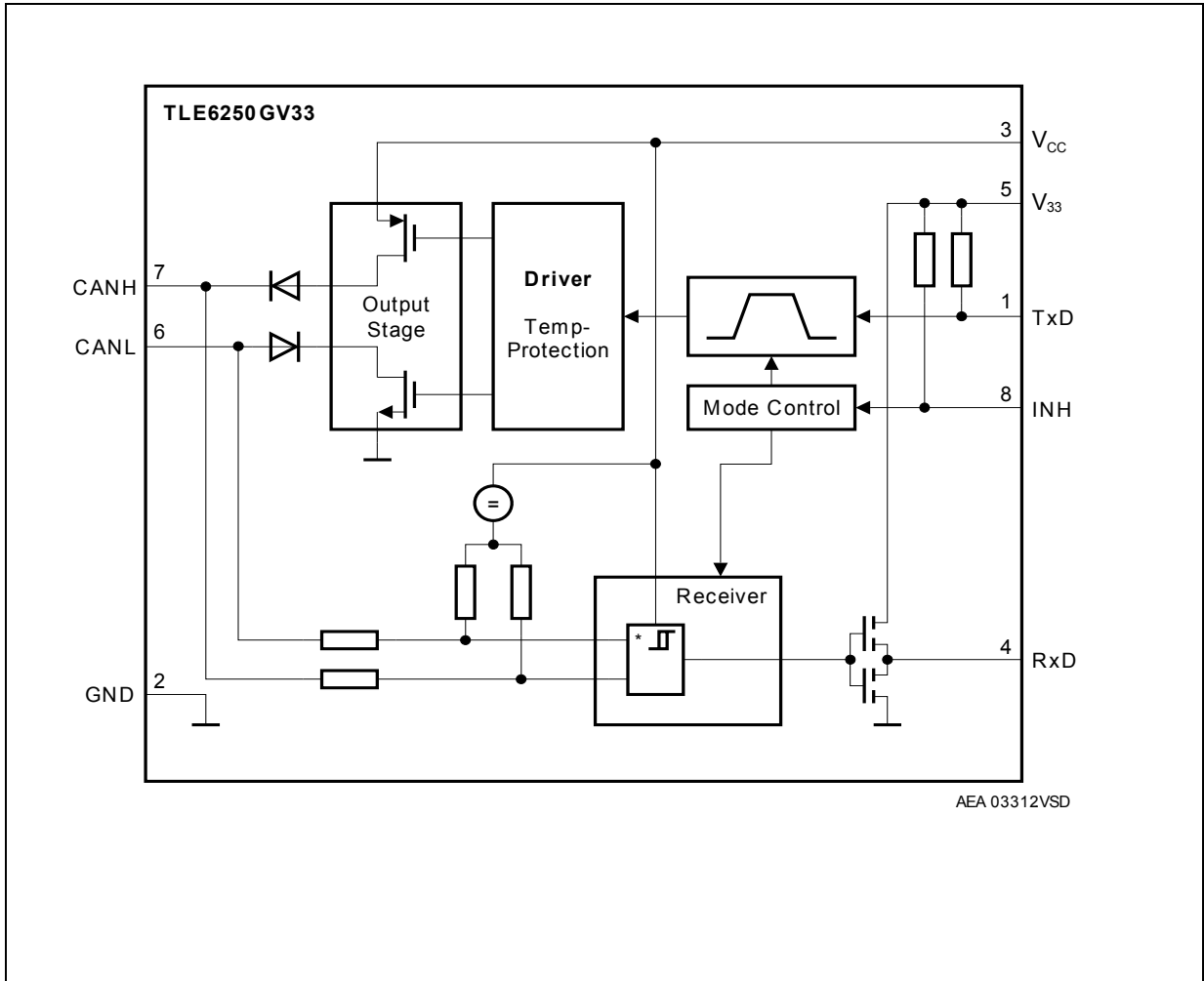
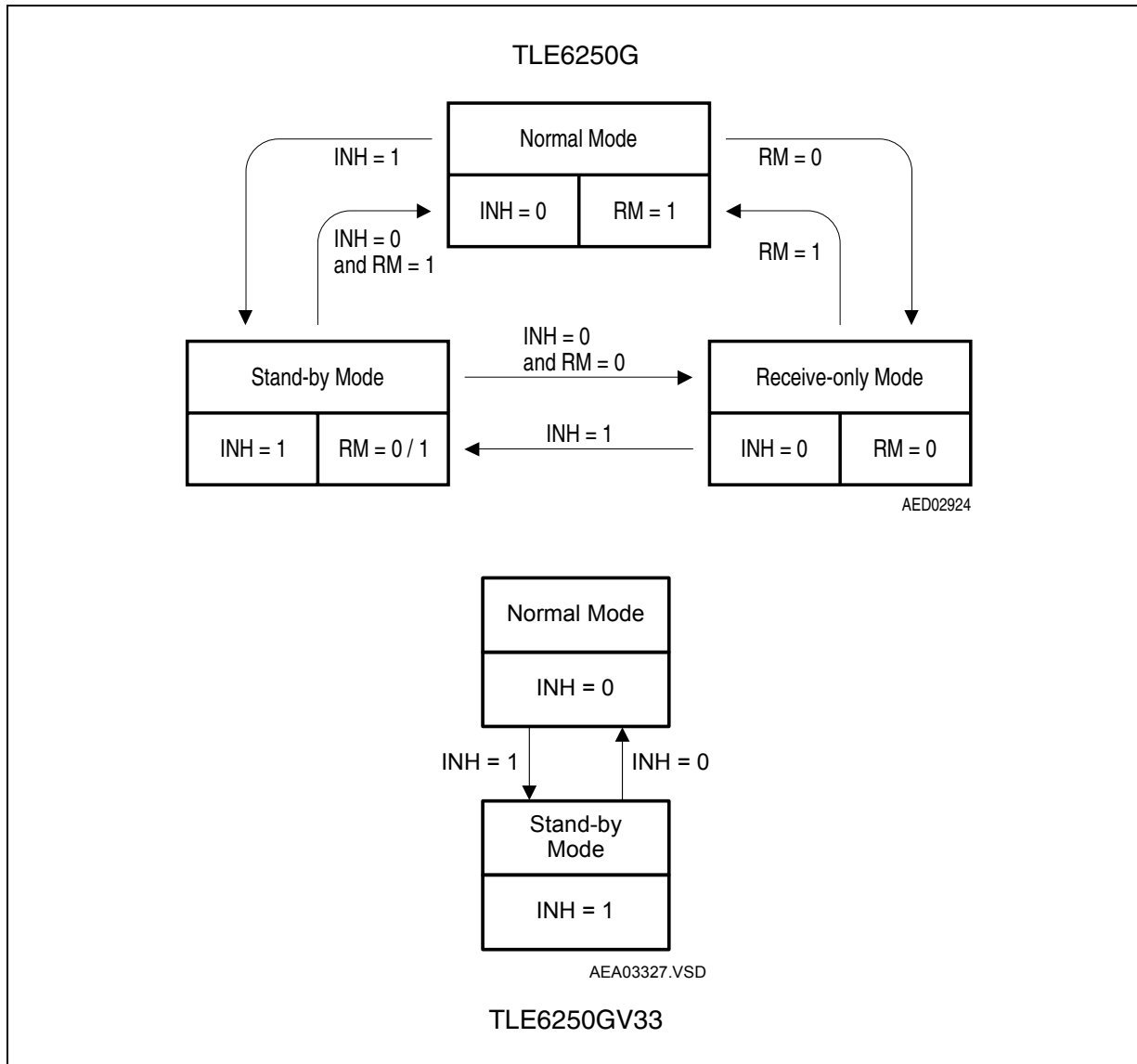


