Dual P-CHANNEL MOSFET

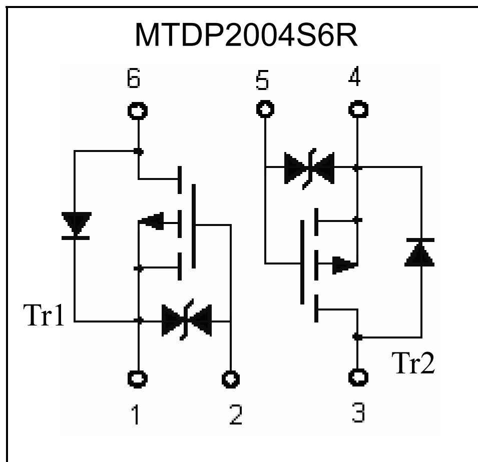
MTDP2004S6R

BV_{DSS}	-20V
I_D	-500mA
R_{DSON}@V_{GS}=-4.5V, I_D=-430mA	0.64Ω(typ)
R_{DSON}@V_{GS}=2.5V, I_D=-300mA	1.1Ω(typ)
R_{DSON}@V_{GS}=-1.8V, I_D=-150mA	1.7Ω (typ)

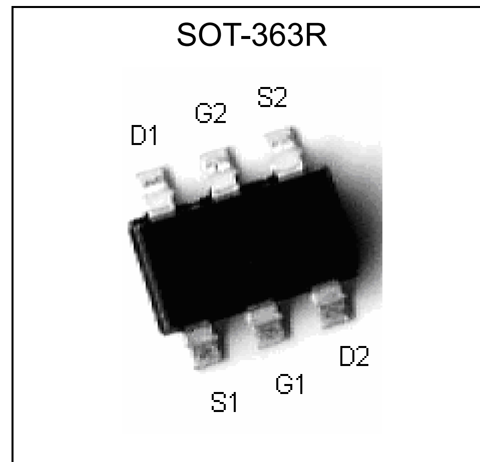
Features

- Low on-resistance
- High ESD capability
- High speed switching
- Low-voltage drive(-1.8V)
- Pb-free package

Equivalent Circuit



Outline



The following characteristics apply to both Tr1 and Tr2

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current @ T_A=25°C, V_{GS}=-4.5V (Note 3)		I_D	-500	mA
Continuous Drain Current @ T_A=85°C, V_{GS}=-4.5V (Note 3)			-360	
Pulsed Drain Current (Notes 1, 2)		I_{DM}	-1.5	A
Maximum Power Dissipation (Note 3)	T_A=25℃	P_D	300	mW
	T_A=85℃		160	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+150	°C

Note : 1. Pulse width limited by maximum junction temperature.
2. Pulse width≤ 300μs, duty cycle≤2%.
3.Surface mounted on 1 in² copper pad of FR-4 board, t≤5s.

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient(PCB mounted) (Note)	Rth,ja	417	°C/W

Note : Surface mounted on 1 in² copper pad of FR-4 board, t≤5s.

Electrical Characteristics (Tj=25°C, unless otherwise noted)

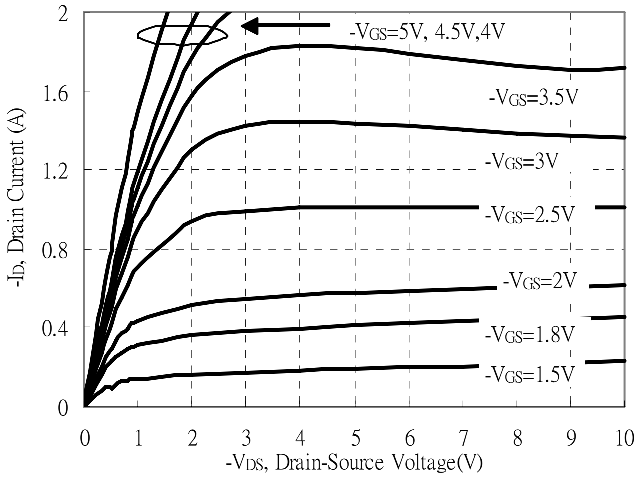
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-20	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-0.5	-0.8	-1.2	V	V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±5	μA	V_{GS}=±8V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=20V, V_{GS}=0
	-	-	10		V_{DS}=16V, V_{GS}=0 (Tj=70°C)
*$R_{DS(ON)}$	-	0.64	0.9	Ω	V_{GS}=-4.5V, I_D=-430mA
	-	1.1	1.4		V_{GS}=-2.5V, I_D=-300mA
	-	1.7	2.3		V_{GS}=-1.8V, I_D=-150mA
*G_{FS}	-	0.6	-	S	V_{DS}=-10V, I_D=-200mA
Dynamic					
Ciss	-	59	-	pF	V_{DS}=-10V, V_{GS}=0, f=1MHz
Coss	-	21	-		
Crss	-	15	-		
$t_{d(ON)}$	-	5	-	ns	V_{DS}=-6V, I_D=-500mA, V_{GS}=-4.5V, R_G=50Ω
t_r	-	6	-		
$t_{d(OFF)}$	-	42	-		
t_f	-	14	-		
Qg	-	1.2	-	nC	V_{DS}=-5V, I_D=-250mA, V_{GS}=-4.5V
Qgs	-	0.38	-		
Qgd	-	0.23	-		
Source-Drain Diode					
*V_{SD}	-	-0.78	-1.2	V	V_{GS}=0V, I_S=-115mA

