

Dual Channel Power Distribution Switches

Features

- IN Operating Range: 1.0V to 5.5V with VB
- IN Operating Range: 2.7V to 5.5V without VB
- 120mΩ High-Side MOSFET
- 2mS Typical Rise Time
- Recovery and Latch OFF mode
- Under Voltage Lockout
- Deglitched Open-Drain Over-Current Flag Output (FLAG)
- TSOT23-6, TDFN2X2-10 Packages (Halogen Free/Pb Free)

Application

- High-Side Power Protection Switch

General Description

The G2895 is a tiny dual channel integrated power switches for high-side power protection switch application.

Several protection features include current limiting and thermal shutdown to prevent catastrophic switch failure caused by increasing power dissipation when continuous heavy loads or short circuit occurs. A built-in charge pump is used to drive the MOSFET

FLAG is an open-drain output report over-current and has typical 9ms deglitch timeout period.

Ordering Information

ORDER NUMBER	MARKING	ENABLE	Output Current	Output MOS $R_{DS(ON)}$	Mode	TEMP. RANGE	PACKAGE (Green)
G2895TP1U	2895x	Active High	0.5A/0.2A	120mΩ	Recovery	-40°C to +85°C	TSOT-23-6
G2895LTP1U	285Lx	Active High	0.5A/0.2A	120mΩ	Latch OFF	-40°C to +85°C	TSOT-23-6
G2895K21U	2895	Active High	0.5A/0.2A	120mΩ	Recovery	-40°C to +85°C	TDFN2X2-10
G2895LK21U	2895L	Active High	0.5A/0.2A	120mΩ	Latch OFF	-40°C to +85°C	TDFN2X2-10

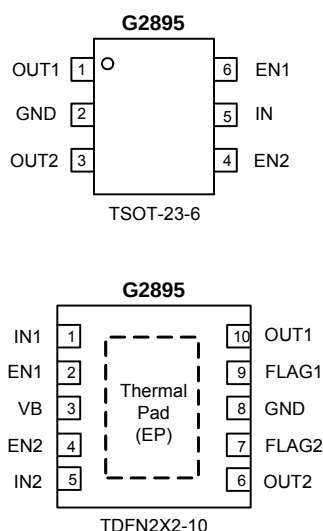
Note: TP: TSOT-23-6, K2: TDFN2X2-10

1: Bonding Code

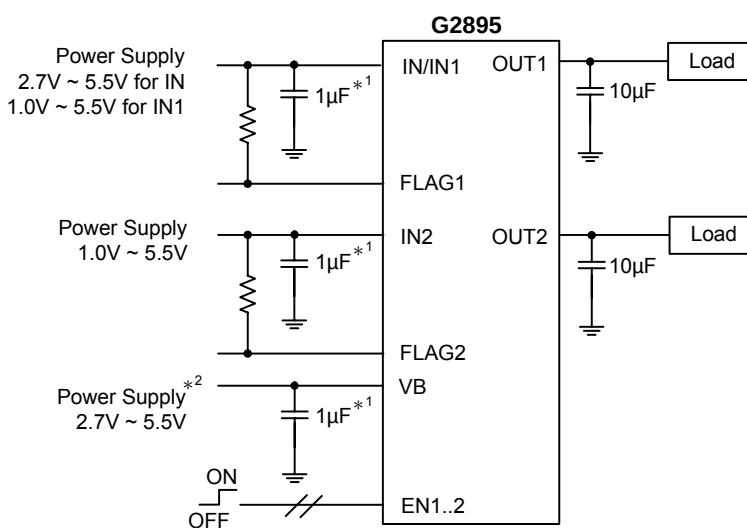
U: Tape & Reel

Green : Lead Free / Halogen Free

Pin Configuration



Typical Application Circuit



*1. 1μF of input capacitor is enough in most application cases.

If the PCB trace of power rail to IN is long, larger input capacitor is necessary.

