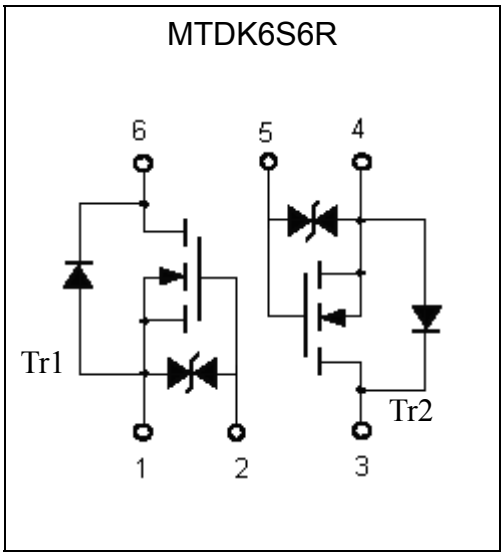
N-CHANNEL MOSFET (dual transistors)

MTDK6S6R

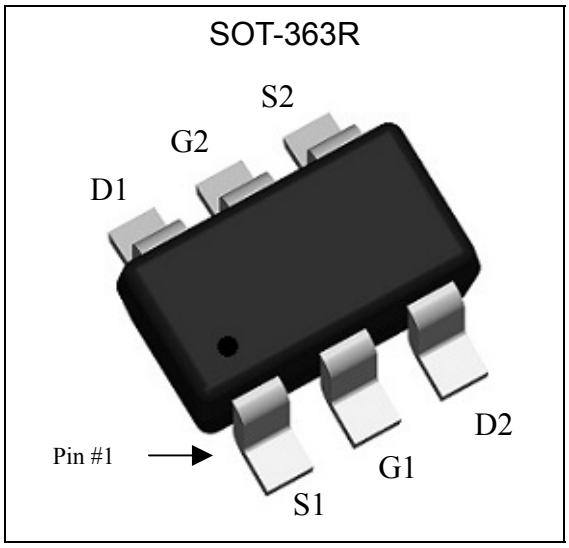
Features

- ESD protected gate, ≥**2kV (HBM)**
- High speed switching
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free lead plating and halogen-free package

Equivalent Circuit

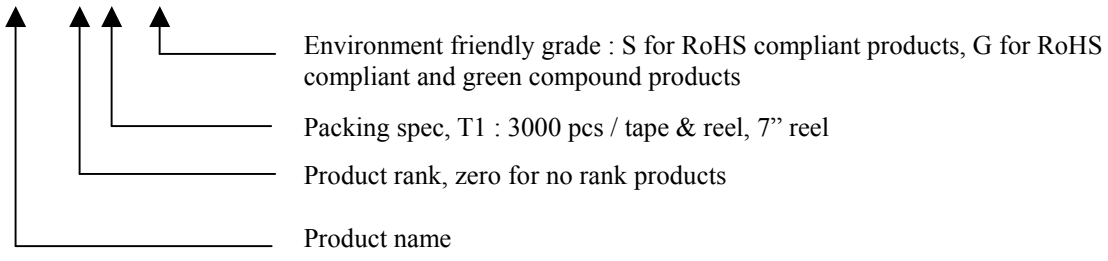


Outline



Ordering Information

Device	Package	Shipping
MTDK6S6R-0-T1-G	SOT-363 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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	
Continuous Drain Current @V_{GS}=10V, T_A=25°C (Note 3)	I_D	320	mA
Continuous Drain Current @V_{GS}=10V, T_A=70°C (Note 3)		256	
Pulsed Drain Current (Notes 1, 2)	I_{DM}	1300	
Power Dissipation (Note 3)	P_D	300	mW
ESD susceptibility (Note 4)	V_{ESD}	2000	V
Operating Junction Temperature Range	Tj	-55~+150	°C
Storage Temperature Range	Tstg	-55~+150	

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max (Note 3)	$R_{\theta JA}$	417	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	150	

Note : 1. Pulse width limited by maximum junction temperature.
2. Pulse width≤ 300μs, duty cycle≤2%.
3. Surface mounted on copper pad of FR-4 board with minimum footprint, 2 oz. copper.
4. Human body model, 1.5kΩ in series with 100pF

