## ESD protected N-CHANNEL MOSFET

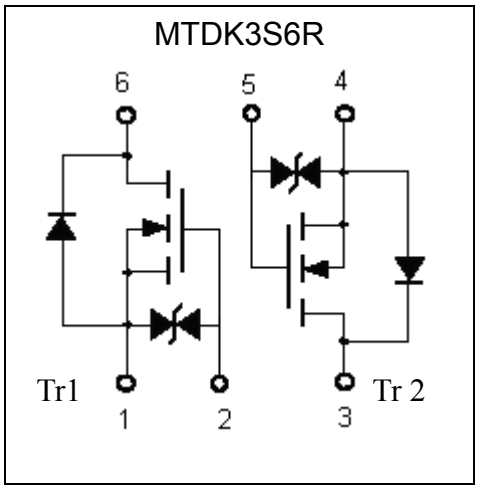
# MTDK3S6R

| | |
|---|---|
| $BV_{DSS}$ | 20V |
| $I_D$ | 100mA |
| $R_{DSON}$ | 3Ω |

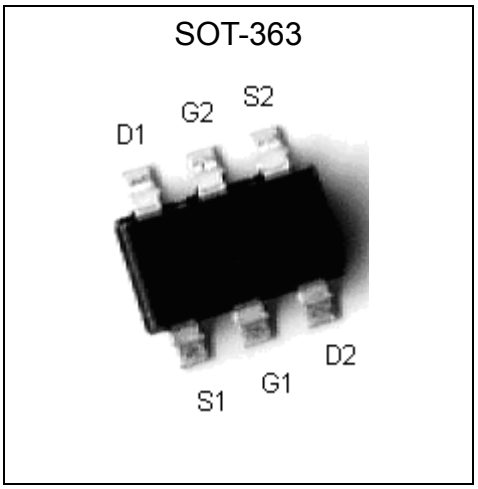
## Description

- Low voltage drive, 1.8V
- Easy to use in parallel
- High speed switching
- ESD protected device
- Pb-free package

## Symbol




## Outline




## The following characteristics apply to both Tr1 and Tr2

## Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | $BV_{DSS}$ | 20 | | V |
| Gate-Source Voltage | $V_{GS}$ | ±8 | | V |
| Continuous Drain Current | $I_D$ | 100 | | mA |
| Pulsed Drain Current (Ta=25°C) | $I_{DM}$ | 400 | *1 | mA |
| Total Power Dissipation | $P_D$ | 300 | *2 | mW |
| ESD susceptibility | | 350 | *3 | V |
| Operating Junction and Storage Temperature Range | Tj | -55~+150 | | °C |
| Thermal Resistance, Junction-to-Ambient | Rth,ja | 415 | | °C/W |

Note : *1. Pulse Width ≤ 300μs, Duty cycle ≤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 |
|---|---|---|---|---|---|
| **Static** | | | | | |
| $BV_{DSS}$ | 20 | - | - | V | $V_{GS}$=0, $I_D$=100μA |
| $V_{GS(th)}$ | 0.5 | - | 1.0 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| $I_{GSS}$ | - | - | ±1 | μA | $V_{GS}$=±8V, $V_{DS}$=0 |
| $I_{DSS}$ | - | - | 500 | nA | $V_{DS}$=20V, $V_{GS}$=0 |
| $R_{DS(ON)}$ | - | 1.7 | 3 | Ω | $V_{GS}$=4.5V, $I_D$=100mA |
| | - | 3.5 | 6 | | $V_{GS}$=1.8V, $I_D$=20mA |
| $G_{FS}$ | 100 | - | - | mS | $V_{DS}$=5V, $I_D$=100mA |
| **Dynamic** | | | | | |
| $C_{iss}$ | - | - | 50 | pF | $V_{DS}$=10V, $V_{GS}$=0, f=1MHz |
| $C_{oss}$ | - | - | 25 | | |
| $C_{rss}$ | - | - | 5 | | |
| **Source-Drain Diode** | | | | | |
| *$V_{SD}$ | - | - | 1 | V | $V_{GS}$=0V, $I_S$=10mA |