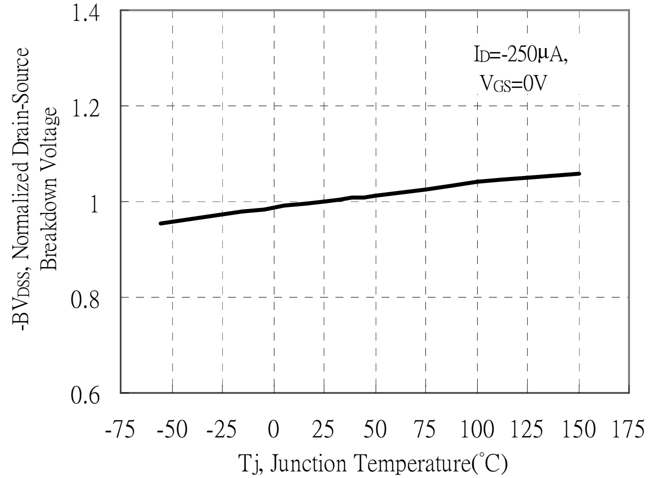
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

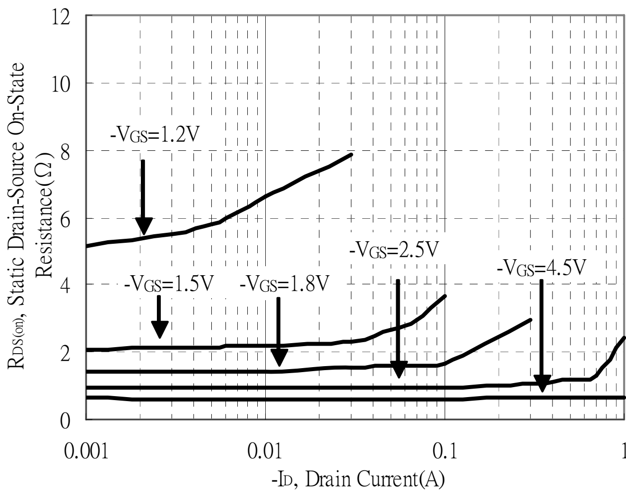
Ordering Information

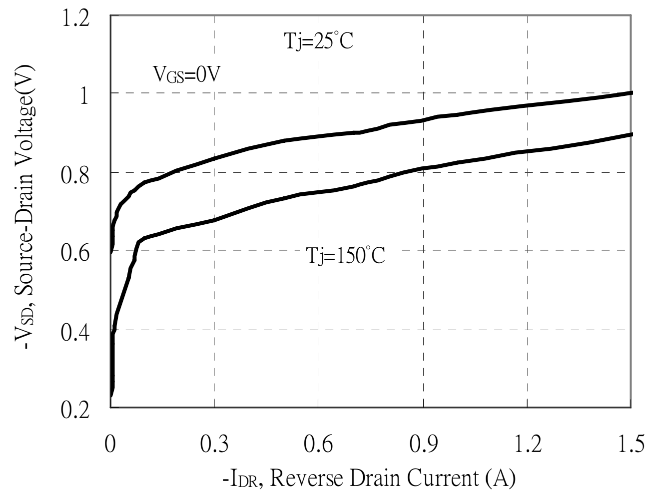
Device	Package	Shipping	Marking
MTDP2004S6R	SOT-363 (Pb-free)	3000 pcs / Tape & Reel	2004

