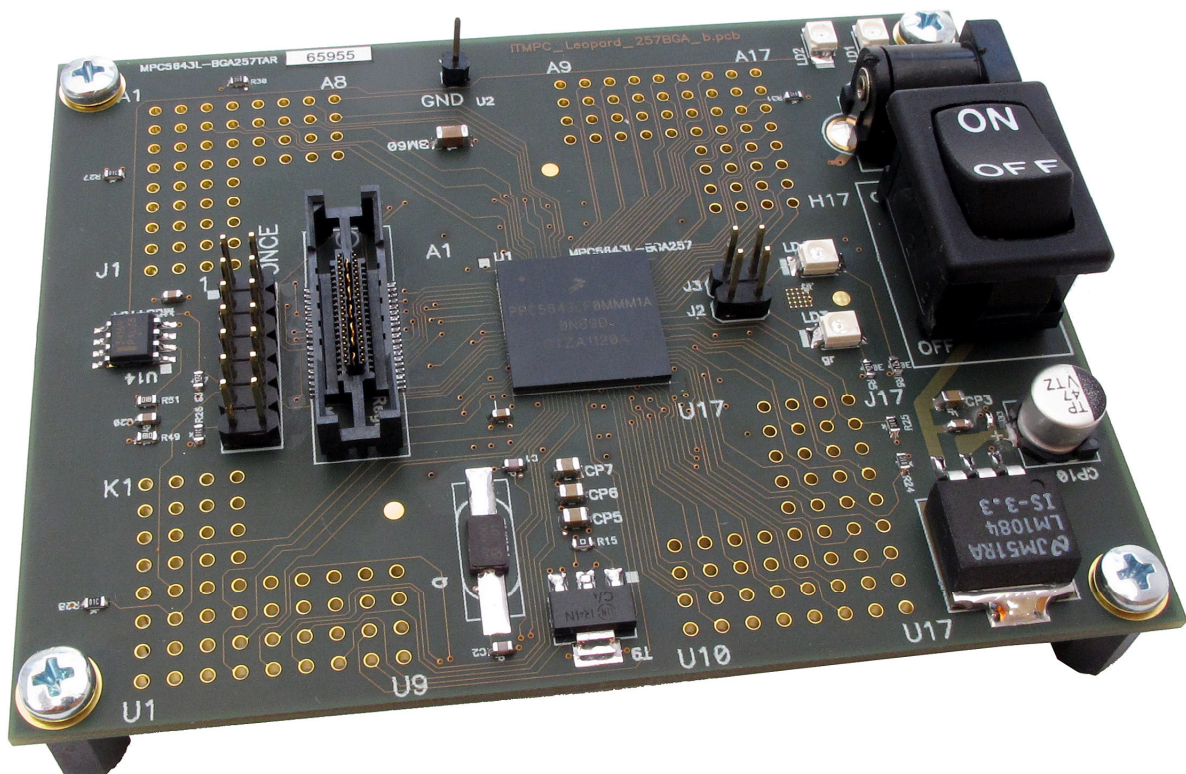


## Freescale MPC5643L Target Board

	Ordering code
MPC5643L Target Board	ITMPC5643L-257



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## Features

This target board is an evaluation and a development system for Freescale MPC5643L microcontroller. The ITMPC5643L package features a target board populated with Freescale MPC5643L CPU in the BGA257 package, ONCE debug and Nexus debug connector. A power supply also comes along with the board. The application under the development or test can run from the internal CPU flash or from the internal SRAM.