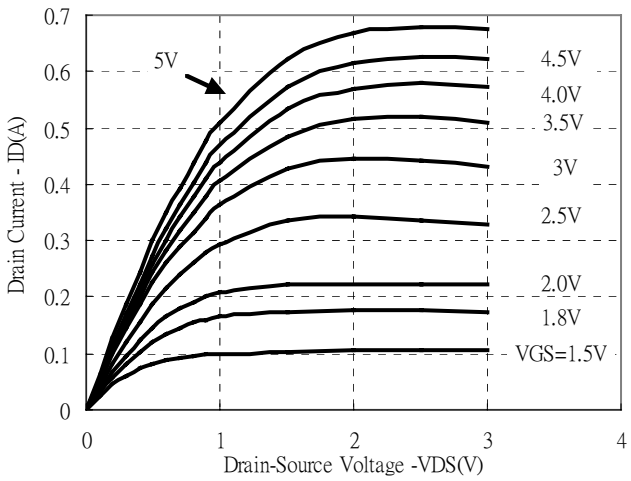
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## Ordering Information

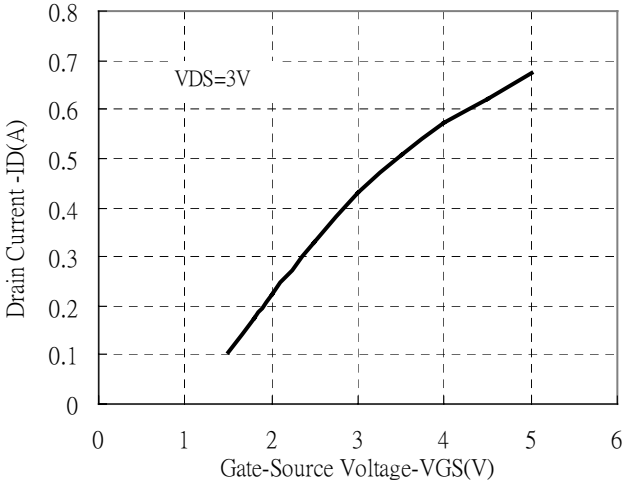
| Device | Package | Shipping | Marking |
|---|---|---|---|
| MTDK3S6R | SOT-363 (Pb-free) | 3000 pcs / Tape & Reel | KG |

