PIN Diode Driver (Positive Voltage)

MPD2T28125-700 Series Datasheet

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Features

- High Output Voltage and High Output Current PIN Diode Driver in Surface Mount Package
- Usable with MSW2000, 2010, 2030, 2040 and 2050 Series T-R and Symmetrical High Power SP2T Switches.
- Operates from Positive Voltage Only: +5 V and +28 V to +125 V
- High Output Currents (200 mA) for Low Switch Loss and High Isolation
- Single or Separate TTL Input Controls, 2 Outputs
- RoHS Complaint

Description

The MPD2T28125-700 Surface Mount PIN Diode Driver is designed to provide high voltage and high current bias signals to high power PIN diode single pole double throw (SPDT or SP2T) switches. This PIN diode driver is intended to operate with Aeroflex / Metelics MSW2000, MSW2010, MSW2030, MSW2040 and MSW2050 series of surface mount, high power SP2T transmit-receive and symmetrical switches, as well as with switch designs employing discrete PIN diodes. The driver operates with positive supply voltages only.

This driver can supply voltages from 10 V to 125 V for reverse biasing switching PIN diodes to enable PIN diode switches, such as those described above, to handle up to 100 W CW RF signals. The MPD2T28125-700 driver can source current up to 200 mA to enable PIN diode switches to produce low insertion loss and high isolation. The driver can be controlled via one or two TTL-compatible control ports. Two complementary outputs are available which can drive the four bias ports which are required for a typical SP2T PIN diode switch which employs the series-shunt topology, or for asymmetrical switch designs. Switching time is approximately 1 µs.

The PIN driver is available in a 1.3 (W) x 1.3 (L) x 0.33 (H) inches (33 x 33 x 8.4 mm) surface mount package. The device is available in tube and tape-reel packaging for high volume pick and place automated assembly. It is RoHS compliant.

Applications

The MPD2T28125-700 Switch Driver is designed to provide high voltage and high current bias to high power PIN diode SP2T switches. This driver is compatible with high volume, surface mount, solder reflow manufacturing. The product is durable, reliable, and capable of operating reliably in military, commercial and industrial environments.

Environmental Capabilities

The MPD2T28125-700 Switch Driver is capable of meeting the environmental requirements of MIL-STD-202 and MIL-STD-750.

ESD and Moisture Sensitivity Level Rating

All semiconductor devices are susceptible to damage from ESD events. Proper precautions must be taken to protect this product from such events. The ESD rating for this device is Class 1A, HBM. The moisture sensitivity level rating for this device is MSL 1.

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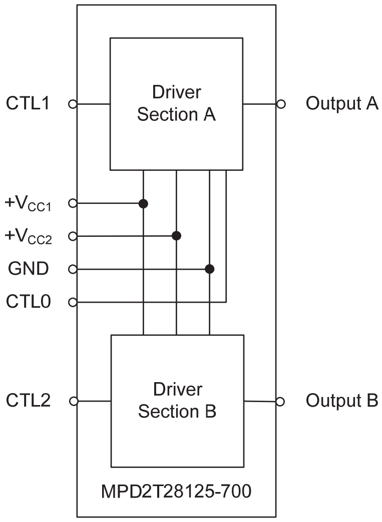
MPD2T28125-700
PIN Diode Driver

Block Diagram



MPD2T28125-700 Electrical Specifications

T_A = +25 °C (Unless Otherwise Defined)

Parameter	Symbol	Test Conditions	Minimum Value	Typical Value	Maximum Value	Unit
Operating Frequency	PRF	$+V_{CC1}$ = 5 V, $+V_{CC2}$ = 28 V to 125 V	0	100	500	kHz
Supply Voltage 1	$+V_{CC1}$		4.5	5	5.5	V
Supply Voltage 2	$+V_{CC2}$		10	28	125	V
Quiescent Current, $+V_{CC1}$	I_{Q1}	$+V_{CC1}$ = 5 V, $+V_{CC2}$ = 28 V to 125 V, no load connected to Output A and Output B	5	10	20	mA
Quiescent Current, $+V_{CC2}$	I_{Q2}	$+V_{CC1}$ = 5 V, $+V_{CC2}$ = 28 V to 125 V, no load connected to Output A and Output B	30	40	50	mA
TTL Input Voltage	V_{TTL}	Logic 0: sink current = 20 µA Logic 1: source current = 500 µA	0 2		0.8 5.0	V
Low Level Output Voltage, Output A or Output B	V_{OUTL}	$+V_{CC1}$ = 5 V, $+V_{CC2}$ = 28 V to 125 V, sink current = 200 mA	0.05	0.1	0.2	V
High Level Output Voltage, Output A or Output B	V_{OUTH}	$+V_{CC1}$ = 5 V, $+V_{CC2}$ = 28 V to 125 V, source current = 20 mA	$+V_{CC2}$ -1	$+V_{CC2}$ - 0.3	$+V_{CC2}$ - 0.1	V
Switching Time (Note 1)	T_{ON} T_{OFF}	V_{CC1} = 5 V, $+V_{CC2}$ = 28 V to 125 V, f = 10 kHz, 50% TTL to 10% or 90% RF output voltage		1.5	2	µs

Notes:

1. Switching time is measured using the Aeroflex / Metelics MSW2031-203 Symmetrical SP2T switch, f_{RF} = 500 MHz, $+V_{CC1}$ = 5 V and $+V_{CC2}$ = 50 V in the commutating switching mode.

