

**Switching Control Diode**

# DISC0165CTSP

$I_{F(AV)}$	$2 \times 1A$
$V_{RRM}$	650V
$T_j$	150°C

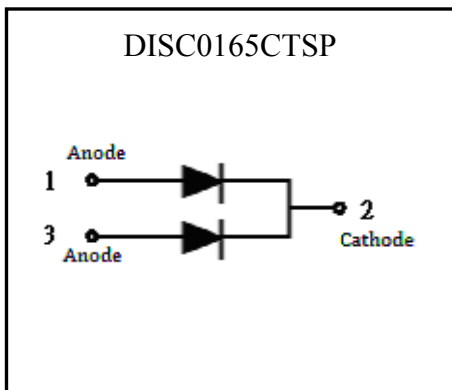
**Features**

- High current capability
- Smoothly soft reverse recovery time (trr)
- Low profile surface mounted package in order to minimize board space
- Two dice in a package
- Pb-free lead plating and halogen-free package

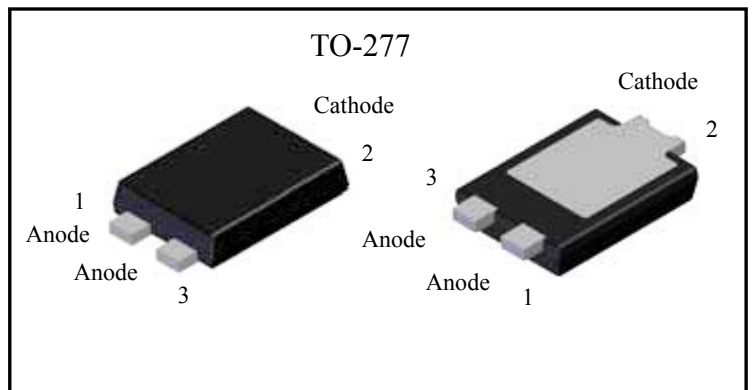
**Mechanical data**

- Case : TO-277 Molded plastic
- Epoxy : UL94-V0 rated flame retardant
- Terminals : Plated terminals, solderable per MIL-STD-202 method 208
- Weight : approx. 0.093 gram

**Symbol**

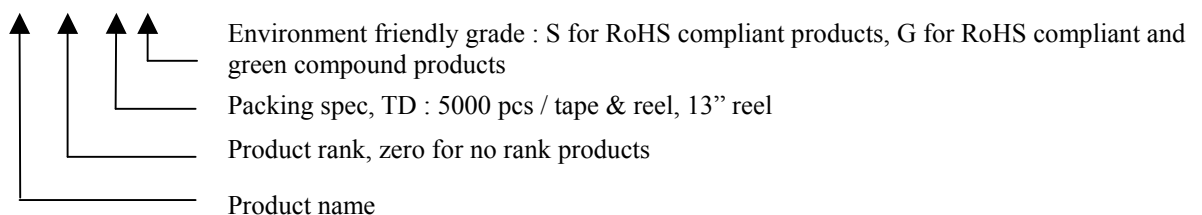


**Outline**



**Ordering Information**

Device	Package	Shipping
DISC0165CTSP-65-TD-G	TO-277 (Pb-free lead plating and halogen-free package)	5000 pcs / tape & reel



**Absolute Maximum Ratings** ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted), per leg

Parameters	Conditions	Symbol	Value	Units
Repetitive peak reverse voltage		$V_{RRM}$	650	V
RMS voltage		$V_{RMS}$	455	V
Continuous reverse voltage		$V_R$	650	V
Forward rectified current	Single phase half wave, 60Hz @ $T_J=25^{\circ}\text{C}$ , per leg	$I_{F(AV)}$	1	A
Forward rectified current	Single phase half wave, 60Hz @ $T_J=25^{\circ}\text{C}$ , per device	$I_{F(AV)}$	2	A
Repetitive Peak Forward Current	Single phase half wave, 60Hz @ $T_J=25^{\circ}\text{C}$ , per leg	$I_{FRM}$	1.57	A
Repetitive Peak Forward Current	Single phase half wave, 60Hz @ $T_J=25^{\circ}\text{C}$ , per device	$I_{FRM}$	3.14	A
Forward surge current	8.3ms single half sine-wave superimposed on rated load (JEDEC method), per device	$I_{FSM}$	14	A
Maximum reverse recovery time	$I_F=1\text{A}$ , $dI_F/dt=100\text{A}/\mu\text{s}$	$t_{rr}$	1	$\mu\text{s}$
Storage temperature range		$T_{stg}$	-55~+150	$^{\circ}\text{C}$
Operating junction temperature range		$T_J$	-55~+150	$^{\circ}\text{C}$