*2. VB ≥ INx

Absolute Maximum Ratings

Terminal Voltage (with respect to GND)

VB Pin Voltage, VB -0.3V to +6.0V

INx, OUTx Pin Voltage, V_{IN}, V_{OUT} -0.3V to +6.0V

ENx, FLAGx Pin Voltage, V_{EN}, V_{FLG} -0.3V to +6.0V

Junction Temperature. 150°C

Storage Temperature (T_S) -65°C to +150°C

Reflow Temperature (soldering, 10sec) 260°C

Continuous Power Dissipation (T_A = +25°C)

TSOT-23-6 TBD

TDFN2X2-10 TBD

Thermal Resistance Junction to Ambient, (θ_{JA})

TSOT-23-6 TBD

TDFN2X2-10 TBD

Thermal Resistance Junction to Case, (θ_{JC})

TSOT-23-6 TBD

TDFN2X2-10 TBD

ESD(HBM)⁽¹⁾ 2KV

ESD(CDM) 1KV

Operating Ratings

Supply Voltage (VB, IN) 2.7V to 5.5V

Supply Voltage (IN1, IN2) 1.0V to 5.5V

Operating Temperature (T_A) -40°C to +85°C

(1) Human body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

Electrical Characteristics

V_{IN} = 3.3V, C_{IN}=1μF, C_{OUT}=1μF, R_L=10Ω T_A = 25°C.

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified.

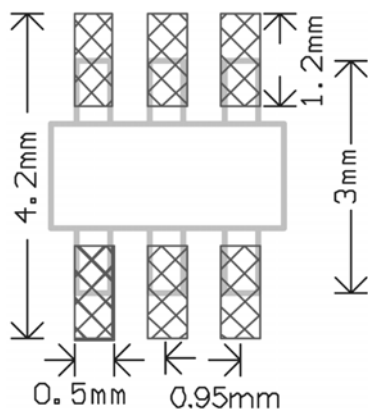
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Bias Voltage Range	VB		2.7	---	5.5	
IN Input Voltage Range	V _{IN}	TSOT-23-6	2.7	---	5.5	V
IN1 & IN2 Input Voltage Range	V _{IN1/2}	TDFN2X2-10 with VB	1.0	---	5.5	V
Quiescent Current	I _{Q IN}	V _{IN} =3.3V, EN1=EN2=High	---	200	---	μA
Quiescent Current	I _{Q VB}	VB= V _{IN1} = V _{IN2} =3.3V, EN1=EN2=High	---	200	---	μA
Off Supply Current	I _{Q(OFF)}	V _{IN} =3.3V or VB=3.3V, ENx=Low	---	0.1	1	μA
VB Under Voltage Lockout	VB _{UVLO}	VB	2.3	2.45	2.6	V
Output MOS R _{DS(ON)}	R _{DS(ON)}	I _{OUTx} = 0.2A	---	120	140	mΩ
Over Current Trigger Point	I _{LIM}	G2895 CH1, IN1(IN)-OUT1	0.6	0.8	1.0	A
		G2895 CH2, IN2(IN)-OUT2	0.3	0.4	0.5	
EN Input Threshold-High VIH	V _{EN(H)}		1.2	---	---	V
EN Input Threshold-Low VIL	V _{EN(L)}		---	---	0.6	V
Output Turn-on Rising Time	T _R	C _{OUT} =1μF, 10% to 90% Settling	1	2	4	ms
FLAG Deglitch	T _{FLAG}	FLAG assertion or deassertion	4	9	14	ms
Shutdown OUT Pull Low Resistance			---	150	225	Ω
Thermal Limit	OT		---	140	---	°C
Thermal Limit Hysteresis	OT _{HYS}		---	30	---	°C

Note:

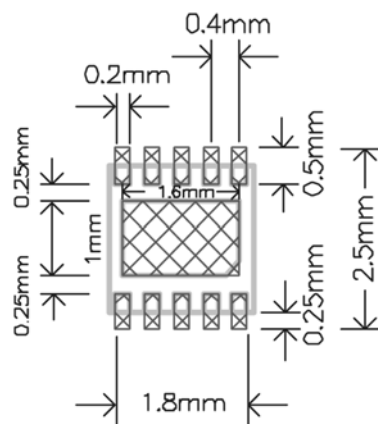
To exactly identify the short circuit characteristic of IC, avoid the test result interfered by parasitic inductor, output capacitor, and contact resistor. It is necessary to follow the recommendation as follows.

