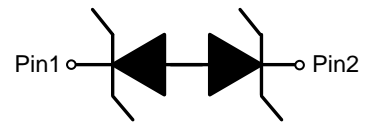


**ESD54031Z**
**1-Line, Bi-directional, Transient Voltage Suppressors**
<http://www.sh-willsemi.com>
**Descriptions**

The ESD54031Z is a TVS (Transient Voltage Suppressor) designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and lightning.

The ESD54031Z may be used to provide ESD protection up to  $\pm 30\text{kV}$  (contact discharge) according to IEC61000-4-2, and withstand peak pulse current up to 7.0A (8/20 $\mu\text{s}$ ) according to IEC61000-4-5.

The ESD54031Z is available in DFN0603-2L package. Standard products are Pb-free and Halogen-free.


**DFN0603-2L (Bottom View)**

**Circuit diagram**
**Features**

- Stand-off voltage:  $\pm 12\text{V}$  Max.
- Transient protection for each line according to IEC61000-4-2 (ESD):  $\pm 30\text{kV}$  (contact discharge)  
IEC61000-4-5 (surge): 7A (8/20 $\mu\text{s}$ )
- Capacitance:  $C_J = 9.0\text{pF}$  typ.
- Ultra-low leakage current:  $I_R < 1\text{nA}$  typ.
- Low clamping voltage:  $V_{CL} = 18\text{V}$  typ. @  $I_{PP} = 16\text{A}$  (TLP)
- Solid-state silicon technology



\* = Month code (A~Z)

L = Device code

**Marking (Top View)**
**Applications**

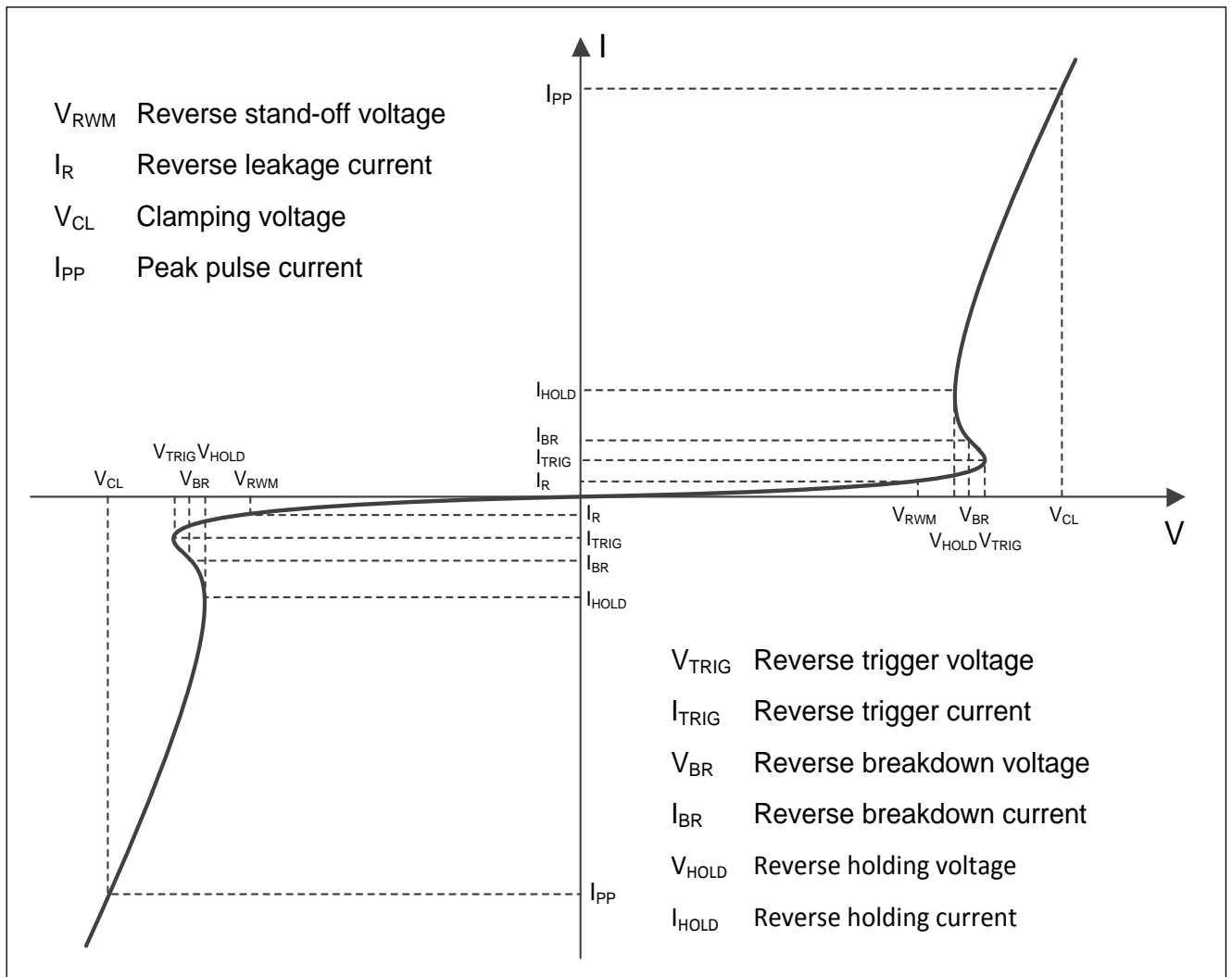
- Computers and peripherals
- Cellular handsets
- Portable Electronics
- Notebooks