**Thermal Data, per leg**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	12.5	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-ambient, max (Note 1)	$R_{th,j-a}$	39	
Thermal Resistance, Junction-to-ambient, max (Note 2)		75	
Thermal Resistance, Junction-to-ambient, max (Note 3)		169	
Power Dissipation @ $T_C=25^{\circ}\text{C}$	$P_D$	10	W
Power Dissipation @ $T_A=25^{\circ}\text{C}$ (Note 1)		3.2	
Power Dissipation @ $T_A=25^{\circ}\text{C}$ (Note 2)		1.7	
Power Dissipation @ $T_A=25^{\circ}\text{C}$ (Note 3)		0.74	

Note: 1. Device mounted on FR-4 PCB, single sided 2 oz. copper, pad dimension 50mmx50mm.

2. Device mounted on FR-4 PCB, single sided 1 oz. copper, pad dimension 25mmx25mm.

3. Device mounted on FR-4 PCB, single sided 1 oz. copper, minimum recommended pad dimension.

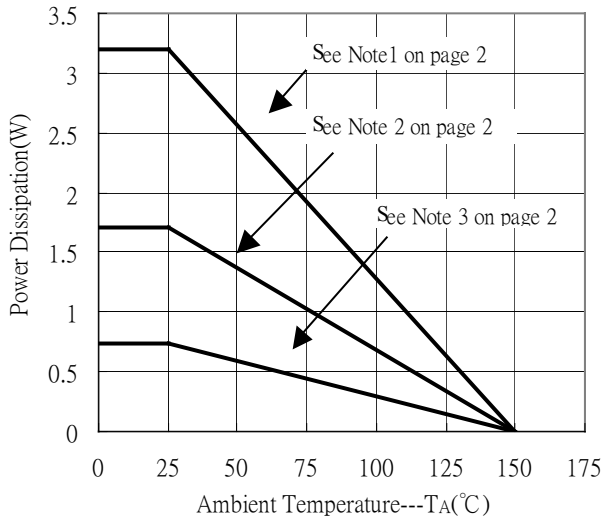
**Characteristics** ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted), per leg

Characteristic	Symbol	Condition	Min.	Typ	Max.	Unit
Continuous reverse voltage	$V_R$	$I_R=100\mu\text{A}$	650	-	-	V
Forward Voltage	$V_F 1$	$I_F=100\text{mA}$	-	-	1.1	V
	$V_F 2$	$I_F=500\text{mA}$	-	-	1.2	
Reverse Leakage Current	$I_R$	$V_R=540\text{V}$	-	-	100	nA
		$V_R=540\text{V}$ , $T_A=125^{\circ}\text{C}$	-	-	10	$\mu\text{A}$
Junction Capacitance	$C_J$	$V_R=1\text{V}$ , $f=1\text{MHz}$	-	7	-	pF