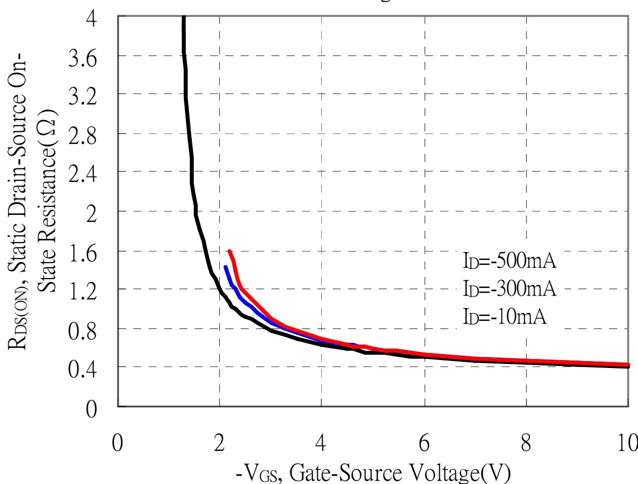
Typical Characteristics

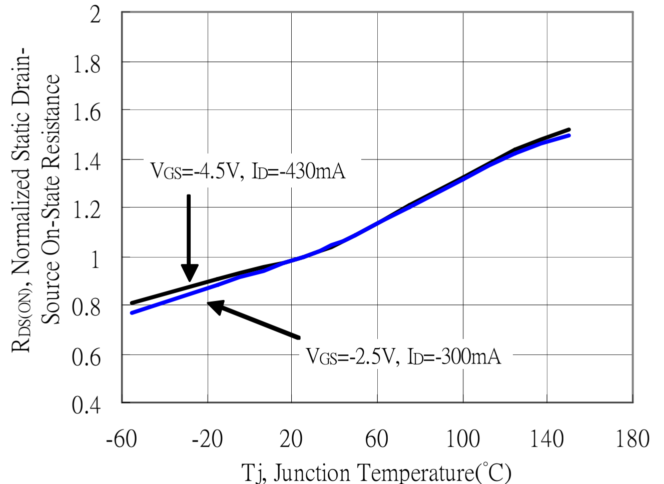




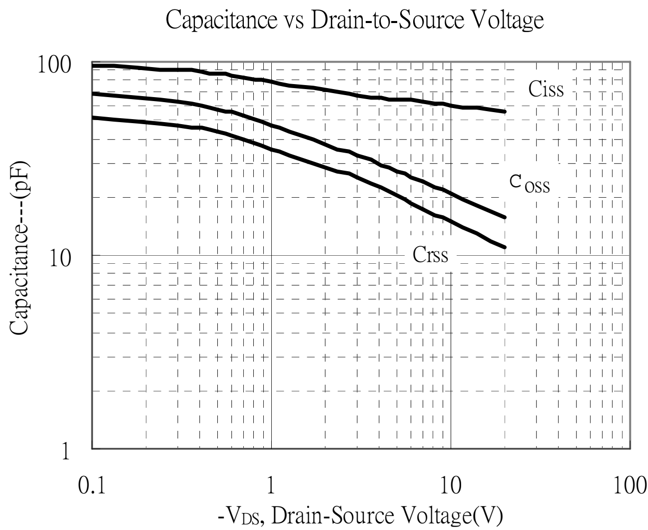


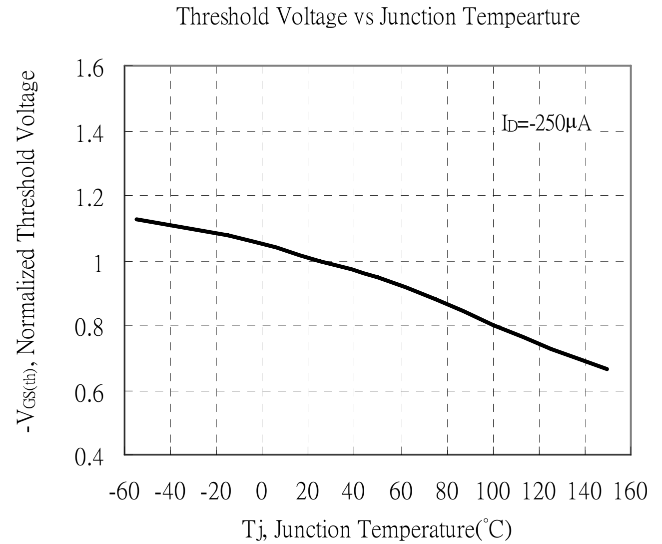