Figure 3 Block Diagram TLE6250G



**Figure 4** Block Diagram TLE6250GV33

Application Information



**Figure 5 Mode State Diagram**

Both, the TLE6250G as well as the TLE6250C offer three different operation modes (see [Figure 5](#)), controlled by the INH and RM pin. The TLE6250GV33 offers only two modes, controlled by the INH (GV33) pin respectively.

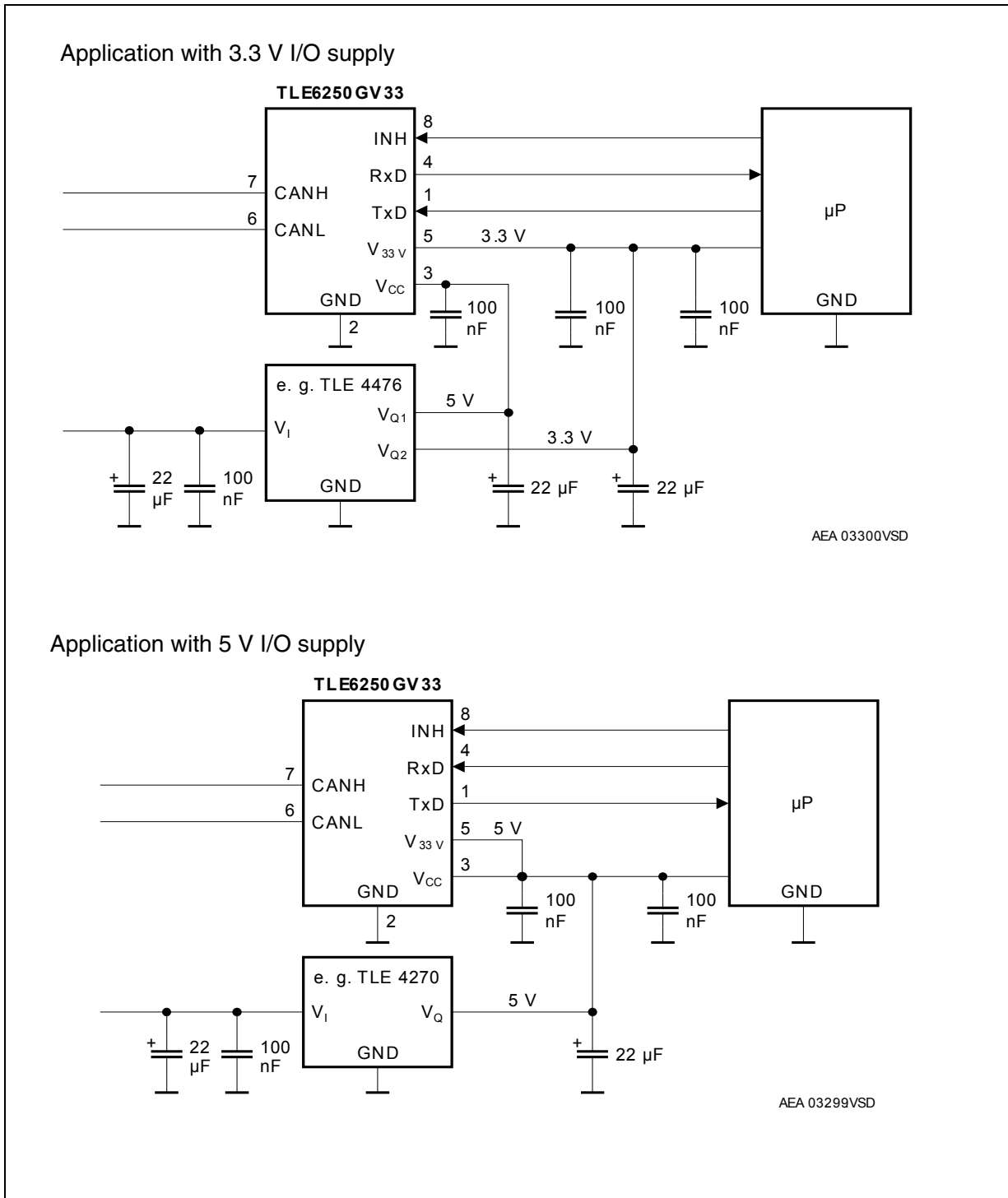


In the normal mode the device is able to receive and to transmit messages whereas in the receive-only mode signals at the TxD input are not transmitted to the CAN bus. The receive-only mode can be used for diagnostic purposes (to check the bus connections between the nodes) as well as to prevent the bus being blocked by a faulty permanent dominant TxD input signal. The stand-by mode is a low power mode that disables both, the receiver as well as the transmitter.

