Isolated CAN Transceiver with Flexible Data Rate

Features

- Meet ISO11898 Standard
- Support CAN FD and data rates up to 5 Mbps
- Typical Loop Delay: 110 ns
- 5 V power supply, 3.0 V ~ 5.5 V IO interface
- Receiver Common Mode Input Voltage: ±30 V
- Bus Fault Protection: ±42 V
- Up to 5 kV RMS Isolation Rating (WSOP)
- 10 kV Surge Capability (WSOP)
- ±200 kV/μs typ static CMTI, ±150 kV/μs typ dynamic CMTI
- Junction Temperatures from −40°C to 150°C
- SMP8 and Wide-SOIC (WSOP8, WSOP16)
- BUS pin ESD Protection：
  - ±15 kV Human-Body Model
  - ±1.5 kV Charged-Device Model
- Safety-Related Certifications:
  - VDE Certification according to DIN VDE V 0884-17(IEC60747-17)
  - 5000V_{RMS} (WSOP16, WSOP8), 3750V_{RMS} (SOP8) Isolation Rating per UL 1577
  - CQC Certification per GB 4943.1
  - CAS, TUV and CB certifications

Description

The TPT710xx device is an isolated CAN transceiver which meets the ISO11898 High-speed CAN (Controller Area Network) physical layer standard. The device is designed to use in CAN FD networks up to 5 Mbps, and to enhance timing margin and higher data rates in long and high-loading networks. As the design, the device features cross-wire, overvoltage and loss of ground protection from −42 V to +42 V, overtemperature shutdown, a −30 V to +30 V common-mode range. The VCCA is the power supply input for RXD and TXD I/O pins which support 2.25V to 5.5V wide range. The 2nd power supply VCCB of CAN BUS side which support 4.5V to 5.5V range.

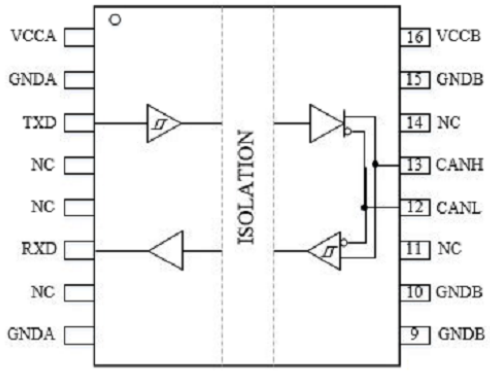
The devices integrate high-performance digital isolators with 5000 VRMS (WSOP8, WSOP16 packages), 3750 VRMS (SMP8 package), isolation ratings per UL 1577. These devices are also to be certified by VDE, UL, CSA, and CQC.

TPT710xx family is available in WSOP8, WSOP16, SMP8 package, and is characterized from −40°C to +125°C.

Applications

- Industrial Automation
- Motor Control
- Solar Inverters
- Battery Charging and Management

Functional Block Diagram



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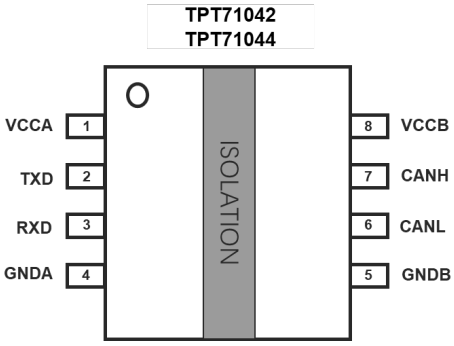
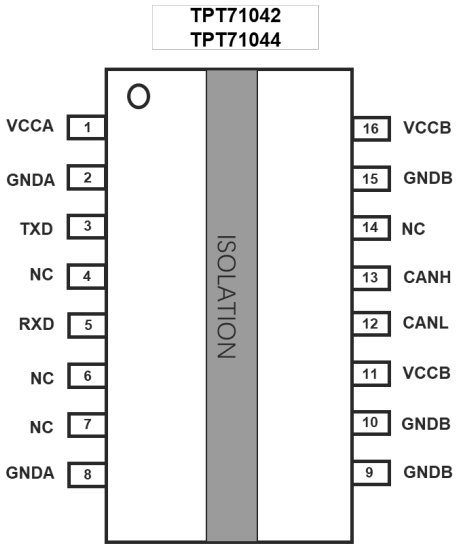
Revision History

Date	Revision	Notes
2022-2-7	Rev.Pre.0	Preliminary version
2022-11-1	Rev.A.0	Released version

Pin Configuration and Functions-TPT71042/TPT71044

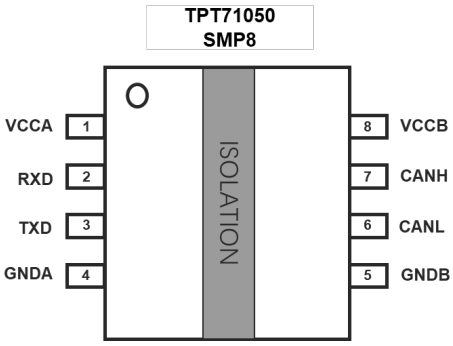


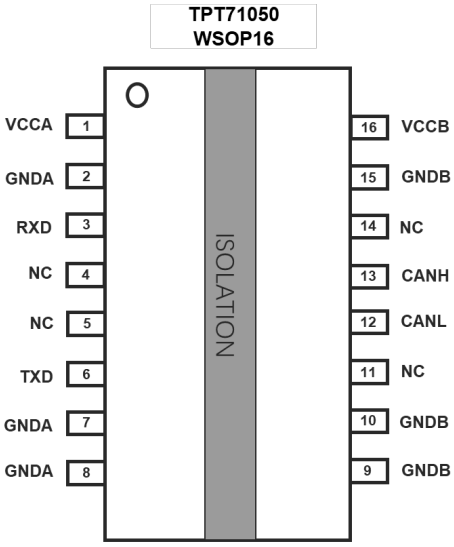


Pin Functions

Pin					I/O	Description
Name	WSOP8		WSOP16			
	TPT71042	TPT71044	TPT71042	TPT71044		
VCCA	1	1	1	1	–	Power supply, VCCA
TXD	2	2	3	3	I	Input, CAN transmit data in
RXD	3	3	5	5	O	Output, CAN receive data out
GNDA	4	4	2, 8	2, 8	–	Ground connection for VCCA
GNDB	5	5	9, 10,15	9, 10,15	–	Ground connection for VCCB
CANL	6	6	12	12	IO	Low level CAN bus input/output line
CANH	7	7	13	13	IO	High level CAN bus input/output line
VCCB	8	8	11,16	11,16	–	Power supply, VCCB
NC	–	–	4, 6, 7, 14	4, 6, 7, 14	–	No Connect