**Order information**

Device	Package	Shipping
ESD54031Z-2/TR	DFN0603-2L	10000/Tape&Reel

**Absolute maximum ratings**

Parameter	Symbol	Rating	Unit
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	140	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{PP}$	7	A
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	$\pm 30$	kV
ESD according to IEC61000-4-2 contact discharge		$\pm 30$	
Junction temperature	$T_J$	125	$^{\circ}C$
Operating temperature	$T_{OP}$	-40~85	$^{\circ}C$
Lead temperature	$T_L$	260	$^{\circ}C$
Storage temperature	$T_{STG}$	-55~150	$^{\circ}C$

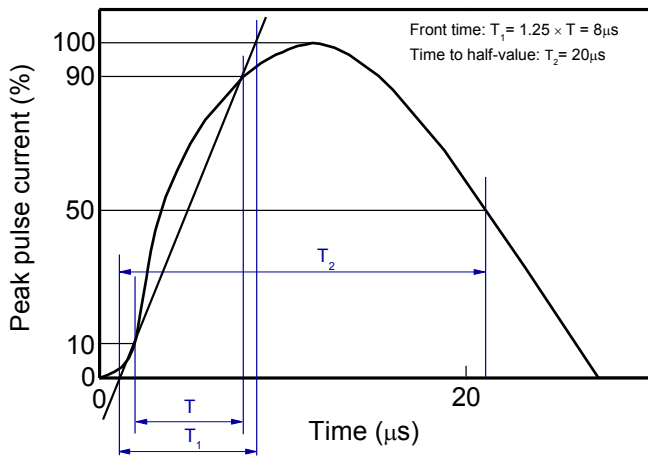
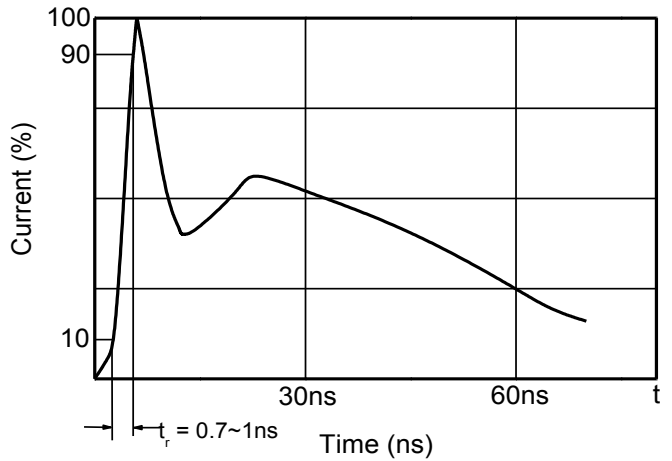
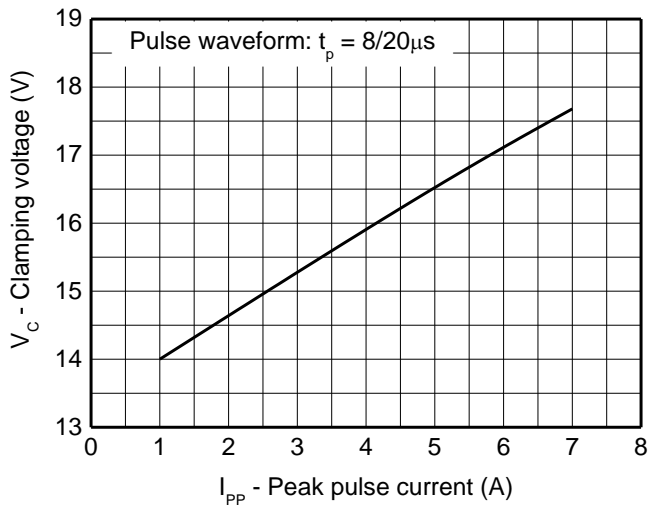
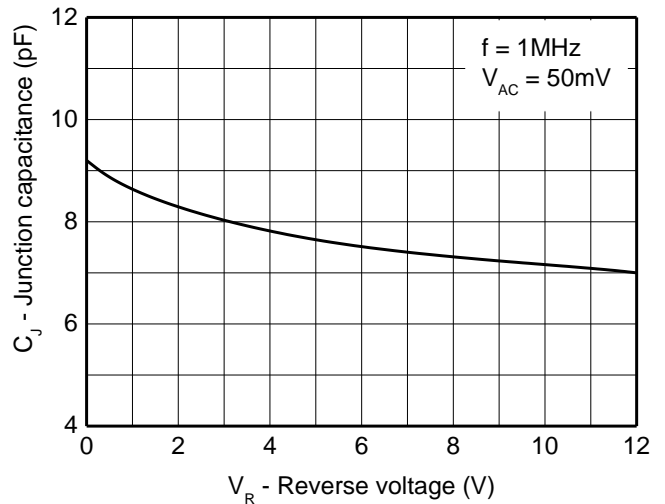
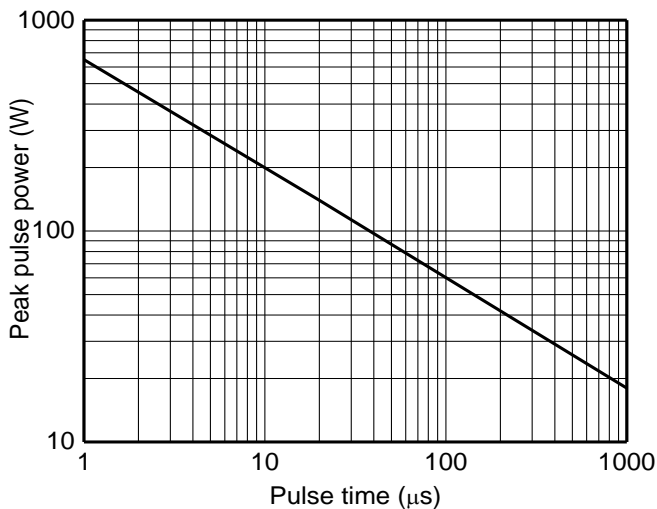
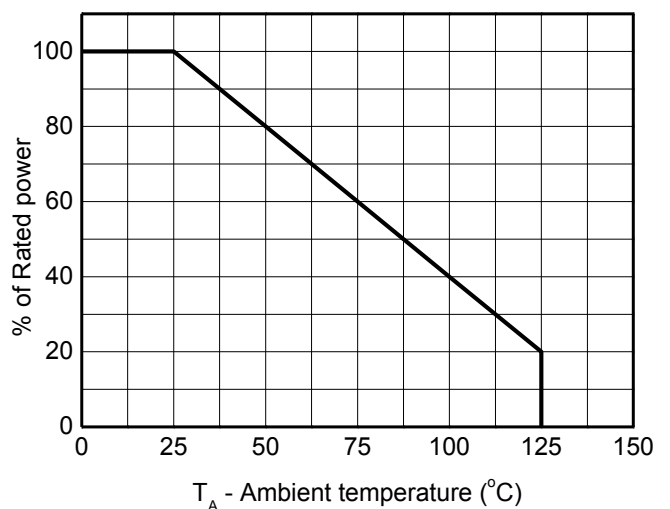
**Electrical characteristics ( $T_A=25^{\circ}C$ , unless otherwise noted)**