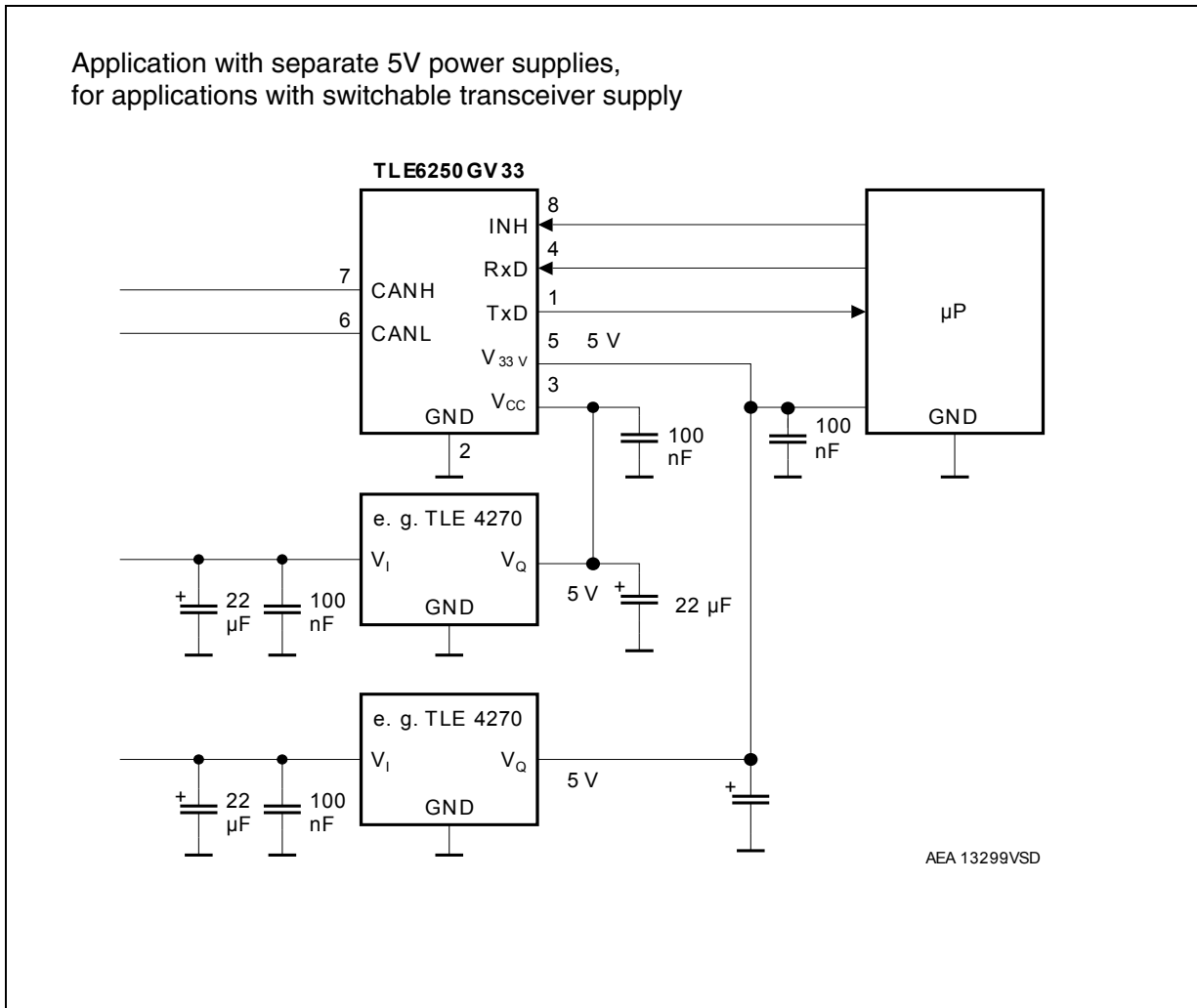
In case the receive-only feature is not used the RM pin has to be left open. When the stand-by mode is not used the INH pin has to be connected to ground level in order to switch the TLE6250G in normal mode.

### **Application Information for the 3.3 V Versions**

The TLE6250GV33 can be used for both; 3.3 V and 5 V microcontroller logic supply, as shown in [Figure 6](#). Don't apply external resistors between the power supply and this pin. This may cause a voltage drop and so reduce the available voltage at this pin.



**Figure 6 Application Circuits TLE6250GV33 Used for 3.3 V and 5 V Logic**



**Figure 6 (cont.) Application Circuits TLE6250GV33 Used for 3.3 V and 5 V Logic**

**Electrical Characteristics TLE6250G (5 V version)**
**Table 3 Absolute Maximum Ratings**

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
<b>Voltages</b>					
Supply voltage	$V_{CC}$	-0.3	6.5	V	–
CAN input voltage (CANH, CANL)	$V_{CANH/L}$	-40	40	V	–
Logic voltages at INH, RM, TxD, RxD	$V_I$	-0.3	$V_{CC}$	V	$0\text{ V} < V_{CC} < 5.5\text{ V}$
Electrostatic discharge voltage at CANH, CANL	$V_{ESD}$	-6	6	kV	human body model (100 pF via 1.5 k $\Omega$ )
Electrostatic discharge voltage	$V_{ESD}$	-2	2	kV	human body model (100 pF via 1.5 k $\Omega$ )
<b>Temperatures</b>					
Junction temperature	$T_j$	-40	160	$^{\circ}\text{C}$	–

*Note: Maximum ratings are absolute ratings; exceeding any one of these values may cause irreversible damage to the integrated circuit.*

**Table 4 Operating Range**

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
Supply voltage	$V_{CC}$	4.5	5.5	V	–
Junction temperature	$T_j$	-40	150	$^{\circ}\text{C}$	–
<b>Thermal Resistances</b>					
Junction ambient	$R_{thj-a}$	–	185	K/W	–
<b>Thermal Shutdown (junction temperature)</b>					
Thermal shutdown temperature	$T_{jsD}$	160	200	$^{\circ}\text{C}$	10 $^{\circ}\text{C}$ hysteresis