## Characteristic Curves

Typical Output Characteristics

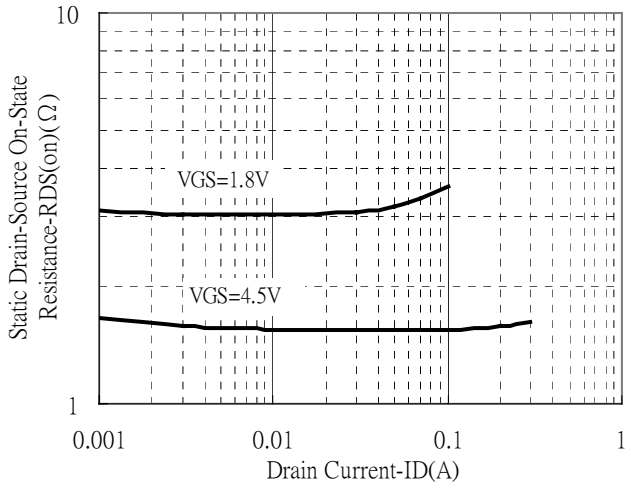



Typical Transfer Characteristics

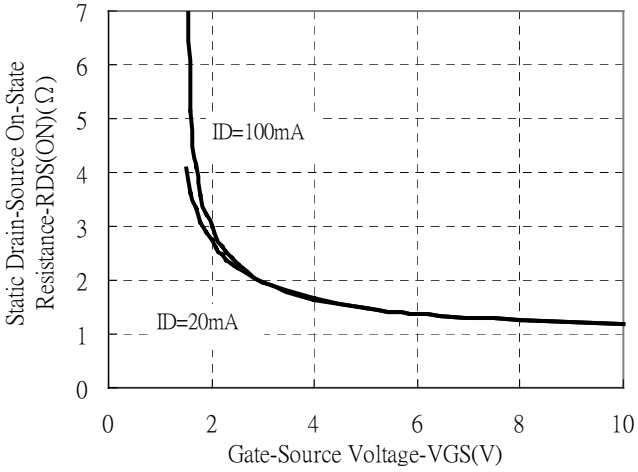


## Characteristic Curves(Cont.)

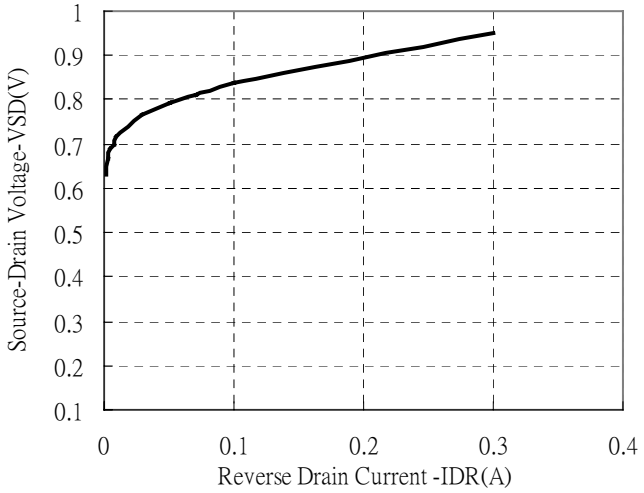
Static Drain-Source On-State resistance vs Drain Current



