

TLE6250

High Speed CAN-Transceiver



Automotive Power



Never stop thinking

<http://store.iic.cc/>

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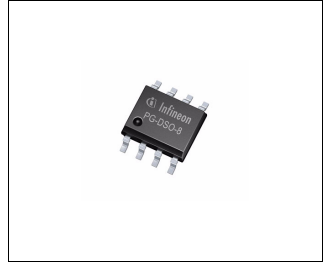
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Features

- 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[®]** 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

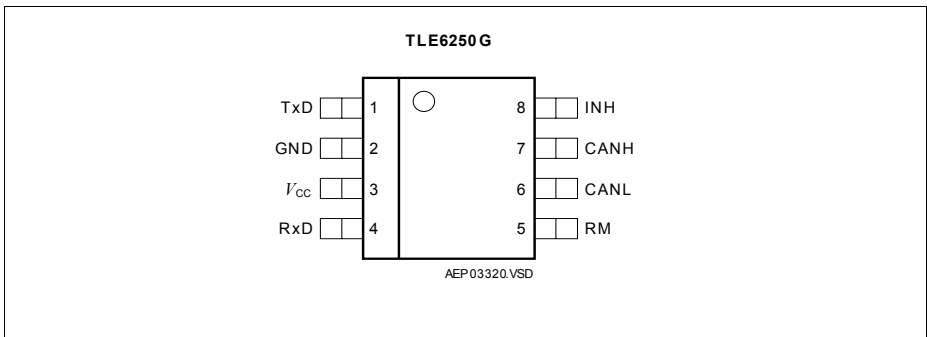


Figure 1 Pin Configuration TLE6250G (top view)

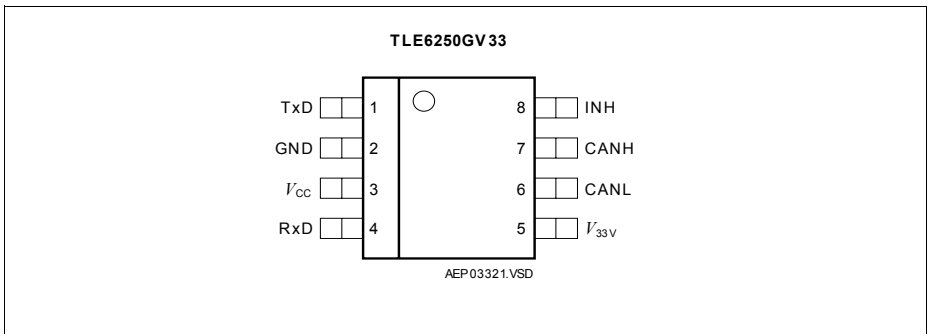


Figure 2 Pin Configuration TLE6250GV33 (top view)