**Table 5 Electrical Characteristics**

4.5 V <  $V_{CC}$  < 5.5 V;  $R_L = 60 \Omega$ ;  $V_{INH} < V_{INH,ON}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$ ; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Current Consumption</b>						
Current consumption	$I_{CC}$	–	6	10	mA	recessive state; $V_{TxD} = V_{CC}$
Current consumption	$I_{CC}$	–	45	70	mA	dominant state; $V_{TxD} = 0 \text{ V}$
Current consumption	$I_{CC}$	–	6	10	mA	receive-only mode; RM = low
Current consumption	$I_{CC, stb}$	–	1	10	$\mu\text{A}$	stand-by mode; TxD = RM = high
<b>Receiver Output RxD</b>						
HIGH level output current	$I_{RD,H}$	–	-4	-2	mA	$V_{RD} = 0.8 \times V_{CC}$ , $V_{diff} < 0.4 \text{ V}^1)$
LOW level output current	$I_{RD,L}$	2	4	–	mA	$V_{RD} = 0.2 \times V_{CC}$ , $V_{diff} > 1 \text{ V}^1)$
<b>Transmission Input TxD</b>						
HIGH level input voltage threshold	$V_{TD,H}$	–	$0.5 \times V_{CC}$	$0.7 \times V_{CC}$	V	recessive state
LOW level input voltage threshold	$V_{TD,L}$	$0.3 \times V_{CC}$	$0.4 \times V_{CC}$	–	V	dominant state
TxD pull-up resistance	$R_{TD}$	10	25	50	k $\Omega$	–
<b>Inhibit Input (pin INH)</b>						
HIGH level input voltage threshold	$V_{INH,H}$	–	$0.5 \times V_{CC}$	$0.7 \times V_{CC}$	V	stand-by mode;
LOW level input voltage threshold	$V_{INH,L}$	$0.3 \times V_{CC}$	$0.4 \times V_{CC}$	–	V	normal mode
INH pull-up resistance	$R_{INH}$	10	25	50	k $\Omega$	–

**Table 5 Electrical Characteristics (cont'd)**

4.5 V < V<sub>CC</sub> < 5.5 V; R<sub>L</sub> = 60 Ω; V<sub>INH</sub> < V<sub>INH,ON</sub>; -40 °C < T<sub>j</sub> < 150 °C; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Receive only Input (pin RM) (5 V version only)</b>						
HIGH level input voltage threshold	V <sub>RM,H</sub>	–	0.5 × V <sub>CC</sub>	0.7 × V <sub>CC</sub>	V	normal mode;
LOW level input voltage threshold	V <sub>RM,L</sub>	0.3 × V <sub>CC</sub>	0.4 × V <sub>CC</sub>	–	V	receive-only mode
RM pull-up resistance	R <sub>RM</sub>	10	25	50	kΩ	–
<b>Bus Receiver</b>						
Differential receiver threshold voltage, recessive to dominant edge	V <sub>diff,d</sub>	–	0.75	0.90	V	-20 V < (V <sub>CANH</sub> , V <sub>CANL</sub> ) < 25 V V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub>
Differential receiver threshold voltage dominant to recessive edge	V <sub>diff,r</sub>	0.50	0.60	–	V	-20 V < (V <sub>CANH</sub> , V <sub>CANL</sub> ) < 25 V V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub>
Common Mode Range	CMR	-20	–	25	V	V <sub>CC</sub> = 5 V
Differential receiver hysteresis	V <sub>diff,hys</sub>	–	150	–	mV	–
CANH, CANL input resistance	R <sub>i</sub>	10	20	30	kΩ	recessive state
Differential input resistance	R <sub>diff</sub>	20	40	60	kΩ	recessive state

**Table 5 Electrical Characteristics (cont'd)**

4.5 V < V<sub>CC</sub> < 5.5 V; R<sub>L</sub> = 60 Ω; V<sub>INH</sub> < V<sub>INH,ON</sub>; -40 °C < T<sub>j</sub> < 150 °C; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Bus Transmitter</b>						
CANL/CANH recessive output voltage	V <sub>CANL/H</sub>	0.4 × V <sub>CC</sub>	–	0.6 × V <sub>CC</sub>	V	V <sub>TxD</sub> = V <sub>CC</sub>
CCANH, CANL recessive output voltage difference V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub> , no load <sup>2)</sup>	V <sub>diff</sub>	-1	–	0.05	V	V <sub>TxD</sub> = V <sub>CC</sub>
CANL dominant output voltage	V <sub>CANL</sub>	–	–	2.0	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANH dominant output voltage	V <sub>CANH</sub>	2.8	–	–	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANH, CANL dominant output voltage difference V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub>	V <sub>diff</sub>	1.5	–	3.0	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANL short circuit current	I <sub>CANLsc</sub>	50	120	200	mA	V <sub>CANLshort</sub> = 18 V
		–	150	–	mA	V <sub>CANLshort</sub> = 36 V
CANH short circuit current	I <sub>CANHsc</sub>	-200	-120	-50	mA	V <sub>CANHshort</sub> = 0 V
CANH short circuit current	I <sub>CANHsc</sub>	–	-120	–	mA	V <sub>CANHshort</sub> = -5 V
Output current	I <sub>CANH,ik</sub>	-50	-300	-400	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = -7 V
		-50	-100	-150	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = -2 V
Output current	I <sub>CANH,ik</sub>	50	280	400	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = 7 V
		50	100	150	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = 2 V

**Table 5 Electrical Characteristics (cont'd)**

4.5 V <  $V_{CC}$  < 5.5 V;  $R_L = 60 \Omega$ ;  $V_{INH} < V_{INH,ON}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$ ; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Dynamic CAN-Transceiver Characteristics</b>						
Propagation delay TxD-to-RxD LOW (recessive to dominant)	$t_{d(L),TR}$	–	150	280	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay TxD-to-RxD HIGH (dominant to recessive)	$t_{d(H),TR}$	–	150	280	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay TxD LOW to bus dominant	$t_{d(L),T}$	–	100	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$
Propagation delay TxD HIGH to bus recessive	$t_{d(H),T}$	–	100	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$
Propagation delay bus dominant to RxD LOW	$t_{d(L),R}$	–	50	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay bus recessive to RxD HIGH	$t_{d(H),R}$	–	50	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$

1)  $V_{diff} = V_{CANH} - V_{CANL}$

2) Deviation from ISO/DIS 11898



**Electrical Characteristics TLE6250GV33 (3.3 V version)**
**Table 6 Absolute Maximum Ratings**

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
<b>Voltages</b>					
Supply voltage	$V_{CC}$	-0.3	6.5	V	–
3.3 V supply	$V_{33V}$	-0.3	6.5	V	–
CAN input voltage (CANH, CANL)	$V_{CANH/L}$	-40	40	V	–
Logic voltages at INH, RM, TxD, RxD	$V_I$	-0.3	$V_{CC}$	V	$0\text{ V} < V_{CC} < 5.5\text{ V}$
Electrostatic discharge voltage at CANH, CANL	$V_{ESD}$	-6	6	kV	human body model (100 pF via 1.5 k $\Omega$ )
Electrostatic discharge voltage	$V_{ESD}$	-2	2	kV	human body model (100 pF via 1.5 k $\Omega$ )
<b>Temperatures</b>					
Junction temperature	$T_j$	-40	160	$^{\circ}\text{C}$	–