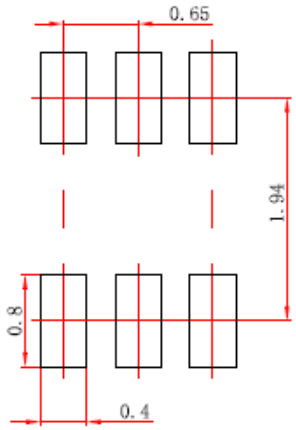
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}*	60	-	-	V	V_{GS}=0V, I_D=10μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.06	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=60V, V_{GS}=0V
	-	-	10		V_{DS}=48V, V_{GS}=0V (Tj=70°C)
$R_{DS(ON)}$*	-	1.1	2.5	Ω	I_D=500mA, V_{GS}=10V
	-	1.3	3		I_D=200mA, V_{GS}=4.5V
G_{FS}	100	250	-	mS	V_{DS}=10V, I_D=100mA
C_{iss}	-	26	-	pF	V_{DS}=30V, V_{GS}=0V, f=1MHz
C_{oss}	-	9.7	-		
C_{rss}	-	2.9	-		
$t_{d(ON)}$	-	3.8	-	ns	V_{DS}=30V, I_D=0.5A, V_{GS}=10V, R_G=1Ω
t_r	-	15.4	-		
$t_{d(OFF)}$	-	8.6	-		
t_f	-	10.8	-		
Qg	-	1.7	-	nC	V_{DS}=48V, I_D=1A, V_{GS}=10V
Qgs	-	0.6	-		
Qgd	-	0.6	-		

Source-Drain Diode					
I_S	-	-	0.32	A	
I_{SM}	-	-	1.3		
*V_{SD}	-	0.8	1.2	V	V_{GS}=0V, I_S=0.1A
*trr	-	9.7	-	ns	I_F=0.5A, dI_F/dt=100A/μs
*Qrr	-	3	-	nC	

