

#### **General Description**

The MAX4890E/MAX4892E meet the needs of high-speed differential switching. The devices handle the needs of Gigabit Ethernet (10/100/1000) Base-T switching as well as LVDS and LVPECL switching. The MAX4890E/ MAX4892E provide enhanced ESD protection up to ±15kV, and excellent high-frequency response, making the devices especially useful for interfaces that must go to an outside connection.

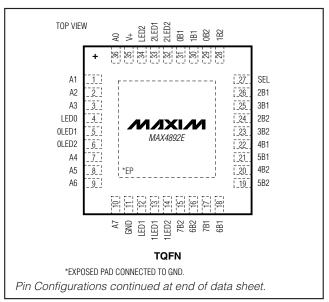
Both devices provide extremely low capacitance (CON), as well as low resistance (RON), for low-insertion loss and very wide bandwidth. In addition to the four pairs of DPDT switches, the MAX4892E provides LED switching for laptop computer/docking station use.

The MAX4890E/MAX4892E are pin-for-pin equivalents to the MAX4890/MAX4892 and can replace these devices for those applications requiring the enhanced ESD protection. Both devices are available in spacesaving TQFN packages and operate over the standard -40°C to +85°C temperature range.

#### **Applications**

Notebooks and Docking Stations Servers and Routers with Ethernet Interfaces Board-Level Redundancy Protection SONET/SDH Signal Routing T3/E3 Redundancy Protection LVDS and LVPECL Switching

### Pin Configurations



#### **Features**

- ♦ ±15kV ESD Protected Per MIL-STD-883, Method
- ♦ Single +3.0V to +3.6V Power-Supply Voltage
- ♦ Low On-Resistance (RoN):  $4\Omega$  (typ),  $6.5\Omega$  (max)
- ♦ Ultra-Low On-Capacitance (CoN): 8pF (typ)
- ♦ -23dB Return Loss (100MHz)
- ♦ -3dB Bandwidth: 650MHz
- ♦ Optimized Pin Out for Easy Transformer and PHY Interface
- ♦ Built-In LED Switches for Switching Indicators to **Docking Station (MAX4892E)**
- ♦ Low 450µA (max) Quiescent Current
- ♦ Bidirectional 8 to 16 Multiplexer/Demultiplexer
- ♦ Standard Pin Out, Matching the MAX4890 and **MAX4892**
- ♦ Space-Saving Lead-Free Packages 32-Pin, 5mm x 5mm, TQFN Package 36-Pin, 6mm x 6mm, TQFN Package

#### **Ordering Information**

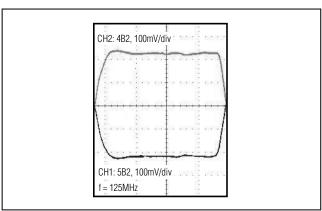
PART	PIN- PACKAGE	LED SWITCHES	PKG CODE		
MAX4890EETJ+	32 TQFN-EP*	_	T-3255-4		
MAX4892EETX+	36 TQFN-EP*	3	T-3666-3		

+Denotes lead-free package.

Note: All devices are specified over the -40°C to +85°C operating temperature range.

\*EP = Exposed pad.

### Eye Diagram



Typical Operating Circuit and Functional Diagrams appear at end of data sheet.

Maxim Integrated Products 1

#### **ABSOLUTE MAXIMUM RATINGS**

V+0.3V to +4V All Other Pins0.3V to (V+ + 0.3V
Continuous Current (A_ to _B_)±120mA
Continuous Current (LED_ to _LED_) ±40mA
Peak Current (A_ to _B_)
(pulsed at 1ms, 10% duty cycle) ±240m/
Current into Any Other Pin±20m/
Continuous Power Dissipation ( $T_A = +70^{\circ}C$ )
32-Pin TQFN (derate 34.5mW/°C above +70°C) 2.76W
36-Pin TQFN (derate 35.7mW/°C above +70°C) 2.85W
ESD Protection, Human Body Model±15k\

Operating Temperature Range	40°C to +85°C
Junction Temperature	+150°C
Storage Temperature Range	65°C to +150°C
Lead Temperature (soldering, 10s)	+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

#### **ELECTRICAL CHARACTERISTICS**

 $(V+ = +3V \text{ to } +3.6V, T_A = T_J = T_{MIN} \text{ to } T_{MAX}, \text{ unless otherwise noted. Typical values are at } V+ = 3.3V, T_A = +25^{\circ}C.)$  (Note 1)