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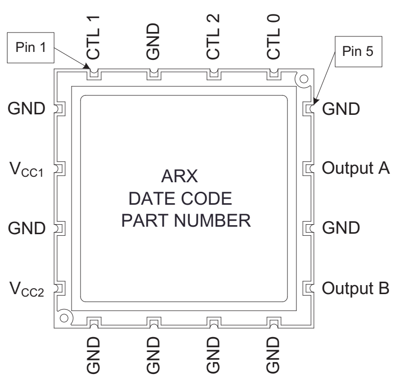
MPD2T28125-700
PIN Diode Driver

Absolute Maximum Ratings Specifications

T_A = 25 °C (unless otherwise noted)

Parameter	Conditions	Absolute Maximum Value
Input Voltage, +VCC 1		-0.5 V to 6.0 V
Input Voltage, +VCC 2		-0.5 V to 130 V
Control Port Input Voltage		-0.5 V to 5.5 V
Output Sink Current	$V_{OUT} = 0$ V	200 mA
Output Source Current	$V_{OUT} \approx +V_{CC2}$ V	25 mA
Operating Temperature		- 65 °C to 125 °C
Storage Temperature		- 65 °C to 150 °C
Junction Temperature		175 °C
Assembly Temperature	t ≈ 10 s	260 °C
Total Dissipated Power	T_{CASE} = 85 °C	2.0 W

Pinout & Pin Description



Top View

Pin	Pin Name	Input/Output (I/O)	Description
1	CTL1	I	TTL control input to driver section A
2	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
3	CTL2	I	TTL control input to driver section A
4	CTL0	O	Complement of control signal applied to CTL1. May be connected to CTL2 for single control port operation via CTL1.
5	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
6	Output A	O	Bias voltage/current output from driver section A
7	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
8	Output B	O	Bias voltage/current output from driver section B
9	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
10	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
11	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
12	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
13	$+V_{CC2}$	I	High voltage (28 V to 125 V) input
14	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return
15	$+V_{CC1}$	I	5 V supply voltage input
16	GND		$+V_{CC1}$ & $+V_{CC2}$ ground return

Truth Table

CTL1 (notes 1, 2)	CTL2 (notes 1, 2)	Output A	Output B
V_{HIGH}	V_{LOW}	$V_{OUT} = 0$ V, current sinking mode	$V_{OUT} \approx +V_{CC2}$, current sourcing mode
V_{LOW}	V_{HIGH}	$V_{OUT} \approx +V_{CC2}$, current sourcing mode	$V_{OUT} = 0$ V, current sinking mode
V_{HIGH}	V_{HIGH}	Not recommended (note 3)	
V_{LOW}	V_{LOW}	Not recommended (note 3)	

Notes:

1. $2\text{ V} \le V_{HIGH} \le 5\text{ V}$
2. $0\text{ V} \le V_{LOW} \le 0.8\text{ V}$
3. Operation in these modes may not be compatible with the design of the PIN switch being controlled.

Applications

The MPD2T28125-700 Surface Mount PIN Diode Driver is optimized for use with Aeroflex Metelics families of SP2T switches. It can also be used to control other PIN diode SPST or SP2T switches. The driver comprises two driver sections, each of which is capable of providing either a forward-bias current or a reverse-bias, high voltage to a PIN diode, depending upon the TTL-compatible control voltage applied to its control port. Each section of the driver has a dedicated control port, so these sections are controlled and may be operated independently. In typical applications the control inputs and consequently their driver section outputs are complements of each other. Provisions are also made to enable single control signal operation by externally connecting CTL0 to CTL2.

The driver evaluation board includes a parallel R-C network on the output of each driver section (R1-C3 on the Driver A output, R2–C4 on the Driver B output). Each network produces a current spike on the transitions of the driver state, which rapidly extracts stored charge from PIN diodes which are being forced from the conduction to the non-conduction state, as well as to rapidly inject charge into PIN diodes which are being forced from the non-conduction to the conduction state. These current spikes accelerate the transition of the switch from one state to the other.