*Note: Maximum ratings are absolute ratings; exceeding any one of these values may cause irreversible damage to the integrated circuit.*

**Table 7 Operating Range**

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
Supply voltage	$V_{CC}$	4.5	5.5	V	–
3.3 V supply voltage	$V_{33V}$	3.0	5.5	V	–
Junction temperature	$T_j$	-40	150	$^{\circ}\text{C}$	–
<b>Thermal Resistances</b>					
Junction ambient	$R_{thj-a}$	–	185	K/W	–
<b>Thermal Shutdown (junction temperature)</b>					
Thermal shutdown temperature	$T_{jsD}$	160	200	$^{\circ}\text{C}$	10 $^{\circ}\text{C}$ hysteresis

**Table 8 Electrical Characteristics**

4.5 V <  $V_{CC}$  < 5.5 V; (3.0 V <  $V_{33V}$  < 5.5V for 3.3 V version);  $R_L = 60 \Omega$ ;  $V_{INH} < V_{INH,ON}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$ ; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Current Consumption (3.3 V version)</b>						
Current consumption	$I_{CC+33V}$	–	6	10	mA	recessive state; $V_{TxD} = V_{33V}$
Current consumption	$I_{CC+33V}$	–	45	70	mA	dominant state; $V_{TxD} = 0 \text{ V}$
Current consumption	$I_{33V}$	–	–	2	mA	–
Current consumption	$I_{CC+33V, \text{stb}}$	–	1	10	$\mu\text{A}$	stand-by mode, TxD = high
<b>Receiver Output RxD</b>						
HIGH level output current	$I_{RD,H}$	–	-2	-1	mA	$V_{RD} = 0.8 \times V_{33V}$ , $V_{\text{diff}} < 0.4 \text{ V}^1)$
LOW level output current	$I_{RD,L}$	1	2	–	mA	$V_{RD} = 0.2 \times V_{33V}$ , $V_{\text{diff}} > 1 \text{ V}^1)$
<b>Transmission Input TxD</b>						
HIGH level input voltage threshold	$V_{TD,H}$	–	$0.55 \times V_{33V}$	$0.7 \times V_{33V}$	V	recessive state
LOW level input voltage threshold	$V_{TD,L}$	$0.3 \times V_{33V}$	$0.45 \times V_{33V}$	–	V	dominant state
TxD pull-up resistance	$R_{TD}$	10	25	50	k $\Omega$	–
<b>Inhibit Input (pin INH)</b>						
HIGH level input voltage threshold	$V_{INH,H}$	–	$0.55 \times V_{33V}$	$0.7 \times V_{33V}$	V	stand-by mode;
LOW level input voltage threshold	$V_{INH,L}$	$0.3 \times V_{33V}$	$0.45 \times V_{33V}$	–	V	normal mode;
INH pull-up resistance	$R_{INH}$	10	25	50	k $\Omega$	–

**Table 8 Electrical Characteristics (cont'd)**

4.5 V <  $V_{CC}$  < 5.5 V; (3.0 V <  $V_{33V}$  < 5.5V for 3.3 V version);  $R_L = 60 \Omega$ ;  $V_{INH} < V_{INH,ON}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$ ; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Bus Receiver</b>						
Differential receiver threshold voltage, recessive to dominant edge	$V_{diff,d}$	–	0.75	0.90	V	$-20 \text{ V} < (V_{CANH}, V_{CANL}) < 25 \text{ V}$ $V_{diff} = V_{CANH} - V_{CANL}$
Differential receiver threshold voltage, dominant to recessive edge	$V_{diff,r}$	0.50	0.60	–	V	$-20 \text{ V} < (V_{CANH}, V_{CANL}) < 25 \text{ V}$ $V_{diff} = V_{CANH} - V_{CANL}$
Common Mode Range	CMR	-20	–	25	V	$V_{CC} = 5 \text{ V}$
Differential receiver hysteresis	$V_{diff,hys}$	–	150	–	mV	–
CANH, CANL input resistance	$R_i$	10	20	30	k $\Omega$	recessive state
Differential input resistance	$R_{diff}$	20	40	60	k $\Omega$	recessive state

**Table 8 Electrical Characteristics (cont'd)**

4.5 V < V<sub>CC</sub> < 5.5 V; (3.0 V < V<sub>33V</sub> < 5.5V for 3.3 V version); R<sub>L</sub> = 60 Ω; V<sub>INH</sub> < V<sub>INH,ON</sub>; -40 °C < T<sub>j</sub> < 150 °C; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Bus Transmitter</b>						
CANL/CANH recessive output voltage	V <sub>CANL/H</sub>	0.4 × V <sub>CC</sub>	–	0.6 × V <sub>CC</sub>	V	V <sub>TxD</sub> = V <sub>33V</sub>
CANH, CANL recessive output voltage difference V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub> , no load <sup>2)</sup>	V <sub>diff</sub>	-1	–	0.05	V	V <sub>TxD</sub> = V <sub>33V</sub>
CANL dominant output voltage	V <sub>CANL</sub>	–	–	2.0	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANH dominant output voltage	V <sub>CANH</sub>	2.8	–	–	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANH, CANL dominant output voltage difference V <sub>diff</sub> = V <sub>CANH</sub> - V <sub>CANL</sub>	V <sub>diff</sub>	1.5	–	3.0	V	V <sub>TxD</sub> = 0 V; V <sub>CC</sub> = 5 V
CANL short circuit current	I <sub>CANLsc</sub>	50	120	200	mA	V <sub>CANLshort</sub> = 18 V
		–	150	–	mA	V <sub>CANLshort</sub> = 36 V
CANH short circuit current	I <sub>CANHsc</sub>	-200	-120	-50	mA	V <sub>CANHshort</sub> = 0 V
CANH short circuit current	I <sub>CANHsc</sub>	–	-120	–	mA	V <sub>CANHshort</sub> = -5 V
Output current	I <sub>CANH/L,ik</sub>	-50	-300	-400	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = -7 V
		-50	-100	-150	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = -2 V
Output current	I <sub>CANH/L,ik</sub>	50	280	400	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = 7 V
		50	100	150	μA	V <sub>CC</sub> = 0 V, V <sub>CANH</sub> = V <sub>CANL</sub> = 2 V