Table 1 Pin Definitions and Functions TLE6250G

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

Table 2 Pin Definitions and Functions TLE6250GV33

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

Functional Block Diagram

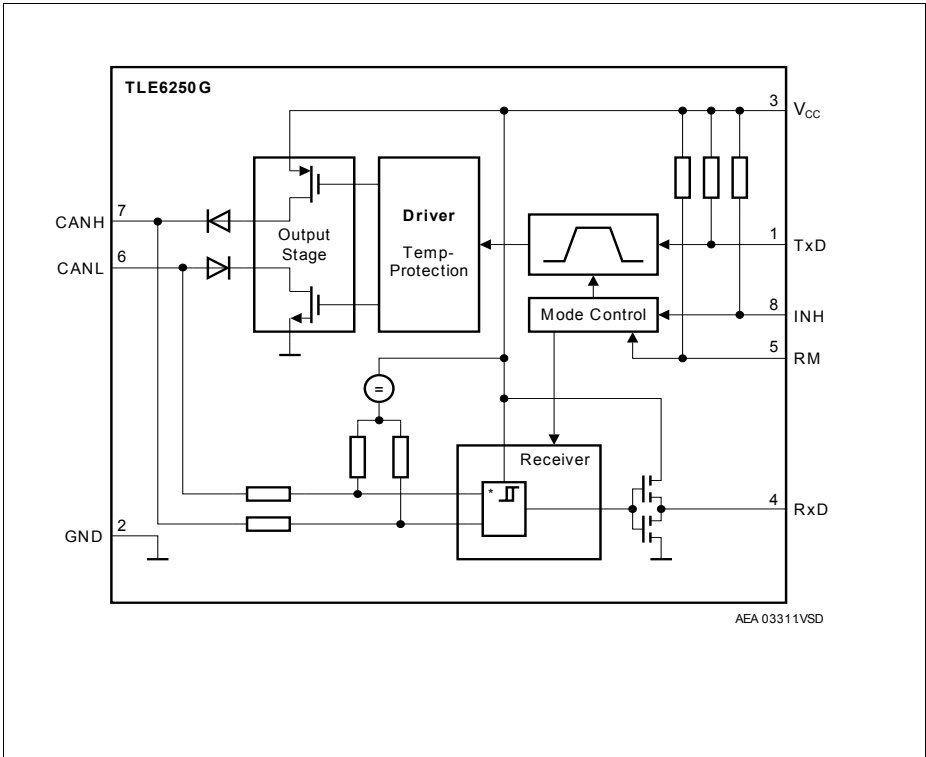