**Electrical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**

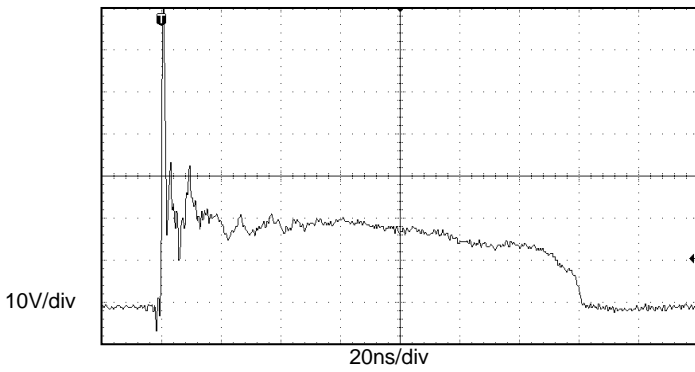
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Stand-off voltage	$V_{RWM}$				$\pm 12$	V
Reverse leakage current	$I_R$	$V_{RWM} = 12\text{V}$		<1	50	nA
Reverse breakdown voltage	$V_{BR}$	$I_T = 1\text{mA}$	13		16	V
Clamping voltage <sup>1)</sup>	$V_{CL}$	$I_{PP} = 16\text{A}$ , $t_p = 100\text{ns}$		18		V
Dynamic resistance <sup>1)</sup>	$R_{DYN}$			0.30		$\Omega$
Clamping voltage <sup>2)</sup>	$V_{CL}$	$I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$			16	V
		$I_{PP} = 7\text{A}$ , $t_p = 8/20\mu\text{s}$			20	V
Junction capacitance	$C_J$	$V_R = 0\text{V}$ , $f = 1\text{MHz}$		9	12	pF

1) TLP parameter:  $Z_0 = 50\Omega$ ,  $t_p = 100\text{ns}$ ,  $t_r = 2\text{ns}$ , averaging window from 60ns to 80ns.  $R_{DYN}$  is calculated from 4A to 16A.

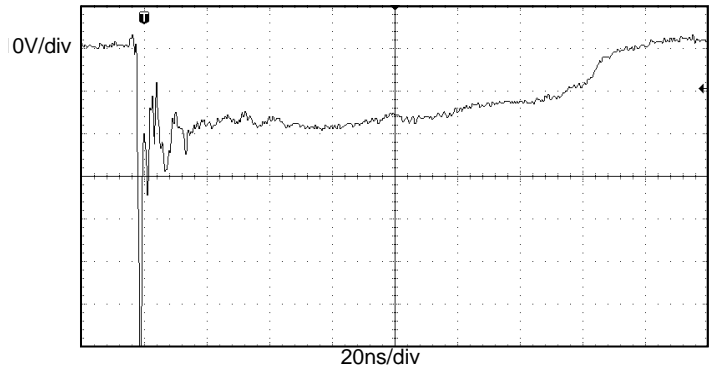
2) Non-repetitive current pulse, according to IEC61000-4-5.

**Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**

**8/20 $\mu\text{s}$  waveform per IEC61000-4-5**

**Contact discharge current waveform per IEC61000-4-2**

**Clamping voltage vs. Peak pulse current**

**Capacitance vs. Reverse voltage**

**Non-repetitive peak pulse power vs. Pulse time**

**Power derating vs. Ambient temperature**

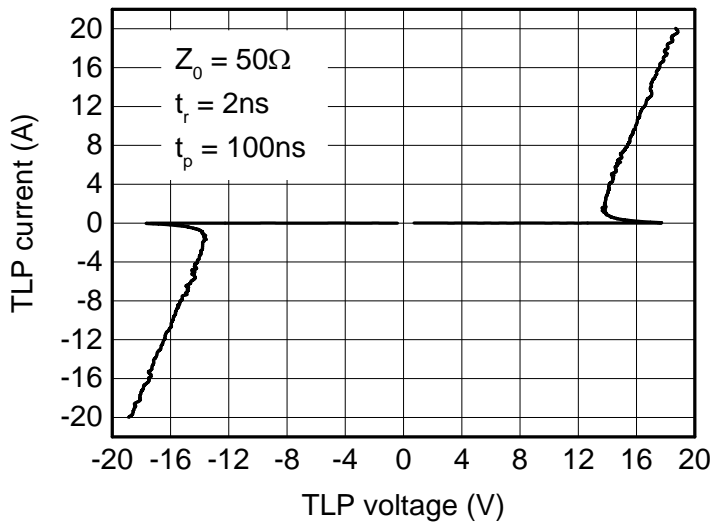
Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)



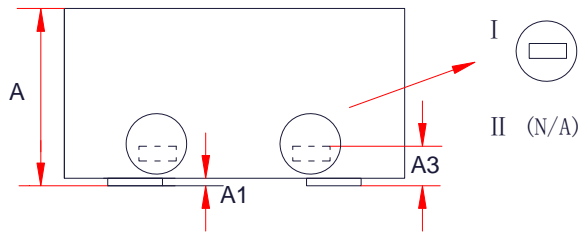
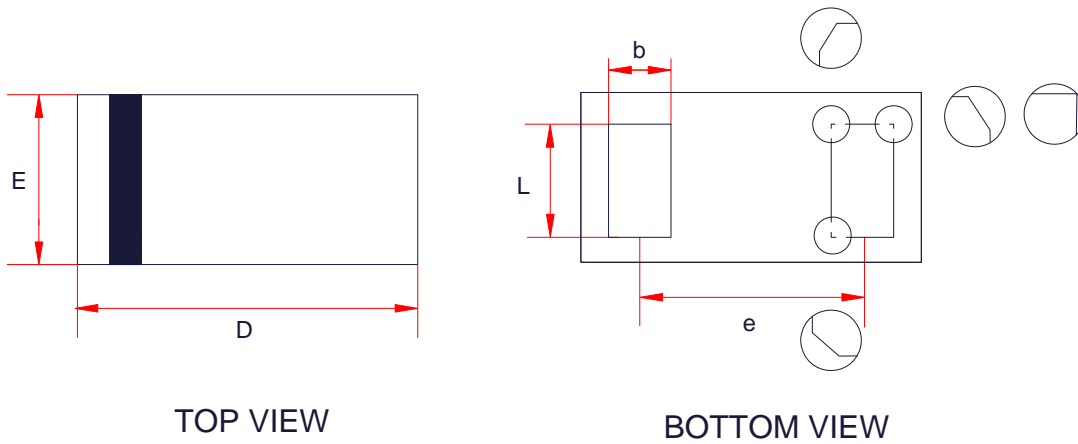
**ESD clamping**  
 (+8kV contact discharge per IEC61000-4-2)