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

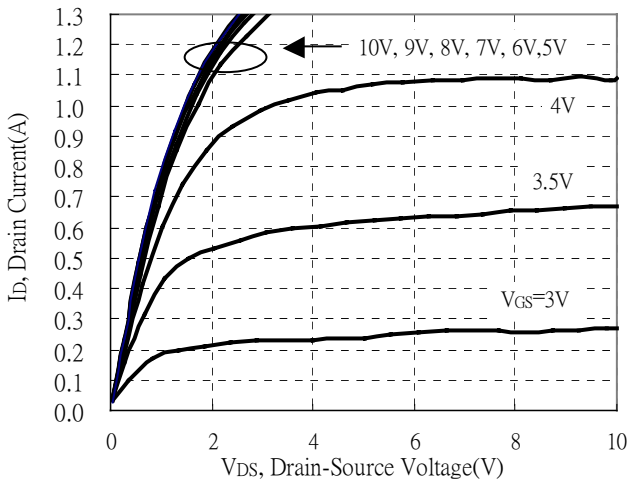
Recommended Soldering Footprint



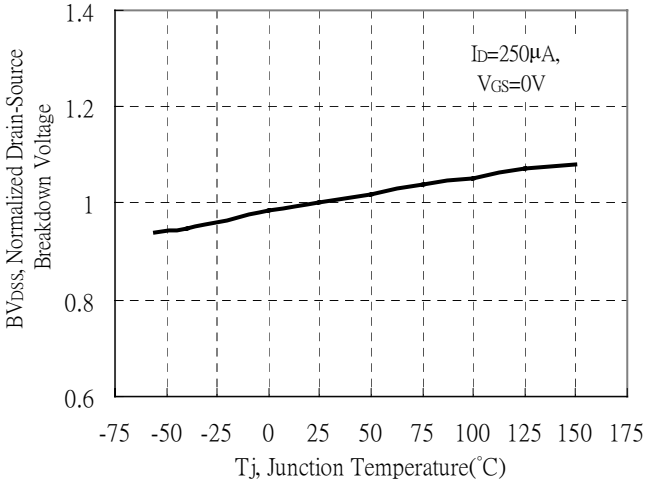
unit：mm

Typical Characteristics

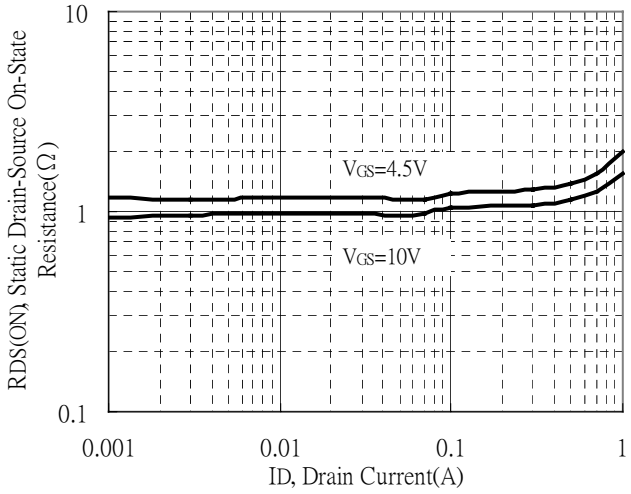
Typical Output Characteristics



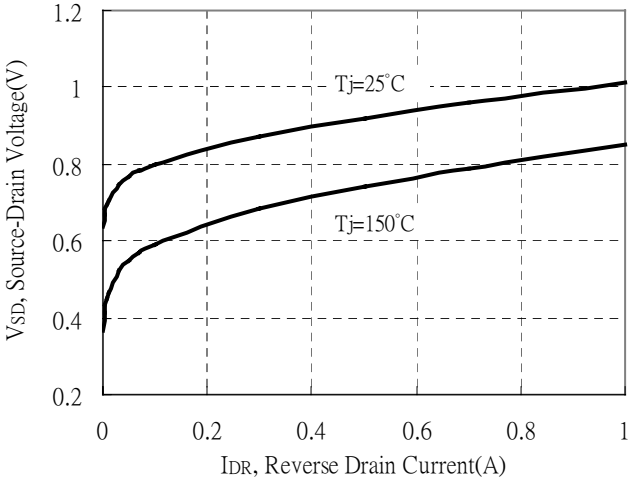
Brekdown Voltage vs Ambient Temperature



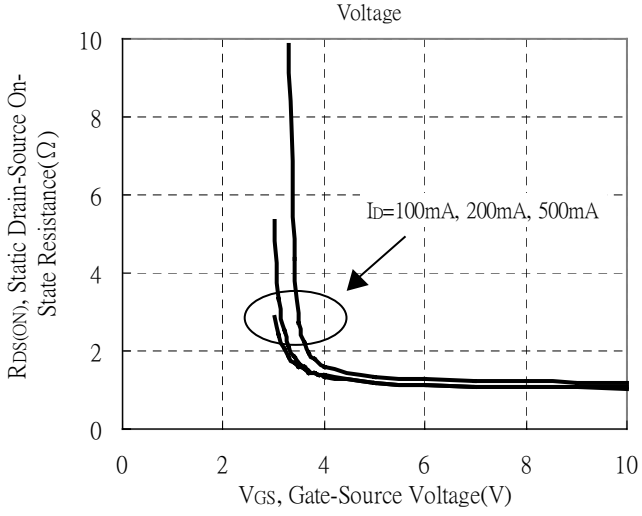
Static Drain-Source On-State resistance vs Drain Current



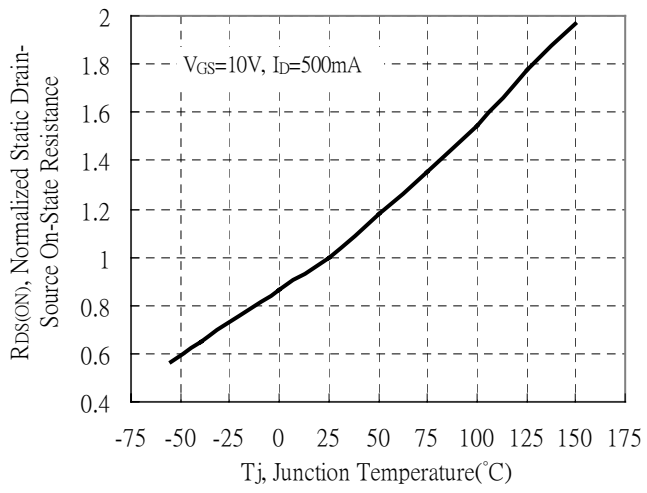
Reverse Drain Current vs Source-Drain Voltage