Pin Configuration and Functions-TPT71050





Pin Functions

Pin			I/O	Description
Name	SMP8	WSOP16		
	TPT71050	TPT71050		
VCCA	1	1	–	Power supply, VCCA
RXD	2	3	O	Output, CAN receive data out
TXD	3	5	I	Input, CAN transmit data in
GNDA	4	2, 8	–	Ground connection for VCCA
GNDB	5	9, 10,15	–	Ground connection for VCCB
CANL	6	12	IO	Low level CAN bus input/output line
CANH	7	13	IO	High level CAN bus input/output line
VCCB	8	16	–	Power supply, VCCB
NC	–	4, 6, 7, 11, 14	–	No Connect

Specifications

Absolute Maximum Ratings (1)

Parameter		Min	Max	Unit
V_{CC}	Supply Voltage, V_{CCA}, V_{CCB} (2)	−0.5	6	V
V_{IO}	Voltage at IN1, IN2, OUT1, OUT2	−0.5	V_{CC} + 0.5	V
I_O	Output Current	−15	15	mA
T_J	Operating Virtual Junction Temperature		150	°C
T_{STG}	Storage Temperature Range	−65	150	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.
(2) This data was taken with the JEDEC low effective thermal conductivity test board.
(3) This data was taken with the JEDEC standard multilayer test boards.

ESD, Electrostatic Discharge Protection

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD, per ANSI/ESDA/JEDEC JS-001 (1)	Bus Pin	±15	kV
		All Pin Except Bus Pin	±6	kV
CDM	Charged Device Model ESD, per ANSI/ESDA/JEDEC JS-002 (2)	All Pin	±1.5	kV
LU	Latch Up, per JESD78	All Pin	±500	mA

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Recommended Operating Conditions

Parameter		Min	Typ	Max	Unit
V_{CCB}	Supply voltage, V_{CCB}	4.5		5.5	V
V_{CCA}	Supply voltage, V_{CCA}	2.25		5.5	V
V_{IH}	High-level input voltage (data input)	2		V_{CC}	V
V_{IL}	Low-level input voltage (data input)	0		0.8	V
f_{data}	Data rate (1)	0		5	Mbps
T_A	Operating ambient temperature	−40	25	125	°C

(1) 5 Mbps is the maximum specified data rate, although higher data rates are possible.

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
8-Pin WSOP	85	43	°C/W
16-Pin WSOP	75	41	°C/W
8-Pin SMP	74	65	°C/W

Insulation Specifications

Symbol	Parameter	Conditions	Value			Unit
			SMP8	WSOP8	WSOP16	
CLR	External clearance	Shortest terminal-to-terminal distance through air	> 6.0	> 8.0	> 8.0	mm
CPG	External creepage	Shortest terminal-to-terminal distance across the package surface	> 6.0	> 8.0	> 8.0	mm
DTI	Distance through the insulation	Minimum internal gap (internal clearance)	> 22	> 22	> 22	μm
DTC	Distance through the Molding compound	Minimum internal distance across the conductors inside the package	0.45	0.8	0.8	mm
CTI	Comparative tracking index	DIN EN 60112 (VDE 0303-11); IEC 60112; UL 746A	> 600	> 600	> 600	V
	Material group	According to IEC 60664-1	I	I	I	
	Over-voltage category	For Rated Mains Voltage ≤ 150 V_{RMS}	I-IV	I-IV	I-IV	
		For Rated Mains Voltage ≤ 300 V_{RMS}	I-III	I-IV	I-IV	
		For Rated Mains Voltage ≤ 600 V_{RMS}	I-II	I-IV	I-IV	
		For Rated Mains Voltage ≤ 1000 V_{RMS}	I	I-III	I-III	
	Climatic category		40/125/21	40/125/21	40/125/21	
	Pollution degree		2	2	2	
DIN V VDE V 0884-17 (1)(2)						
V_{IORM}	Maximum repetitive isolation voltage	AC voltage	637	1414	1414	V_{PK}
V_{IOWM}	Maximum working isolation voltage	AC voltage; TDDB Test	450	1000	1000	V_{RMS}
		DC voltage	637	1414	1414	V_{DC}
V_{IOTM}	Maximum transient isolation voltage	$V_{TEST} = V_{IOTM}$, t = 60 s (qualification); $V_{TEST} = 1.2 \times V_{IOTM}$, t = 1 s (100% production)	5300	7000	7000	V_{PK}
V_{IOSM}	Maximum surge isolation voltage (3)	Test method per IEC 62368-1, 1.2/50 μs waveform, $V_{TEST} = 1.3 \times V_{IOSM}$ (qualification)	5980	6500	6500	V_{PK}
q_{pd}	Apparent charge	Method a, After Input/Output safety test subgroup 2/3, $V_{ini} = V_{IOTM}$, t_{ini} = 60 s; $V_{pd(m)} = 1.2 \times V_{IORM}$, t_m = 10 s	≤ 5	≤ 5	≤ 5	pC
		Method a, After environmental tests subgroup 1, $V_{ini} = V_{IOTM}$, t_{ini} = 60 s; $V_{pd(m)} = 1.6 \times V_{IORM}$, t_m = 10 s	≤ 5	≤ 5	≤ 5	
		Method b1; At routine test (100% production) and preconditioning (type test), $V_{ini} = 1.2 \times V_{IOTM}$,	≤ 5	≤ 5	≤ 5	

		t_{ini} = 1 s; $V_{pd(m)}$ = 1.875 × V_{IORM}, t_m = 1 s				
C_{IO}	Isolation capacitance	V_{IO} = 0.4 × sin (2πft), f = 1 MHz	~0.5	~0.5	~0.5	pF
R_{IO}	Isolation resistance	V_{IO} = 500 V, T A= 25°C	> 10^{12}	> 10^{12}	> 10^{12}	Ω
		V_{IO} = 500 V, 100°C ≤ T A≤ 125°C	> 10^{11}	> 10^{11}	> 10^{11}	Ω
		V_{IO} = 500 V at T S= 150°C	> 10^{9}	> 10^{9}	> 10^{9}	Ω
UL 1577						
V_{ISO}	Withstanding isolation voltage	V_{TEST} = V_{ISO} , t = 60 s(qualification); V_{TEST} = 1.2 × V_{ISO} , t = 1 s (100% production)	3750	5000	5000	V_{RMS}

(1) All pins on each side of the barrier tied together creating a two-terminal device.
(2) This coupler is suitable for safe electrical insulation only within the safety operating ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits.
(3) Testing must be carried out in oil.