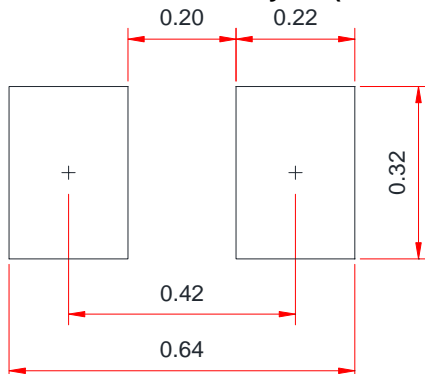
**ESD clamping**  
 (-8kV contact discharge per IEC61000-4-2)



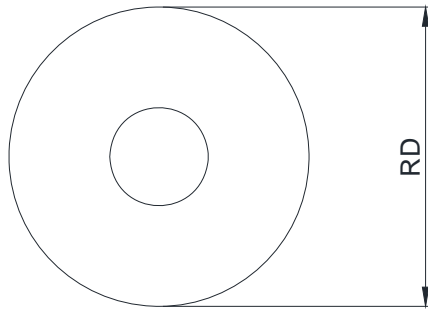
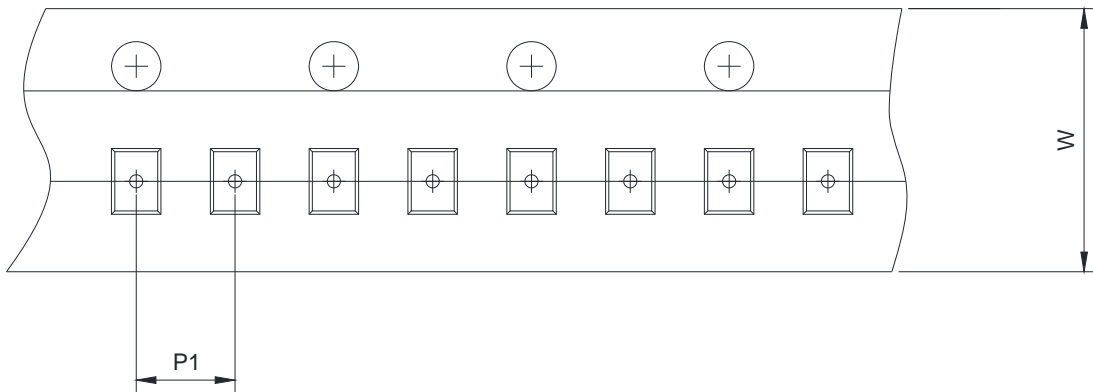
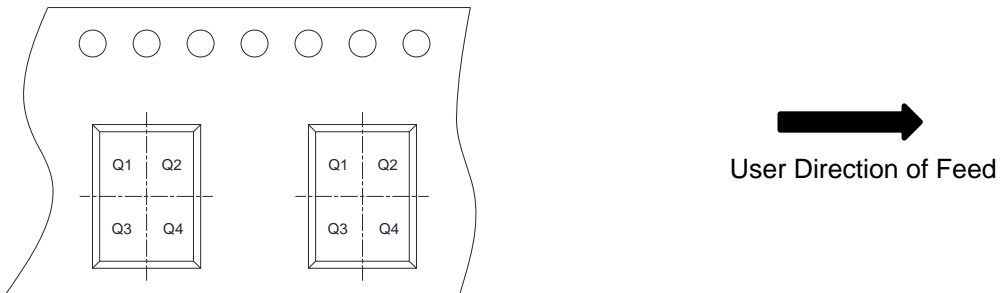
**TLP Measurement**

**PACKAGE OUTLINE DIMENSIONS**
**DFN0603-2L**

**SIDE VIEW**

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.23	0.30	0.34
A1	0.00	0.03	0.05
A3	0.10 Ref.		
D	0.55	0.60	0.67
E	0.25	0.30	0.37
b	0.10	0.15	0.20
L	0.20	0.24	0.30
e	0.40 Ref.		

**Recommended PCB Layout (Unit: mm)**

**Notes:**

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch	
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm	<input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input checked="" type="checkbox"/> 2mm	<input type="checkbox"/> 4mm	<input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input checked="" type="checkbox"/> Q2	<input type="checkbox"/> Q3 <input type="checkbox"/> Q4