Control of Symmetrical SP2T Switch

The MPD2T28125-700 is fully capable of controlling a SP2T switch comprising a series-shunt topology. Each driver section is connected to bias a series diode on one side of the switch and the shunt diode on the opposite side of the switch. For example, in the configuration described below for the control of a symmetrical SP2T switch, Driver Section A biases the series diode connected between switch ports J0 and J1, as well as the shunt diode connected between switch ports J2 and B2. Driver Section B is connected to control the remaining two diodes.

A typical symmetric switch/driver application circuit is shown below. In this circuit, the MPD2T28125-700 driver is used to control the Aeroflex / Metelics MSW2031-203 symmetrical SP2T switch. The switch may be controlled to one of two operational states, which are called State 1 and State 2. In the descriptions of States 1 and 2 (below), it is assumed that $+V_{CC1} = 5$ V and $+V_{CC2} = 28$ V.

State 1

In State 1, the series PIN diode between the J0 and J1 ports is forward biased by applying 0 V to the J1 bias input port (P1-J1). The magnitude of the resultant bias current through the diode is primarily determined by the voltage applied to the J0 bias port (P1-J0), the magnitude of the forward voltage across the PIN diode and the resistance of R1. This current is nominally 100 mA. At the same time, the PIN diode connected between J2 and B2 ports is also forward biased by applying a high bias voltage, nominally 28 V, to the J2 bias port (P1-J2) and 0 V to the B2 bias port (P1-B2). Under this condition, the PIN diode connected between the J0 and J2 ports is reverse biased and the PIN diode connected between the J2 and B2 ports is forward biased. The magnitude of the bias current through this diode is primarily determined by the voltage applied to the J2 bias port, the

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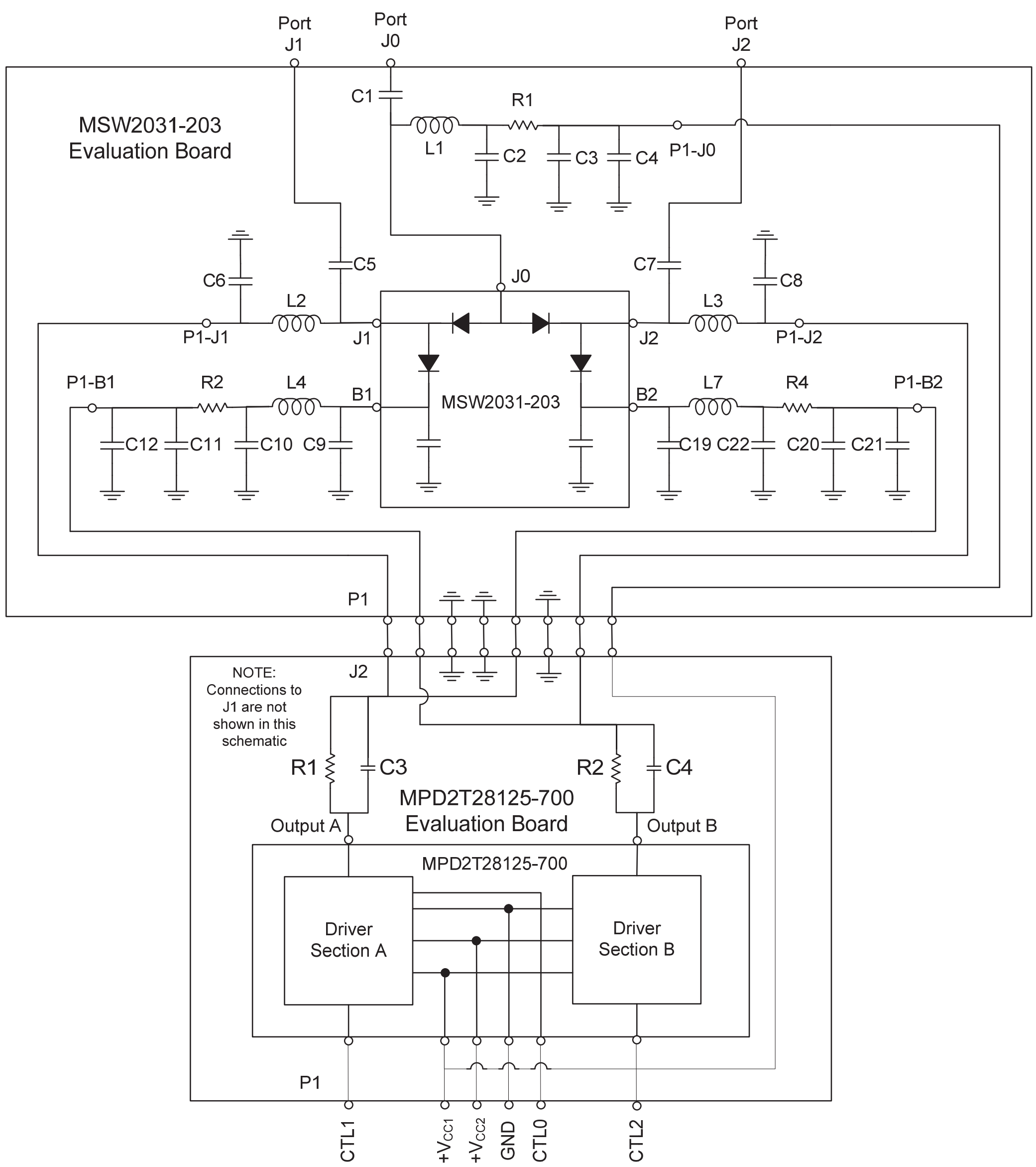
Truth Table for Control of Symmetrical SP2T Switch, MSW2030-203