## Specifications

Clock Speed – up to 120 MHz

Power requirement: 6 - 12V DC, + in the center @ 500 mA

Board Size: 106 mm x 86 mm

## EVB-5643L Features

- MPC5643L, BGA257
- 40MHz clock (ext. crystal)
- Power Indicator – Supply voltage indication for 3.3V
- User Indicators – two LEDs connecting to the microcontroller
- Debug connections: ONCE (14-pin 2.54mm connector) and Nexus (Mictor 38-pin connector)

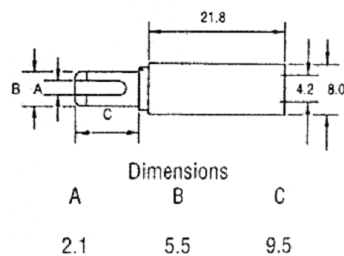
## Software Development

The board has been tested with the microcontroller running at maximum frequency (120MHz). Software development can be performed by connecting the development tool to the ONCE (JTAG) or P4 (Nexus) connector. iSYSTEM provides various tools based on the iC5000 or the iC3000 unit. Contact iSYSTEM sales representative for more details on available tool options.

## Power Supply

Permissible input voltage: 6-12 V DC, **+ in the center**. The required current load capacity of the power supply depends on the specific configuration of the target board. A power supply with a minimum of 500mA is recommended and delivered in the package. Low voltage DC plug must conform to the DIN 45323 standards:

- The hole diameter is 1.95 – 2.5 mm (standard: 2.1 mm)
- The external diameter is 6.2 - 5.5 mm (standard: 5.5 mm)



Switch-on the target board after the AC power supply is plugged into the wall and connected to the target board. Check that power indicator (LD1) lit, indicating that 3.3V voltage is present.

Note: When connecting an external debugger, make sure that the debugger is powered on first, then the target board and vice versa when switching off the system. First, switch off the target and then the emulator.

# Settings and Options

## Jumpers

Jumper J2 connects user LD4 LED to the MPC5643L pin T14 and jumper J3 connects user LD3 LED to the pin R14.

## Status Indicators

LD1 LED indicates a presence of the 3.3 supply voltage. It lits when the power is applied to the evaluation board and the power switch is switched on.

LD2 LED indicates reset line status.

LD3 and LD4 are available for the user.

## Component List

Name	Description
U1	Motorola MPC5643L CPU
P4	Nexus debug connector
P3	Power supply connector
ONCE	JTAG debug connector
J2	Connects LD4 to CPU T14
J3	Connects LD3 to CPU R14
J1	Connected to GND
LD1	Power LED 3,3V
LD2	Reset indication LED
LD3	User LED
LD4	User LED
SW1	Power switch

## Connectors

### 14-pin 2.54mm ONCE debug connector

CPU_TDI	<b>1</b>	<b>2</b>	GND
CPU_TDO	<b>3</b>	<b>4</b>	GND
CPU_TCK	<b>5</b>	<b>6</b>	GND
N.C.	<b>7</b>	<b>8</b>	N.C.
CPU_RESET	<b>9</b>	<b>10</b>	CPU_TMS
3V3	<b>11</b>	<b>12</b>	N.C.
N.C.	<b>13</b>	<b>14</b>	CPU_TRST

## Mictor 38-pin Nexus debug connector

Signal	Pin	Pin	Signal
NC	1	2	NC
NC	3	4	NC
MDO9	5	6	NC
NC	7	8	MDO8
RSTIN	9	10	EVTIN
TDO	11	12	VTREF
MDO10	13	14	RDY
TCK	15	16	MDO7
TMS	17	18	MDO6
TDI	19	20	MDO5
NTRST	21	22	MDO4
MDO11	23	24	MDO3
NC	25	26	MDO2
NC	27	28	MDO1
NC	29	30	MDO0
NC	31	32	EVTO
NC	33	34	MCKO
NC	35	36	MSEO1
NC	37	38	MSEO0

Note: External debug tool must connect to one debug connector only! Only Mictor 38-pin connector exposes Nexus debug interface.

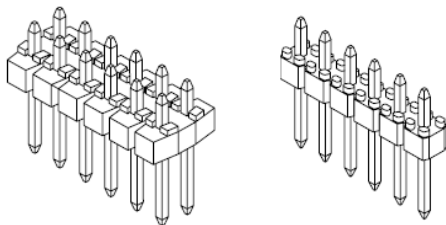
## CPU expansion connection

The target board exposes all MPC5643L pins/signals, which allow easy expansion of the development system.