Safety-Related Certifications

VDE	UL	TUV	CQC	CSA	CB
Certified according to DIN EN IEC 60747-17 (VDE 0884-17)	Certified according to UL 1577 and CSA Component Acceptance Service No. 5A	Certified according to EN IEC 62368-1 and EN IEC 61010-1	Certified according to GB 4943.1	Certified CSA C22.2 No. 62368-1 and CAN/CSA-C22.2 No. 60601-1	Certified according to EN IEC 62368-1
Basic insulation (WSOP) VIORM= 1414 VIOSM= 6500 (SOP, QSOP) VIORM= 637 VIOSM= 5980	(WSOP) Single protection, 5000Vrms (SOP, QSOP) Single protection, 3750Vrms	6400Vrms reinforced insulation (WSOP), 800Vrms maximum work voltage. 4000Vrms basic insulation (SOP, QSOP), 400V rms maximum work voltage.	Reinforced insulation (WSOP), Altitude<=5000m, 800V rms maximum work voltage. Basic insulation (SOP, QSOP), Altitude<=5000m, 400V rms maximum work voltage.	400Vrms basic insulation (SOP, QSOP) and 600V rms reinforced insulation (WSOP) working voltage per CSA C22.2 No. 62368-1:19 3rd, IEC 62368-1:2018 Ed. 3(in pollution degree 2, material group I) 2 MOPP (Means of Patient Protection) insulation requirements for 250Vrms and 1 MOPP insulation requirements for 500Vrms (WSOP) in CAN/CSA-C22.2 No. 60601-1:14, IEC 60601-1:2005 + AMD1:2012. 1 MOPP (Means of Patient Protection) insulation requirements for 250Vrms (SOP, QSOP) in CAN/CSA-C22.2 No. 60601-1:14, IEC 60601-1:2005 + AMD1:2012	Reinforced insulation (WSOP), Altitude<=5000m,800V rms maximum work voltage. Basic insulation (SOP, QSOP), Altitude<=5000m,400V rms maximum work voltage
TBD	Report Reference E524241	TBD	Certificate No. CQC22001356658	Master contract: 302375	Ref. Certif. No. CN57658

Electrical Characteristics

All test conditions: V_{CCA} = 2.25 V ~ 5.5 V, V_{CCB} = 4.5 V ~ 5.5 V, T_A = −40°C to 125°C. Typical value is in V_{CCA} = 3.3 V, V_{CCB} = 5 V, T_A = +25°C.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Power Supply						
I_{CCA}	Supply current Side 1	Bus dominant, V_{CCA} = 2.25 V to 5.5 V, TXD = 0 V		2.3	8	mA
		Bus recessive, V_{CCA} = 2.25 V to 5.5 V, TXD = V_{CCA}		1.3	4.1	mA
		V_{CCA}=4.5 to 5.5V, TXD= 1Mbps 50% duty square wave		2.0	7.6	mA
		V_{CCA}=4.5 to 5.5V, TXD= 5Mbps 50% duty square wave		2.0	9	mA
I_{CCB}	Supply current Side 2	Bus dominant, TXD = 0 V, R_L = 60 Ω		10	80	mA
		Bus recessive, TXD = V_{CCA}, R_L = 60 Ω		1	6	mA
		V_{CCB}=4.5 to 5.5V, TXD= 1Mbps 50% duty square wave		10	50	mA
		V_{CCB}=4.5 to 5.5V, TXD= 5Mbps 50% duty square wave		10	60	mA
UV_{VCCA}	Rising under voltage detection, Side 1			2	2.25	V
UV_{VCCA}	Falling under voltage detection, Side 1		1.7	1.85		V
$V_{HYS(UVCC1)}$	Hysterisis voltage on V_{CCA} undervoltage lock-out (1)			150(2)		mV
UV_{VCCB}	Rising under voltage detection, side 2			4.2	4.45	V
UV_{VCCB}	Falling under voltage detection, side 2		3.5	4.0		V
$V_{HYS(UVCC2)}$	Hysterisis voltage on V_{CCB} undervoltage lock-out (1)			200		mV
TXD Terminal						
V_{IH}	High level input voltage		2		Vcc	V
V_{IL}	Low level input voltage		0		0.8	V
I_{IH}	High level input leakage current	TXD = V_{CCA}			5	uA
I_{IL}	Low level input leakage current	TXD = 0 V	−20			uA
C_I	Input capacitance (1)	V_{IN} = 0.4 x sin(2 x π x 1E+6 x t) + 2.5 V, V_{CCA} = 5 V		3		pF

(1). Parameters are provided by lab bench test and design simulation

(2). VHYS(UVCC1), min = 75mV by bench test and design simulation

Electrical Characteristics (Continued)

All test conditions: V_{CCA} = 2.25 V ~ 5.5 V, V_{CCB} = 4.5 V ~ 5.5 V, T_A = −40°C to 125°C. Typical value is in V_{CCA} = 3.3 V, V_{CCB} = 5 V, T_A = +25°C.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
RXD Terminal						
$V_{OH} - V_{CCA}$	High level output voltage	I_O = −4 mA for 4.5 V ≤ V_{CCA} ≤ 5.5 V	−0.4			V
		I_O = −2 mA for 3.0 V ≤ V_{CCA} ≤ 3.6 V	−0.2			V
		I_O = −1 mA for 2.25 V ≤ V_{CCA} ≤ 2.75 V	−0.1			V
		I_O = −1 mA for 1.71 V ≤ V_{CCA} ≤ 1.89 V	−0.1			V
V_{OL}	Low level output voltage	I_O = 4 mA for 4.5 V ≤ V_{CCA} ≤ 5.5 V			0.4	V
		I_O = 2 mA for 3.0 V ≤ V_{CCA} ≤ 3.6 V			0.2	V
		I_O = 1 mA for 2.25 V ≤ V_{CCA} ≤ 2.75 V			0.1	V
		I_O = 1 mA for 1.71 V ≤ V_{CCA} ≤ 1.89 V			0.1	V
Driver Electrical Characteristics						
$V_{O(DOM)}$	Bus output voltage (Dominant), CANH	TXD = 0 V, 50 Ω ≤ R_L ≤ 65 Ω, C_L = open	2.75		4.5	V
	Bus output voltage (Dominant), CANL	TXD = 0 V, 50 Ω ≤ R_L ≤ 65 Ω, C_L = open	0.5		2.25	V
$V_{O(REC)}$	Bus output voltage (recessive), CANH and CANL	XD = V_{CCA}, R_L = open	2.0	0.5 x V_{CCB}	3.0	V