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

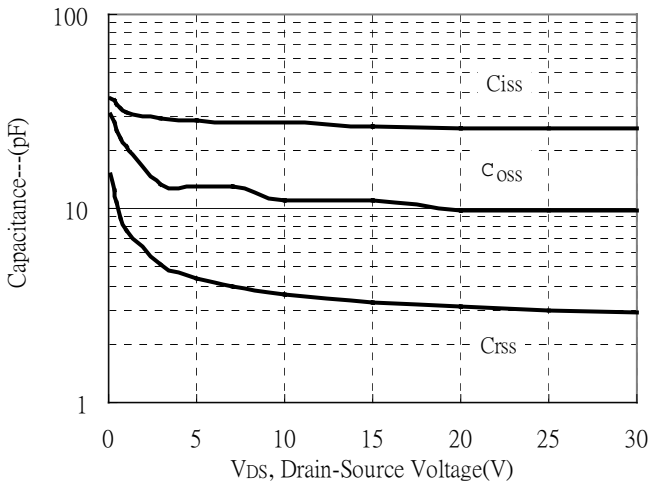


Drain-Source On-State Resistance vs Junction Tempearture

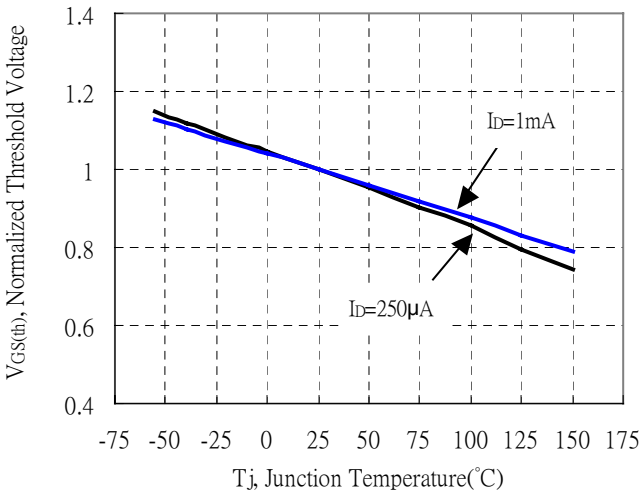


Typical Characteristics(Cont.)

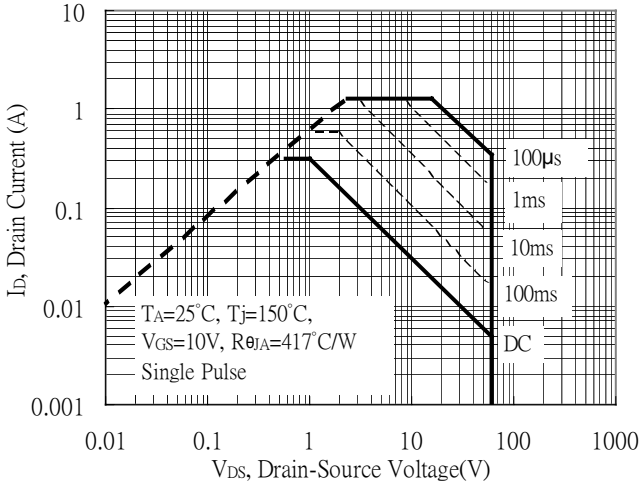
Capacitance vs Drain-to-Source Voltage



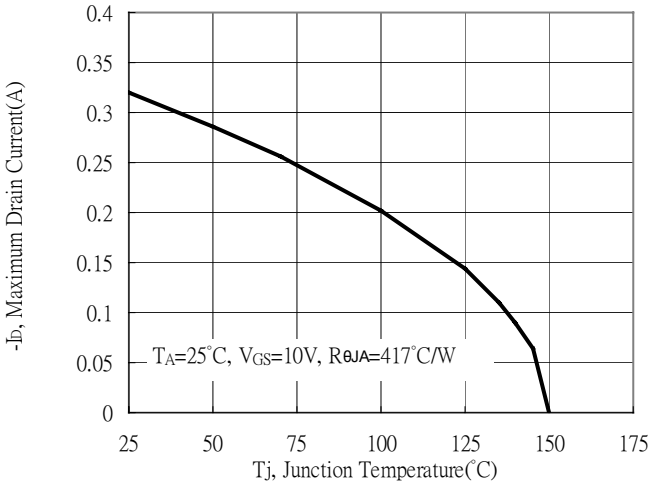
Threshold Voltage vs Junction Tempearture