The expansion array uses the same numbering scheme as the original microcontroller in the BGA257 package and also matches with the MPC5643L BGA257 pinout.

By populating the expansion array with 2.54mm pitch headers, the board can be easily connected to another custom tailored board.

An example of breakaway dual and single row 2.54mm pitch headers, which can be easily stacked side-to-side:

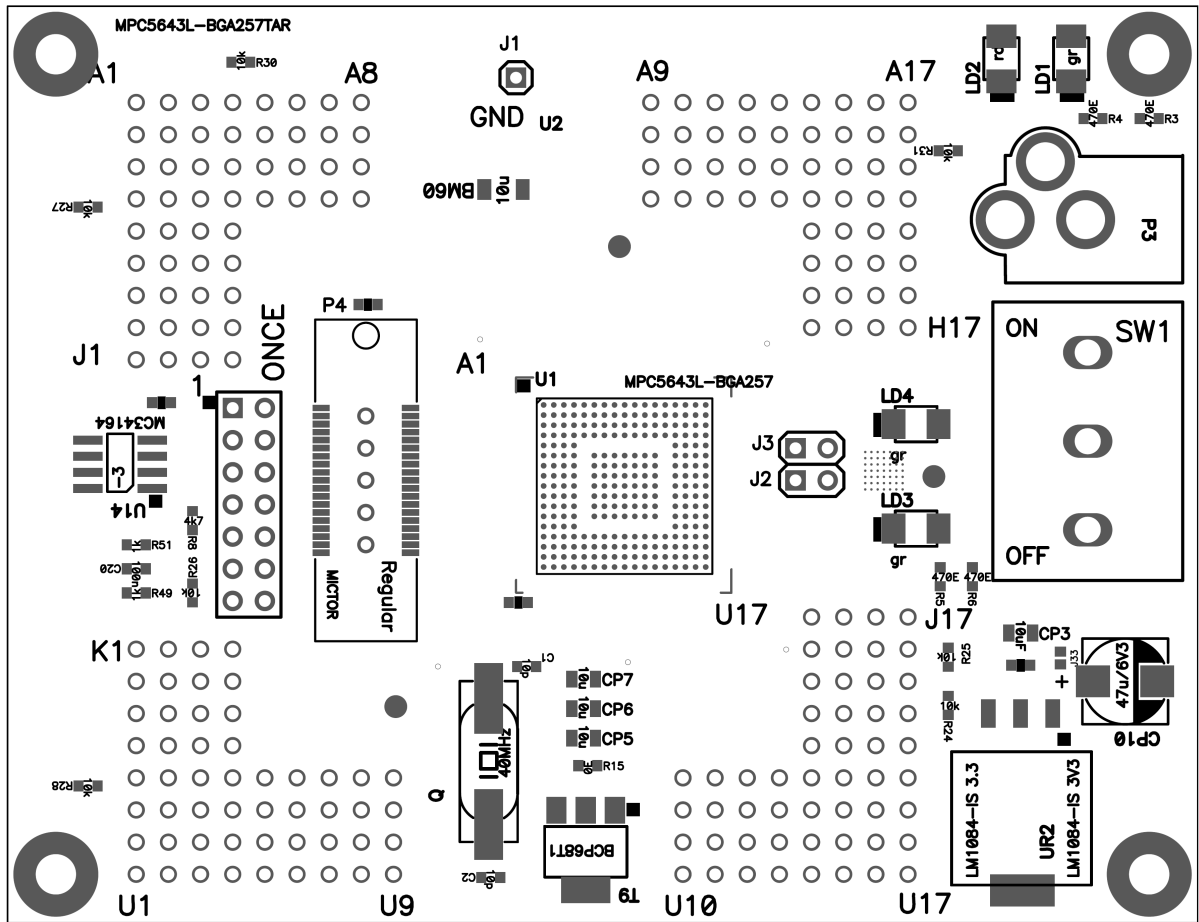


A small plastic bag with headers comes along the target board already.



