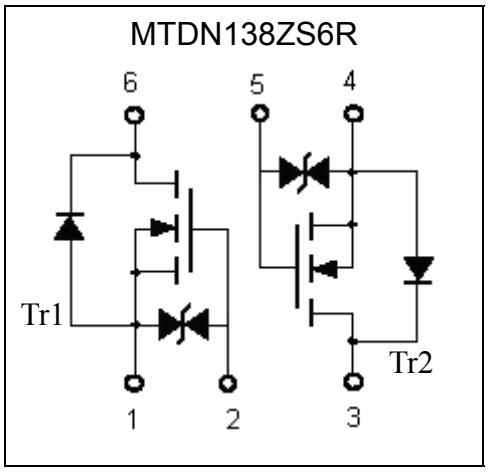
N-Channel MOSFET (dual transistors)

MTDN138ZS6R

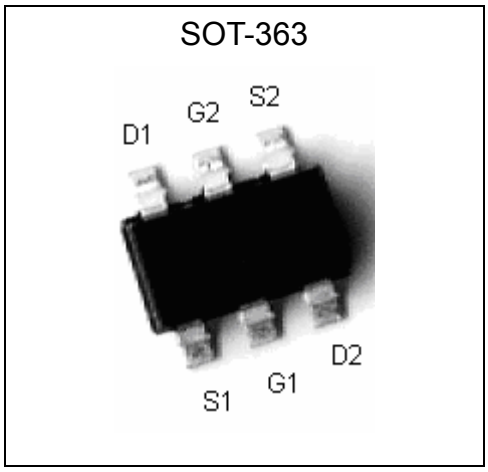
Features

- Low on-resistance
- High ESD capability
- High speed switching
- Low-voltage drive
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free lead plating and halogen-free package

Equivalent Circuit



Outline



Ordering Information

Device	Package	Shipping
MTDN138ZS6R-0-T1-G	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T1 : 3000 pcs / tape & reel, 7” reel

Product rank, zero for no rank products

Product name

The following characteristics apply to both Tr1 and Tr2

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	
Drain Current	Continuous	I_D	200	mA
	Pulsed	I_{DP}	800 (Note 1)	
Drain Reverse Current	Continuous	I_{DR}	200	
	Pulsed	I_{DRP}	800 (Note 1)	
Power Dissipation		Pd	300(total) (Note 2)	mW
ESD susceptibility			1550 (Note 3)	V
Operating Junction and Storage Temperature Range		Tj ; Tstg	-55~+150	°C

Note : 1. Pulse test, pulse width≤300μs, duty≤2%
2. 200mW per element must not be exceeded.
3. Human body model, 1.5kΩ in series with 100pF

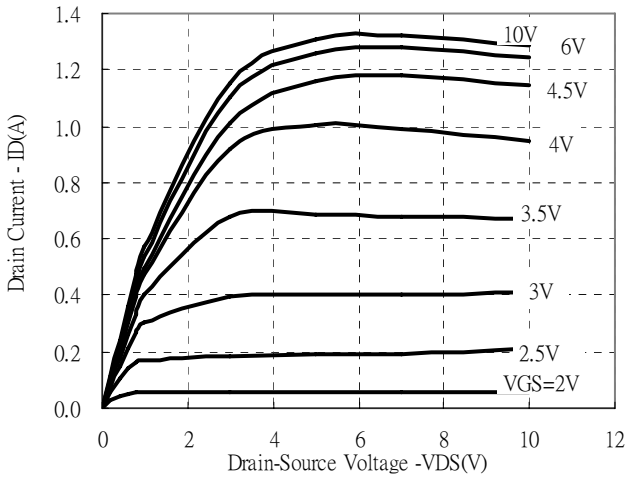
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}*	60	-	-	V	V_{GS}=0, I_D=10μA
$V_{GS(th)}$	1	1.2	2		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1		V_{DS}=60V, V_{GS}=0
$R_{DS(ON)}$*	-	3.2	5	Ω	I_D=1mA, V_{GS}=2.5V
	-	3.2	5		I_D=10mA, V_{GS}=2.5V
	-	2	4		I_D=10mA, V_{GS}=4V
	-	2	4		I_D=200mA, V_{GS}=4V
	-	1.5	3		I_D=200mA, V_{GS}=10V
G_{FS}	100	240	-	mS	V_{DS}=10V, I_D=100mA
C_{iss}	-	30.6	-	pF	V_{DS}=10V, V_{GS}=0, f=1MHz
C_{oss}	-	5.5	-		
C_{rss}	-	4	-		
$t_{d(ON)}$	-	3	-	ns	V_{DS}=30V, I_D=200mA, V_{GS}=10V, R_G=6Ω
t_r	-	5	-		
$t_{d(OFF)}$	-	14	-		
t_f	-	9	-		
Qg	-	1.1	-	nC	V_{DS}=30V, I_D=200mA, V_{GS}=10V
Qgs	-	0.1	-		
Qgd	-	0.23	-		