(1). Parameters are provided by lab bench test and design simulation

Electrical Characteristics-DC Specification

All test conditions: V_{CCA} = 2.25 V ~ 5.5 V, V_{CCB} = 4.5 V ~ 5.5 V, T_A = −40°C to 125°C. Typical value is in V_{CCA} = 3.3 V, V_{CCB} = 5 V, T_A = +25°C.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Power Supply						
$V_{OD(DOM)}$	Differential output voltage, CANH − CANL (dominant)	TXD = 0 V, 45 Ω ≤ R_L ≤ 50 Ω, C_L = open	1.4		3.0	V
		TXD = 0 V, 50 Ω ≤ R_L ≤ 65 Ω, C_L = open	1.5		3.0	V
		TXD = 0 V, R_L = 2240 Ω, C_L = open	1.5		5.0	V
$V_{OD(REC)}$	Differential output voltage, CANH-CANL (recessive)	TXD = V_{CCA}, R_L = 60 Ω, C_L = open	-120		120	mV
		TXD = V_{CCA}, R_L = open, C_L = open	-50		50	mV
V_{SYM_DC}	DC Output symmetry (V_{CCB} − $V_{O(CANH)}$ − $V_{O(CANL)}$)	R_L = 60 Ω, C_L = open, TXD = V_{CCA} or 0 V	−400		400	mV
$I_{SO(SS_DOM)}$	Short circuit current steady state output current, dominant	V_{CANH} = −5 V to 40 V, CANL = open, TXD = 0 V	−100			mA
		V_{CANL} = −5 V to 40 V, CANH = open, TXD = 0 V			100	mA
$I_{SO(SS_REC)}$	Short circuit current steady state output current, recessive	−30 V ≤ V_{BUS} ≤ 30 V, V_{BUS} = CANH = CANL, TXD = V_{CCA}	−5.0		5.0	mA
Receiver Electrical Characteristics						
V_{IT}	Differential input threshold voltage	|V_{CM}| ≤ 20 V	500		900	mV
		20 V ≤ |V_{CM}| ≤ 30 V	400		1000	
V_{HYS}	Hysteresis voltage for differential input threshold (1)			120		mV
V_{CM}	Input common mode range		−30		30	V
$I_{OFF(LKG)}$	Power-off bus input leakage current	CANH = CANL = 5 V, V_{CCB} to GND via 0 Ω and 47 kΩ resistor			4.8	uA
C_I	Input capacitance to ground (CANH or CANL) (1)	TXD = V_{CCA}		24.0	30	pF
C_{ID}	Differential input capacitance (CANH – CANL) (1)	TXD = V_{CCA}		12.0	15	pF
R_{ID}	Differential input resistance	TXD = V_{CCA}; −30 V ≤ V_{CM} ≤ +30 V	25		80	kΩ
R_{IN}	Input resistance (CANH or CANL)	TXD = V_{CCA}; −30 V ≤ V_{CM} ≤ +30 V	15		40	kΩ
$R_{IN(M)}$	Input resistance matching: (1 − $R_{IN(CANH)}$/$R_{IN(CANL)}$) x 100% (1)	V_{CANH} = V_{CANL} = 5 V	−2.0		2.0	%
Thermal shutdown						
T_{TSD}	Thermal shutdown temperature (1)			170		°C
T_{TSD_HYST}	Thermal shutdown hysteresis (1)			5		°C

(1) Provided by bench test and design simulation

Switching Characteristics

All test conditions: V_{CCA} = 2.25 V ~ 5.5 V, V_{CCB} = 4.5 V ~ 5.5 V, T_A = −40°C to 125°C. Typical value is in V_{CCA} = 3.3 V, V_{CCB} = 5 V, T_A = +25°C.

Parameter		Conditions	Min	Typ	Max	Units
Switching Characteristics						
$t_{PROP(LOOP1)}$	Total loop delay, driver input TXD to receiver RXD, recessive to dominant	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns; 2.25 V ≤ V_{CCA} ≤ 5.5 V	80	110	200	ns
$t_{PROP(LOOP2)}$	Total loop delay, driver input TXD to receiver RXD, dominant to recessive	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns; 2.25 V ≤ V_{CCA} ≤ 5.5 V	80	120	200	ns
$t_{UV_RE_ENABLE}$	Re-enable time after Undervoltage event	Time for device to return to normal operation from V_{CCA} or V_{CCB} under voltage event			300	μs
Static CMTI	Static Common mode transient immunity (1)	V_{CM} = 1200 V_{PK}	150	200		kV/μs
Dynamic CMTI	Dynamic Common mode transient immunity (1)	V_{CM} = 1200 V_{PK}	100	150		kV/μs
Driver Switching Characteristics						
t_{pHR}	Propagation delay time, HIGH TXD to driver recessive	R_L = 60 Ω and C_L = 100 pF; input rise/fall time (10% to 90%) on TXD = 1 ns		76	140	ns
t_{pLD}	Propagation delay time, LOW TXD to driver dominant			61	140	
$t_{sk(p)}$	Pulse skew ($\lvert t_{pHR} - t_{pLD} \rvert$)(1)			14	30	
t_R	Differential output signal rise time (1)			45		
t_F	Differential output signal fall time (1)			45		
V_{SYM}	Output symmetry (dominant or recessive) ($V_{O(CANH)}$ + $V_{O(CANL)}$) / V_{CCB}	R_{TERM} = 60 Ω, C_{SPLIT} = 4.7 nF, C_L = open, R_L = open, TXD = 250 kHz, 1 MHz	0.9		1.1	V/V
t_{TXD_DTO}	Dominant time out	R_L = 60 Ω and C_L = open	1.2		3.8	ms

(1). Parameters are provided by lab bench test and design simulation

Switching Characteristics (Continued)

All test conditions: V_{CCA} = 2.25 V ~ 5.5 V, V_{CCB} = 4.5 V ~ 5.5 V, T_A = −40°C to 125°C. Typical value is in V_{CCA} = 3.3 V, V_{CCB} = 5 V, T_A = +25°C.