Figure 3 Block Diagram TLE6250G

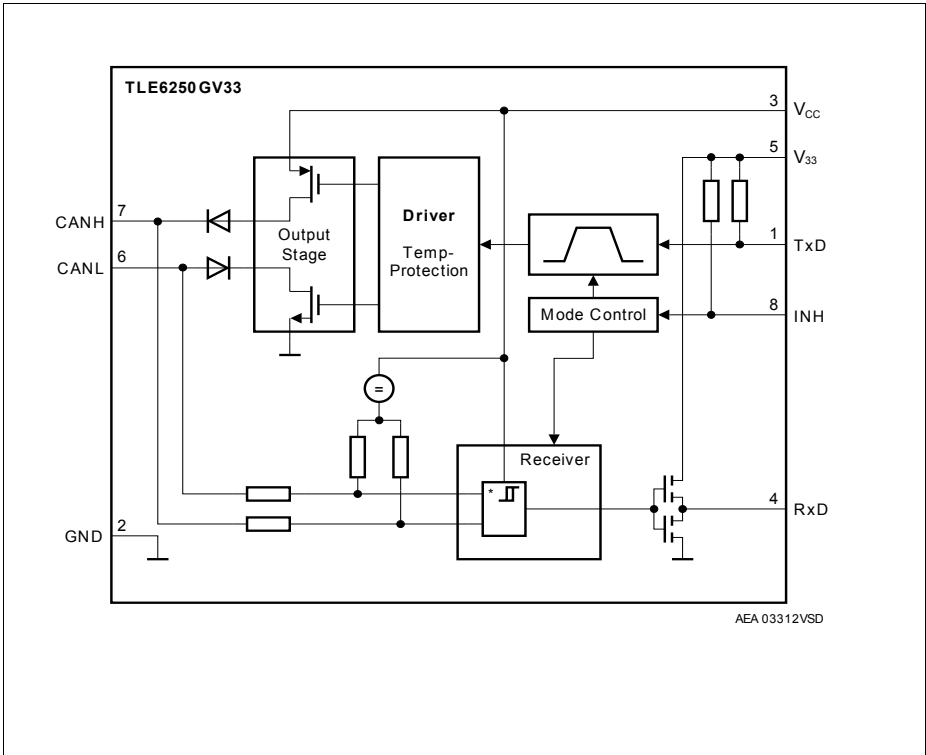


Figure 4 Block Diagram TLE6250GV33

Application Information

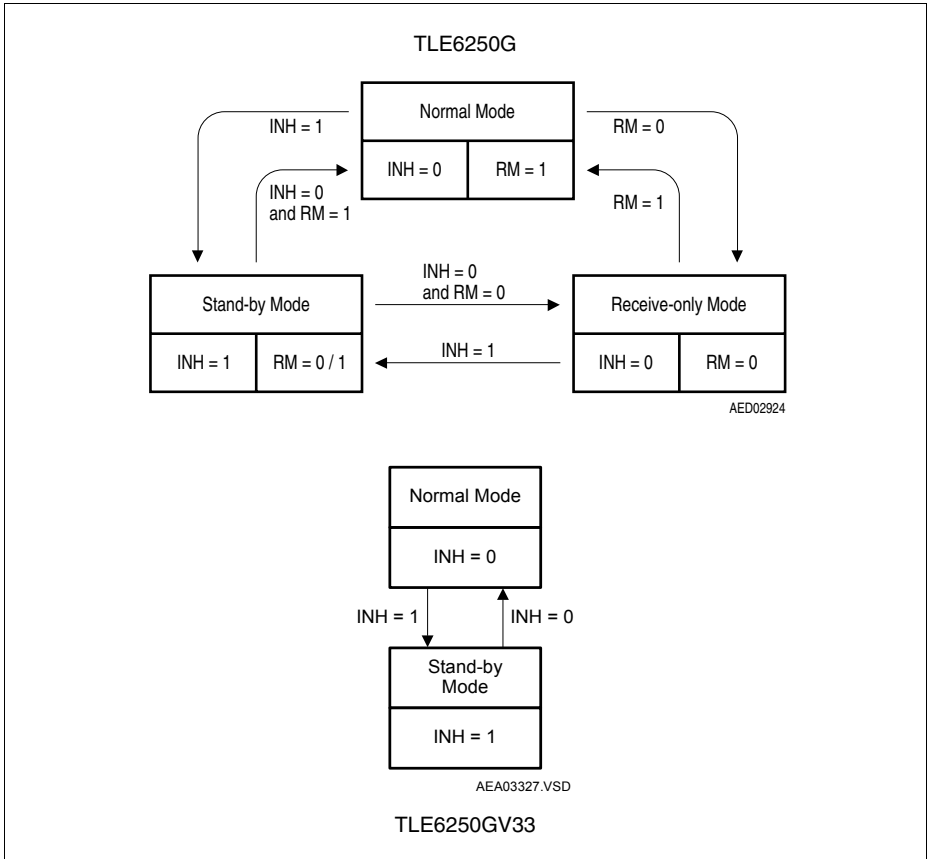


Figure 5 Mode State Diagram

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.