# Appendix A

## View of the ITMPC5643L



Note: A designation on *Figure 4* stands for A1 designation on the above ITMPC5643L view, B stands for B1, etc.

## Expansion Connection as seen from the top.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
A	V <sub>SS</sub>	V <sub>SS</sub>	V <sub>DD_HV</sub>	H[2]	H[0]	G[14]	D[3]	C[15]	V <sub>DD_HV</sub>	A[12]	H[10]	H[14]	A[10]	B[2]	C[10]	V <sub>SS</sub>	V <sub>SS</sub>	
B	V <sub>SS</sub>	V <sub>SS</sub>	B[6]	A[14]	F[3]	A[9]	D[4]	D[0]	V <sub>SS</sub>	H[12]	E[15]	E[14]	B[3]	F[13]	B[0]	V <sub>DD_HV</sub>	V <sub>SS</sub>	
C	V <sub>DD_HV</sub>	NC <sup>1</sup>	V <sub>SS</sub>	FCCU_F[1]	D[2]	A[13]	V <sub>DD_HV</sub>	V <sub>DD_HV</sub>	I[0]	JCOMP	H[11]	I[1]	F[14]	B[1]	V <sub>SS</sub>	A[4]	F[12]	
D	F[5]	F[4]	A[15]	C[6]	V <sub>SS</sub>	V <sub>DD_LV</sub>	F[0]	V <sub>DD_HV</sub>	V <sub>SS</sub>	NC	A[11]	E[13]	F[15]	V <sub>DD_HV</sub>	V <sub>PP_TEST</sub>	D[14]	G[3]	
E	MDO0	F[6]	D[1]	NMI											NC	C[14]	G[2]	I[3]
F	H[1]	G[12]	A[7]	A[8]											NC	C[13]	I[2]	G[4]
G	H[3]	V <sub>DD_HV</sub>	C[5]	A[6]											D[12]	H[13]	H[9]	G[6]
H	G[13]	V <sub>SS</sub>	C[4]	A[5]											V <sub>SS</sub>	V <sub>DD_HV</sub>	V <sub>DD_HV</sub>	H[6]
J	F[7]	G[15]	V <sub>DD_HV</sub>	V <sub>DD_HV</sub>											V <sub>DD_LV</sub>	V <sub>DD_HV</sub>	V <sub>SS</sub>	H[15]
K	F[9]	F[8]	See note <sup>2</sup>	C[7]											NC	H[8]	H[7]	A[3]
L	F[10]	F[11]	D[9]	NC											NC	TCK	H[4]	B[4]
M	V <sub>DD_HV</sub>	V <sub>DD_HV</sub>	D[8]	NC											C[11]	B[5]	TMS	H[5]
N	XTAL	V <sub>SS</sub>	D[5]	V <sub>SS_LV_PLL</sub>											NC	C[12]	A[2]	G[5]
P	V <sub>SS</sub>	RESET	D[6]	V <sub>DD_LV_PLL</sub>	V <sub>DD_LV</sub>	V <sub>SS</sub>	B[8]	NC	V <sub>SS</sub>	V <sub>DD_HV</sub>	B[14]	V <sub>DD_LV</sub>	V <sub>SS</sub>	V <sub>DD_HV</sub>	G[10]	G[8]	G[7]	
R	EXTAL	FCCU_F[0]	V <sub>SS</sub>	D[7]	B[7]	E[6]	V <sub>REFP_HV_AD0</sub>	B[10]	V <sub>REFP_HV_AD1</sub>	B[13]	B[15]	C[0]	BCTRL	A[1]	V <sub>SS</sub>	D[11]	G[9]	
T	V <sub>SS</sub>	V <sub>DD_HV</sub>	NC	C[1]	E[5]	E[7]	V <sub>REFN_HV_AD0</sub>	B[11]	V <sub>REFN_HV_AD1</sub>	E[9]	E[10]	E[12]	E[0]	A[0]	D[10]	V <sub>DD_HV</sub>	V <sub>SS</sub>	
U	V <sub>SS</sub>	V <sub>SS</sub>	NC	E[4]	C[2]	E[2]	B[9]	B[12]	V <sub>DD_HV</sub>	V <sub>SS</sub>	E[11]	NC	NC	V <sub>DD_HV</sub>	G[11]	V <sub>SS</sub>	V <sub>SS</sub>	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	