PARAMETER	SYMBOL	CON	DITIONS	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
On-Resistance	Ron	$V+ = 3V,$ $I_{A_{-}} = -40mA,$	T <sub>A</sub> = +25°C		4	5.5	Ω
Oli-nesistance	HON		T <sub>MIN</sub> to T <sub>MAX</sub>			6.5	52
On-Resistance LED Switches	Ronled	V+ = 3V, I_LED_ = -40 (MAX4892E)	mA, V <sub>LED</sub> = 0, 1.5V, 3V			40	Ω
On-Resistance Match	ΔRon	$V+ = 3V,$ $I_{A}= -40mA,$	T <sub>A</sub> = +25°C		0.5	1.5	Ω
Between Channels	ΔΠΟΝ	V <sub>A</sub> _ = 0, 1.5V, 3V (Note 2)	T <sub>MIN</sub> to T <sub>MAX</sub>			2	22
On-Resistance Flatness	RFLAT(ON)	V+ = 3V, I <sub>A</sub> _ = -40m	A, V <sub>A</sub> _ = 1.5V, 3V		0.01		Ω
Off-Leakage Current	I <sub>LA_(OFF)</sub>	V+ = 3.6V, V <sub>A</sub> _ = 0.3 V <sub>B1</sub> or V <sub>B2</sub> = 3.3V,		-1		+1	
On-Leakage Current	I <sub>LA_(ON)</sub>	V+ = 3.6V, V <sub>A</sub> _= 0.3V, 3.3V; V <sub>B1</sub> or V <sub>B2</sub> = 0.3V, 3.3V or floating		-1		+1	μΑ
ESD PROTECTION							
ESD Protection		Human Body Model Method 3015)	(spec MIL-STD-883,		±15		kV
SWITCH AC PERFORMANCE							
Insertion Loss	I <sub>LOS</sub>	$R_S = R_L = 50\Omega$ , unbath (Note 2)	alanced, f = 1MHz,		0.6		dB
Return Loss	R <sub>LOS</sub>	f = 100MHz			-23		dB

### **ELECTRICAL CHARACTERISTICS (continued)**

 $(V+=+3V \text{ to } +3.6V, T_A=T_J=T_{MIN} \text{ to } T_{MAX}, \text{ unless otherwise noted.}$  Typical values are at  $V+=3.3V, T_A=+25^{\circ}C.)$  (Note 1)

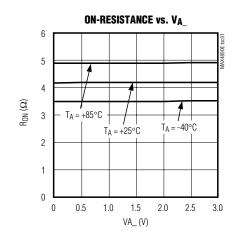
PARAMETER	SYMBOL	CON	DITIONS	MIN	TYP	MAX	UNITS
Crosstalk	V <sub>CT1</sub>	Any switch to any switch; R <sub>S</sub> = R <sub>L</sub> =	f = 25MHz		-50		dB
Clossian	V <sub>CT2</sub>	$50\Omega$ , unbalanced, Figure 1	f = 125MHz		-26		dБ
SWITCH AC CHARACTERISTIC							
-3dB Bandwidth	BW	$R_S = R_L = 50\Omega$ , unb	alanced		650		MHz
Off-Capacitance	Coff	f = 1MHz, _B_, A_			3.5		рF
On-Capacitance	Con	f = 1MHz, _B_, A_			6.5		рF
Turn-On Time	ton	$V_{A_{-}} = 1V, R_{L}, 100\Omega,$	Figure 2			50	ns
Turn-Off Time	toff	$V_{A_{-}} = 1V, R_{L}, 100\Omega,$	Figure 2			50	ns
Propagation Delay	t <sub>PLH</sub> , t <sub>PHL</sub>	$R_S = R_L = 50\Omega$ , unb	alanced, Figure 3		0.1		ns
Output Skew Between Ports	tsk(o)	Skew between any t	wo ports, Figure 4		0.01		ns
SWITCH LOGIC							
Input-Voltage Low	VIL	V+ = 3.0V				0.8	V
Input-Voltage High	VIH	V+ = 3.6V		2.0			V
Input-Logic Hysteresis	V <sub>HYST</sub>	V+ = 3.3V			100		mV
Input Leakage Current	I <sub>SEL</sub>	$V+ = 3.6V, V_{SEL} = 0$	or V+	-5		+5	μΑ
Operating Supply-Voltage Range	V+			3.0		3.6	V
Quiescent Supply Current	l+	V+ = 3.6V, V <sub>SEL</sub> = 0	or V+		280	450	μΑ

**Note 1:** Specifications at -40°C are guaranteed by design.

Note 2: Guaranteed by design.

### **Typical Operating Characteristics**

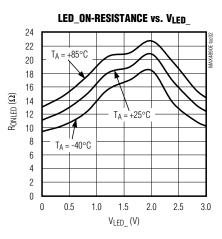
 $(V+ = 3.3V, T_A = +25^{\circ}C, unless otherwise noted.)$ 

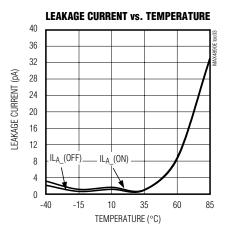


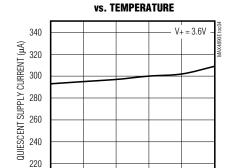
200

-40

-15







10

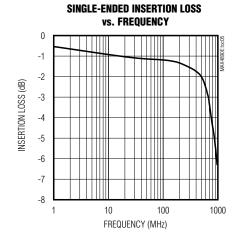
TEMPERATURE (°C)