Parameter		Conditions	Min	Typ	Max	Units
Receiver Switching Characteristics						
t_{pRH}	Propagation delay time, bus recessive input to RXD high output	$C_{L(RXD)}$ = 15 pF		75	150	ns
t_{pDL}	Propagation delay time, bus dominant input to RXD low output			63	150	ns
t_R	Output signal rise time (RXD) (1)			1.4		ns
t_F	Output signal fall time (RXD) (1)			1.8		ns
CAN FD Timing parameters						
$t_{BIT(BUS)}$	Bit time on CAN bus output pins with $t_{BIT(TXD)}$ = 500 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns	435		530	ns
	Bit time on CAN bus output pins with $t_{BIT(TXD)}$ = 200 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns	155		210	ns
$t_{BIT(RXD)}$	Bit time on RXD output pins with $t_{BIT(TXD)}$ = 500 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns	400		550	ns
	Bit time on RXD output pins with $t_{BIT(TXD)}$ = 200 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns	120		220	ns
Δt_{REC}	Receiver timing symmetry with $t_{BIT(TXD)}$ = 500 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns; Δt_{REC} = $t_{BIT(RXD)}$ − $t_{BIT(BUS)}$	−65.0		40.0	ns
	Receiver timing symmetry with $t_{BIT(TXD)}$ = 200 ns	R_L = 60 Ω, C_L = 100 pF, $C_{L(RXD)}$ = 15 pF; input rise/fall time (10% to 90%) on TXD =1 ns; Δt_{REC} = $t_{BIT(RXD)}$ − $t_{BIT(BUS)}$	−45.0		15.0	ns

(1). Parameters are provided by lab bench test and design simulation

Typical Performance Characteristics

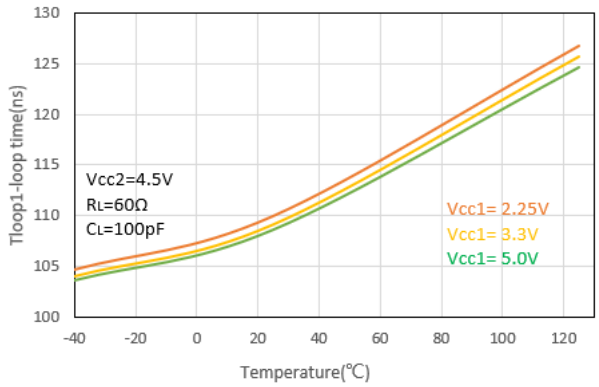


Figure 1. Recessive-to-Dominant Loop Time vs Free-Air Temperature (Across Vcc)

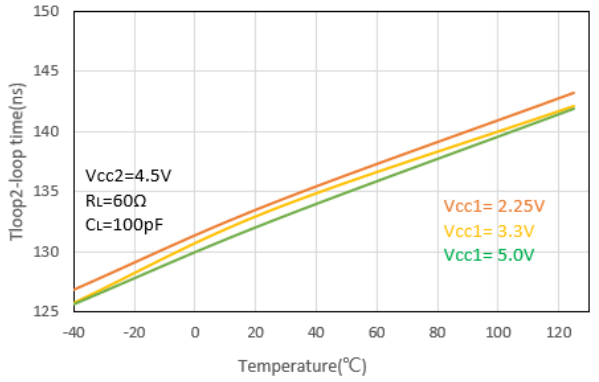


Figure 2. Dominant-to-Recessive Loop Time vs Free-Air Temperature (Across Vcc)

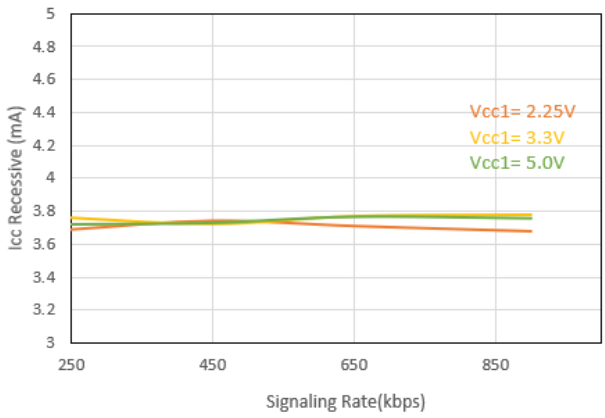


Figure 3. Supply Current (RMS) vs Signaling Rate (kbps)

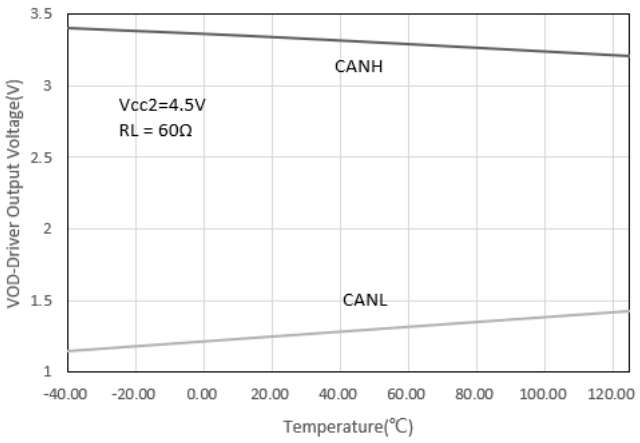


Figure 4. Driver Output Voltage vs Free-Air Temperature

Detailed Description

Overview

The TPT71044 and TPT71050 device is an isolated CAN transceiver which meets the ISO11898 High-speed CAN (Controller Area Network) physical layer standard. The device is designed to use in CAN FD networks up to 5 Mbps, and to enhance timing margin and higher data rates in long and high-loading networks. As the design, the device features cross-wire, overvoltage and loss of ground protection from −42 V to +42 V, overtemperature shutdown, a −30 V to +30 V common-mode range. The VCCA is the power supply input for RXD and TXD I/O pins which support 2.25V to 5.5V wide range. The 2nd power supply VCCB of CAN BUS side which support 4.5V to 5.5V range. The difference between TPT71050 and TPT71044 is the TXD and RXD pin position.