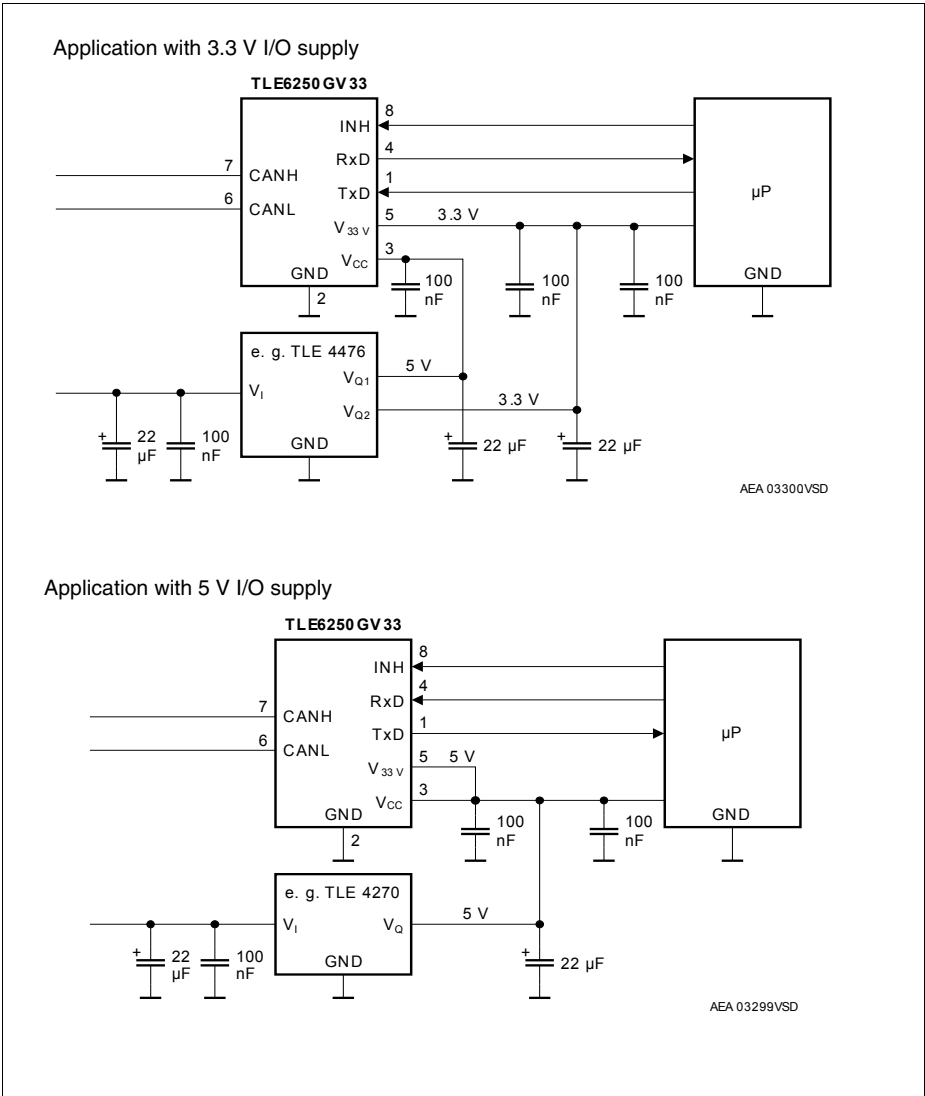
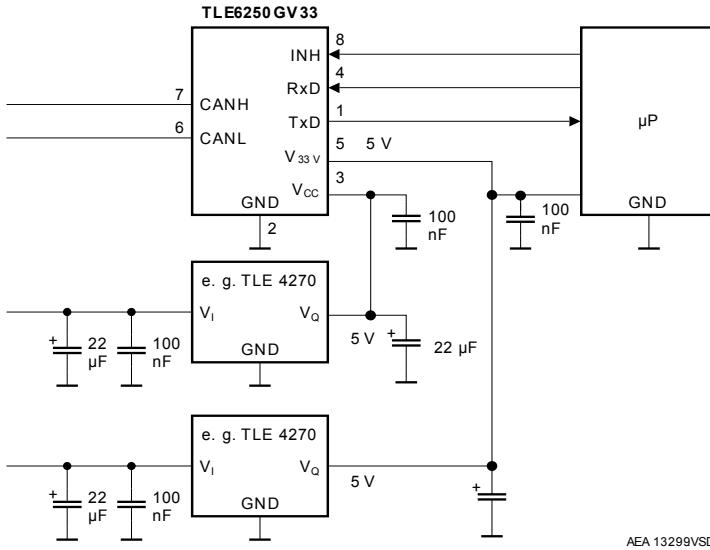


Figure 6 Application Circuits TLE6250GV33 Used for 3.3 V and 5 V Logic

Application with separate 5V power supplies,
for applications with switchable transceiver supply



AEA 13299VSD

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. | | |
| Voltages | | | | | |
| 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 Ω) |
| Electrostatic discharge voltage | V_{ESD} | -2 | 2 | kV | human body model (100 pF via 1.5 k Ω) |
| Temperatures | | | | | |
| Junction temperature | T_j | -40 | 160 | °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 | °C | – |
| Thermal Resistances | | | | | |
| Junction ambient | R_{thj-a} | – | 185 | K/W | – |
| Thermal Shutdown (junction temperature) | | | | | |
| Thermal shutdown temperature | T_{jsD} | 160 | 200 | °C | 10 °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. | | |
| Current Consumption | | | | | | |
| 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 | $I_{CC,stab}$ | – | 1 | 10 | μA | stand-by mode; TxD = RM = high |
| Receiver Output RxD | | | | | | |
| 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 | $V_{RD} = 0.2 \times V_{CC}$, $V_{diff} > 1 \text{ V}^{(1)}$ |
| Transmission Input TxD | | | | | | |
| 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 Ω | – |
| Inhibit Input (pin INH) | | | | | | |
| 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 Ω | – |