CPU		connector	
TPA0-T14	XTALIN	D15	pin_test
TPA1-K13	XTALOUT	M0	VDD_LV
TPA2-K12	NMI	M1	VDD_LV
TPA3-K11	EA	M2	VDD_LV
TPA4-K10	P2_CPU_RESET	M3	VDD_LV
TPA5-K9	RESET	M4	VDD_LV
TPA6-K8	L15_CPU_TCK	M5	VDD_LV
TPA7-K7	TCK	M6	VDD_LV
TPA8-K6	TMS	M7	VDD_LV
TPA9-K5	JTAG_C18_C00	M8	VDD_LV
TPA10-K4	MODEM	M9	VDD_LV
TPA11-K3	MODEM	M10	VDD_LV
TPA12-K2	MODEM	M11	VDD_LV
TPA13-K1	MODEM	M12	VDD_LV
TPA14-K0	MODEM	M13	VDD_LV
TPB0-B13	BTCTRL	M14	VDD_LV
TPB1-B12	BTCTRL	M15	VDD_LV
TPB2-B11	BTCTRL	M16	VDD_LV
TPB3-B10	BTCTRL	M17	VDD_LV
TPB4-B9	BTCTRL	M18	VDD_LV
TPB5-B8	BTCTRL	M19	VDD_LV
TPB6-B7	BTCTRL	M20	VDD_LV
TPB7-B6	BTCTRL	M21	VDD_LV
TPB8-B5	BTCTRL	M22	VDD_LV
TPB9-B4	BTCTRL	M23	VDD_LV
TPB10-B3	BTCTRL	M24	VDD_LV
TPB11-B2	BTCTRL	M25	VDD_LV
TPB12-B1	BTCTRL	M26	VDD_LV
TPB13-B0	BTCTRL	M27	VDD_LV
TPC0-C15	F15	M28	VDD_LV
TPC1-C14	F14	M29	VDD_LV
TPC2-C13	F13	M30	VDD_LV
TPC3-C12	F12	M31	VDD_LV
TPC4-C11	F11	M32	VDD_LV
TPC5-C10	F10	M33	VDD_LV
TPC6-C9	F9	M34	VDD_LV
TPC7-C8	F8	M35	VDD_LV
TPC8-C7	F7	M36	VDD_LV
TPC9-C6	F6	M37	VDD_LV
TPC10-C5	F5	M38	VDD_LV
TPC11-C4	F4	M39	VDD_LV
TPC12-C3	F3	M40	VDD_LV
TPC13-C2	F2	M41	VDD_LV
TPC14-C1	F1	M42	VDD_LV
TPC15-C0	F0	M43	VDD_LV
TPD0-D15	D15	M44	VDD_LV
TPD1-D14	D14	M45	VDD_LV
TPD2-D13	D13	M46	VDD_LV
TPD3-D12	D12	M47	VDD_LV
TPD4-D11	D11	M48	VDD_LV
TPD5-D10	D10	M49	VDD_LV
TPD6-D9	D9	M50	VDD_LV
TPD7-D8	D8	M51	VDD_LV
TPD8-D7	D7	M52	VDD_LV
TPD9-D6	D6	M53	VDD_LV
TPD10-D5	D5	M54	VDD_LV
TPD11-D4	D4	M55	VDD_LV
TPD12-D3	D3	M56	VDD_LV
TPD13-D2	D2	M57	VDD_LV
TPD14-D1	D1	M58	VDD_LV
TPD15-D0	D0	M59	VDD_LV
TPE0-E15	E15	M60	VDD_LV
TPE1-E14	E14	M61	VDD_LV
TPE2-E13	E13	M62	VDD_LV
TPE3-E12	E12	M63	VDD_LV
TPE4-E11	E11	M64	VDD_LV
TPE5-E10	E10	M65	VDD_LV
TPE6-E9	E9	M66	VDD_LV
TPE7-E8	E8	M67	VDD_LV