Minimum Footprint PCB Layout Section

TSOT-23-6



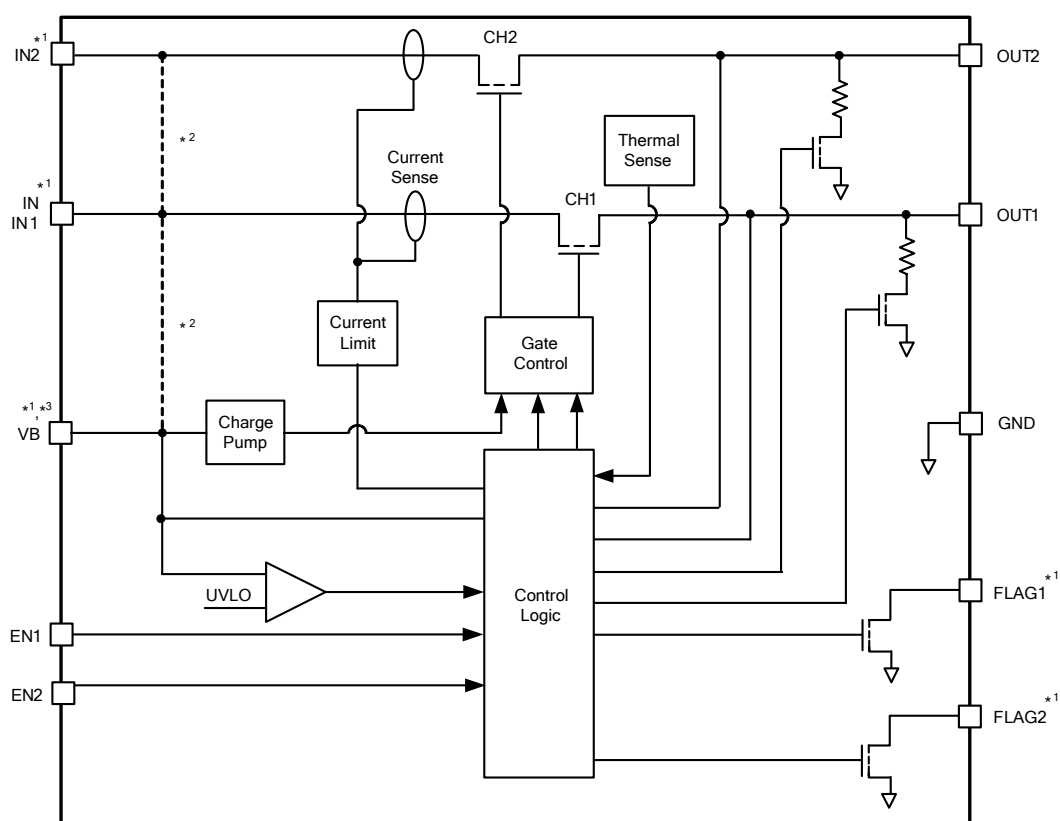
TDFN2X2-10



Pin Description

PIN		Name	FUNCTION
TSOT-23-6	TDFN2X2-10		
1	10	OUT1	CH1 output terminal
2	8	GND	Ground.
3	6	OUT2	CH2 output terminal
4	4	EN2	CH2 logic level enable input.
5	1	IN/IN1	IN, Internal bias supply voltage and CH1/CH2 inputs supply, Connect to a positive supply. IN1, CH1 input power supply, Connect to a positive supply.
6	2	EN1	CH1 logic level enable input.
---	5	IN2	CH2 Input power supply, Connect to a positive supply.
---	9	FLAG1	CH2 Open-Drain Over-Current Flag output.
---	7	FLAG2	CH1 Open-Drain Over-Current Flag output.
---	3	VB	Internal bias supply, $VB \geq INx$

Block Diagram



Note:

*1 . VB, IN1, IN2, FLAG1, FLAG2 all exist in the TDFN2X2-10 package

*2 . The dotted line exists in the TSOT-23-6 package, VB, IN and IN2 are all bonded together internal.