**Table 8 Electrical Characteristics (cont'd)**

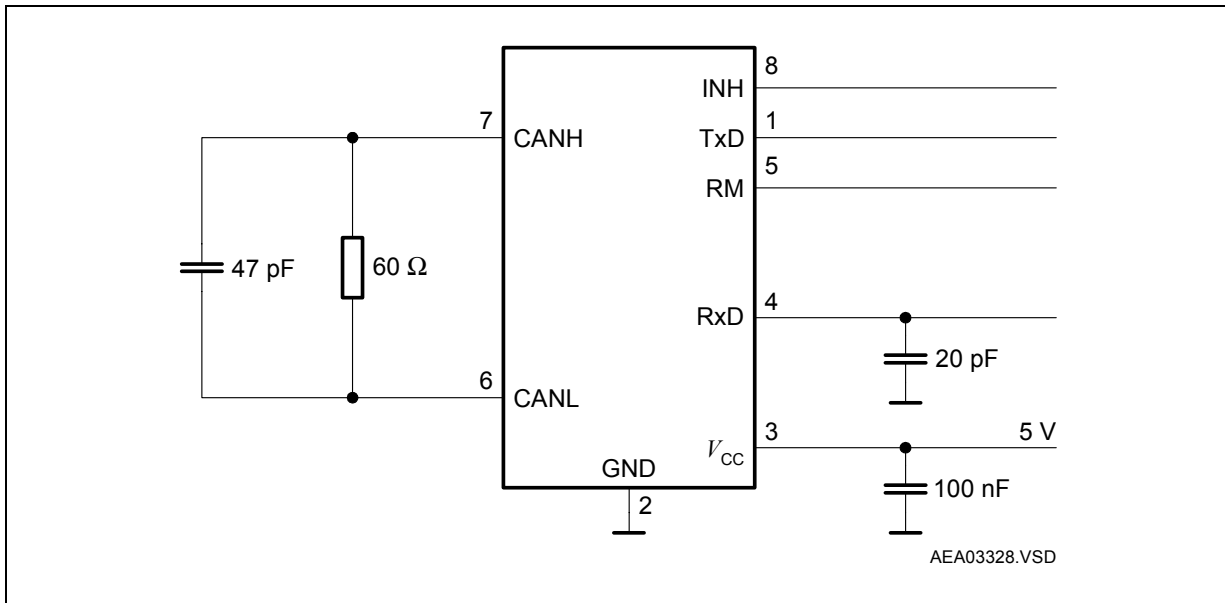
4.5 V <  $V_{CC}$  < 5.5 V; (3.0 V <  $V_{33V}$  < 5.5V for 3.3 V version);  $R_L = 60 \Omega$ ;  $V_{INH} < V_{INH,ON}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$ ; all voltages with respect to ground; positive current flowing into pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
<b>Dynamic CAN-Transceiver Characteristics</b>						
Propagation delay TxD-to-RxD LOW (recessive to dominant)	$t_{d(L),TR}$	–	150	280	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay TxD-to-RxD HIGH (dominant to recessive)	$t_{d(H),TR}$	–	150	280	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay TxD LOW to bus dominant	$t_{d(L),T}$	–	100	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$
Propagation delay TxD HIGH to bus recessive	$t_{d(H),T}$	–	100	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$
Propagation delay bus dominant to RxD LOW	$t_{d(L),R}$	–	50	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$
Propagation delay bus recessive to RxD HIGH	$t_{d(H),R}$	–	50	140	ns	$C_L = 47 \text{ pF}$ ; $R_L = 60 \Omega$ ; $V_{CC} = 5 \text{ V}$ ; $C_{RxD} = 20 \text{ pF}$