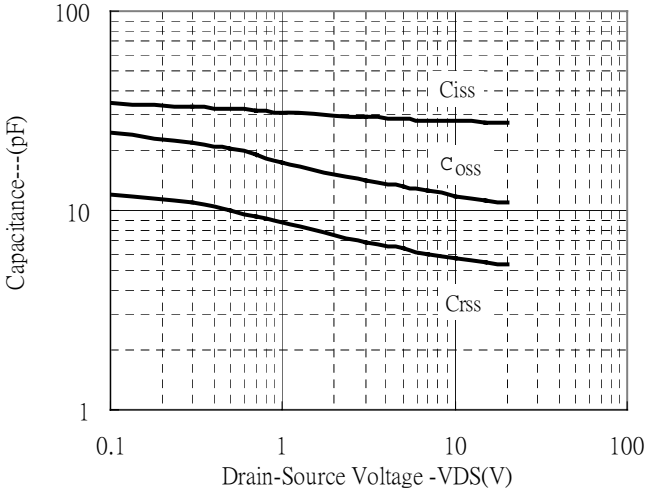

Static Drain-Source On-State Resistance vs Gate-Source Voltage



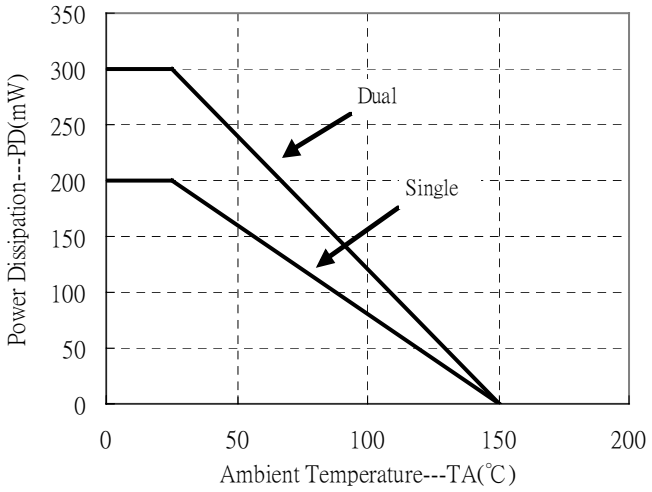

Reverse Drain Current vs Source-Drain Voltage



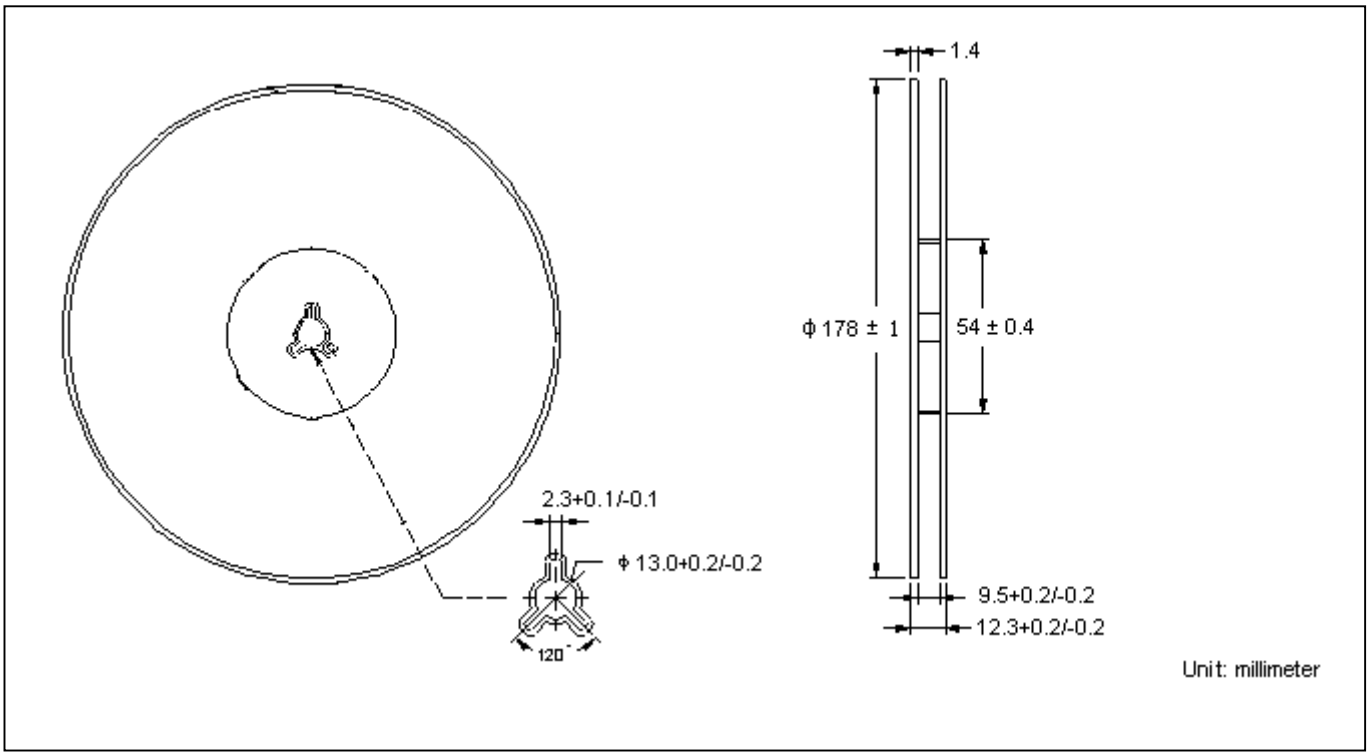

Capacitance vs Drain-to-Source Voltage



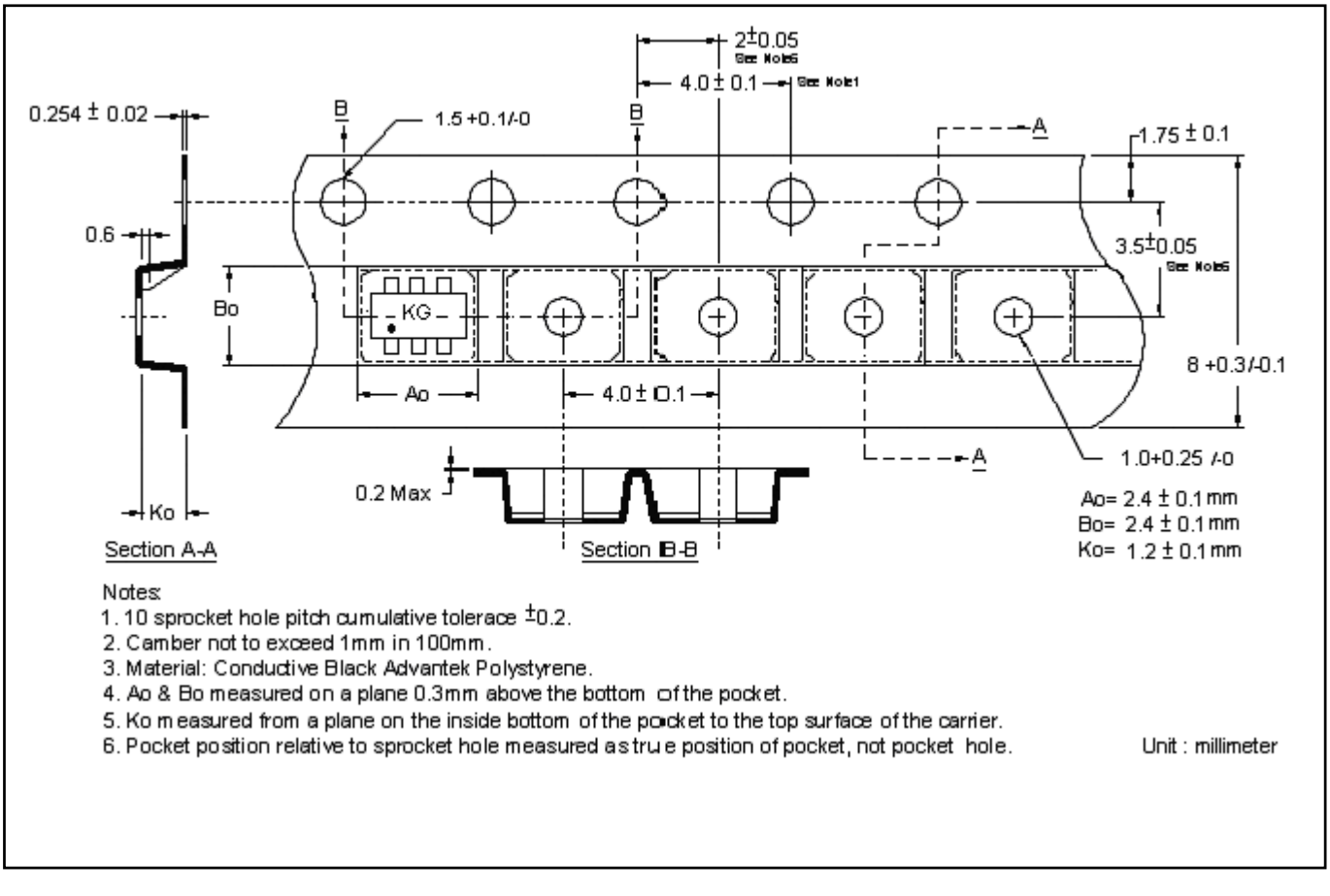

Power Derating Curves



## Reel Dimension




## Carrier Tape Dimension



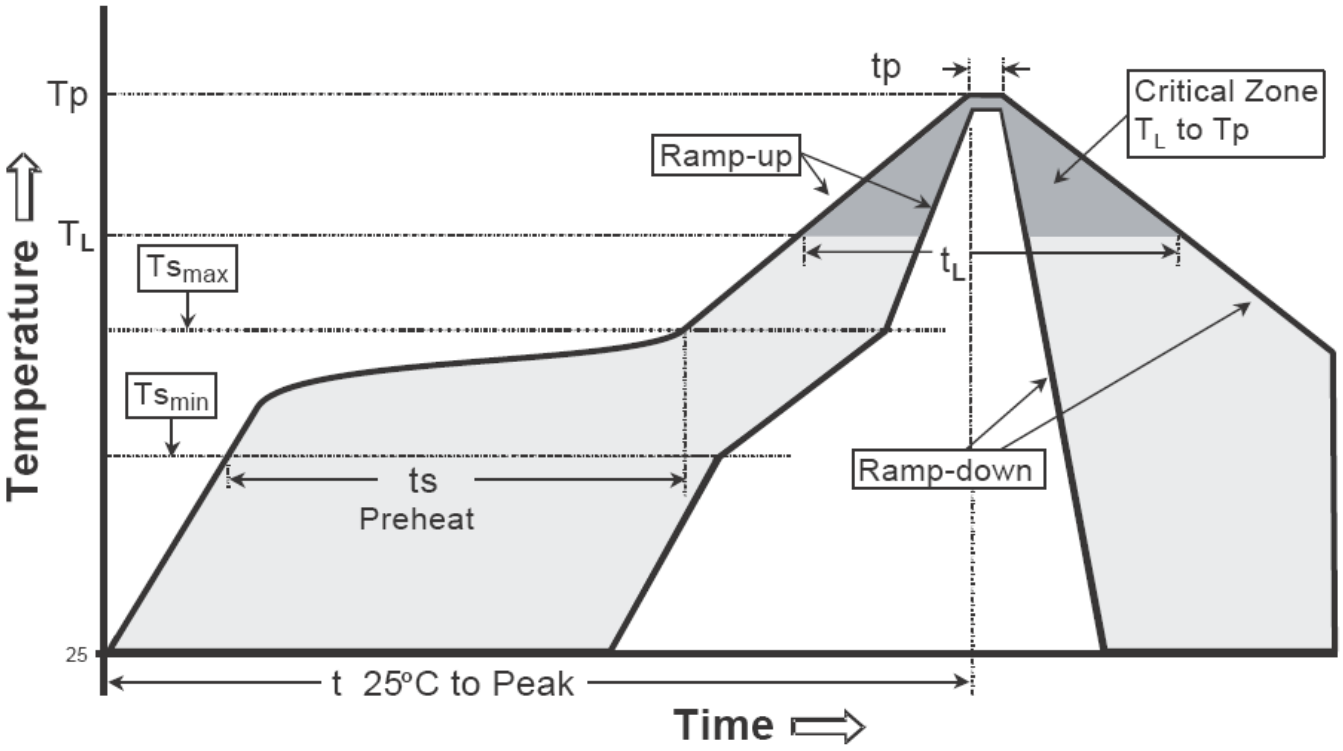

Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of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

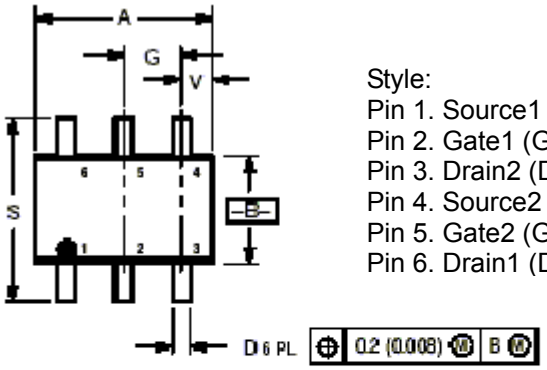