35

60

85

QUIESCENT SUPPLY CURRENT



### Pin Description

PIN			
MAX4892E	MAX4890E	NAME	FUNCTION
1	32	A1	Differential PHY Interface Pair. Connect to the Ethernet PHY.
2	1	A2	Differential PHY Interface Pair. Connect to the Ethernet PHY.
3	2	А3	Differential PHY Interface Pair. Connect to the Ethernet PHY.
4	_	LED0	LED0 Input
5	_	0LED1	0LED1 Output. Drive SEL low (SEL = 0) to connect LED0 to 0LED1.
6	_	0LED2	0LED2 Output. Drive SEL high (SEL = 1) to connect LED0 to 0LED2.
7	7	A4	Differential PHY Interface Pair. Connect to the Ethernet PHY.
8	8	A5	Differential PHY Interface Pair. Connect to the Ethernet PHY.
9	9	A6	Differential PHY Interface Pair. Connect to the Ethernet PHY.
10	10	A7	Differential PHY Interface Pair. Connect to the Ethernet PHY.
11	11	GND	Ground
12	_	LED1	LED1 Input
13	_	1LED1	1LED1 Output. Drive SEL low (SEL = 0) to connect LED1 to 1LED1.
14	_	1LED2	1LED2 Output. Drive SEL high (SEL = 1) to connect LED1 to 1LED2.
15	13	7B2	B2 Differential Pair
16	14	6B2	B2 Differential Pair
17	15	7B1	B1 Differential Pair
18	16	6B1	B1 Differential Pair
19	17	5B2	B2 Differential Pair
20	18	4B2	B2 Differential Pair
21	19	5B1	B1 Differential Pair
22	20	4B1	B1 Differential Pair
23	21	3B2	B2 Differential Pair
24	22	2B2	B2 Differential Pair
25	23	3B1	B1 Differential Pair
26	24	2B1	B1 Differential Pair
27	29	SEL	Select Input. SEL selects switch connection. See the Truth Table (Table1).
28	25	1B2	B2 Differential Pair
29	26	0B2	B2 Differential Pair
30	27	1B1	B1 Differential Pair
31	28	0B1	B1 Differential Pair
32	_	2LED2	2LED2 Output. Drive SEL high (SEL = 1) to connect LED2 to 2LED2.
33	_	2LED1	2LED1 Output. Drive SEL low (SEL = 0) to connect LED2 to 2LED1.
34	_	LED2	LED2 Input
35	30	V+	Positive-Supply Voltage Input. Bypass to GND with a 0.1µF ceramic capacitor.
36	31	A0	Differential PHY Interface Pair. Connect to the Ethernet PHY.
	3-6, 12	N.C.	No Connection. Not internally connected.
_		EP	Exposed Pad. Connect exposed pad to GND or leave it unconnected.

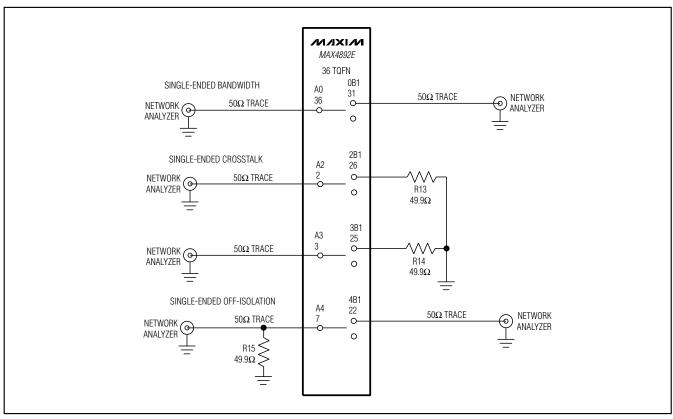


Figure 1. Single-Ended Bandwidth, Crosstalk, and Off-Isolation

#### **Detailed Description**

The MAX4890E/MAX4892E are high-speed analog switches targeted for 1000 Base-T applications. In a typical application, the MAX4890E/MAX4892E switch the signals from two separate interface transformers and connect the signals to a single 1000 Base-T Ethernet PHY (see the *Typical Operating Circuit*). This configuration simplifies docking station design by avoiding signal reflections associated with unterminated transmission lines in a T configuration. The MAX4890E/MAX4892E are protected against ±15kV electrostatic discharge (ESD) shocks. The MAX4892E also includes LED switches that allow the LED output signals to be routed to a docking station along with the Ethernet signals. See the *Functional Diagrams*.

With their low resistance and capacitance, as well as high ESD protection, the MAX4890E/MAX4892E can be used to switch most low-voltage differential signals.

such as LVDS, SEREDES, and LVPECL, as long as the signals do not exceed maximum ratings of the devices.

The MAX4890E/MAX4892E switches provide an extremely low capacitance and on-resistance to meet Ethernet insertion and return-loss specifications. The MAX4892E features three built-in LED switches.

The MAX4890E/MAX4892E incorporate a unique architecture design utilizing only n-channel switches within the main Ethernet switch, reducing I/O capacitance and channel resistance. An internal two-stage charge pump with a nominal output of 7.5V provides the high voltage needed to drive the gates of the n-channel switches while maintaining a consistently low Ron throughout the input signal range. An internal bandgap reference set to 1.23V and an internal oscillator running at 2.5MHz provide proper charge-pump operation. Unlike other charge-pump circuits, the MAX4890E/MAX4892E include internal flyback capacitors, reducing design time, board space, and cost.