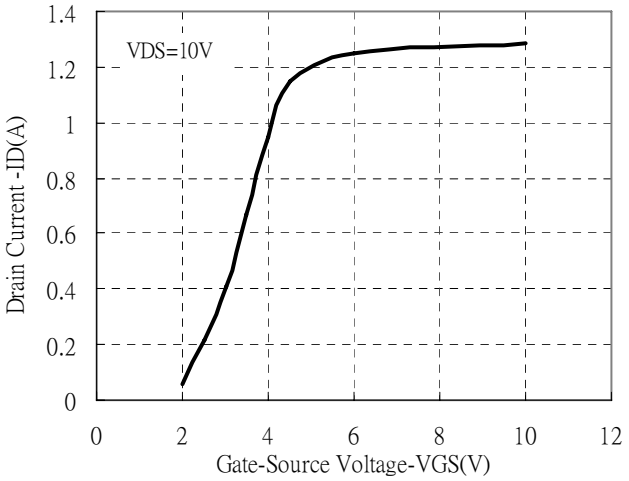
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Characteristic Curves

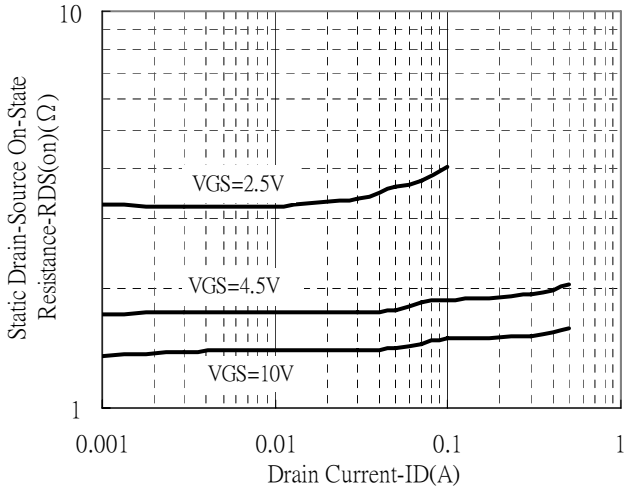
Typical Output Characteristics



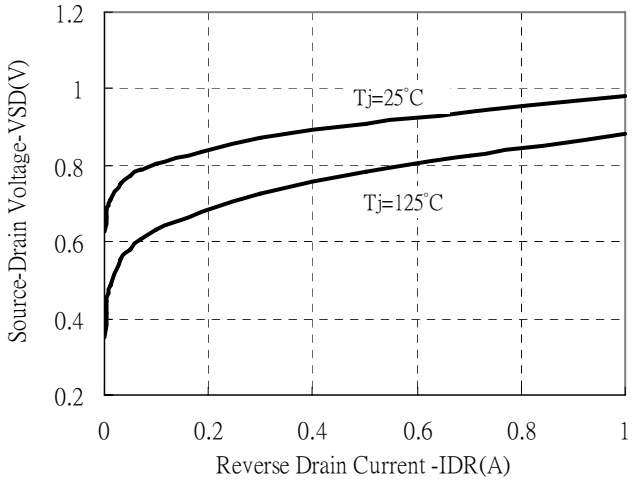