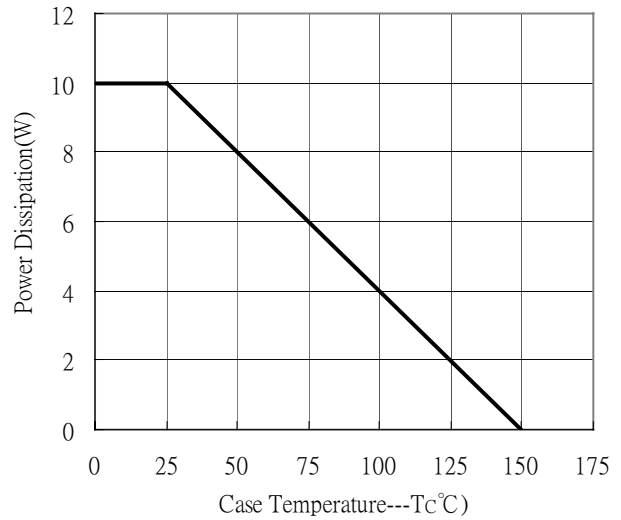


### Typical Characteristics, per leg

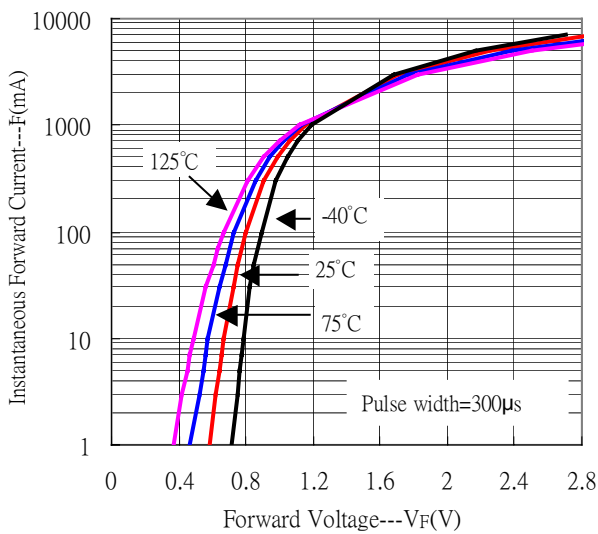
Power Derating Curve



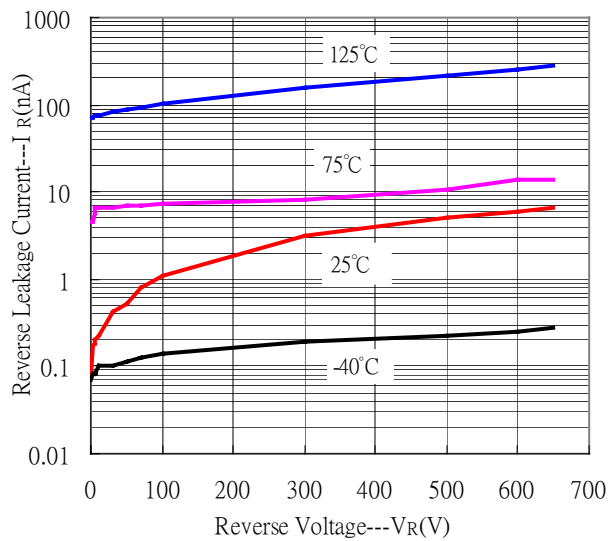
Power Derating Curve



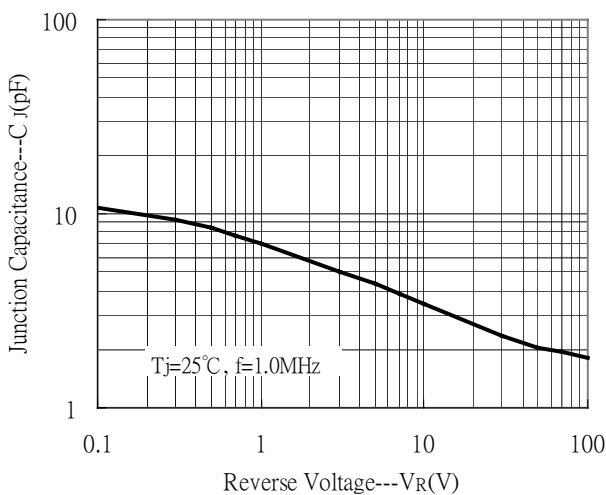
Forward Current vs Forward Voltage



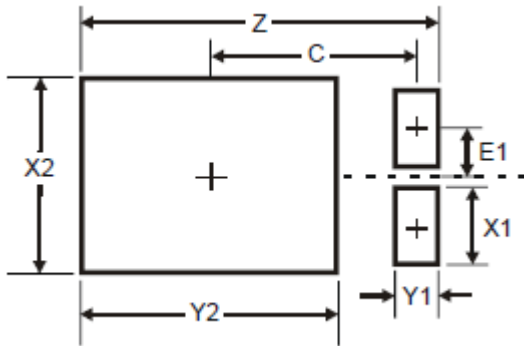
Reverse Leakage Current vs Reverse Voltage