**Table 1. Truth Table** 

SEL	CONNECTION
0	A_ to _B1, LED_ to _LED1
1	A_ to _B2, LED_ to _LED2

#### **Digital Control Inputs**

The MAX4890E/MAX4892E provide a single digital control SEL. SEL controls the switches as well as the LED switches as shown in Table 1.

#### **Analog Signal Levels**

The on-resistance of the MAX4890E/MAX4892E is very low and stable as the analog input signals are swept from ground to V+ (see the *Typical Operating Characteristics*). The switches are bidirectional, allowing A\_ and \_B\_ to be configured as either inputs or outputs.

#### **ESD Protection**

The MAX4890E/MAX4892E are characterized using the Human Body Model for  $\pm 15 \text{kV}$  of ESD protection. Figure 5 shows the Human Body Model. This model consists of a 100pF capacitor charged to the ESD voltage of interest which is then discharged into the test device through a  $1.5 \text{k}\Omega$  resistor. All signal and control pins are ESD protected to  $\pm 15 \text{kV}$  HBM (Human Body Model).

#### Applications Information

#### **Typical Operating Circuit**

The *Typical Operating Circuit* shows the MAX4890E/MAX4892E in a 1000 Base-T docking station application.

#### Power-Supply Sequencing and Overvoltage Protection

**Caution:** Do not exceed the absolute maximum ratings. Stresses beyond the listed ratings may cause permanent damage to the device.

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V+ before applying analog signals, especially if the analog signal is not current limited.

#### Layout

High-speed switches require proper layout and design procedures for optimum performance. Keep design-controlled-impedance pc board traces as short as possible. Ensure that bypass capacitors are as close as possible to the device. Use large ground planes where possible.

**Chip Information** 

PROCESS: BICMOS

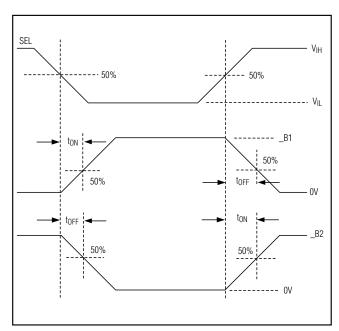


Figure 2. Turn-On and Turn-Off Times

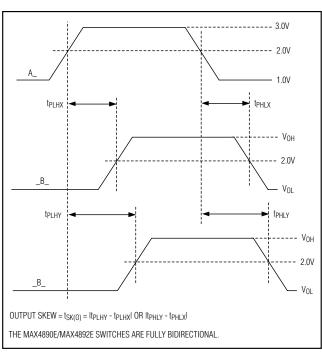


Figure 4. Output Skew

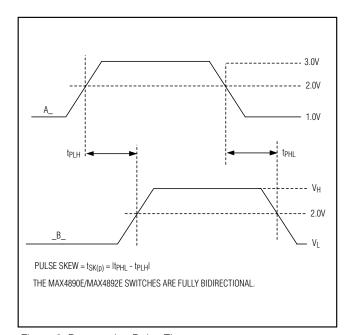


Figure 3. Propagation Delay Times

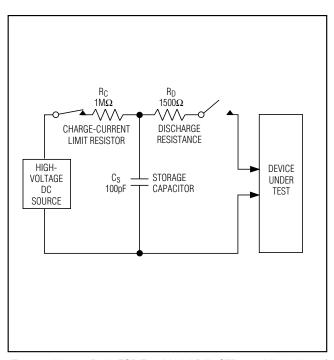
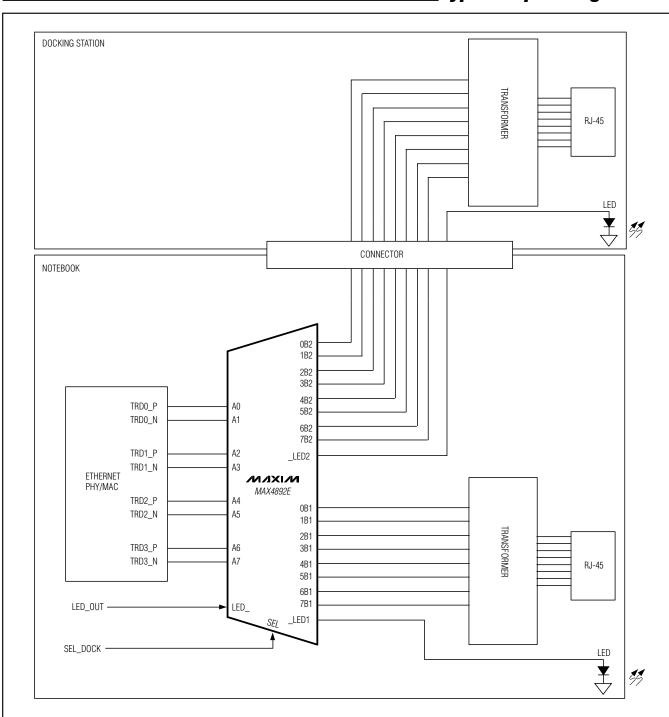
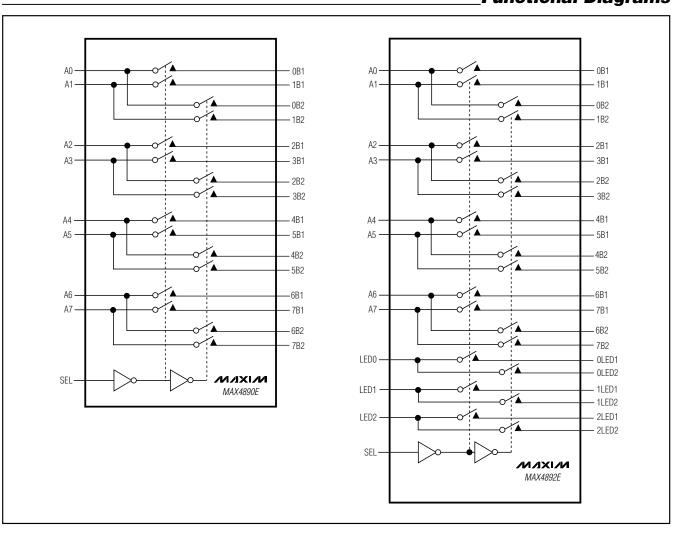