*3 . $VB \geq INx$

Functional Description

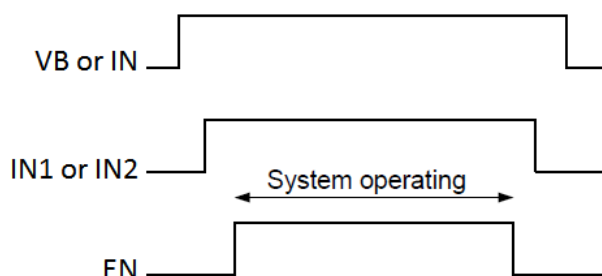
VB, IN, and OUT

VB is the power supply for the controller logic circuitry and a charge pump. IN, IN1 and IN2 (input) is the power supply connecting the drain of the MOSFET. OUT1 and OUT2 (output) is the source of the MOSFET. In a typical application, current flows through the MOSFET from IN to OUT toward the load. VB only exists in the TDFN2X2-10 package.

EN, the Enable Input

EN must be driven logic high or logic low for a clearly defined input. EN should not be allowed to go negative with respect to GND.

Power Sequence Timing



FLAG Function

The FLAG open-drain output is asserted (active low) when an over current condition is encountered after a 9ms deglitch timeout. The output remains asserted until the overcurrent condition is removed. The FLAG only exists in the TDFN2X2-10 package.

Over Current Threshold

The typical overcurrent threshold of G2895 is 0.8A for CH1 and 0.4A for CH2.

Undervoltage Lockout

UVLO (undervoltage lockout) prevents the output MOSFET from turning on until VB or IN (input voltage) exceeds 2.45V typically. After the switch turns on, if the voltage drops below 2.45V typically, UVLO shuts off the output MOSFET.

Thermal Shutdown

Thermal shutdown protects G2895 from excessive power dissipation. If the die temperature exceeds the aforementioned OT spec., the MOSFET switch is shut off. The hysteresis prevents the switch from turning on until the die temperature drops to OT_{HYS} . Thermal shutdown circuit functions only when the switch is enabled.

MODE, Recovery and Latched

G2895 has two options, G2895 is recovery mode, in the recovery mode option, IC will automatically resume after fault events are removed if EN keeps high. G2895L is latched mode, in latched mode, the switch keeps OFF when overcurrent event occurs, even if fault event is removed. The switch can be turned on by either power or EN resetting, however, the power sequence still needs to match with previous section description.

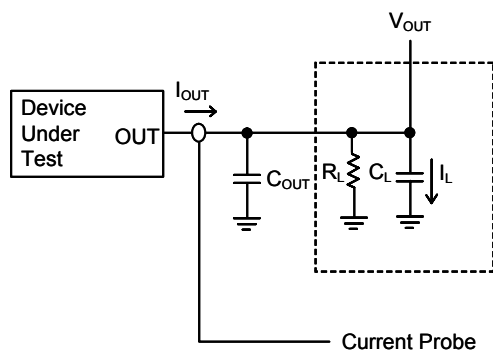
Applications Information

Supply Filtering

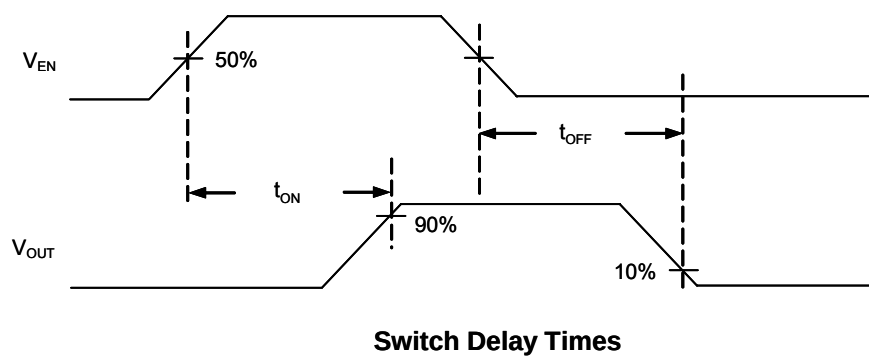
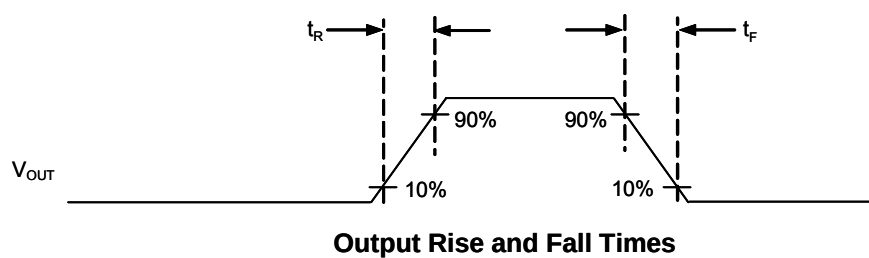
A 1 μ F bypass capacitor for each power supply from VB, IN1, and IN2 to GND, located near the G2895, is strongly recommended to control supply transients. Without a bypass capacitor, an output short may cause sufficient ringing on the input (from supply lead inductance) to damage internal control circuitry.