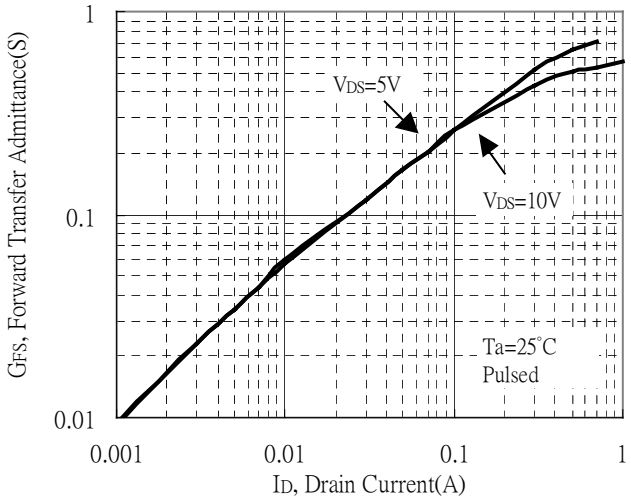
Maximum Safe Operating Area



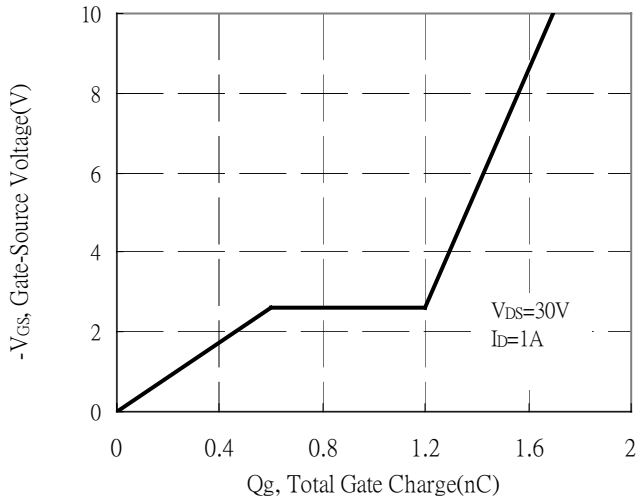
Maximum Drain Current vs JunctionTemperature



Forward Transfer Admittance vs Drain Current

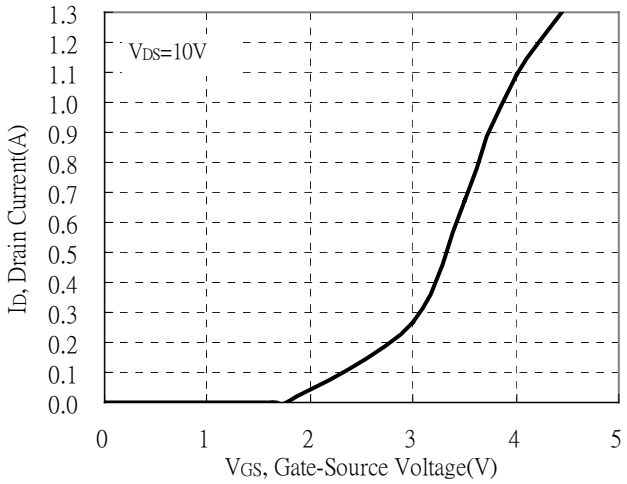


Gate Charge Characteristics

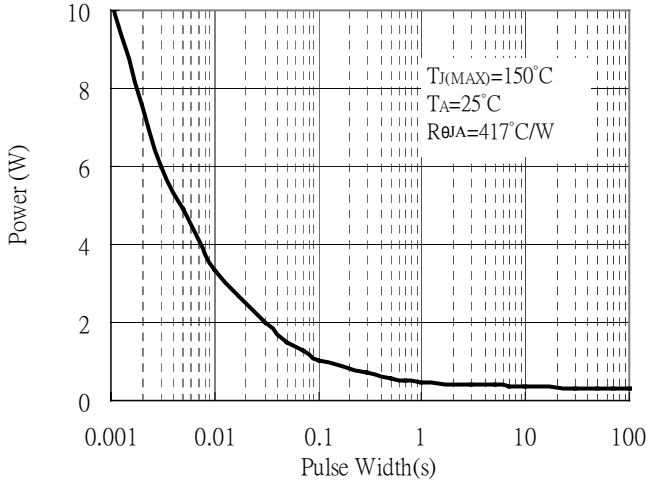


Typical Characteristics(Cont.)