TPE8-E7	E7	M68	VDD_LV
TPE9-E6	E6	M69	VDD_LV
TPE10-E5	E5	M70	VDD_LV
TPE11-E4	E4	M71	VDD_LV
TPE12-E3	E3	M72	VDD_LV
TPE13-E2	E2	M73	VDD_LV
TPE14-E1	E1	M74	VDD_LV
TPE15-E0	E0	M75	VDD_LV
TPF0-F15	F15	M76	VDD_LV
TPF1-F14	F14	M77	VDD_LV
TPF2-F13	F13	M78	VDD_LV
TPF3-F12	F12	M79	VDD_LV
TPF4-F11	F11	M80	VDD_LV
TPF5-F10	F10	M81	VDD_LV
TPF6-F9	F9	M82	VDD_LV
TPF7-F8	F8	M83	VDD_LV
TPF8-F7	F7	M84	VDD_LV
TPF9-F6	F6	M85	VDD_LV
TPF10-F5	F5	M86	VDD_LV
TPF11-F4	F4	M87	VDD_LV
TPF12-F3	F3	M88	VDD_LV
TPF13-F2	F2	M89	VDD_LV
TPF14-F1	F1	M90	VDD_LV
TPF15-F0	F0	M91	VDD_LV
TPG0-G15	G15	M92	VDD_LV
TPG1-G14	G14	M93	VDD_LV
TPG2-G13	G13	M94	VDD_LV
TPG3-G12	G12	M95	VDD_LV
TPG4-G11	G11	M96	VDD_LV
TPG5-G10	G10	M97	VDD_LV
TPG6-G9	G9	M98	VDD_LV
TPG7-G8	G8	M99	VDD_LV
TPG8-G7	G7	M100	VDD_LV
TPG9-G6	G6	M101	VDD_LV
TPG10-G5	G5	M102	VDD_LV
TPG11-G4	G4	M103	VDD_LV
TPG12-G3	G3	M104	VDD_LV
TPG13-G2	G2	M105	VDD_LV
TPG14-G1	G1	M106	VDD_LV
TPG15-G0	G0	M107	VDD_LV
TPH0-H15	H15	M108	VDD_LV
TPH1-H14	H14	M109	VDD_LV
TPH2-H13	H13	M110	VDD_LV
TPH3-H12	H12	M111	VDD_LV
TPH4-H11	H11	M112	VDD_LV
TPH5-H10	H10	M113	VDD_LV
TPH6-H9	H9	M114	VDD_LV
TPH7-H8	H8	M115	VDD_LV
TPH8-H7	H7	M116	VDD_LV
TPH9-H6	H6	M117	VDD_LV
TPH10-H5	H5	M118	VDD_LV
TPH11-H4	H4	M119	VDD_LV
TPH12-H3	H3	M120	VDD_LV
TPH13-H2	H2	M121	VDD_LV
TPH14-H1	H1	M122	VDD_LV
TPH15-H0	H0	M123	VDD_LV
TPJ0-J15	J15	M124	VDD_LV
TPJ1-J14	J14	M125	VDD_LV
TPJ2-J13	J13	M126	VDD_LV
TPJ3-J12	J12	M127	VDD_LV
TPJ4-J11	J11	M128	VDD_LV
TPJ5-J10	J10	M129	VDD_LV
TPJ6-J9	J9	M130	VDD_LV
TPJ7-J8	J8	M131	VDD_LV
TPJ8-J7	J7	M132	VDD_LV
TPJ9-J6	J6	M133	VDD_LV
TPJ10-J5	J5	M134	VDD_LV
TPJ11-J4	J4	M135	VDD_LV
TPJ12-J3	J3	M136	VDD_LV
TPJ13-J2	J2	M137	VDD_LV
TPJ14-J1	J1	M138	VDD_LV
TPJ15-J0	J0	M139	VDD_LV
TPK0-K15	K15	M140	VDD_LV