Typical Transfer Characteristics



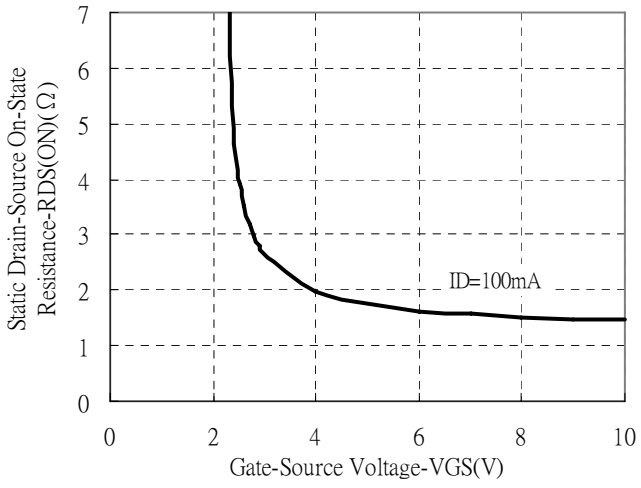
Static Drain-Source On-State resistance vs Drain Current



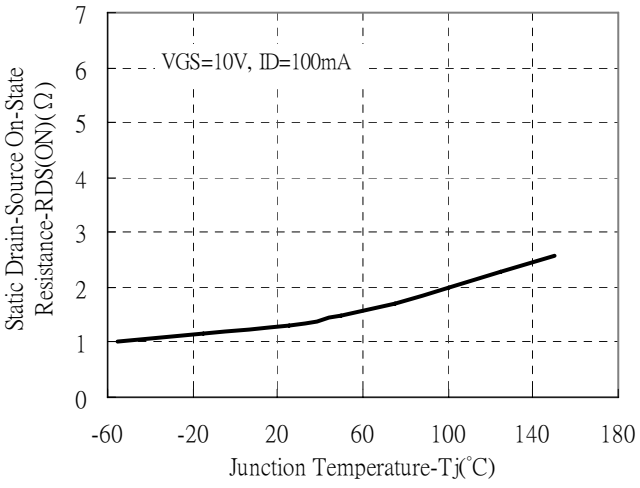
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