$+V_{CC1} = 5$ V and $+V_{CC2} = 28$ V (Unless otherwise noted)

CTL1 (note 2)	CTL2 (notes 1, 2)	RF State	Path J0 to J1	Path J0 to J2	Output A		Output B	
					J1 Bias	B2 Bias	J2 Bias	B1 Bias
V_{HIGH}	V_{LOW}	1	Low Loss	High Isolation	0 V -100 mA	0 V -25 mA	27 V 25 mA	27 V 0 mA
V_{LOW}	V_{HIGH}	2	High Isolation	Low Loss	27 V 25 mA	27 V 0 mA	0 V -100 mA	0 V -25 mA

Notes:

1. All other combinations not recommended.
2. For single control, connect CTL0 to CTL2 and apply control signal to CTL1 only.



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magnitude of the forward voltage across the PIN diode and the resistance of R4. This current is nominally 25 mA.

The series PIN diode which is connected between the J0 and J2 ports must be reverse biased during State 1. The reverse bias voltage must be sufficiently large to maintain the diode in its non-conducting, high impedance state when a large RF signal voltage may be present in the J0-to-J1 path. The reverse voltage across this diode is the arithmetic difference of the bias voltage applied to the J2 bias port and the DC forward voltage of the forward-biased J0-to-J1 series PIN diode.

The minimum voltage required to maintain the series diode between J0 and J2 out of conduction is a function of the magnitude of the RF voltage present, the standing wave present at the series diode's anode, the frequency of the RF signal and the characteristics of the series diode, among other factors. Minimum control voltages for several signal frequencies are shown in the table "Minimum Reverse Bias Voltage", assuming the input power to the J0 or J1 port to be 100 W CW and the VSWR on the J0-J1 path to be 1.5:1. For other conditions, please contact the Aeroflex Metelics applications engineering team for assistance in determining the required bias voltage.

State 2

In State 2, the series PIN diode between the J0 and J2 ports is forward biased by applying 0 V to the J2 bias input port (P1-J2). The magnitude of the resultant bias current through the diode is primarily determined by the voltage applied to the J0 bias port (P1-J0), the magnitude of the forward voltage across the PIN diode and the resistance of R1. This current is nominally 100 mA. At the same time, the PIN diode connected between J2 and B2 ports is reverse biased by applying a high bias voltage, nominally 28 V, to the B2 bias port (P1-B2). A high voltage, nominally 28 V, is also applied to the J1 bias port (P1-J1). Under this condition, the PIN diode connected between the J0 and J1 ports is reverse biased thus isolating the J1 RF port from the RF signal path between J0 and J2. The reverse voltage across this diode is the arithmetic difference of the bias voltage applied to the J1 bias port and the DC forward voltage of the forward-biased J0-to-J2 series PIN diode. As described above, the minimum voltage required to maintain the series diode on the J0-to-J1 side of the switch out of conduction is a function of the magnitude of the RF voltage present, the standing wave present at the diode's anode, the frequency of the RF signal and the characteristics of the series diode, among other factors.

Calculation of Resistor Values

The magnitude of the forward bias current applied to the series diode is set by the magnitude of the supply voltage $+V_{CC1}$, which is nominally 5 V, the value of resistor R1 and the forward voltage of the series diode, V_{DIODE}, among other factors. Given the desired current value, the resistance is given by the formula:

$$R_1 = \frac{(+V_{CC1} - V_{DIODE})}{I_{BIAS}}$$

The magnitude of the current through the shunt diode is set by the magnitude of the supply voltage $+V_{CC2}$, the value of resistor in series with the shunt diode (R2 or R4) and the forward voltage of the shunt diode, V_{DIODE}, among other factors. Given the desired current value, this resistance is given by the formula:

$$R_{SHUNT} = \frac{(+V_{CC2} - 0.3 - V_{DIODE})}{I_{BIAS}}$$

Single Control Operation

The logic level available at output CTL0 is the complement of the control voltage applied to input CTL1. For single control operation via input CTL1, connect CTL0 directly to control input CTL2.