TPK1-K14	K14	M141	VDD_LV
TPK2-K13	K13	M142	VDD_LV
TPK3-K12	K12	M143	VDD_LV
TPK4-K11	K11	M144	VDD_LV
TPK5-K10	K10	M145	VDD_LV
TPK6-K9	K9	M146	VDD_LV
TPK7-K8	K8	M147	VDD_LV
TPK8-K7	K7	M148	VDD_LV
TPK9-K6	K6	M149	VDD_LV
TPK10-K5	K5	M150	VDD_LV
TPK11-K4	K4	M151	VDD_LV
TPK12-K3	K3	M152	VDD_LV
TPK13-K2	K2	M153	VDD_LV
TPK14-K1	K1	M154	VDD_LV
TPK15-K0	K0	M155	VDD_LV
TPM0-M15	M15	M156	VDD_LV
TPM1-M14	M14	M157	VDD_LV
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TPM3-M12	M12	M159	VDD_LV
TPM4-M11	M11	M160	VDD_LV
TPM5-M10	M10	M161	VDD_LV
TPM6-M9	M9	M162	VDD_LV
TPM7-M8	M8	M163	VDD_LV
TPM8-M7	M7	M164	VDD_LV
TPM9-M6	M6	M165	VDD_LV
TPM10-M5	M5	M166	VDD_LV
TPM11-M4	M4	M167	VDD_LV
TPM12-M3	M3	M168	VDD_LV
TPM13-M2	M2	M169	VDD_LV
TPM14-M1	M1	M170	VDD_LV
TPM15-M0	M0	M171	VDD_LV
TPN0-N15	N15	M172	VDD_LV
TPN1-N14	N14	M173	VDD_LV
TPN2-N13	N13	M174	VDD_LV
TPN3-N12	N12	M175	VDD_LV
TPN4-N11	N11	M176	VDD_LV
TPN5-N10	N10	M177	VDD_LV
TPN6-N9	N9	M178	VDD_LV
TPN7-N8	N8	M179	VDD_LV
TPN8-N7	N7	M180	VDD_LV
TPN9-N6	N6	M181	VDD_LV
TPN10-N5	N5	M182	VDD_LV
TPN11-N4	N4	M183	VDD_LV
TPN12-N3	N3	M184	VDD_LV
TPN13-N2	N2	M185	VDD_LV
TPN14-N1	N1	M186	VDD_LV
TPN15-N0	N0	M187	VDD_LV
TPQ0-Q15	Q15	M188	VDD_LV
TPQ1-Q14	Q14	M189	VDD_LV
TPQ2-Q13	Q13	M190	VDD_LV
TPQ3-Q12	Q12	M191	VDD_LV
TPQ4-Q11	Q11	M192	VDD_LV
TPQ5-Q10	Q10	M193	VDD_LV
TPQ6-Q9	Q9	M194	VDD_LV
TPQ7-Q8	Q8	M195	VDD_LV
TPQ8-Q7	Q7	M196	VDD_LV
TPQ9-Q6	Q6	M197	VDD_LV
TPQ10-Q5	Q5	M198	VDD_LV
TPQ11-Q4	Q4	M199	VDD_LV
TPQ12-Q3	Q3	M200	VDD_LV
TPQ13-Q2	Q2	M201	VDD_LV
TPQ14-Q1	Q1	M202	VDD_LV
TPQ15-Q0	Q0	M203	VDD_LV
TPR0-R15	R15	M204	VDD_LV
TPR1-R14	R14	M205	VDD_LV
TPR2-R13	R13	M206	VDD_LV
TPR3-R12	R12	M207	VDD_LV
TPR4-R11	R11	M208	VDD_LV
TPR5-R10	R10	M209	VDD_LV