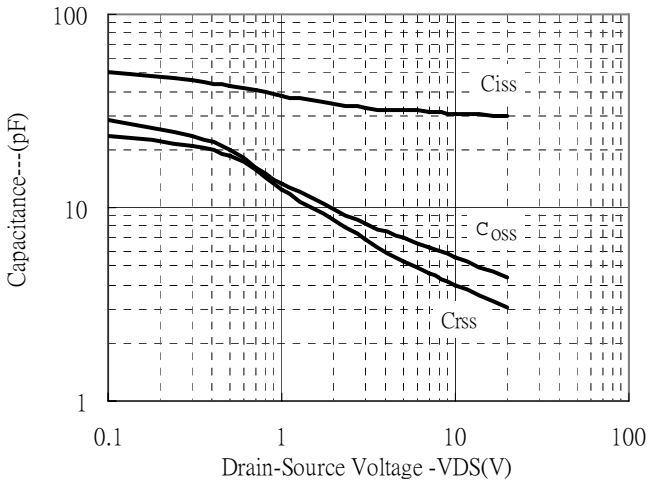


Drain-Source On-State Resistance vs Junction Tempearture

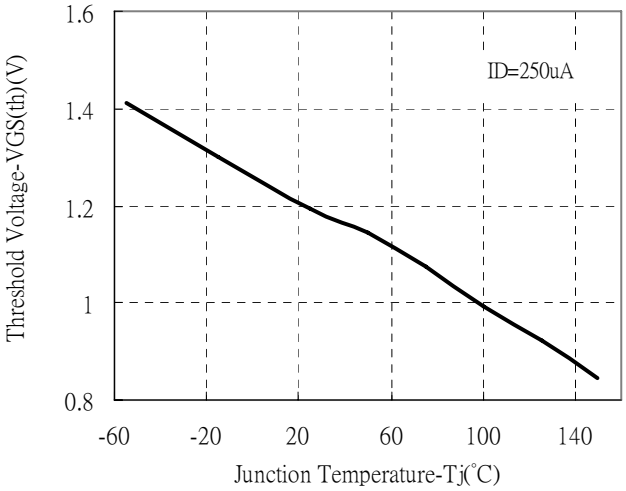


Characteristic Curves (Cont.)

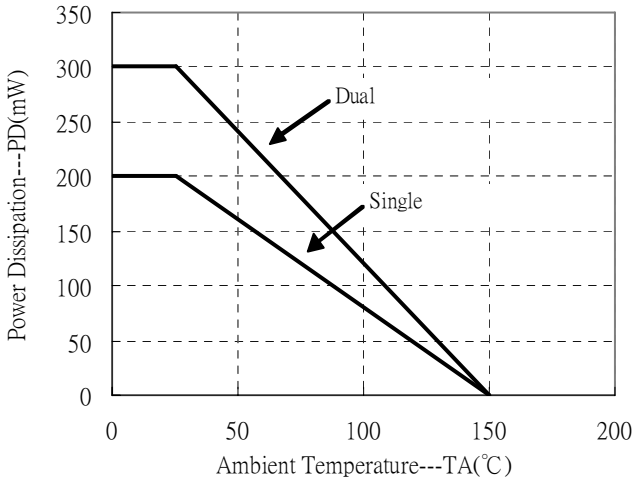
Capacitance vs Drain-to-Source Voltage



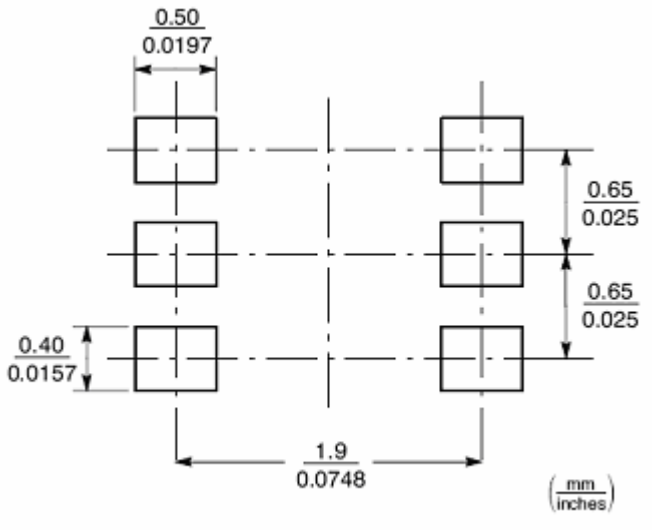
Threshold Voltage vs Junction Tempearture