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. | | |
| Receive only Input (pin RM) (5 V version only) | | | | | | |
| HIGH level input voltage threshold | $V_{RM,H}$ | – | $0.5 \times V_{CC}$ | $0.7 \times V_{CC}$ | V | normal mode; |
| LOW level input voltage threshold | $V_{RM,L}$ | $0.3 \times V_{CC}$ | $0.4 \times V_{CC}$ | – | V | receive-only mode |
| RM pull-up resistance | R_{RM} | 10 | 25 | 50 | k Ω | – |
| Bus Receiver | | | | | | |
| 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 Ω | recessive state |
| Differential input resistance | R_{diff} | 20 | 40 | 60 | k Ω | recessive state |

Table 5 Electrical Characteristics (cont'd)

4.5 V < V_{CC} < 5.5 V; R_L = 60 Ω; V_{INH} < V_{INH,ON}; -40 °C < T_j < 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. | | |
| Bus Transmitter | | | | | | |
| CANL/CANH recessive output voltage | V _{CANL/H} | 0.4 × V _{CC} | – | 0.6 × V _{CC} | V | V _{TxD} = V _{CC} |
| CCANH, CANL recessive output voltage difference V _{diff} = V _{CANH} - V _{CANL} , no load ²⁾ | V _{diff} | -1 | – | 0.05 | V | V _{TxD} = V _{CC} |
| CANL dominant output voltage | V _{CANL} | – | – | 2.0 | V | V _{TxD} = 0 V; V _{CC} = 5 V |
| CANH dominant output voltage | V _{CANH} | 2.8 | – | – | V | V _{TxD} = 0 V; V _{CC} = 5 V |
| CANH, CANL dominant output voltage difference V _{diff} = V _{CANH} - V _{CANL} | V _{diff} | 1.5 | – | 3.0 | V | V _{TxD} = 0 V; V _{CC} = 5 V |
| CANL short circuit current | I _{CANLsc} | 50 | 120 | 200 | mA | V _{CANLshort} = 18 V |
| | | – | 150 | – | mA | V _{CANLshort} = 36 V |
| CANH short circuit current | I _{CANHsc} | -200 | -120 | -50 | mA | V _{CANHshort} = 0 V |
| CANH short circuit current | I _{CANHsc} | – | -120 | – | mA | V _{CANHshort} = -5 V |
| Output current | I _{CANH,ik} | -50 | -300 | -400 | μA | V _{CC} = 0 V, V _{CANH} = V _{CANL} = -7 V |
| | | -50 | -100 | -150 | μA | V _{CC} = 0 V, V _{CANH} = V _{CANL} = -2 V |
| Output current | I _{CANH,ik} | 50 | 280 | 400 | μA | V _{CC} = 0 V, V _{CANH} = V _{CANL} = 7 V |
| | | 50 | 100 | 150 | μA | V _{CC} = 0 V, V _{CANH} = V _{CANL} = 2 V |

Table 5 Electrical Characteristics (cont'd)