TPR6-R9	R9	M210	VDD_LV
TPR7-R8	R8	M211	VDD_LV
TPR8-R7	R7	M212	VDD_LV
TPR9-R6	R6	M213	VDD_LV
TPR10-R5	R5	M214	VDD_LV
TPR11-R4	R4	M215	VDD_LV
TPR12-R3	R3	M216	VDD_LV
TPR13-R2	R2	M217	VDD_LV
TPR14-R1	R1	M218	VDD_LV
TPR15-R0	R0	M219	VDD_LV
TPS0-S15	S15	M220	VDD_LV
TPS1-S14	S14	M221	VDD_LV
TPS2-S13	S13	M222	VDD_LV
TPS3-S12	S12	M223	VDD_LV
TPS4-S11	S11	M224	VDD_LV
TPS5-S10	S10	M225	VDD_LV
TPS6-S9	S9	M226	VDD_LV
TPS7-S8	S8	M227	VDD_LV
TPS8-S7	S7	M228	VDD_LV
TPS9-S6	S6	M229	VDD_LV
TPS10-S5	S5	M230	VDD_LV
TPS11-S4	S4	M231	VDD_LV
TPS12-S3	S3	M232	VDD_LV
TPS13-S2	S2	M233	VDD_LV
TPS14-S1	S1	M234	VDD_LV
TPS15-S0	S0	M235	VDD_LV
TPU0-U15	U15	M236	VDD_LV
TPU1-U14	U14	M237	VDD_LV
TPU2-U13	U13	M238	VDD_LV
TPU3-U12	U12	M239	VDD_LV
TPU4-U11	U11	M240	VDD_LV
TPU5-U10	U10	M241	VDD_LV
TPU6-U9	U9	M242	VDD_LV
TPU7-U8	U8	M243	VDD_LV
TPU8-U7	U7	M244	VDD_LV
TPU9-U6	U6	M245	VDD_LV
TPU10-U5	U5	M246	VDD_LV
TPU11-U4	U4	M247	VDD_LV
TPU12-U3	U3	M248	VDD_LV
TPU13-U2	U2	M249	VDD_LV
TPU14-U1	U1	M250	VDD_LV
TPU15-U0	U0	M251	VDD_LV
TPV0-V15	V15	M252	VDD_LV
TPV1-V14	V14	M253	VDD_LV
TPV2-V13	V13	M254	VDD_LV
TPV3-V12	V12	M255	VDD_LV
TPV4-V11	V11	M256	VDD_LV
TPV5-V10	V10	M257	VDD_LV
TPV6-V9	V9	M258	VDD_LV
TPV7-V8	V8	M259	VDD_LV
TPV8-V7	V7	M260	VDD_LV
TPV9-V6	V6	M261	VDD_LV
TPV10-V5	V5	M262	VDD_LV
TPV11-V4	V4	M263	VDD_LV
TPV12-V3	V3	M264	VDD_LV
TPV13-V2	V2	M265	VDD_LV
TPV14-V1	V1	M266	VDD_LV
TPV15-V0	V0	M267	VDD_LV
TPW0-W15	W15	M268	VDD_LV
TPW1-W14	W14	M269	VDD_LV
TPW2-W13	W13	M270	VDD_LV
TPW3-W12	W12	M271	VDD_LV
TPW4-W11	W11	M272	VDD_LV
TPW5-W10	W10	M273	VDD_LV
TPW6-W9	W9	M274	VDD_LV
TPW7-W8	W8	M275	VDD_LV
TPW8-W7	W7	M276	VDD_LV
TPW9-W6	W6	M277	VDD_LV
TPW10-W5	W5	M278	VDD_LV

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