Figure 5. Human Body ESD Test Model (MIL-STD-883, Method 3015)

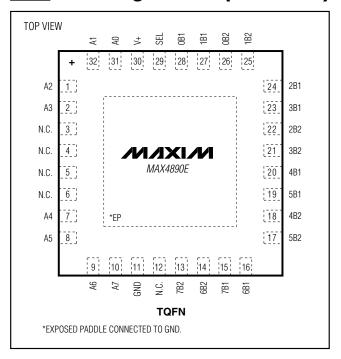
# Typical Operating Circuit



### **Functional Diagrams**

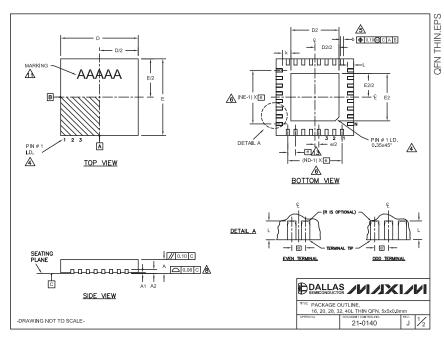


### Pin Configurations (continued)



#### Package Information

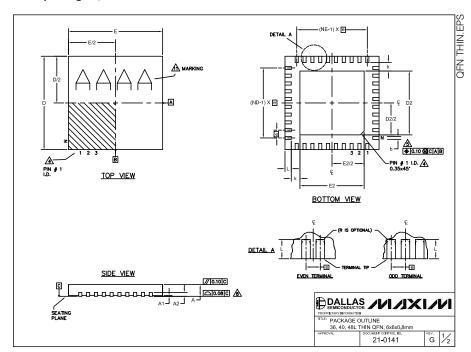
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to <a href="https://www.maxim-ic.com/packages">www.maxim-ic.com/packages</a>.)