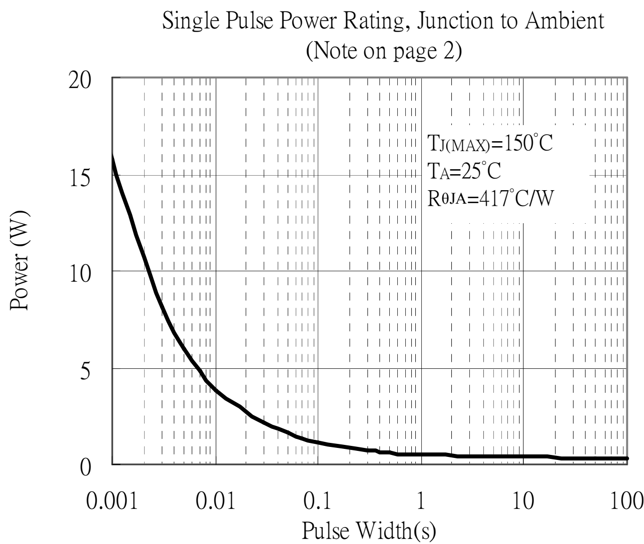


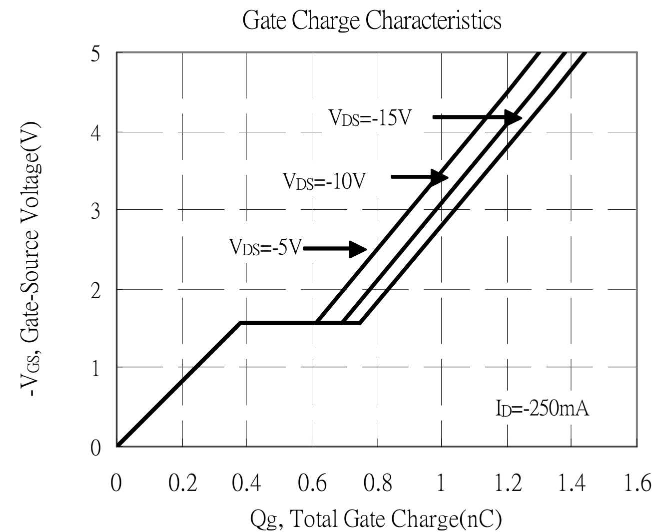


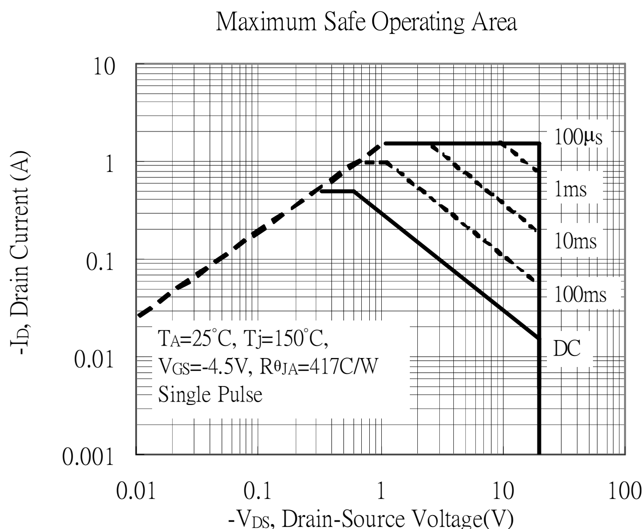
Typical Characteristics(Cont.)