Functional Block Diagram

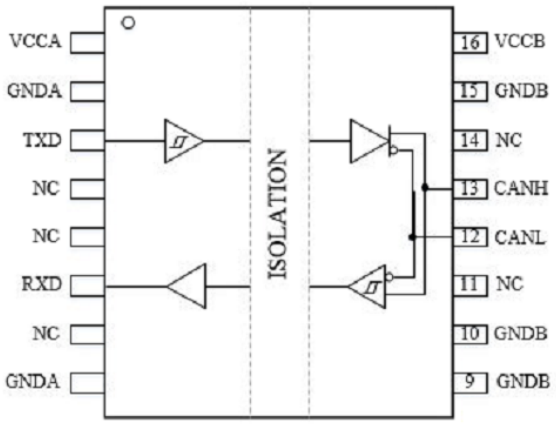


Figure 5a TPT71044 Block Diagram

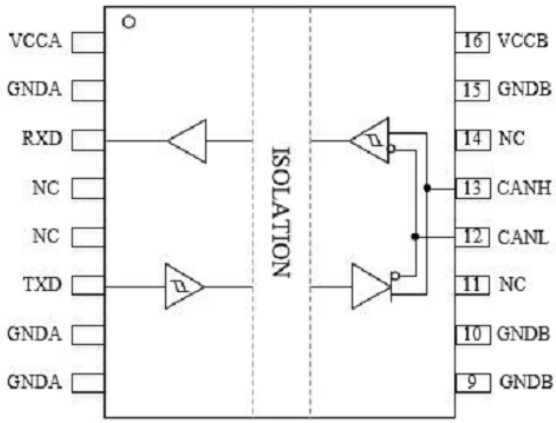


Figure 5b TPT71050 Block Diagram

Application and Implementation

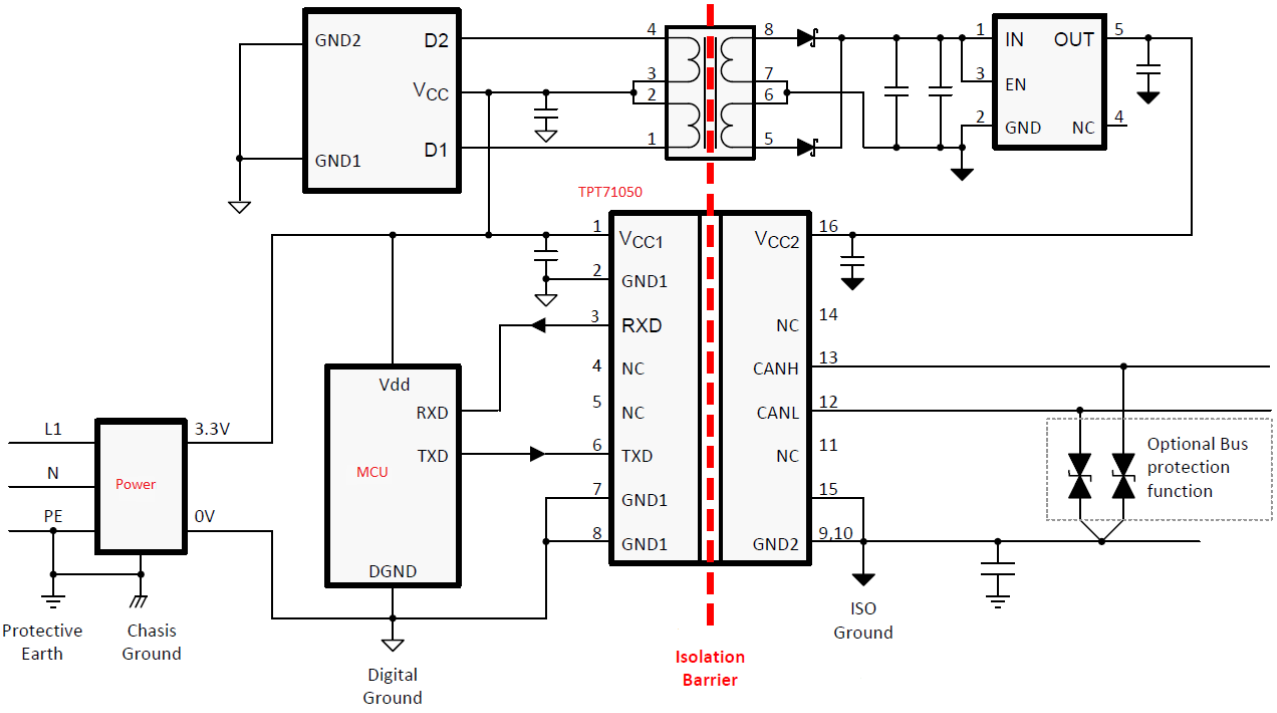
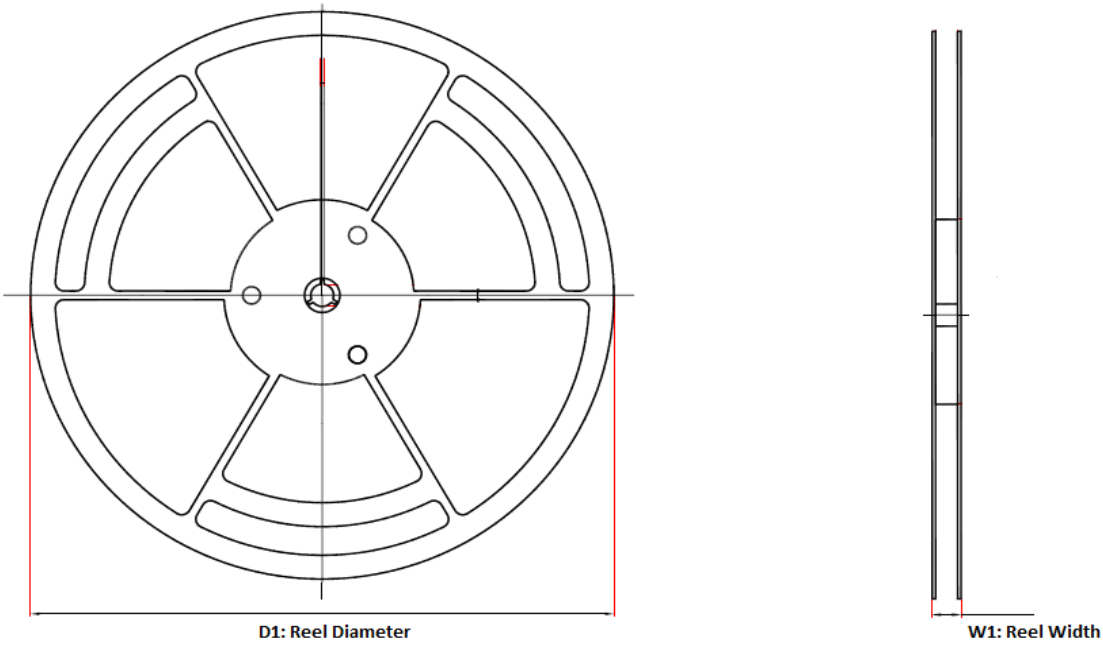