Control of Asymmetrical SP2T Switch

The MPD2T28125-700 can control an SP2T T/R switch comprising a series diode on the Transmit (Tx) side of the switch and a series shunt topology on the Receive (Rx) side of the switch. Each driver section is connected to bias a series diode on one side of the switch. The output of Driver Section A, which controls the series diode on the Tx side of the switch, also controls the shunt diode on the Rx side of the switch. Driver Section B controls the series diode on the Rx side of the switch only.

A typical asymmetric switch/driver application circuit is shown below. In this circuit, the MPD2T28125-700 driver is used to control the Aeroflex / Metelics MSW2000-200 asymmetrical SP2T switch. The switch may be controlled to one of two operational states, which are called Transmit State and Receive State. In the descriptions of these states, it is assumed that $+V_{CC1}$ = 5 V and $+V_{CC2}$ = 28 V.

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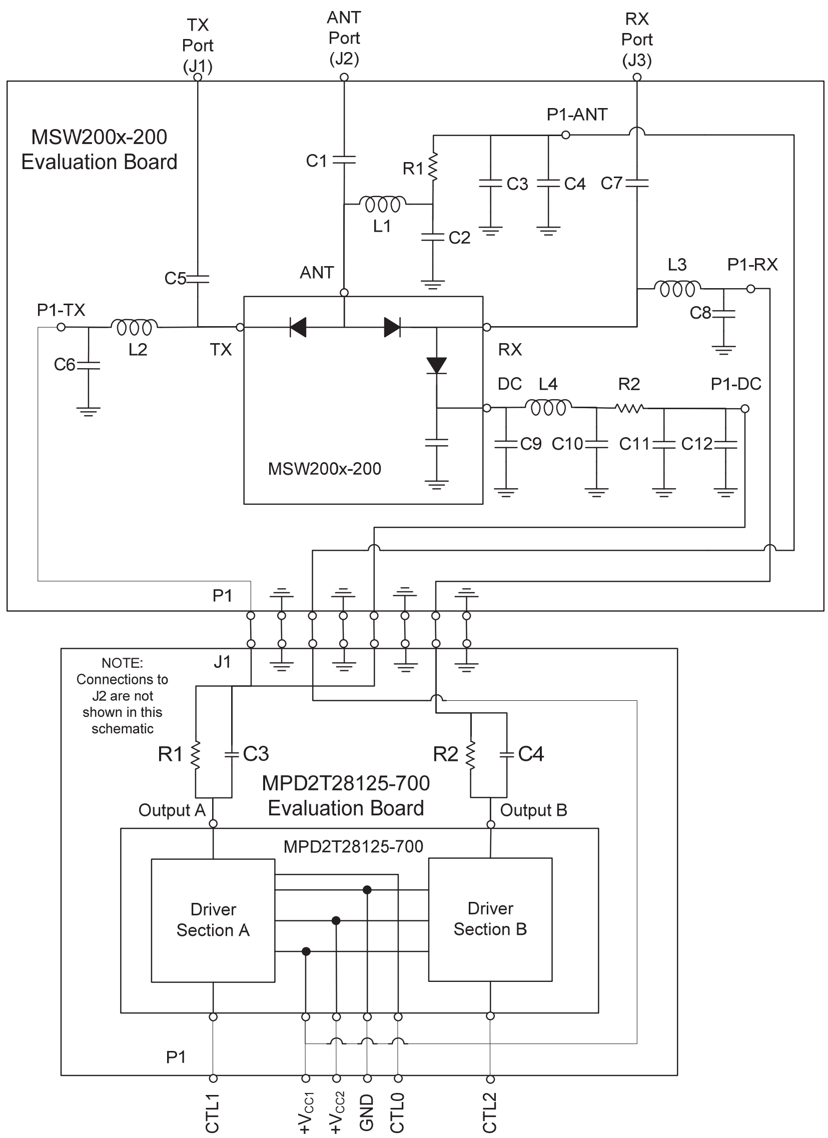
Truth Table for Control of Asymmetrical SP2T Switch, MSW200x-200

$+V_{CC1}$ = 5 V and $+V_{CC2}$ = 28 V (Unless otherwise noted)

CTL1 (note 2)	CTL2 (notes 1, 2)	RF State	Path TX (J1) to ANT (J2)	Path ANT (J2) to RX (J3)	Output A		Output B
					TX (J1) Bias	DC Bias	RX (J3) Bias
V_{HIGH}	V_{LOW}	RX	Low Loss	High Isolation	0 V -100 mA	0 V -25 mA	27 V 25 mA
V_{LOW}	V_{HIGH}	TX	High Isolation	Low Loss	27 V 25 mA	27 V 0 mA	0 V -100 mA

Notes:

1. All other combinations not recommended.
2. For single control, connect CTL0 to CTL2 and apply control signal to CTL1 only.