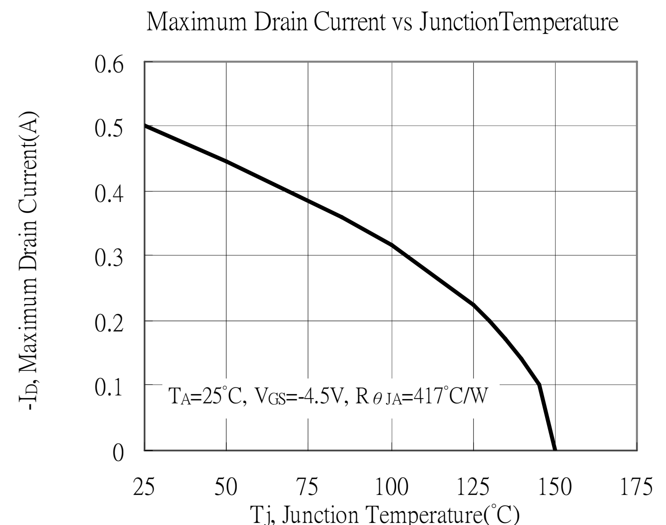




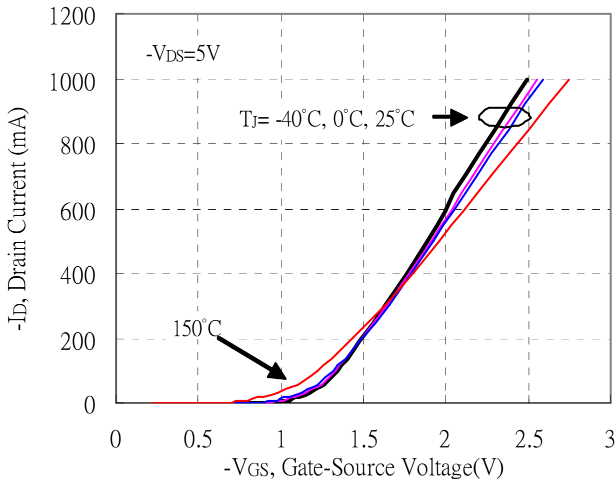


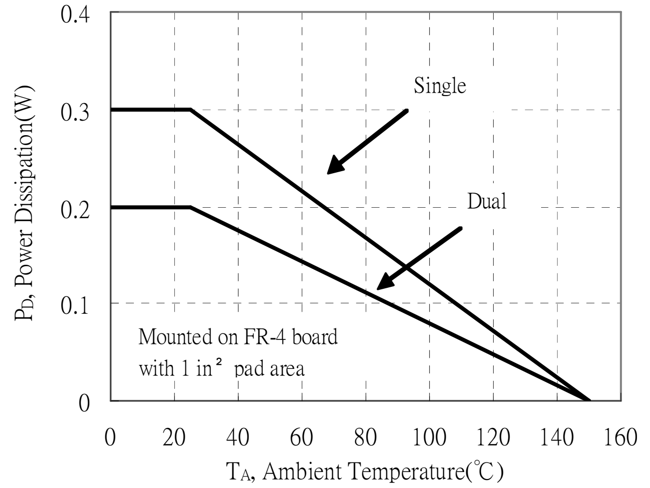


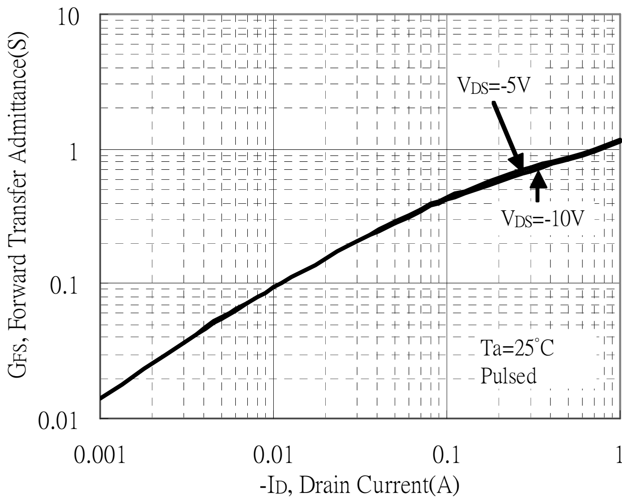


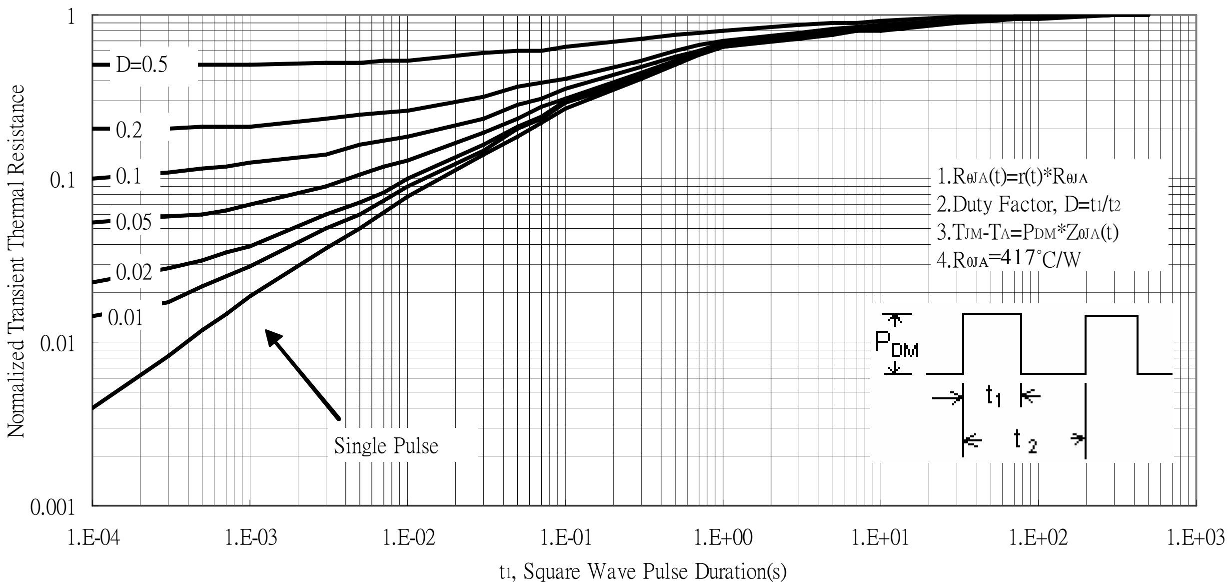


Typical Characteristics(Cont.)