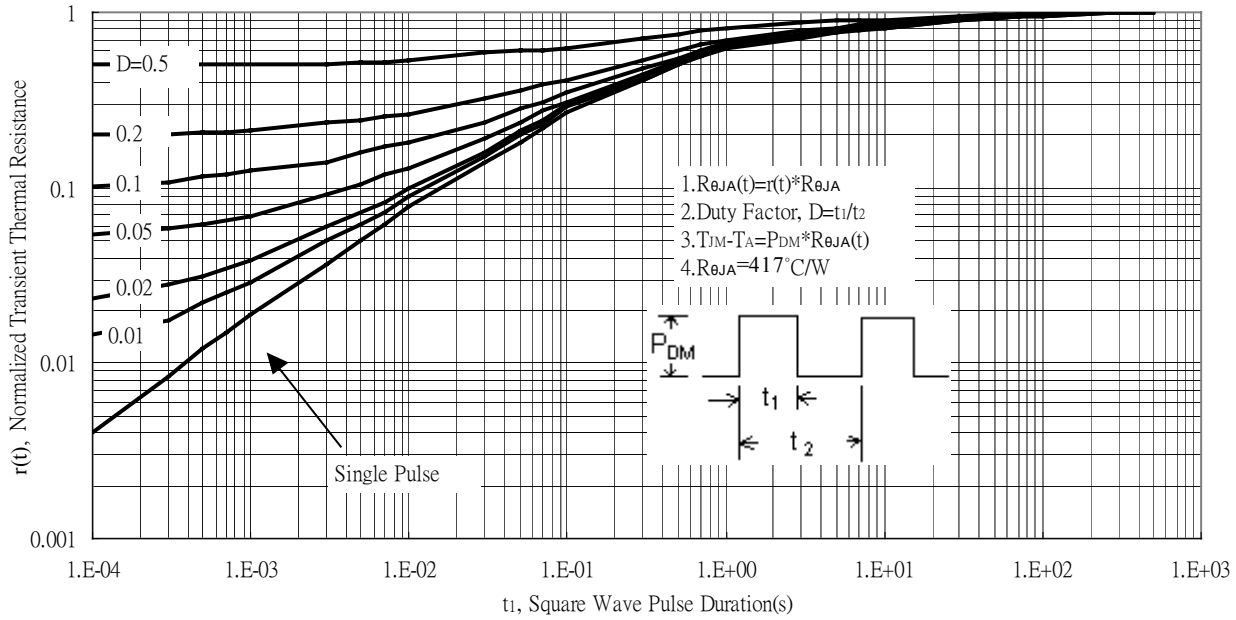
Typical Transfer Characteristics



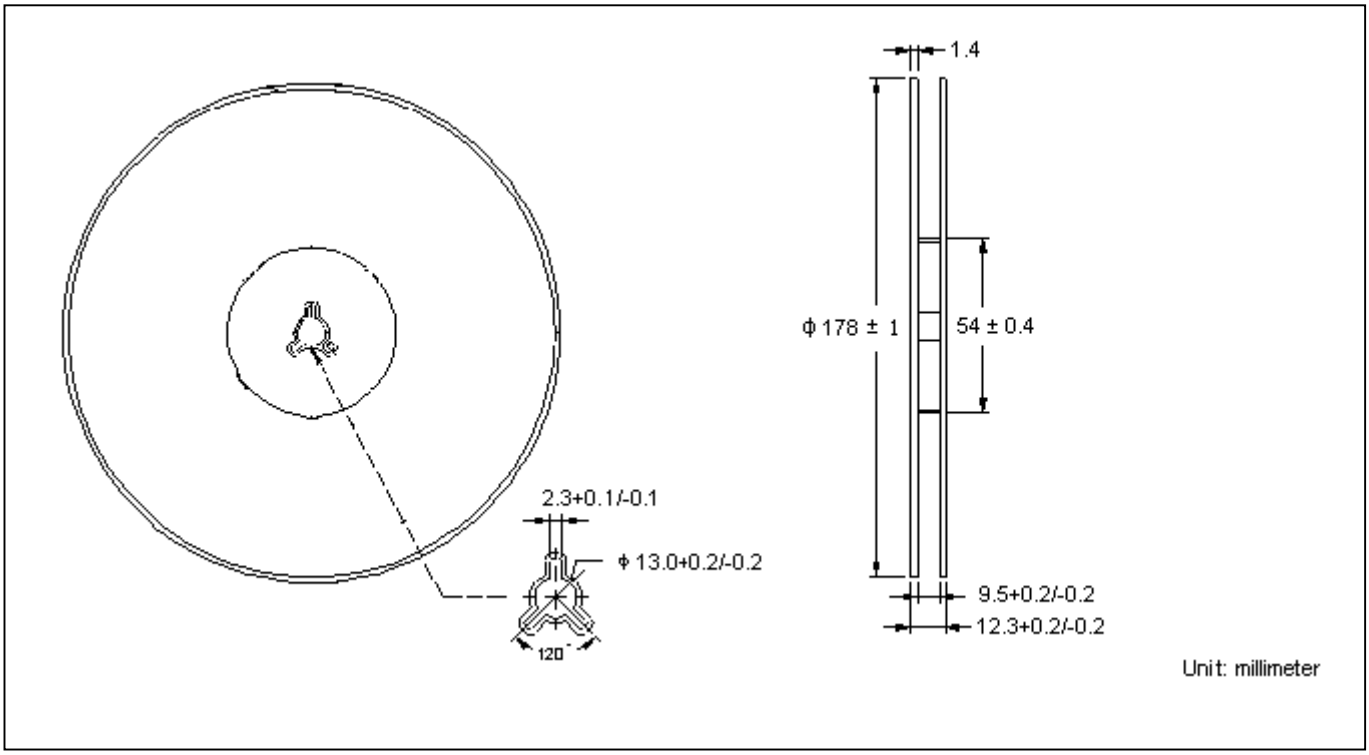
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