Figure 6 TPT71050 application circuit

TPT71050 can be used with other components such as a microcontroller, a transformer driver, and a linear voltage regulator to form a fully isolated CAN interface. TPT71050 and TPT71044 is high ESD solution which meets 8kV IEC contact ESD with no external components on bus.

Tape and Reel Information

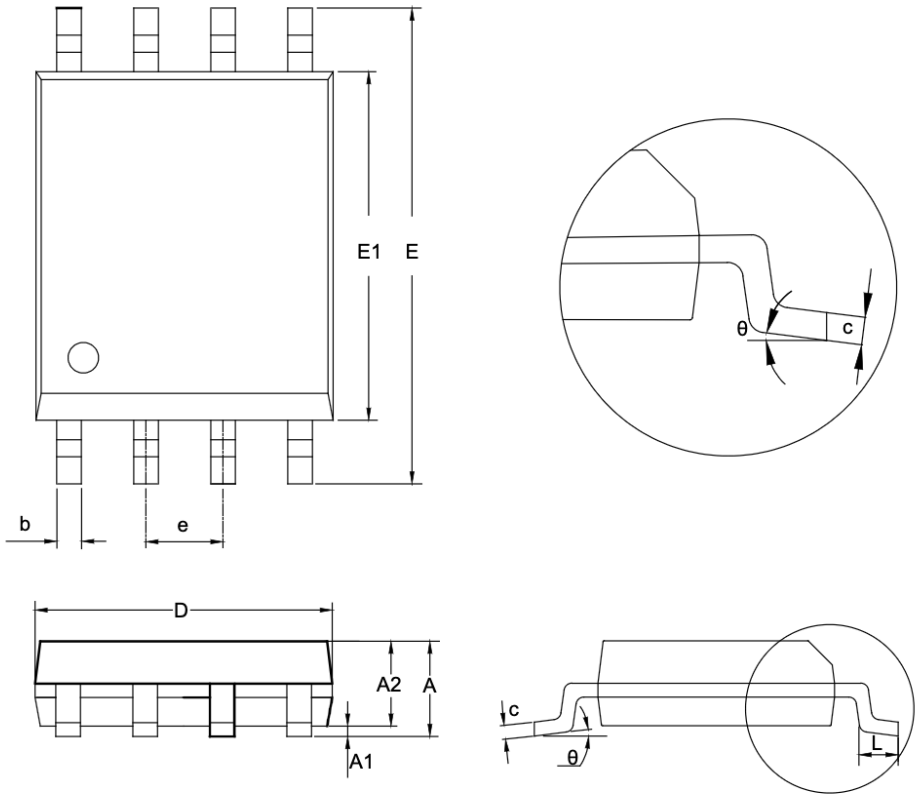


Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPT71050-SOBR	16-Pin WSOP	330.0	22.4	10.90	10.8	3.0	12.0	16.0	Q1
TPT71050-SM1R	8-Pin SMOP	330.0	24.4	10.90	9.6	3.7	16.0	24.0	Q1
TPT71044-SOAR	8-Pin WSOP	330.0	16.4	11.95	6.2	3.0	16.0	16.0	Q1
TPT71044-SOBR	16-Pin WSOP	330.0	22.4	10.90	10.8	3.0	12.0	16.0	Q1
TPT71042-SOAR	8-Pin WSOP	330.0	16.4	11.95	6.2	3.0	16.0	16.0	Q1
TPT71042-SOBR	16-Pin WSOP	330.0	22.4	10.9	10.8	3.0	12.0	16.0	Q1

Package Outline Dimensions

SOAR (WSOP8)

Package Outline Dimensions SOA(WSOP-8-B)