			С	OMMO	ID NC	MEN	SIONS	3										EX	POS	ED PA	D VA	RIA	OIT	VS			
PKG.		6L 5x			OL 5x			8L 5x			32L 5			40L 5:		ı	PKG.		Dź	:	Т		E2		$\neg$		
SYMBOL	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM	MAX	MIN.	NOM.	MAX.		CODES	MIN.	NOI	I. MA	K. MI	N.	NOM	I. M/	AX.		
Α	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80	ı	T1655-2	3.00	3.1	3.2	3.0	10	3.10	3.	20		
A1	0	0.02	0.05	0	0.02	0.05	0	0.02	0.05	0	0.02	0.05	0	0.02	0.05	ı	T1655-3	3.00	3.1	3.2	0 3.0	00	3.10				
A2		20 RE			20 RE			20 RE			.20 R			.20 RE		ı	T1655N-1	3,00	3,1	3,2	0 3.0	00	3,10	3.	20		
b		0.30														ı	T2055-3	3.00	3.1	3,2	0 3.0	00	3.10	3.	20		
D		5.00												5.00		ŀ	T2055-4	3.00	3.1	_		10	3.10	-			
Е		5.00														- 1	T2055-5	3.15	3.2			_	3.25				
e	<del>-</del>	.80 BS	ic.		65 BS	SC.	_	50 BS			.50 E	SC.	_	.40 B	SC.	- 1	T2855-3	3.15					3.25				
k	0.25	- 1		0.25			0.25			0.25			0,25		0.50	_ L	T2855-4	2.60					2.70				
L	0.30	0.40	0.50	0.45		0.65	0.45		0.65	0.30		0.50	0.30		0.50		T2855-5	2.60	2.7				2.70				
N ND	-	16			20 5	_		28 7	_		32		┢	40 10	_	- 1	T2855-6	3.15	-				3.25		35		
NE	-	4			5	-	_	7	_		- 8		$\vdash$	10	-		T2855-7	2.60					2.70				
JEDEC		WHHE		1	NHHC		V	VHHD	-1	V	WHH	0-2			-	-	T2855-8	3,15	_				3,25				
	_												_			L	T2855N-1	3.15			5 3.1						
																ı	T3255-3	3.00			0 3.0						
OTES:																ı	T3255-4	3.00	3.1	3.2	0 3.0	00	3.10	3.	20		
	ENSI	ONING	& TC	I EDA	NICINI		VEOR	нто																			
										E Y14	1.5M-1	1994.				L	T3255-5	3.00	3.1	3.2	3.0	00	3.10	3.	20		
	DIME	NSIO	JS AF														T3255-5 T3255N-1	3.00					3.10				
2. ALL				RE IN I	MILLIN	ЛЕТЕ	RS. A													3.2	0 3.0	00		3.	.20		
2. ALL 3. NIS	THE	тота	NUN	RE IN I	OF TE	IETEI ERMIN	RS. A	NGLE:	S ARE	E IN E	DEGR	EES.	ITION	CHAI			T3255N-1	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS COP	THE TERI NFOR TIONA	TOTA MINAL M TO L, BU	#1 IE JESD F MUS	RE IN I MBER DENTII 95-1 S ST BE	OF TE FIER / SPP-0 LOCA	METEI ERMIN AND T 12. D	RS. A NALS. ERMI ETAII WITH	NAL N S OF N THE	S ARE	ERIN VINAL VE INI	DEGR IG CC L #1 I DICA	EES. NVEN DENTI	FIER	ARE	L NAL #1		T3255N-1 T4055-1	3.00 3.40 3.40	3.1 3.5 3.5	3.2	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS COPTOPTION	THE TERI NFOR TIONA NTIFIE	TOTA MINAL M TO L, BU ER MA	#1 IE JESD I MUS Y BE	MBER MBER DENTIF 95-1 S ST BE EITHE	OF TE FIER / SPP-0 LOC/ ER A I	METER ERMINAND T 12. D TED MOLD	RS. A NALS. ERMI ETAII WITH OR M	NAL N S OF N THE	S ARE IUMB TERN E ZON ED FE	ERIN VINAL VE INI ATUR	DEGR IG CC L #1 I DICA RE.	NVEN DENTI	FIER HE T	ARE ERMI	NAL #1		T3255N-1 T4055-1	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS COPTOPTION	THE TERI NFOR TIONA	TOTA MINAL M TO L, BU ER MA	#1 IE JESD F MUS Y BE PPLI	RE IN IN MBER DENTIF 95-1 S ST BE EITHE ES TO	OF TE FIER / SPP-0 LOC/ ER A I	METEI ERMIN AND T 12. D TED MOLD ALLIZ	RS. A NALS. ERMI ETAII WITH OR M	NAL N S OF N THI IARKE	S ARE IUMB TERN E ZON ED FE	ERIN VINAL VE INI ATUR	DEGR IG CC L #1 I DICA RE.	NVEN DENTI	FIER HE T	ARE ERMI	NAL #1		T3255N-1 T4055-1	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS COPTOPTION	THE TERI NFORI TIONA NTIFIE IENSI 5 mm /	TOTA MINAL M TO . L, BU' ER MA ON b #	#1 IE JESD I MUS Y BE PPLII 30 m	RE IN I MBER DENTII 95-1 S ST BE EITHE ES TO m FRO	OF THE ASPP-0 LOCATER A MET. OM TE	METEI ERMIN 12. D TED MOLD ALLIZ ERMIN	RS. A VALS. TERMI VETAIL WITH OR IN ED TE	NAL N S OF N THI IARKE ERMIN P.	S ARE IUMB TERM E ZON ED FE	ERIN MINAL ME INI ATUF	DEGR IG CC L #1 II DICA RE.	EES. NVEN DENTI TED. 1	FIER HE T	ARE ERMIN	NAL #1	Ē	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS COPTION OPTION O.25	THE TERI NFOR TIONA NTIFIE IENSI TIONA TIONA NTIFIE TIONA TI	TOTA MINAL M TO L, BU' ER MA ON b A AND 0	#1 IE JESD F MUS Y BE PPLII 30 m	RE IN I MBER PENTIF 95-1 S ST BE EITHE ES TO m FRO	OF TE FIER / SPP-0 LOCA ER A IN MET. DM TE	METEI ERMIN 12. D TED MOLD ALLIZ ERMIN	RS. A ERMI ETAII WITH OR M ED TE IAL TI	NAL N S OF N THE IARKE ERMIN P.	