4.5 V < V_{CC} < 5.5 V; R_L = 60 Ω; V_{INH} < V_{INH,ON}; -40 °C < T_j < 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. | | |
| Dynamic CAN-Transceiver Characteristics | | | | | | |
| Propagation delay TxD-to-RxD LOW (recessive to dominant) | $t_{d(L),TR}$ | – | 150 | 280 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V; C _{RxD} = 20 pF |
| Propagation delay TxD-to-RxD HIGH (dominant to recessive) | $t_{d(H),TR}$ | – | 150 | 280 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V; C _{RxD} = 20 pF |
| Propagation delay TxD LOW to bus dominant | $t_{d(L),T}$ | – | 100 | 140 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V |
| Propagation delay TxD HIGH to bus recessive | $t_{d(H),T}$ | – | 100 | 140 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V |
| Propagation delay bus dominant to RxD LOW | $t_{d(L),R}$ | – | 50 | 140 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V; C _{RxD} = 20 pF |
| Propagation delay bus recessive to RxD HIGH | $t_{d(H),R}$ | – | 50 | 140 | ns | C _L = 47 pF; R _L = 60 Ω; V _{CC} = 5 V; C _{RxD} = 20 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. | | |
| Voltages | | | | | |
| 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 Ω) |
| Electrostatic discharge voltage | V_{ESD} | -2 | 2 | kV | human body model (100 pF via 1.5 k Ω) |
| Temperatures | | | | | |
| 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 | $^{\circ}\text{C}$ | – |
| Thermal Resistances | | | | | |
| Junction ambient | R_{thj-a} | – | 185 | K/W | – |
| Thermal Shutdown (junction temperature) | | | | | |
| 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. | | |
| Current Consumption (3.3 V version) | | | | | | |
| 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 | $I_{CC+33V, stb}$ | – | 1 | 10 | μA | stand-by mode, TxD = high |
| Receiver Output RxD | | | | | | |
| HIGH level output current | $I_{RD,H}$ | – | -2 | -1 | mA | $V_{RD} = 0.8 \times V_{33V}$, $V_{diff} < 0.4 \text{ V}^{1)}$ |
| LOW level output current | $I_{RD,L}$ | 1 | 2 | – | mA | $V_{RD} = 0.2 \times V_{33V}$, $V_{diff} > 1 \text{ V}^{1)}$ |
| Transmission Input TxD | | | | | | |
| 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 Ω | – |
| Inhibit Input (pin INH) | | | | | | |
| 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 Ω | – |

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. | | |
| Bus Receiver | | | | | | |
| 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 Ω | recessive state |
| Differential input resistance | R_{diff} | 20 | 40 | 60 | k Ω | recessive state |

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. | | |
| Bus Transmitter | | | | | | |
| CANL/CANH recessive output voltage | $V_{CANL/H}$ | $0.4 \times V_{CC}$ | – | $0.6 \times V_{CC}$ | V | $V_{TxD} = V_{33V}$ |
| CANH, CANL recessive output voltage difference $V_{diff} = V_{CANH} - V_{CANL}$, no load ²⁾ | V_{diff} | -1 | – | 0.05 | V | $V_{TxD} = V_{33V}$ |
| CANL dominant output voltage | V_{CANL} | – | – | 2.0 | V | $V_{TxD} = 0 \text{ V}$; $V_{CC} = 5 \text{ V}$ |
| CANH dominant output voltage | V_{CANH} | 2.8 | – | – | V | $V_{TxD} = 0 \text{ V}$; $V_{CC} = 5 \text{ V}$ |
| CANH, CANL dominant output voltage difference $V_{diff} = V_{CANH} - V_{CANL}$ | V_{diff} | 1.5 | – | 3.0 | V | $V_{TxD} = 0 \text{ V}$; $V_{CC} = 5 \text{ V}$ |
| CANL short circuit current | I_{CANLsc} | 50 | 120 | 200 | mA | $V_{CANLshort} = 18 \text{ V}$ |
| | | – | 150 | – | mA | $V_{CANLshort} = 36 \text{ V}$ |
| CANH short circuit current | I_{CANHsc} | -200 | -120 | -50 | mA | $V_{CANHshort} = 0 \text{ V}$ |
| CANH short circuit current | I_{CANHsc} | – | -120 | – | mA | $V_{CANHshort} = -5 \text{ V}$ |
| Output current | $I_{CANH/L,Ik}$ | -50 | -300 | -400 | μA | $V_{CC} = 0 \text{ V}$, $V_{CANH} = V_{CANL} = -7 \text{ V}$ |
| | | -50 | -100 | -150 | μA | $V_{CC} = 0 \text{ V}$, $V_{CANH} = V_{CANL} = -2 \text{ V}$ |
| Output current | $I_{CANH/L,Ik}$ | 50 | 280 | 400 | μA | $V_{CC} = 0 \text{ V}$, $V_{CANH} = V_{CANL} = 7 \text{ V}$ |
| | | 50 | 100 | 150 | μA | $V_{CC} = 0 \text{ V}$, $V_{CANH} = V_{CANL} = 2 \text{ V}$ |