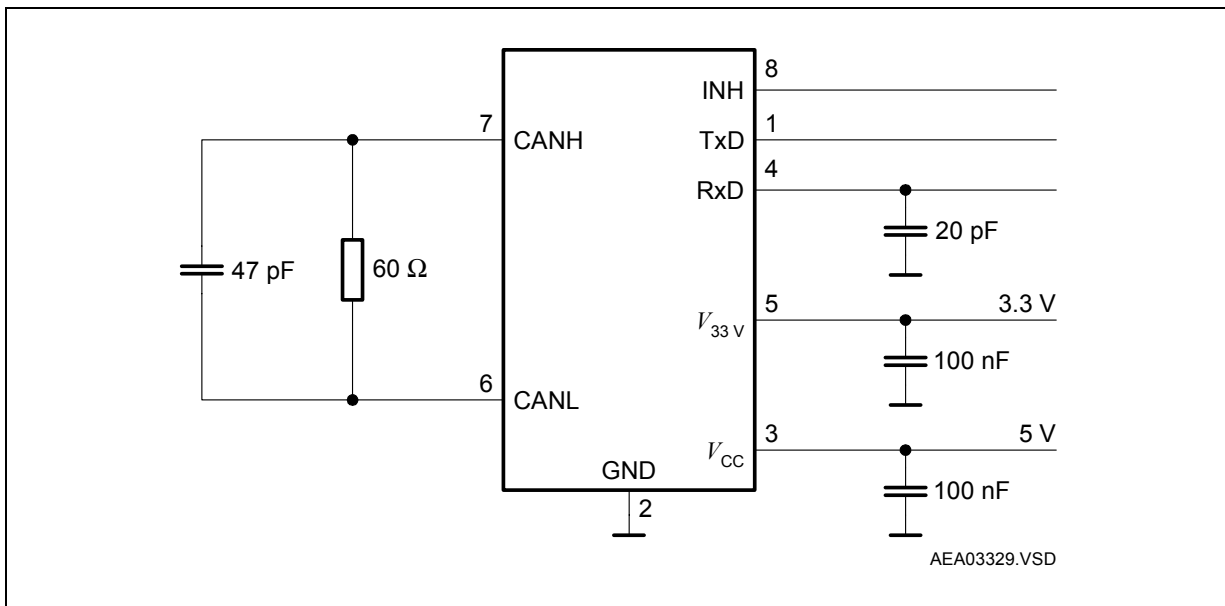
1)  $V_{diff} = V_{CANH} - V_{CANL}$

2) Deviation from ISO/DIS 11898

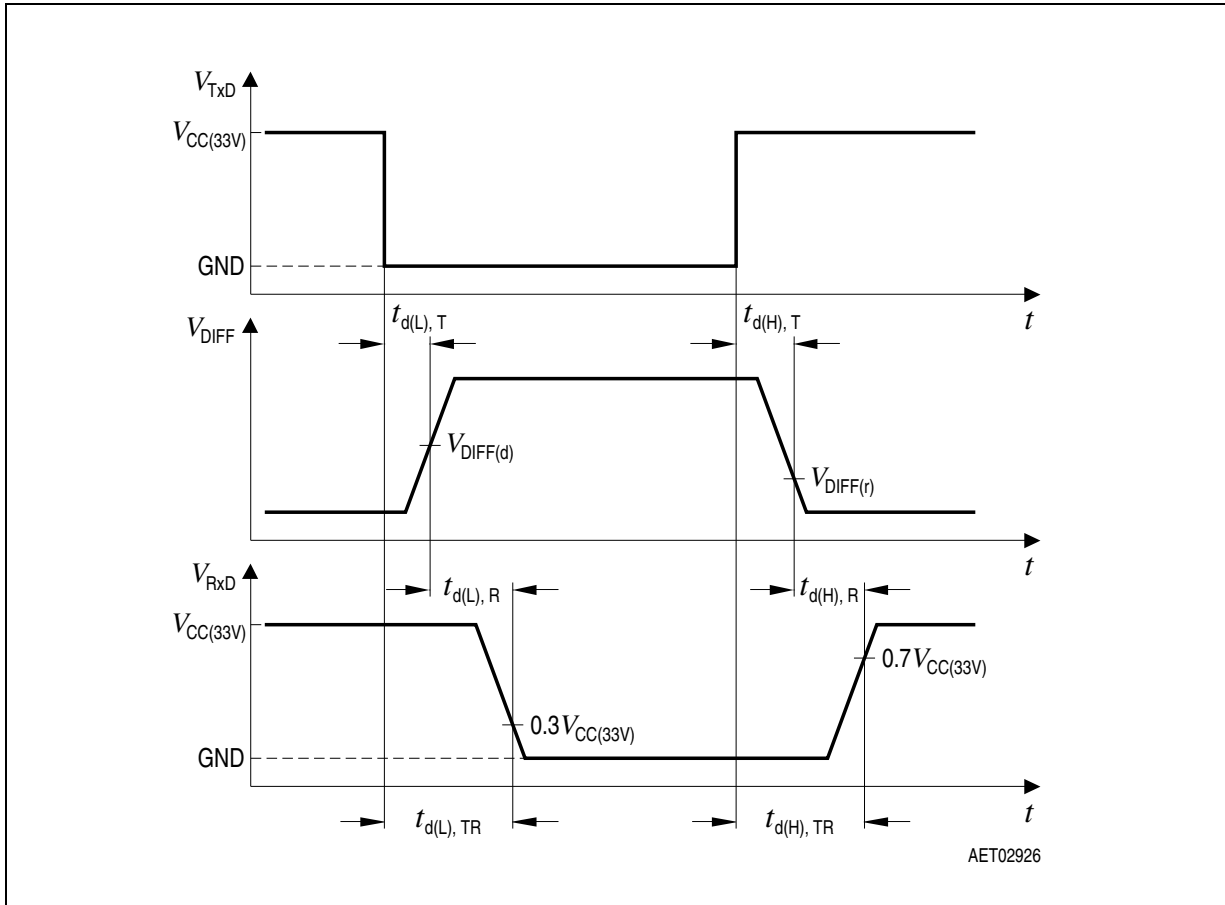
Diagrams



**Figure 7 Test Circuit for Dynamic Characteristics (5 V Version)**



**Figure 8 Test Circuit for Dynamic Characteristics (GV33 Version)**



**Figure 9 Timing Diagrams for Dynamic Characteristics**

Application

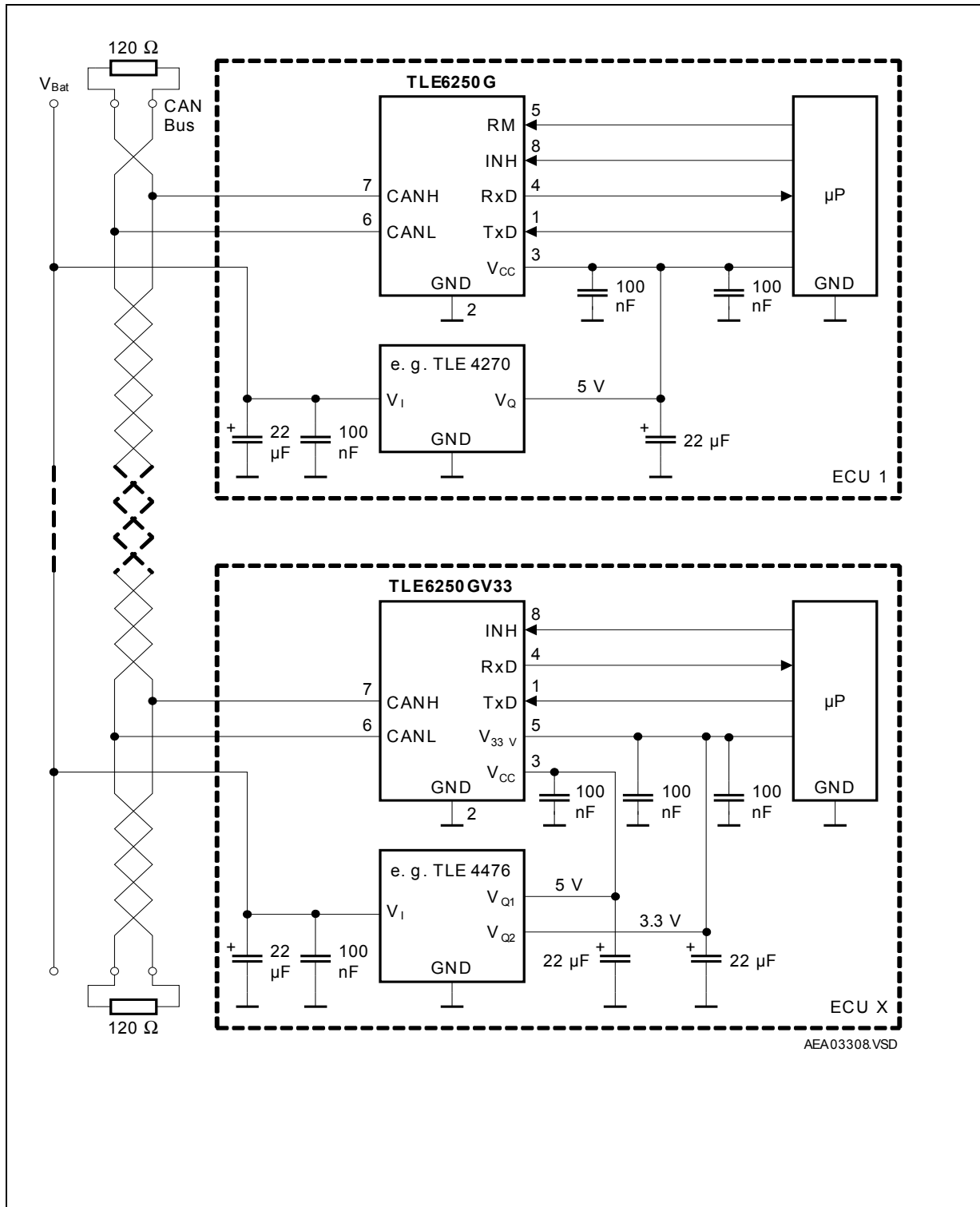


Figure 10 Application Circuit TLE6250G with TLE6250GV33



Package Outlines

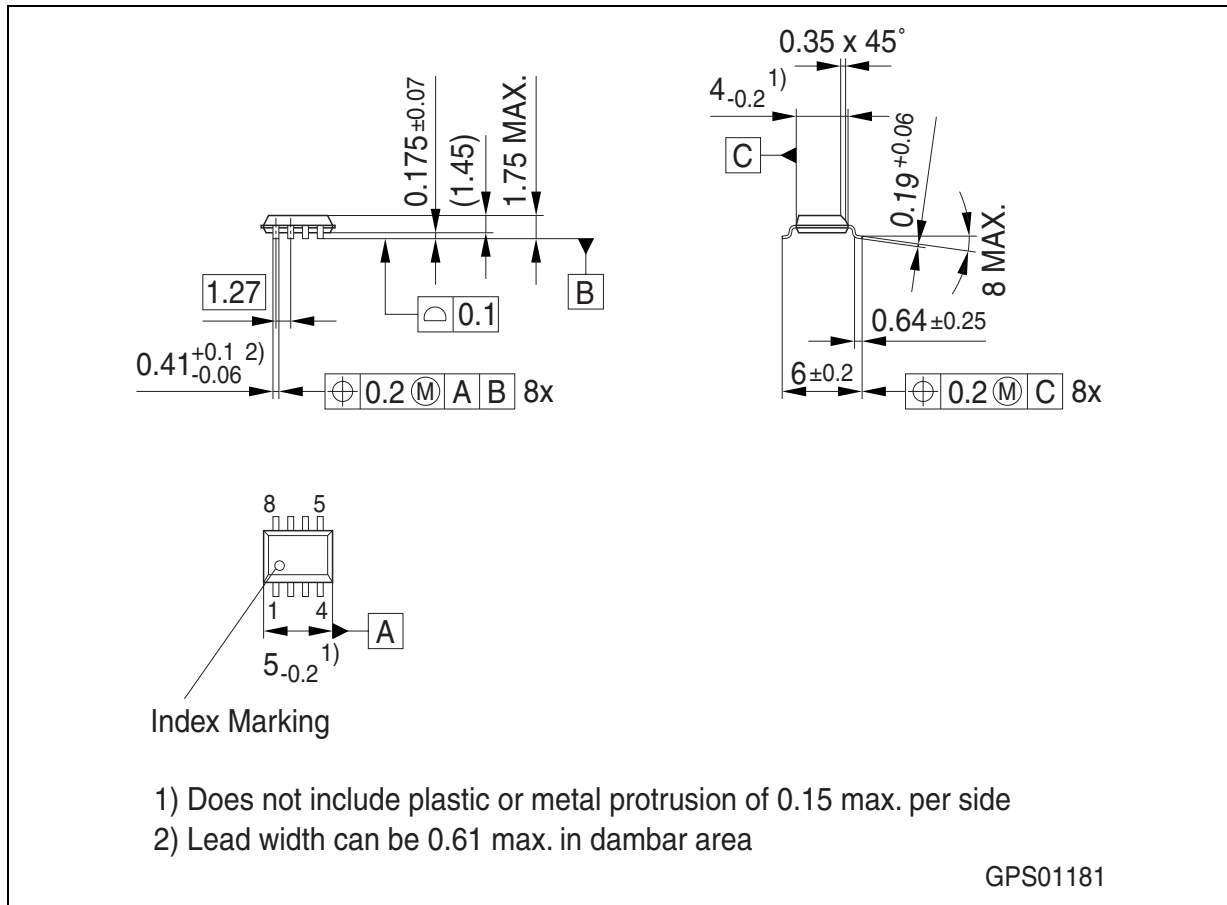


Figure 11 PG-DSO-8 (PG-DSO-8-16 Plastic Dual Small Outline)

Green Product (RoHS compliant)

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

You can find all of our packages, sorts of packing and others in our Infineon Internet Page "Products": <http://www.infineon.com/products>.

SMD = Surface Mounted Device

Dimensions in mm

---

**TLE6250****Revision History:**        **2008-04-28**Rev. 4.0

---

Previous Version: Rev. 3.9 (Data Sheet)

---

Page	Correction inside the TLE6250GV33 characteristics
Page 20	Changed symbol for the leakage current CANH/L: From $I_{CANH,ik}$ to $I_{CANH/L,ik}$ Changed maximum limit for the parameter: Output current, $I_{CANH/L,ik}$ , $V_{CC} = 0\text{ V}$ , $V_{CANH} = V_{CANL} = 7\text{ V}$ : From 300 $\mu\text{A}$ to 400 $\mu\text{A}$
Page 26	updated Revision History

---