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Transmit State

In the TX state, the series PIN diode between the ANT and TX ports is forward biased by applying 0 V to the TX bias input port (pin 1 of multi-pin connector P1). The magnitude of the resultant bias current through the diode is primarily determined by the voltage applied to the ANT bias port (pin 3 of P1), the magnitude of the forward voltage across the PIN diode and the resistance of R1. This current is nominally 100 mA. At the same time, the PIN diode connected between RX and DC ports is also forward biased by applying a higher bias voltage, nominally 28 V, to the RX bias port (pin 7 of P1) and 0 V to the DC bias port (pin 5 of P1). Under this condition, the PIN diode connected between the ANT and RX port is reverse biased and the PIN diode connected between the RX and DC ports is forward biased. The magnitude of the bias current through this diode is primarily determined by the voltage applied to the RX bias port, the magnitude of the forward voltage across the PIN diode and the resistance of R2. This current is nominally 25 mA.

The RX series PIN diode, which is connected between the ANT and RX ports, must be reverse biased during the transmit state. The reverse bias voltage must be sufficiently large to maintain the diode in its non-conducting, high impedance state when large RF signal voltage may be present in the ANT-to-TX path. The reverse voltage across this diode is the arithmetic difference of the bias voltage applied to the RX bias port and the DC forward voltage of the forward-biased transmit series PIN diode.

The minimum voltage required to maintain the series diode on the RX side of the switch out of conduction is a function of the magnitude of the RF voltage present, the standing wave present at the RX series diode's anode, the frequency of the RF signal and the characteristics of the RX series diode, among other factors. Minimum control voltages for several signal frequencies are shown in the table "Minimum Reverse Bias Voltage", assuming the input power to the RX or ANT port to be 100 W CW and the VSWR on the ANT-TX path to be 1.5:1.

Caution: The evaluation board, as supplied from the factory, is not capable of handling RF input signals larger than 45 dBm.

If performance of the switch under larger input signals is to be evaluated, an adequate heat sink must be properly attached to the evaluation board, and several of the passive components on the board must be changed in order to safely handle the dissipated power as well as the high bias voltage necessary for proper performance. Contact the factory for recommended components and heat sink.

Receive State

In the RX state, the series PIN diode between the ANT and RX ports is forward biased by applying 0 V to the RX bias input port (pin 7 of multi-pin connector P1). The magnitude of the resultant bias current through the diode is primarily determined by the voltage applied to the ANT bias port (pin 3 of P1), the magnitude of the forward voltage across the PIN diode and the resistance of R1. This current is nominally 100 mA. At the same time, the PIN diode connected between RX and DC ports is reverse biased by applying a high bias voltage, nominally 28 V, to the DC bias port (pin 5 of P1). A high voltage, nominally 28 V, is also applied to the TX bias port (pin 1 of P1). Under this condition, the PIN diode connected between the ANT and TX port is reverse biased thus isolating the TX RF port from the RX signal path. The reverse voltage across this diode is the arithmetic difference of the bias voltage applied to the TX bias port and the DC forward voltage of the forward-biased receive series PIN diode. The minimum voltage required to maintain the series diode on the TX side of the switch out of conduction is a function of the magnitude of the RF voltage present, the standing wave present at the RX series diode's anode, the frequency of the RF signal and the characteristics of the TX series diode, among other factors. For typical receive-level signals, this diode is held out of conduction with a relatively small reverse bias voltage.

The values of the reactive components which comprise the bias decoupling networks as well as the signal path DC blocking are shown in the table RF Bias Network Component Values.

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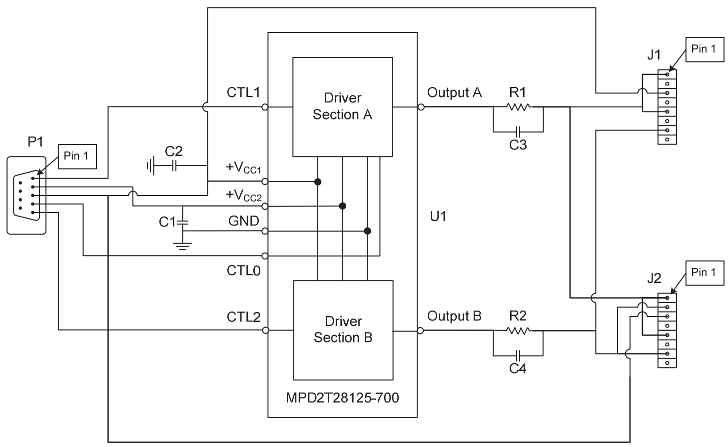
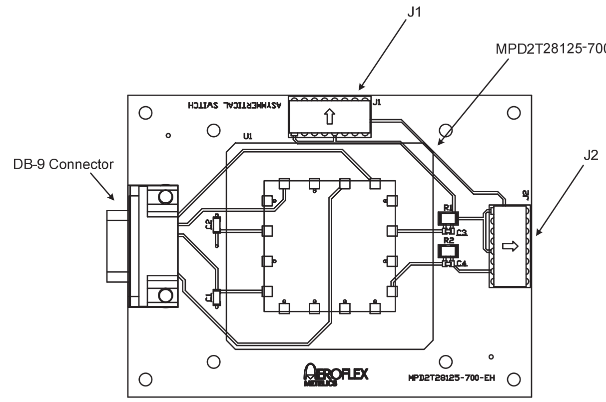
Evaluation Board