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. | | |
| Dynamic CAN-Transceiver Characteristics | | | | | | |
| 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

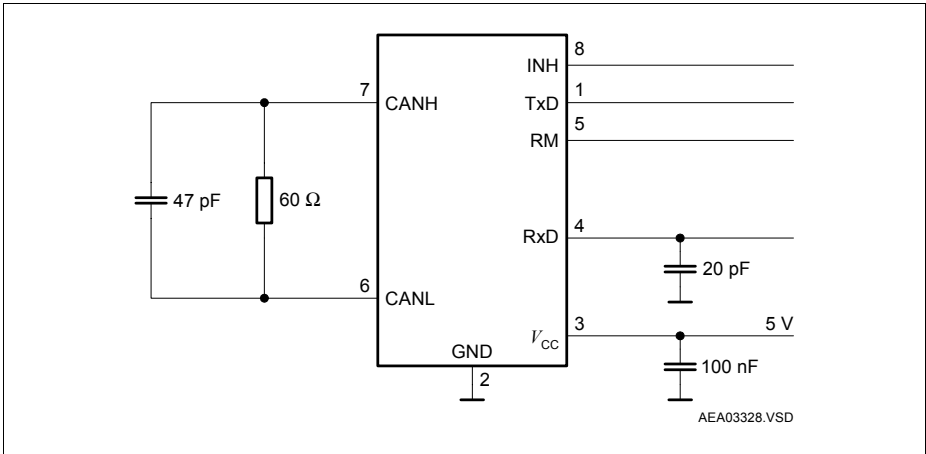


Figure 7 Test Circuit for Dynamic Characteristics (5 V Version)

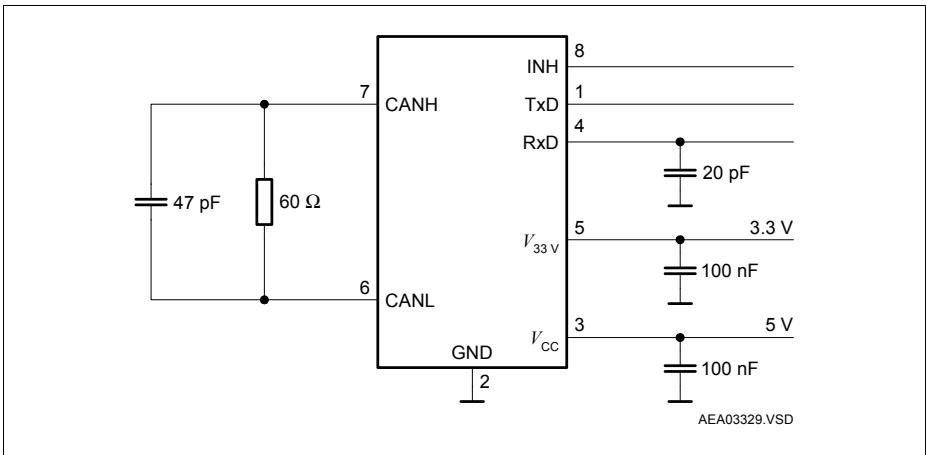


Figure 8 Test Circuit for Dynamic Characteristics (GV33 Version)