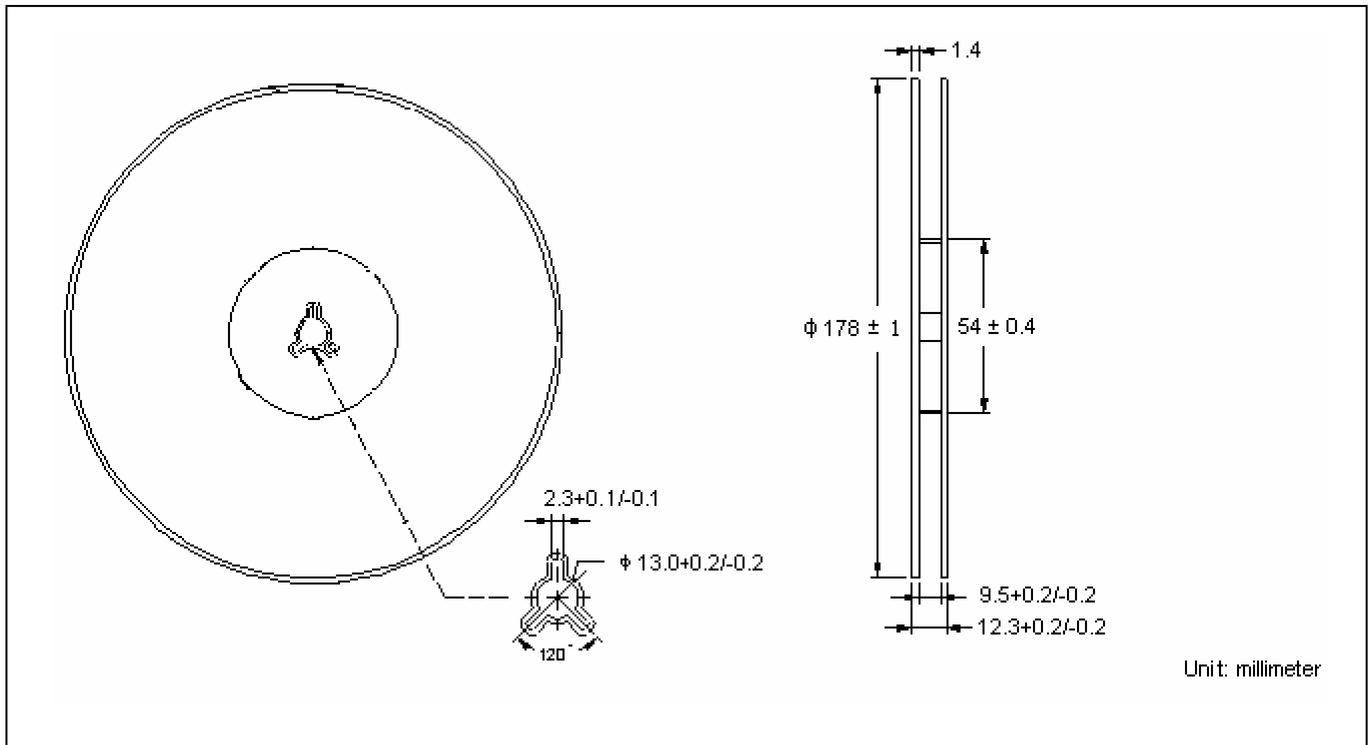