Input transients must not exceed the absolute maximum supply voltage ($V_{IN\ max} = 6V$) even for a short duration.

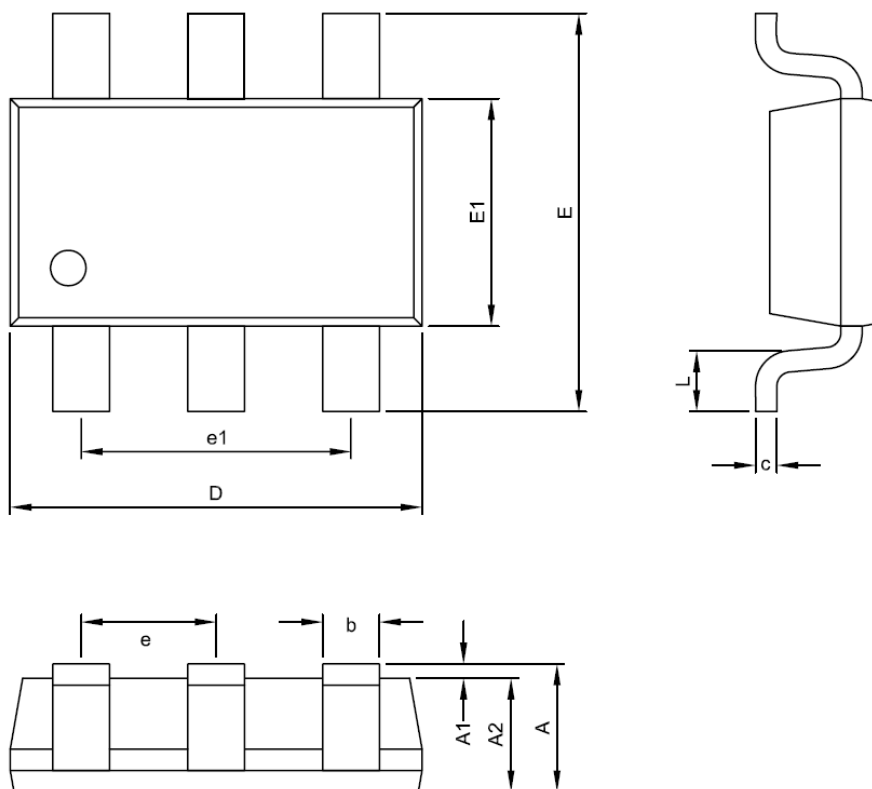
Test Circuit



Timing Diagrams



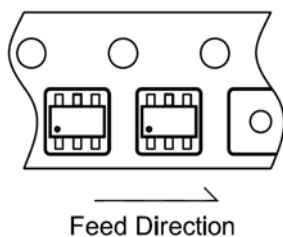
Package Information



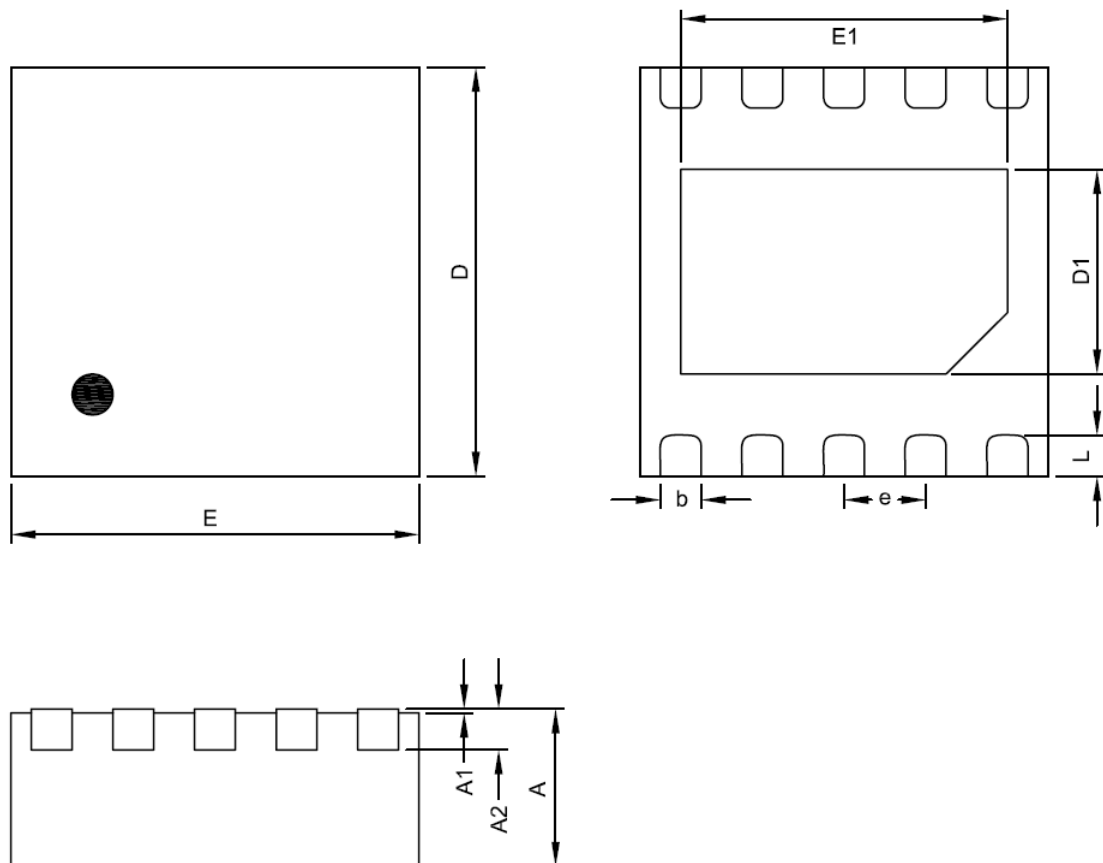
TSOT-23-6 Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	---	---	0.90	---	---	0.035
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70	0.75	0.80	0.028	0.030	0.031
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
c	0.15 REF			0.006 REF		
b	0.30	0.40	0.50	0.012	0.016	0.020
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	0.45	0.60	0.012	0.018	0.024

Taping Specification

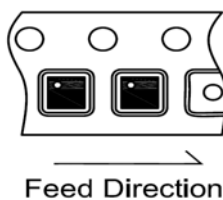


PACKAGE	Q'TY/REEL
TSOT-23-6	3,000 ea


TDFN2X2-10 Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.0276	0.0295	0.0315
A1	0.00	---	0.05	0.0000	---	0.0020
A2	0.20 REF			0.0079 REF		
D	1.95	2.00	2.05	0.0768	0.0787	0.0807
E	1.95	2.00	2.05	0.0768	0.0787	0.0807
D1	0.95	1.00	1.05	0.0374	0.0394	0.0413
E1	1.55	1.60	1.65	0.0610	0.0630	0.0650
b	0.15	0.20	0.25	0.0059	0.0079	0.0098
e	0.40 BSC			0.0157 BSC		
L	0.20	0.25	0.30	0.0079	0.0098	0.0118

Taping Specification



PACKAGE	Q'TY/REEL
TDFN2X2-10	3,000 ea