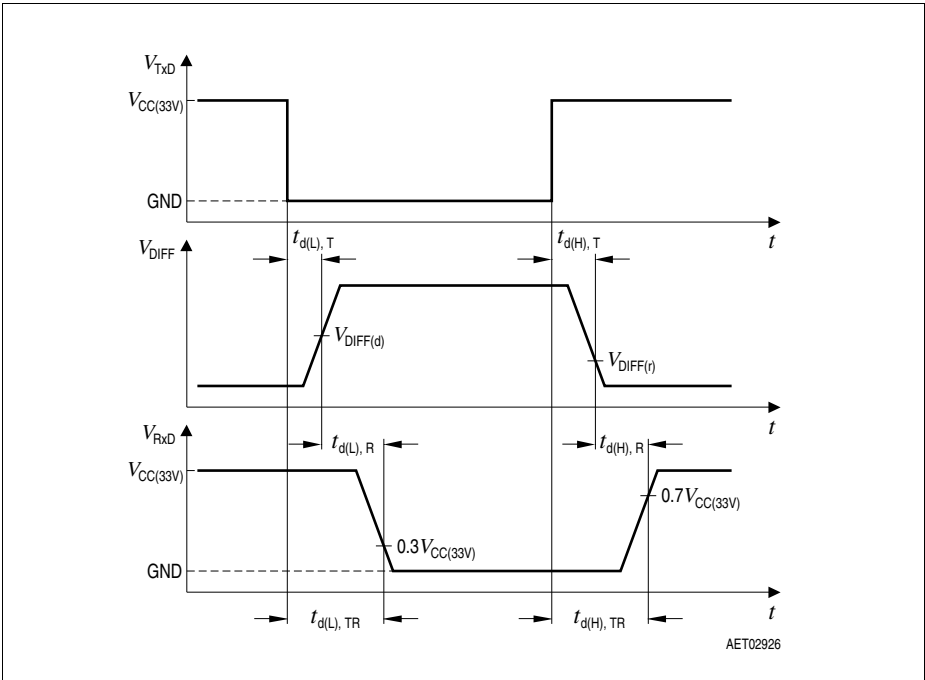


Figure 9 Timing Diagrams for Dynamic Characteristics

Package Outlines

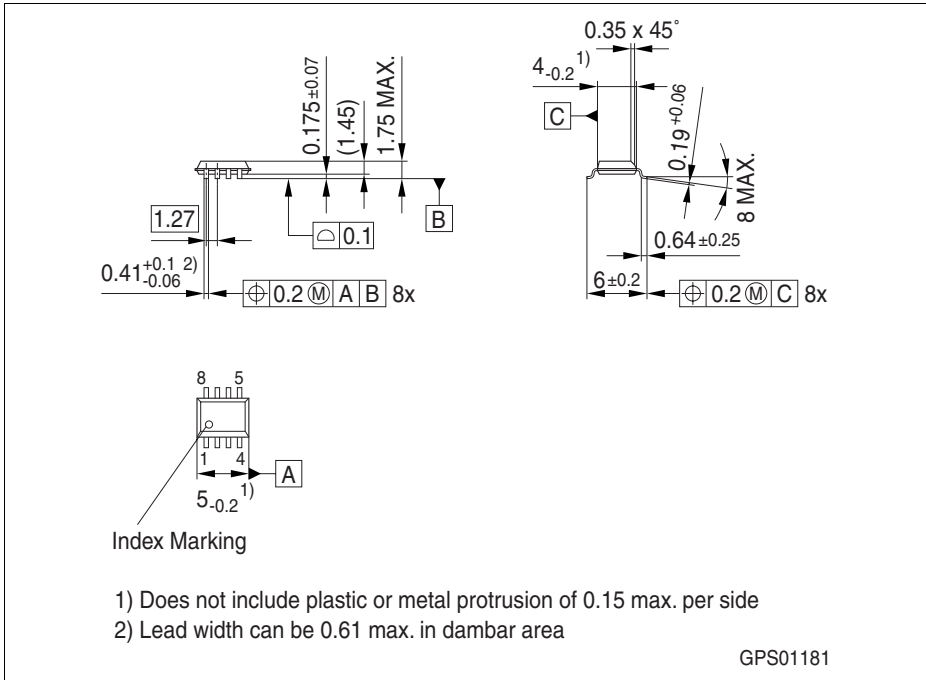


Figure 11 PG-DSO-8 (PG-DSO-8-16 Plastic Dual Small Outline)

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 μA to 400 μA |
| Page 26 | updated Revision History |