S ARE IUMB TERM E ZON D FE IAL AI	ERIN DERINGEN ON E	DEGR IG CC L #1 II DICA RE. B MEA	EES. NVEN DENTI TED. 1	FIER HE T	ARE ERMIN	NAL #1	Ē	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. N IS A THE COPT IDE DIM 0.25 ND	THE TERI NFORI TIONA NTIFIE TENSI TE	TOTA MINAL M TO L, BU' ER MA ON b A AND 0 VE RE ATIO	#1 IC JESD F MUS Y BE PPLII 30 m FER 1	RE IN IN MBER 95-1 S ST BE EITHE ES TO m FRO TO TH	OF THE SPP-0 LOCATER A MET. OM TE NUT BLE IF	METEI ERMIN 12. D TED MOLD ALLIZ ERMIN MBER	RS. A NALS. ERMI ETAII WITH OR N ED TE IAL TI OF T	NAL N S OF N THE IARKE ERMIN P. ERMII TRIC	S ARE IUMB TERM ZON D FE IAL AI	ERIN E WINAL WE INI ATUF ND IS ON E SHIO	DEGR IG CC L #1 II DICA RE. S MEA EACH	NVENDENTI TED. 1	FIER THE T	ARE ERMIN TWEE	NAL #1 N ESPECT	IVEL	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. NIS COPOLINE COPOLINE ADIMO 0.25 AND 7. DEF A. COPOLINE 9. DRA	E THE E TERI NFORI FIONA NTIFIE IENSIG 5 mm / AND N	TOTA MINAL M TO L, BU' ER MA ON 6 A AND 0 NE RE LATIO ARITY G CON	#1 IE JESD F MUS Y BE PPLII 30 m FER 1 N IS F APPL	MEE IN INTERPORT INTERPORT IN INTERPORT INTERPORT IN INTERPORT INTERPORT INTERPORT IN INTERPORT IN INTERPORT INTERPORT IN INTERPORT INTER	OF TE FIER / SPP-0 LOCA ER A IN OM TE E NUI BLE II O THE	METEI ERMIN 12. D TED MOLD ALLIZ ERMIN MBER N A S'	RS. A VALS. TERMITH OR IN ED TE VAL TI OF T YMME	NAL N S OF N THE IARKE ERMIN P. ERMII TRIC ) HEA	S ARE IUMB TERM E ZON ED FE IAL AI NALS AL FA T SIN	ERIN E WINAL WE INI ATUF ND IS ON E SHIO K SLU	DEGR IG CO L #1 II DICA RE. S MEA EACH DN. UG AS	EES.  NVEN DENTI TED. 1  SURE D ANI	FIER THE T D BE	ARE ERMIN TWEE IDE RE	NAL #1 N ESPECT ERMINA	IVEL	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5	3.2 3.6 3.6	0 3.4 0 3.4	00	3.10 3.50 3.50	3.	.20 .60 .60		
2. ALL 3. NIS COPOLINE COPOLINE ADIMO 0.25 AND 7. DEF A. COPOLINE 9. DRA	E THE E TERI NFORI FIONA NTIFIE IENSI 5 mm / AND N POPUI PLAN/ AWING	TOTA MINAL M TO L, BU' ER MA ON 6 A AND 0 NE RE LATIO ARITY S CON	#1 IE JESD F MUS Y BE PPLII 30 m FER 1 N IS F APPL FORM	RE IN INTERPRETATION OF THE POSSII LIES TO MIS TO S.	MILLIN OF TI FIER / SPP-0 LOC / ER A I MET. OM TE E NUI BLE II O THE	METEI ERMIN AND T 12. D TED MOLD ALLIZ ERMIN MBER N A S' E EXP	RS. A VALS. TERMI VETAIL WITH OR IN ED TE VAL TI OF T YMME OSED D220,	NAL N S OF N THE IARKE ERMIN P. ERMII TRIC ) HEA	S ARE IUMB TERM E ZON ED FE IAL AI NALS AL FA T SIN	ERIN E WINAL WE INI ATUF ND IS ON E SHIO K SLU	DEGR IG CO L #1 II DICA RE. S MEA EACH DN. UG AS	EES.  NVEN DENTI TED. 1  SURE D ANI	FIER THE T D BE	ARE ERMIN TWEE IDE RE	NAL #1 N ESPECT ERMINA	IVEL	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5 *SEE	3.2 0 3.6 0 3.6 COMM	0 3.0 0 3.4 0 3.4 ON DIM	000 40 40 40 MENS	3.10 3.50 3.50 SIONS	3. 3. 3. 3. 3. 3.	20 .60 .60 BLE		
2. ALL 3. NIS COPTODPT IDE DIM 0.25 ND 7. DEF COPTOD 9. DRA T28	THE TERNOR TIONA NTIFIE IENSIG MM / AND N POPUI PLAN/ AWING 55-3 / RPAG	TOTA MINAL M TO L, BU' ER MA ON 6 A AND 0 VE RE ATIO VEITY G CON VIND TO	#1 IE JESD F MUS Y BE PPLII 30 m FER 1 N IS F APPL FORM 2855-1	RE IN INTERPORTED IN INTERPORTED IN ITEM IN IT	MILLIN OF THE SPP-0 LOCA ER A IN MET. DM TE E NUT BLE IT O THE JEDE	METEI ERMIN AND T 12. D ALLIZ ERMIN MBER N A S' E EXP EC MC	RS. A VALS. ERMI ETAII WITH OR N ED TE VAL TI OF T YMME OSEI D220, mm.	NGLE: NAL N S OF N THI IARKE ERMIN P. ERMII TRIC/ ) HEA'	S ARE IUMB TERM E ZON ED FE IAL AI VALS AL FA T SIN PT E)	ERIN DERING ON E SHIO K SLU	DEGR IG CC L #1 II DICA' RE. S MEA EACH DN. UG AS	EES.  NVEN DENTI TED. 1  SURE D ANI	FIER THE T D BE	ARE ERMIN TWEE IDE RE	NAL #1 N ESPECT ERMINA	IVEL	T3255N-1 T4055-1 T4055-2	3.00 3.40 3.40	3.1 3.5 3.5 *SEE	3.2 0 3.6 0 3.6 COMM	0 3.0 0 3.4 0 3.4 ON DIM	000 40 40 40 MENS	3.10 3.50 3.50 SIONS	3. 3. 3. 3. 3. 3.	20 .60 .60 BLE	   <b>X</b>	
2. ALL 3. NIS COPT OPT IDE DIM 0.25 ND 7. DEF COPT 128 WAS	E THE E TERI NFOR FIONA NTIFIE S MM / AND N PLAN/ AWING 55-3 / RPAG RKING	MINAL MITO L, BUT ER MA ON 6 A AND 0 NE RE LATIO ARITY G CON ARITY G CON E SHA	#1 IE JESD I MUS Y BE PPLII 30 m FER 1 N IS F APPL FORN 2855-1 LL NO	RE IN IN MBER 95-1 ST BE EITHE ES TO TO TH POSSII MS TO 3. OT EX CKAG	MILLIN OF TE SPP-0 LOCA ER A N MET. OM TE E NUI BLE II O THE JEDE	METEI AND T 112. D MOLD MOLD ALLIZ RMIN MBER N A S' E EXP EC MO 1 0.10	RS. A ANALS. ERMINETALIS INVITH OR IN OR IN OF THE YMME OSED 2220, mm. ATION	NAL N S OF N THI IARKE ERMIN P. ERMII TRICA HEA' EXCE	S ARE JUMB TERM TERM TERM TERM TERM TERM TERM TERM	ERIN C ERIN MINAL ME INI ATUF ON E SHIO K SLL KPOS	DEGR  IG CC L #1 II DICA RE  MEA  EACH ON UG AS  BED P	EES.  NVEN DENTI TED. 1  SURE D ANI	FIER THE T D BE	ARE ERMIN TWEE IDE RE	NAL #1 N ESPECT ERMINA	IVEL	T3255N-1 T4055-1 T4055-2	3.40 3.40 3.40	3.1 3.5 3.5 3.5 *SEE	3.2 3.6 3.6	D 3.4 0 3.4 0 3.4 0 0 3.4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00 10 10 10 MENS	3.10 3.50 3.50 3.50	3. 3. 3. 3. 3. 3.	20 .60 .60 BLE	13%	