Junction Capacitance vs Reverse Voltage

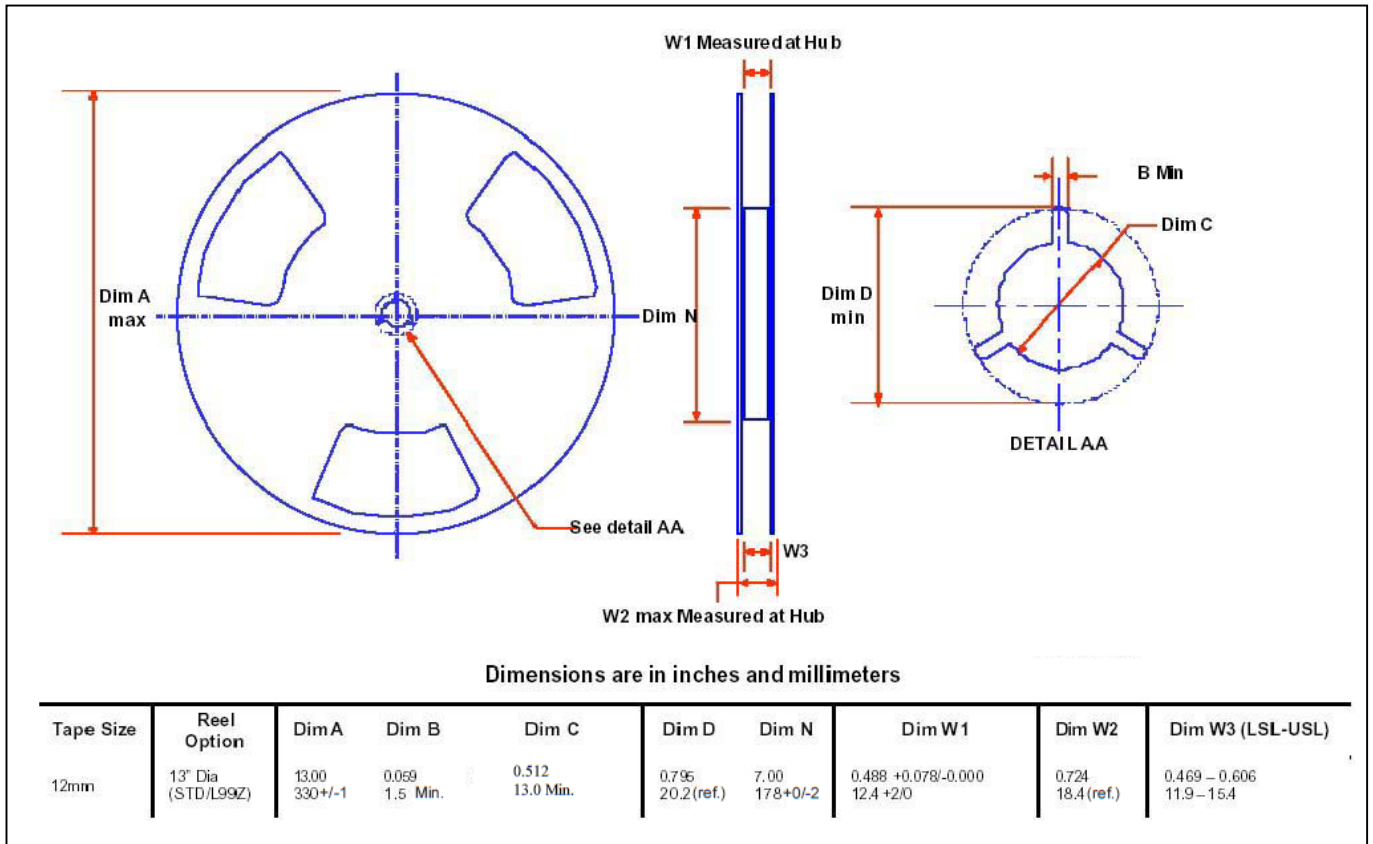


**Recommended Soldering Footprint**

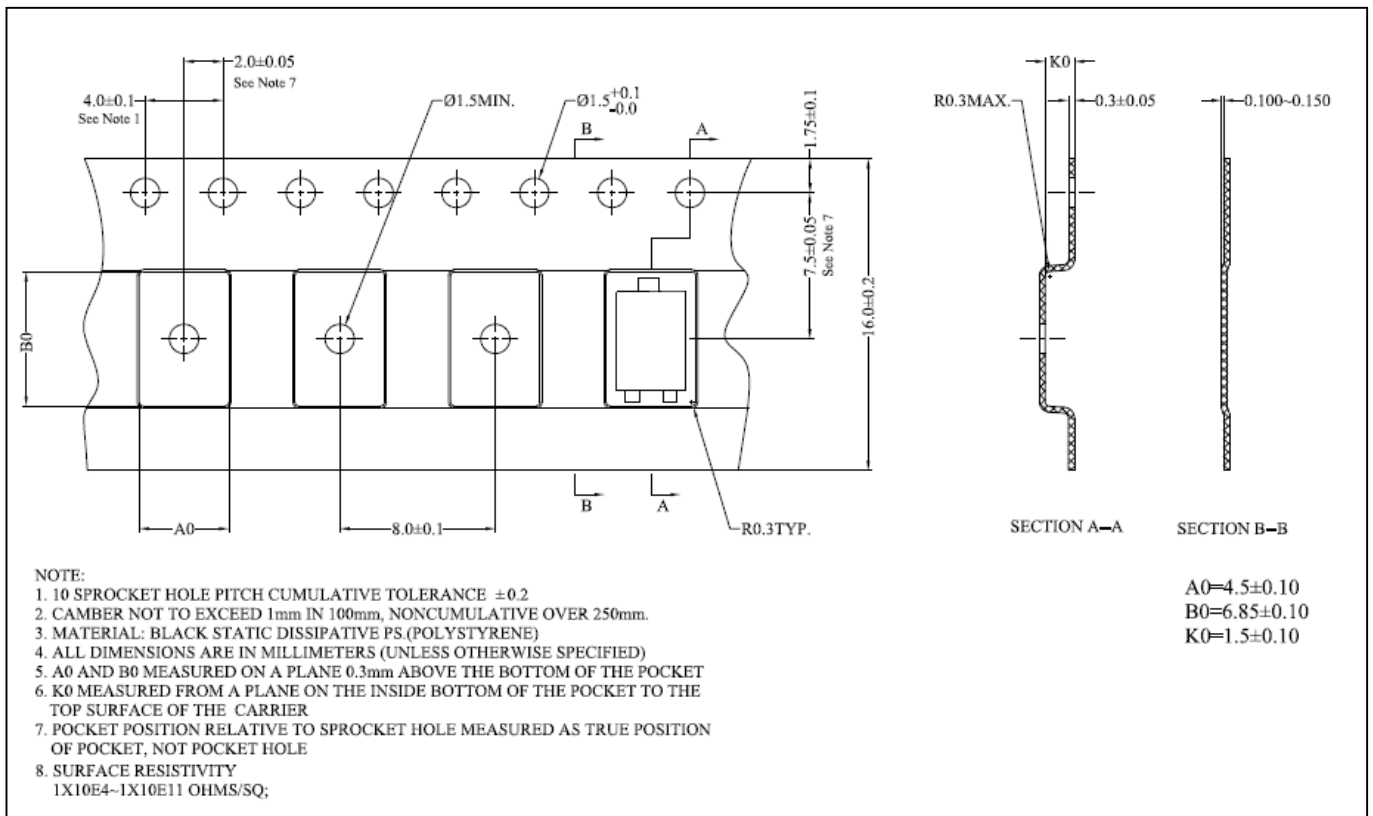


Dimensions	Value (in mm)
Z	6.6
X1	1.4
X2	3.6
Y1	0.8
Y2	4.7
C	3.87
E1	0.9

## Reel Dimension



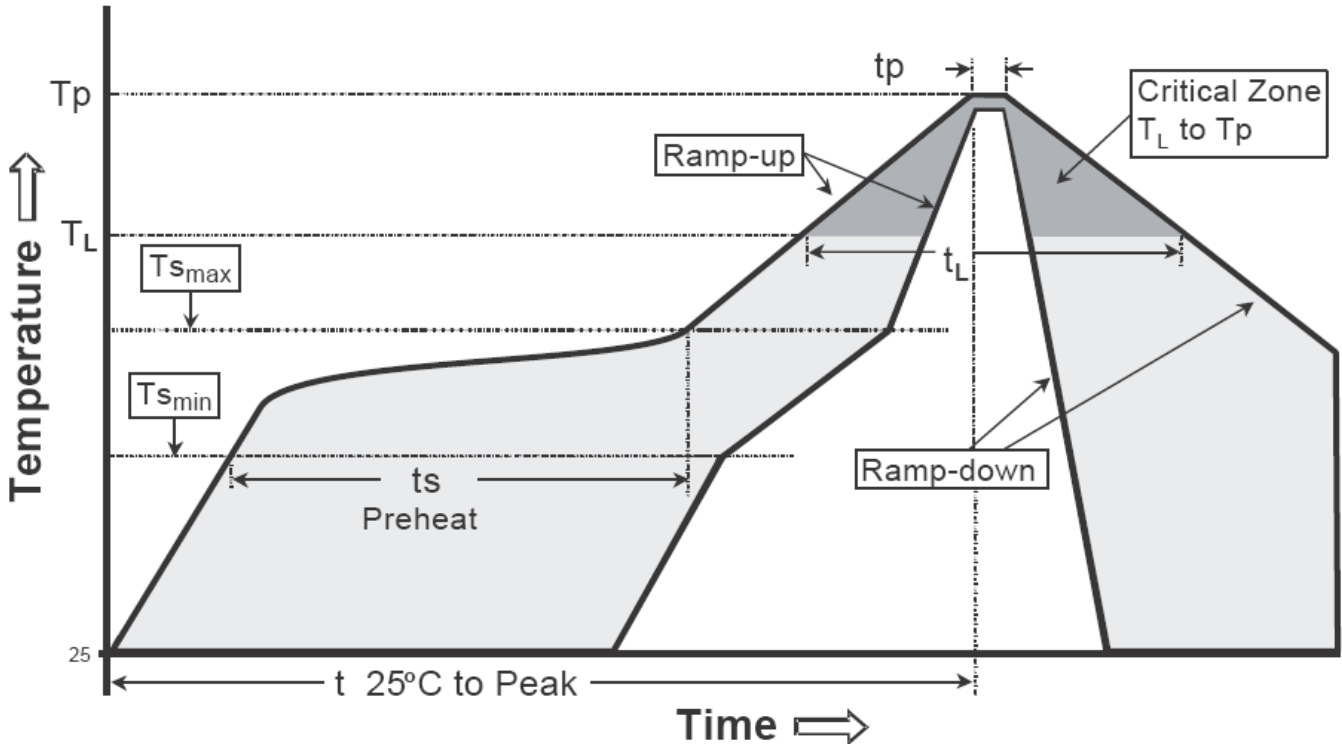