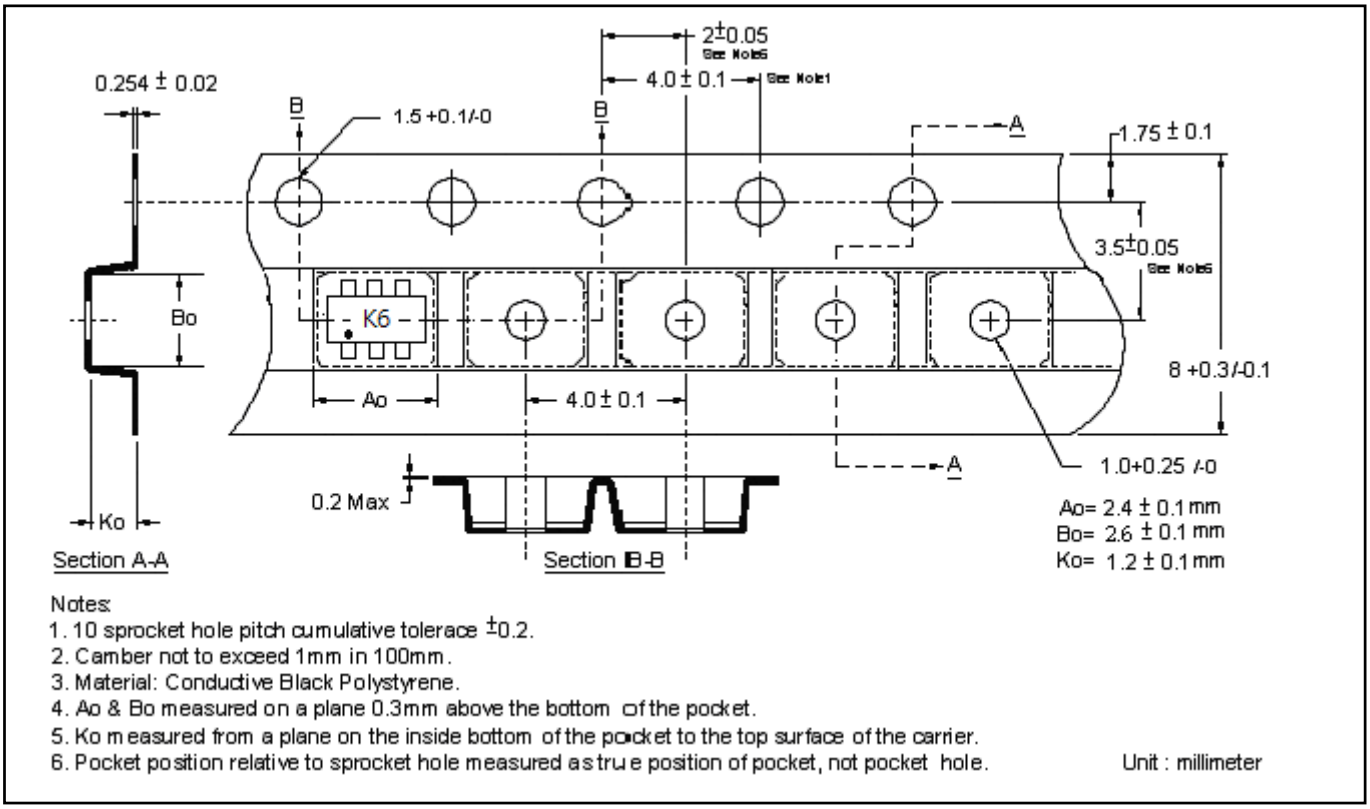
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