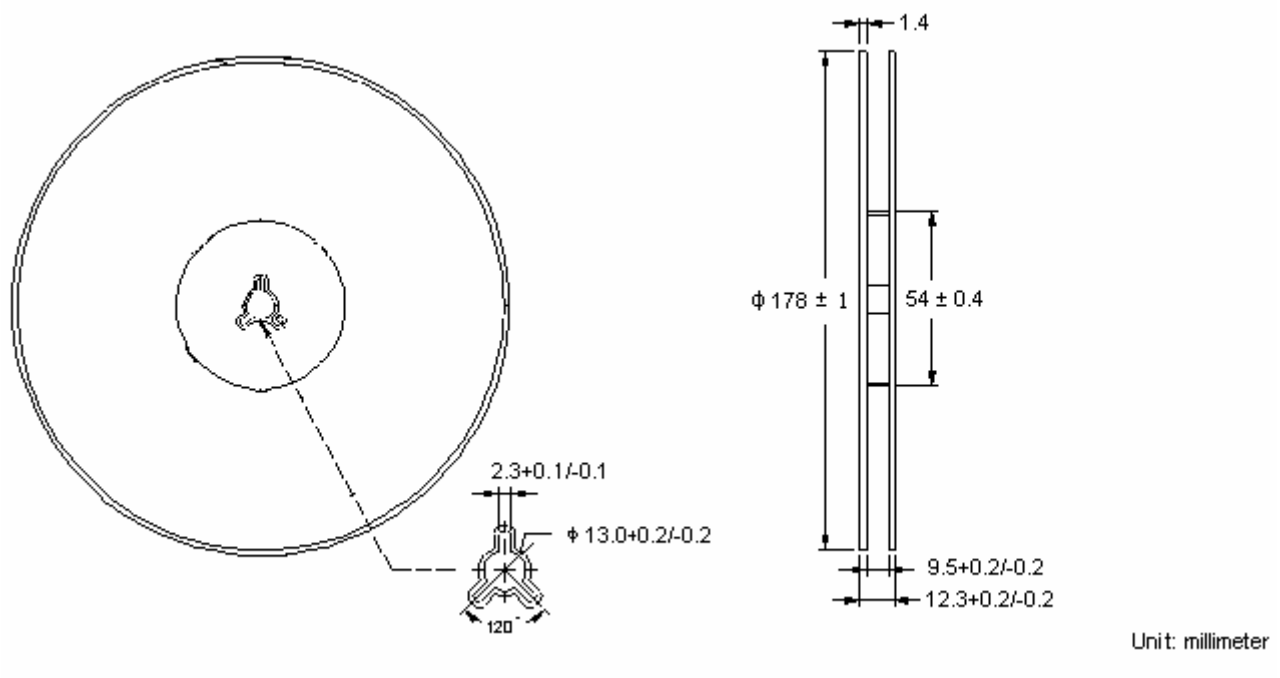
Power Derating Curve



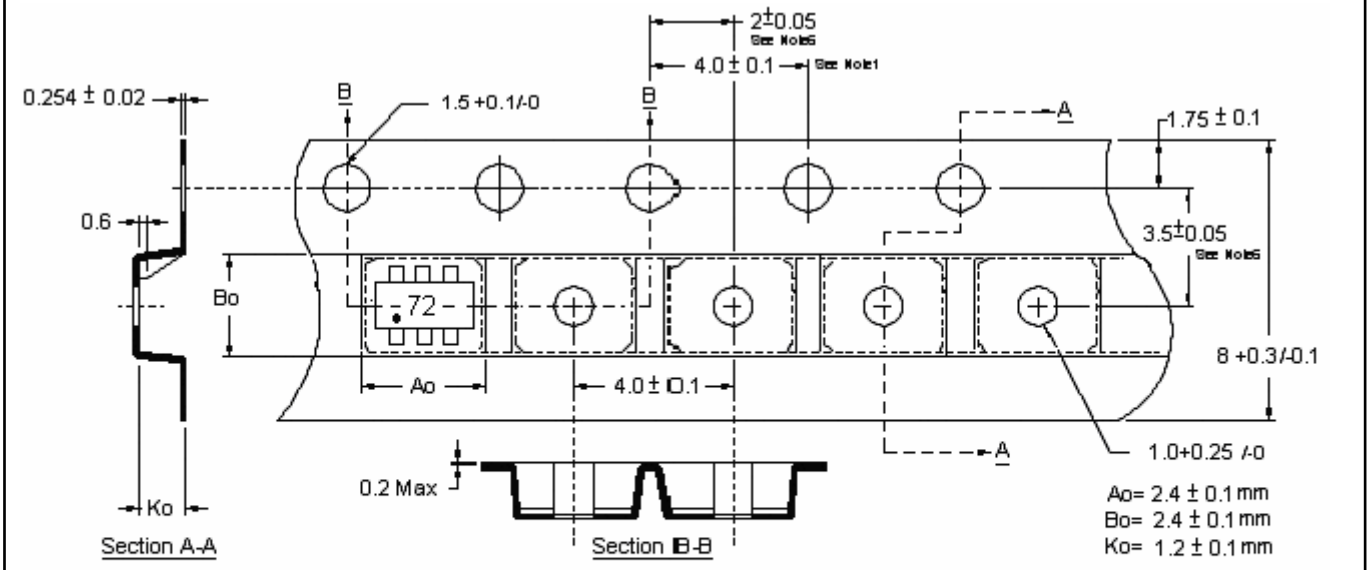
Recommended Soldering Footprint