#### Package Information (continued)

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to www.maxim-ic.com/packages.)



	COMMON DIMENSIONS												
PKG.		36L 6x6	3		40L 6x6	ı	48L 6x6						
SYMBOL	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX				
Α	0.70	0.75	0.80	0.70	0.75	0.80	0.70	0.75	0.80				
A1	0	0.02	0.05	0	0.02	0.05	0	-	0.05				
A2		0.20 REF			0.20 REF			0.20 REF					
ь	0.20	0.25	0.30	0.20	0.25	0.30	0.15	0.20	0.25				
D	5.90	6.00	6.10	5.90	6.00	6.10	5.90	6.00	6.10				
E	5.90	6.00	6.10	5.90	6.00	6.10	5.90	6.00	6.10				
e	0.50 BSC.				0.50 BSC			0.40 BSC					
k	0.25	-	-	0.25	-	-	0.25	-	-				
L	0.45	0.55	0.65	0.30	0.40	0.50	0.30	0.40	0.5				
N		36			40		48						
ND		9			10		12						
NE		9			10		12						
JEDEC	I —	WJJD-1		1	WJJD-2		-						

PKG.		D2			E2	
CODES	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
T3666-2	3.60	3.70	3.80	3.60	3.70	3.80
T3666-3	3.60	3.70	3.80	3.60	3.70	3.80
T3666N-1	3.60	3.70	3.80	3.60	3.70	3.80
T4066-2	4.00	4.10	4.20	4.00	4.10	4.20
T4066-3	4.00	4.10	4.20	4.00	4.10	4.20
T4066-4	4.00	4.10	4.20	4.00	4.10	4.20
T4066-5	4.00	4.10	4.20	4.00	4.10	4.20
T4866-1	4.40	4.50	4.60	4.40	4.50	4.60
T4866-2	4.40	4.50	4.60	4.40	4.50	4.60

- DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
   ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
   N IS THE TOTAL NUMBER OF TERMINALS.

3. NIS THE TOTAL NUMBER OF TERMINALS.

⚠ THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1
SPP-912. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE
ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

⚠ DIMENSION DA APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 mm AND 0.30 mm
FROM TERMINAL TIP.

6. NO AND NE REFER TO THE NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.

7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.

⚠ COPLANARITY APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.

A DEMINISCREDULE ONLEPTOR MOSE EXCEPT EIGH ARM DEAD FOR PROPER PAGE 16966 1

9. DRAWING CONFORMS TO JEDEC MO220, EXCEPT FOR 0.4mm LEAD PITCH PACKAGE T4866-1. 2. WARPAGE SHALL NOT EXCEED 0.10 mm.

MARKING IS FOR PACKAGE ORIENTATION REFERENCE ONLY.

12. NUMBER OF LEADS SHOWN FOR REFERENCE ONLY.



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 $\underline{\mathsf{MAX4890EETJ+}} \ \ \underline{\mathsf{MAX4890EETJ+T}} \ \ \underline{\mathsf{MAX4892EETX+}} \ \ \underline{\mathsf{MAX4892EETX+T}}$