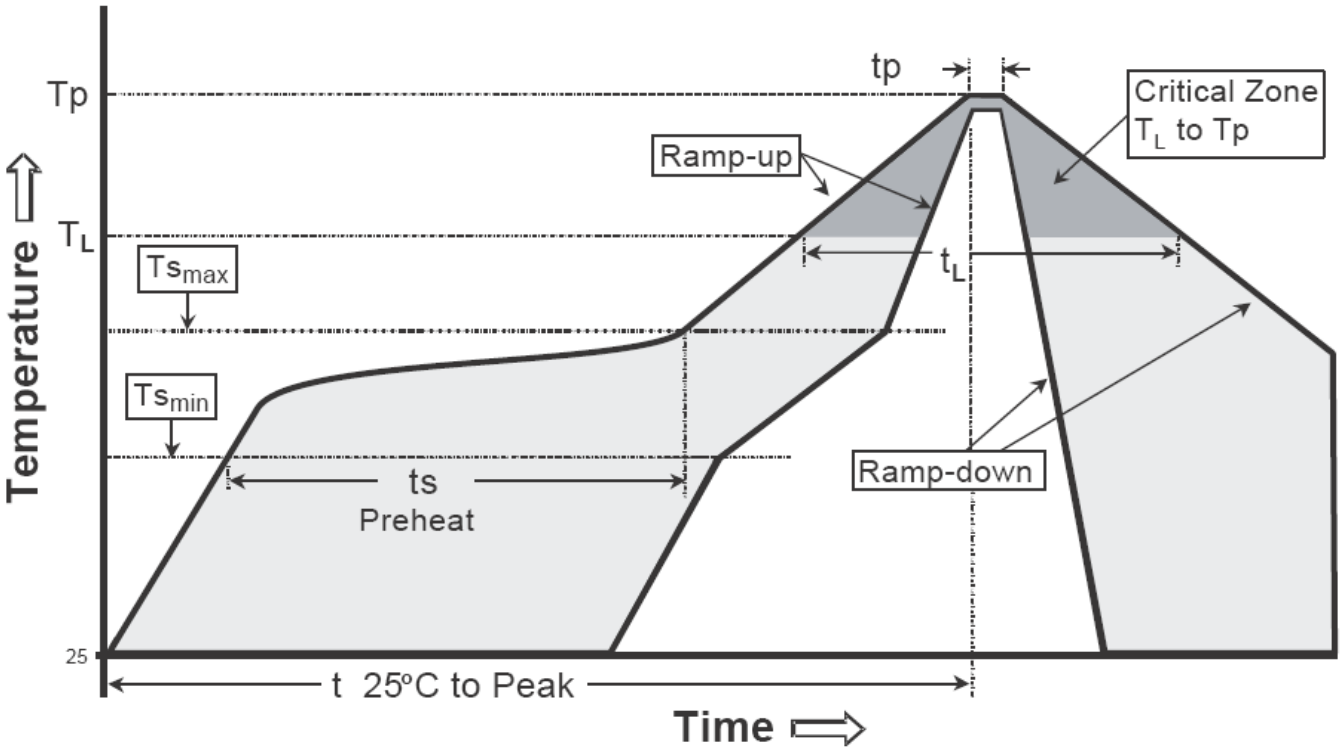
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

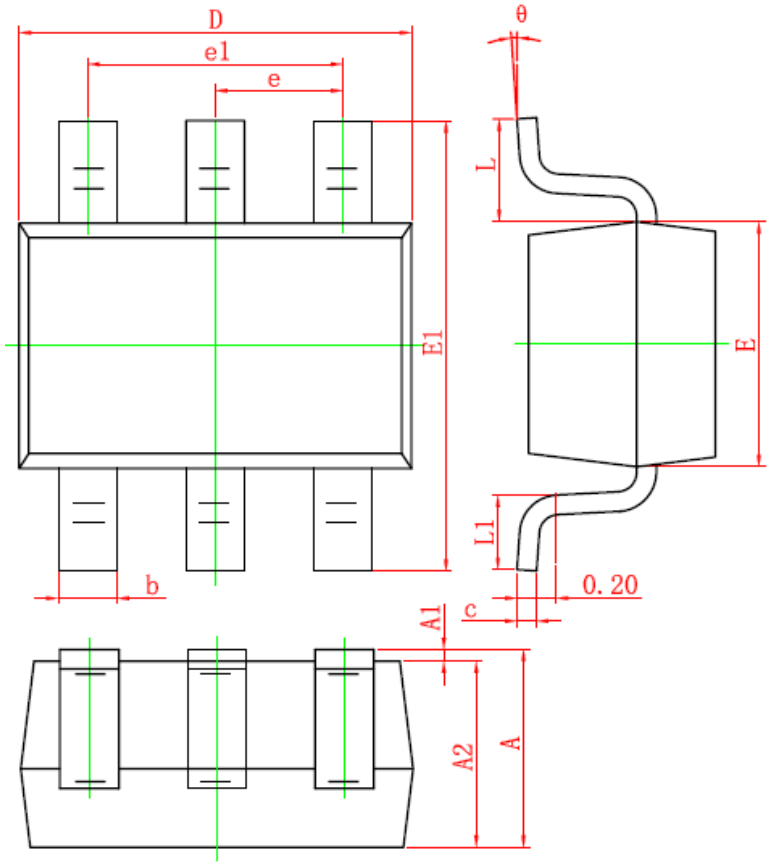
Recommended temperature profile for IR reflow



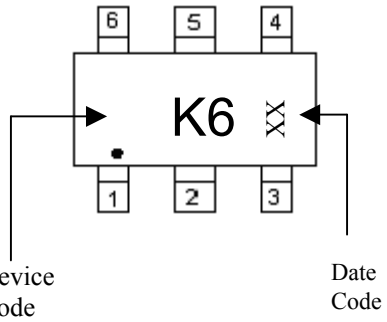
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts $_{min}$ to ts $_{max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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:



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.