## Carrier Tape Dimension



**Recommended wave soldering condition**

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

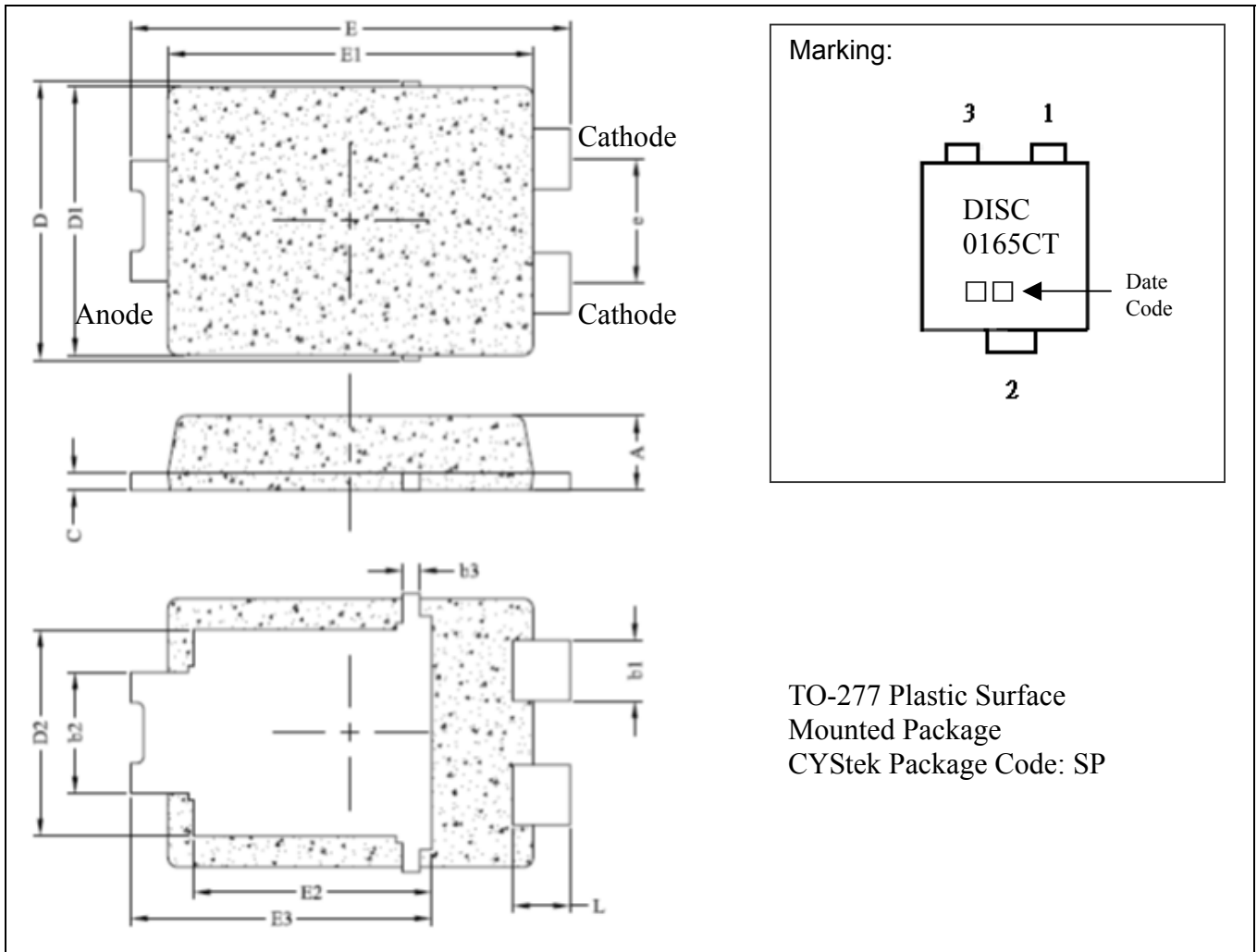
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note :1. All temperatures refer to topside of the package, measured on the package body surface.  
 2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

**TO-277 Dimension**



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	1.05	1.15	0.041	0.045	D2	2.95	3.15	0.116	0.124
b1	0.80	0.99	0.031	0.039	E	6.40	6.60	0.252	0.260
b2	1.70	1.88	0.067	0.074	E1	5.30	5.45	0.209	0.215
b3	0.15	0.35	0.006	0.014	E2	3.45	3.65	0.136	0.144
C	0.20	0.33	0.008	0.013	E3	4.20	4.60	0.165	0.181
D	4.00	4.30	0.157	0.169	e	1.84 TYP		0.072 TYP	
D1	3.90	4.05	0.154	0.159	L	0.75	0.95	0.030	0.037

**Notes :** 1.Controlling dimension : millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material :**

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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