Reel Dimension



Carrier Tape Dimension



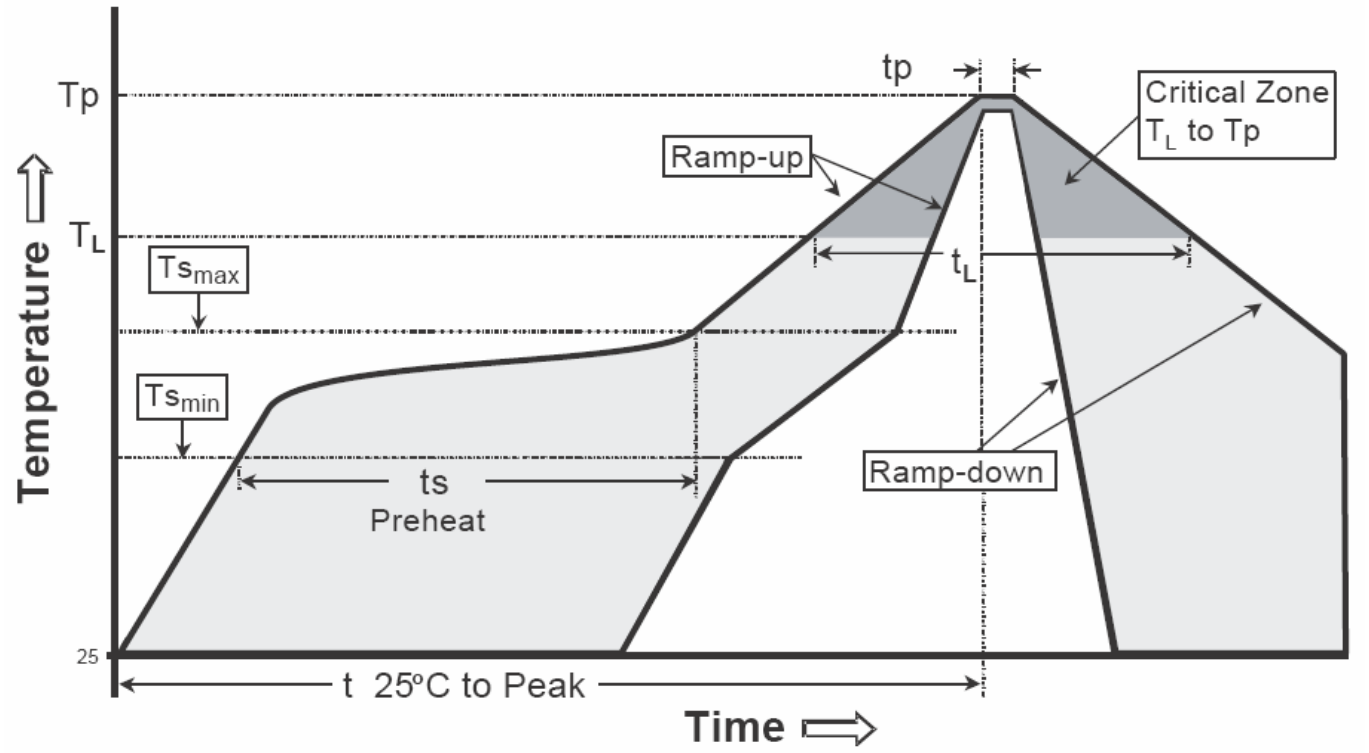
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