## Recommended temperature profile for IR reflow




| 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<br>−Temperature Min($T_S$ min)<br>−Temperature Max($T_S$ max)<br>−Time($t_{s\ min}$ to $t_{s\ max}$) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature ($T_L$)<br>− Time ($t_L$) | <br>183°C<br>60-150 seconds | <br>217°C<br>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. |

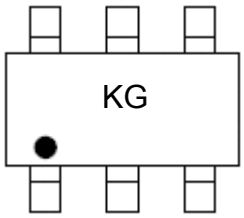
Note : All temperatures refer to topside of the package, measured on the package body surface.

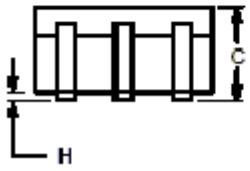
## SOT-363 Dimension

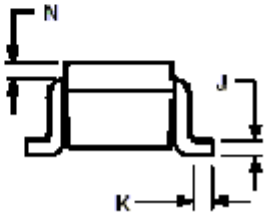



Style:
Pin 1. Source1 (S1)
Pin 2. Gate1 (G1)
Pin 3. Drain2 (D2)
Pin 4. Source2 (S2)
Pin 5. Gate2 (G2)
Pin 6. Drain1 (D1)

Marking:




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

*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.071 | 0.087 | 1.8 | 2.2 | J | 0.004 | 0.010 | 0.1 | 0.25 |
| B | 0.045 | 0.053 | 1.15 | 1.35 | K | 0.004 | 0.012 | 0.1 | 0.30 |
| C | 0.031 | 0.043 | 0.8 | 1.1 | N | 0.008 REF | | 0.20 REF | |
| D | 0.004 | 0.012 | 0.1 | 0.3 | S | 0.079 | 0.087 | 2.00 | 2.40 |
| G | 0.026BSC | | 0.65BSC | | Y | 0.012 | 0.016 | 0.30 | 0.40 |
| H | - | 0.004 | - | 0.1 | | | | | |

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 : 42 Alloy ; pure tin plating
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0