The evaluation board for the MPD2T28125-700 allows for full exercise of the driver, as well as to utilize the driver to control symmetrical or asymmetrical Aeroflex / Metelics SP2T switch evaluation circuits.

In addition to the MPD2T28125-700 driver, the evaluation board contains several passive components. C1 and C2 are bypass capacitors for the $+V_{CC2}$ and $+V_{CC1}$ supply voltages, respectively. R1 and C3 form a parallel RC network which can be used to decrease switching time for the diodes which are driven by the Output A output of the MPD2T28125-700 driver. R2 and C4 may be used to perform the same function for the Output B output.

There are three multi-pin connectors on the board. P1 is a DB-9 male connector which facilitates connection of the TTL control signal(s), supply voltages and ground to the evaluation board. J1 is a 16-pin female header which can be used to connect directly to the male header on Aeroflex Metelics asymmetrical switch evaluation boards. J2 is a 16-pin female header which can be used to connect directly to the male header on Aeroflex Metelics symmetrical switch evaluation boards. The pinouts for these connectors are shown in the tables below. Please note that the MPD2T28125-700 evaluation board is intended to operate only one high power PIN diode switch at a time. It is not recommended to simultaneously connect evaluation boards to J1 and J2.

Pinout – P1 Connector - MPD2T28125-700 Eval Board

DB-9 Connector Pin Number	Connects to MPD2T28125-700 Pin Number	MPD2T28125-700 Pin Name	Function
1	1	CTL1	TTL logic input for driver section A
2	13	$+V_{CC2}$	High voltage bias supply (28 V ≤ $+V_{CC2}$ ≤ 125 V)
3	15	$+V_{CC1}$	Logic supply voltage (5 V)
4	4	CTL0	Complement of logic level applied to CTL1 (may be connected to CTL2 for single control operation via CTL1)
5	3	CTL2	TTL logic input for driver section B
6, 7, 8	2, 5, 7, 9, 10, 11, 12, 14, 16	GND	Supply return for $+V_{CC1}$ and $+V_{CC2}$
9	no connection	n/a	n/a

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Pinout – J1 Connector - MPD2T28125-700 Eval Board (Asymmetric Switches)

J2 Connector Pin Number	Connects to Asymmetric Switch Pin Name	Function
1 (hardwired to pin 5 of J1)	P1-Tx	Bias signal to bias RF Tx port (J1)
2, 4, 6, 8 - 16	GND	Supply return for $+V_{CC1}$ and $+V_{CC2}$
3	ANT	$+V_{CC1}$ supply (% V typical) to ANT port
5 (hardwired to pin 1 of J1)	P1-DC	Bias signal to bias port DC
7	P1-Rx	Bias signal to bias RF Rx port (J2)

Pinout – J2 Connector - MPD2T28125-700 Eval Board (Symmetric Switches)

J2 Connector Pin Number	Connects to Symmetric Switch Pin Name	Function
1 (hardwired to pin 5 of J2)	P1-J1	Bias signal to bias RF port J1
2 (hardwired to pin 7 of J2)	P1-B1	Bias signal to bias port B1
3	P1-J0	$+V_{CC1}$ (5 V typical) supply voltage to bias RF port J0
4, 6, 8 - 16	GND	Supply return for $+V_{CC1}$ and $+V_{CC2}$
5 (hardwired to pin 1 of J2)	P1-B2	Bias signal to bias port B2
7 (hardwired to pin 1 of J2)	P1-J2	Bias signal to bias RF port J2

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Assembly Instructions

The MPD2T28125-700 PIN Diode Drivers are capable of being placed onto circuit boards with pick and place manufacturing equipment from tube or tape-reel dispensing. The devices are attached to the circuit board using conventional solder re-flow or wave soldering procedures with RoHS type or Sn 60 / Pb 40 type solders per Table I and Graph I Time-Temperature recommended profile.