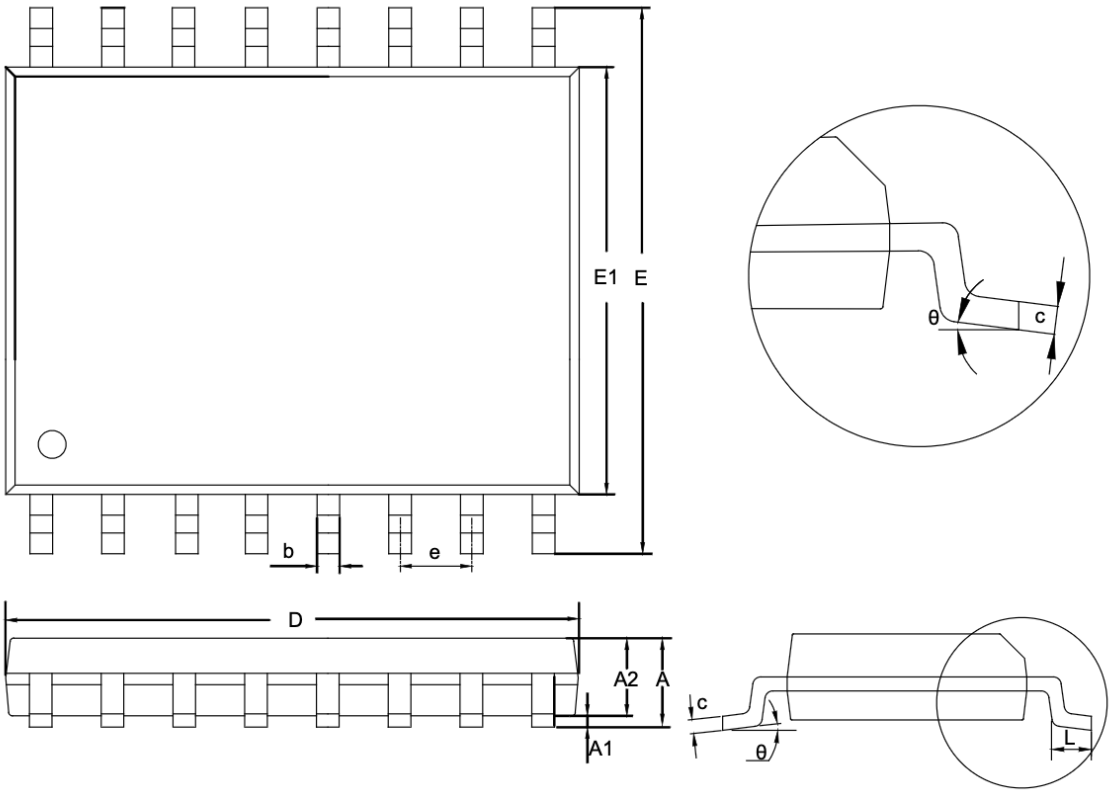
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	2.350	2.650	0.093	0.104
A1	0.100	0.300	0.004	0.012
A2	2.250	2.350	0.089	0.093
b	0.310	0.510	0.012	0.020
c	0.150	0.300	0.006	0.012
D	5.750	5.950	0.226	0.234
E	11.250	11.750	0.443	0.463
E1	7.400	7.600	0.291	0.299
e	1.270 BSC		0.050 BSC	
L	0.500	1.000	0.020	0.039
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SOBR (WSOP16)

Package Outline Dimensions SOB(WSOP-16-A)



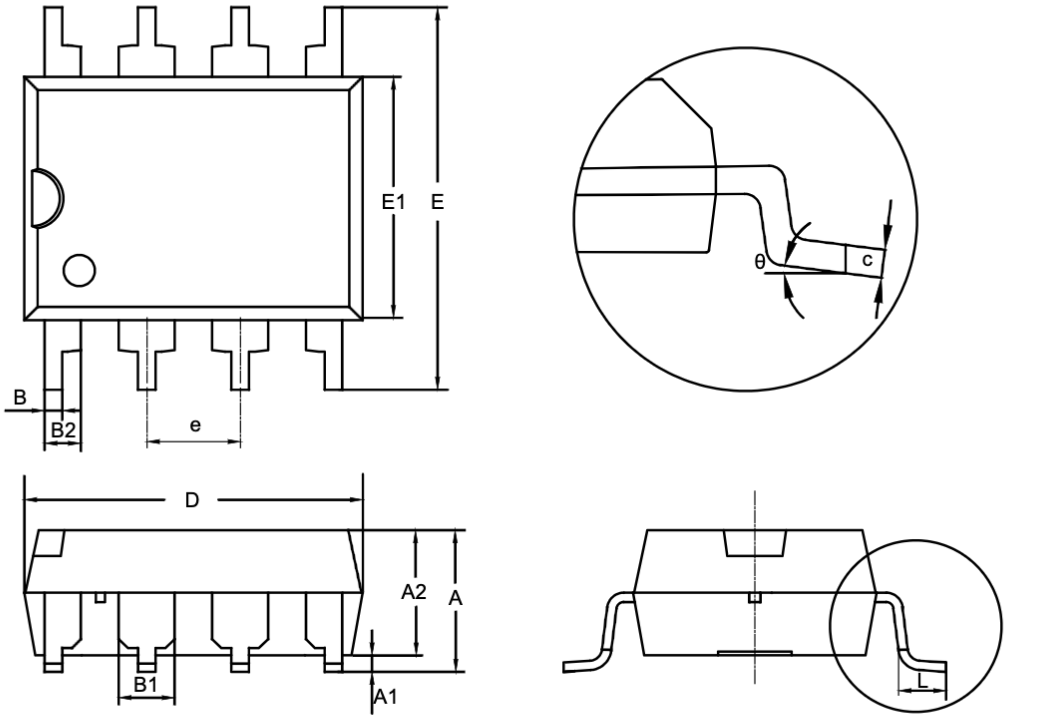
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	2.350	2.650	0.093	0.104
A1	0.100	0.300	0.004	0.012
A2	2.250	2.350	0.089	0.093
b	0.350	0.450	0.014	0.018
c	0.200	0.290	0.008	0.011
D	10.100	10.500	0.398	0.413
E	10.100	10.600	0.398	0.417
E1	7.300	7.700	0.287	0.303
e	1.270 BSC		0.050 BSC	
L	0.500	0.850	0.020	0.033
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

SM1R (SMP8)

Package Outline Dimensions SM1(SMP-8-A)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	3.674	4.026	0.145	0.159
A1	0.350	0.550	0.014	0.022
A2	3.324	3.476	0.131	0.137
B1	1.464	1.584	0.058	0.062
B2	0.930	1.050	0.037	0.041
B	0.420	0.540	0.017	0.021
c	0.204	0.304	0.008	0.012
D	9.100	9.300	0.358	0.366
E	10.100	10.700	0.398	0.421
E1	6.370	6.870	0.251	0.270
e	2.540 BSC		0.100 BSC	
L	1.150	1.450	0.045	0.057
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Order Information

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPT71050-SM1R	−40 to 125°C	8-Pin SMP	71050	MSL3	Tape and Reel, 1500	Green
TPT71050-SOBR	−40 to 125°C	16-Pin WSOP	71050	MSL3	Tape and Reel, 1500	Green
TPT71044-SOAR (1)	−40 to 125°C	8-Pin WSOP	71044	MSL3	Tape and Reel, 1000	Green
TPT71044-SOBR (1)	−40 to 125°C	16-Pin WSOP	71044	MSL3	Tape and Reel, 1500	Green
TPT71042-SOAR	−40 to 125°C	8-Pin WSOP	71042	MSL3	Tape and Reel, 1000	Green
TPT71042-SOBR	−40 to 125°C	16-Pin WSOP	71042	MSL3	Tape and Reel, 1500	Green

(1). Future product, contact 3PEAK factory for more information and sample

(2). Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

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