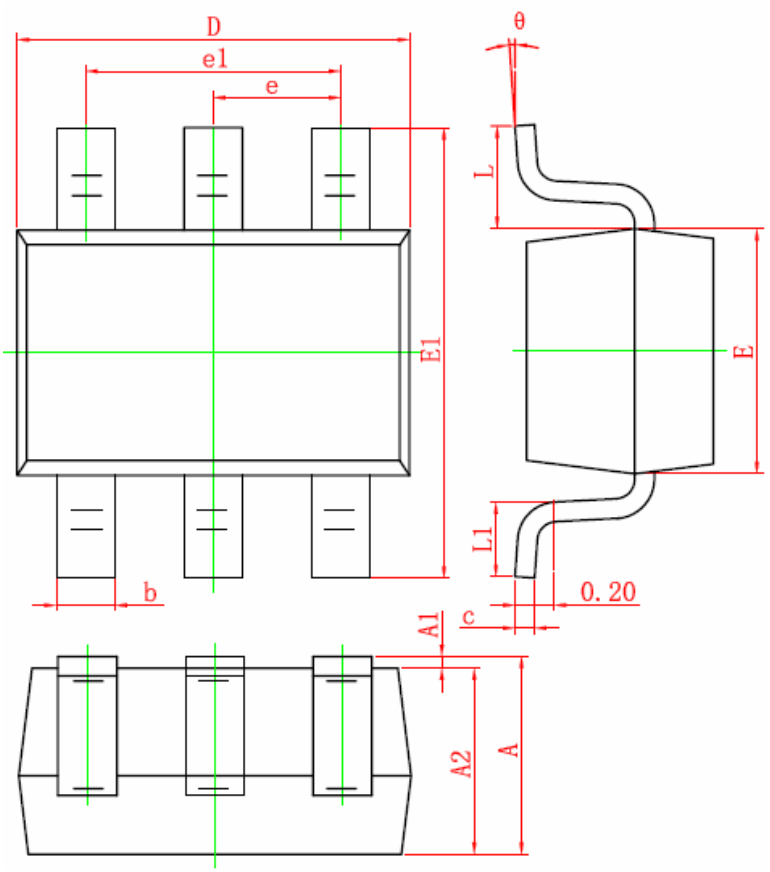
Recommended temperature profile for IR reflow



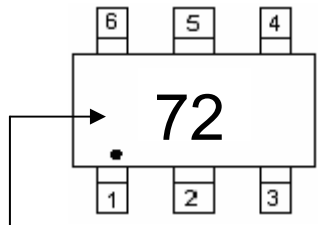
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	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 : All temperatures refer to topside of the package, measured on the package body surface.

SOT-363 Dimension



Marking:



Device Code

6-Lead SOT-363 Plastic
Surface Mounted Package
CYStek Package Code: S6R

Style:
Pin 1. Source1 (S1)
Pin 2. Gate1 (G1)
Pin 3. Drain2 (D2)
Pin 4. Source2 (S2)
Pin 5. Gate2 (G2)
Pin 6. Drain1 (D1)

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043	E1	2.150	2.450	0.085	0.096
A1	0.000	0.100	0.000	0.004	e	0.650 TYP		0.026 TYP	
A2	0.900	1.000	0.035	0.039	e1	1.200	1.400	0.047	0.055
b	0.150	0.350	0.006	0.014	L	0.525 REF		0.021 REF	
c	0.080	0.150	0.003	0.006	L1	0.260	0.460	0.010	0.018
D	2.000	2.200	0.079	0.087	θ	0°	8°	0°	8°
E	1.150	1.350	0.045	0.053					

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.