Table 1: Time-Temperature Profile for Sn 60/Pb 40 or RoHS Type Solders

Profile Feature	Sn-Pb Solder Assembly	Pb-Free Solder Assembly
Average ramp-up rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Preheat - Temperature Minimum (T_{SMIN}) - Temperature Maximum (T_{SMAX}) - Time (Minimum to maximum) (t_S)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
T_{SMAX} to T_L - Ramp-up Rate		 3°C/second maximum
Time Maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature (T_P)	225 +0 / -5°C	245 +0/-5°C
Time within 5°C of actual Peak Temperature (T_P)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

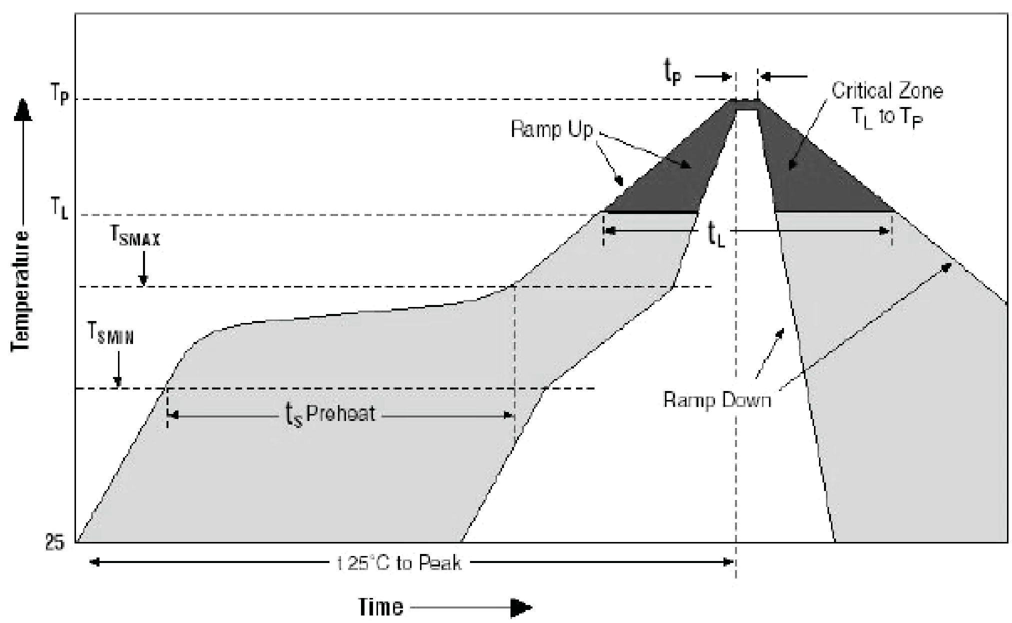

Figure 1: Solder Re-Flow Time-Temperature Function

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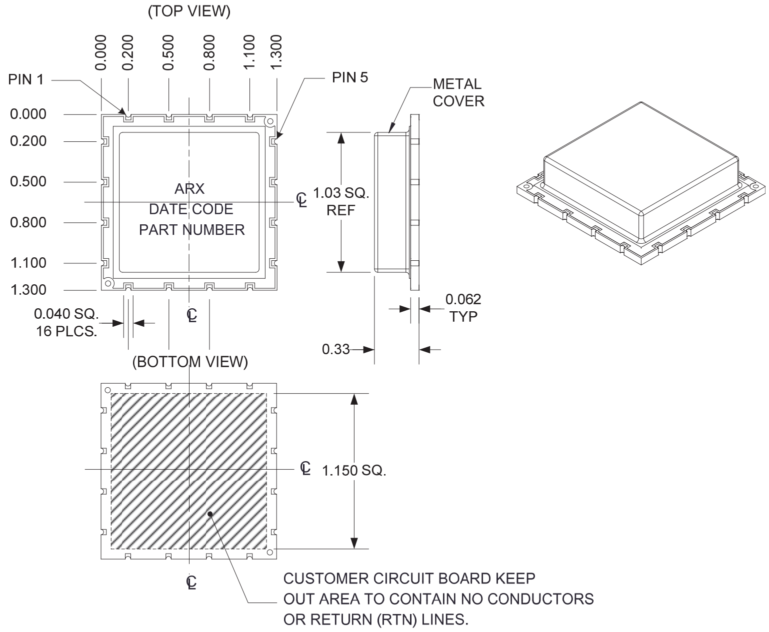
AEROFLEX METELICS

Outline Drawing Case Style 700 (CS700)



NOTES:
1. CIRCUIT BOARD MATERIAL IS FR-4 TYPE.
2. METALLIZATION: 2oz Cu FOLLOWED BY, 150µin TYP. Ni, FOLLOWED BY 4µin TYP. Au.

Part Number Ordering Information:

Part Number	Packaging
MPD2T28125-700-T	Tube Packaging
MPD2T28125-700-R	Tape-Reel Packaging (Quantities of 250 or 500)
MPD2T28125-700-W	Waffle Packaging
MPD2T28125-700-E	Evaluation Board

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