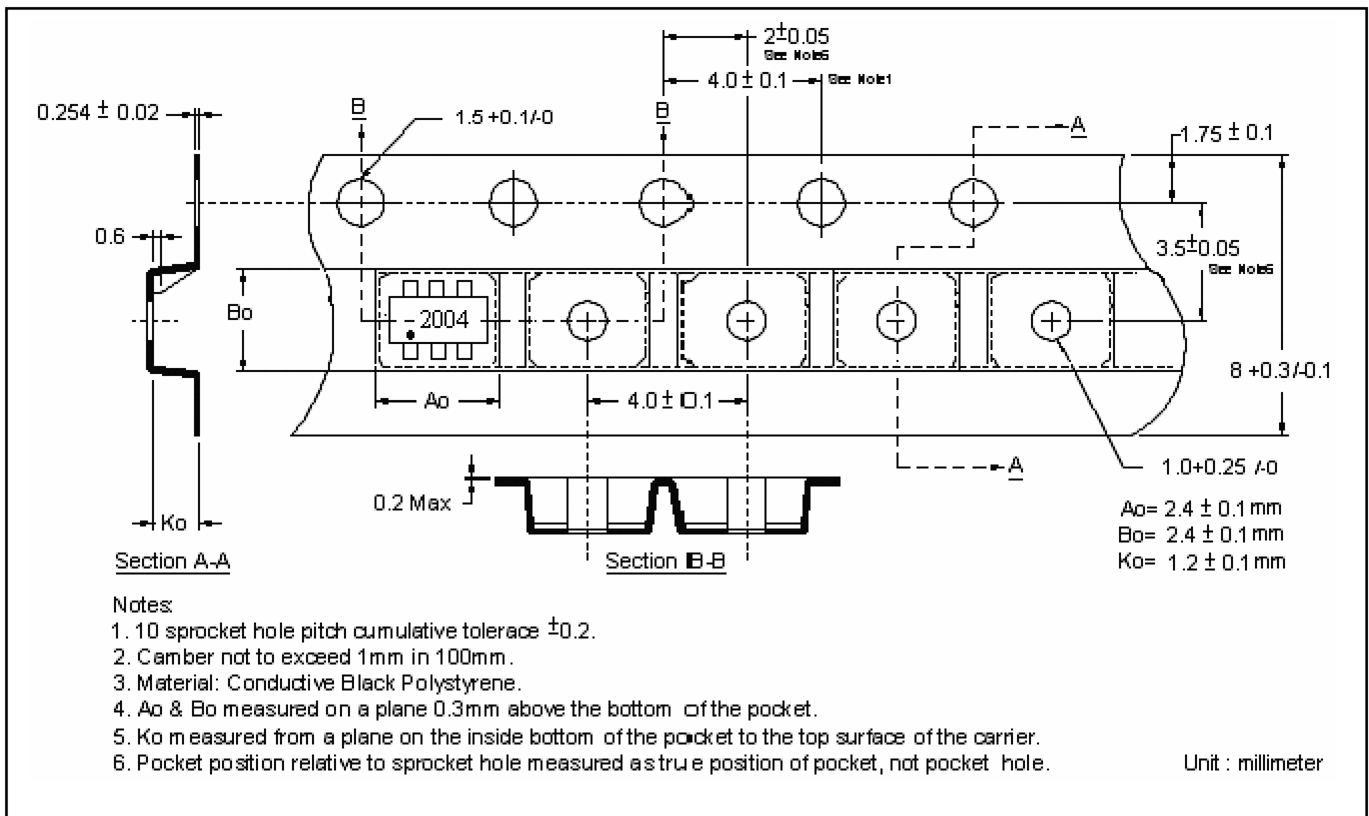




Reel Dimension



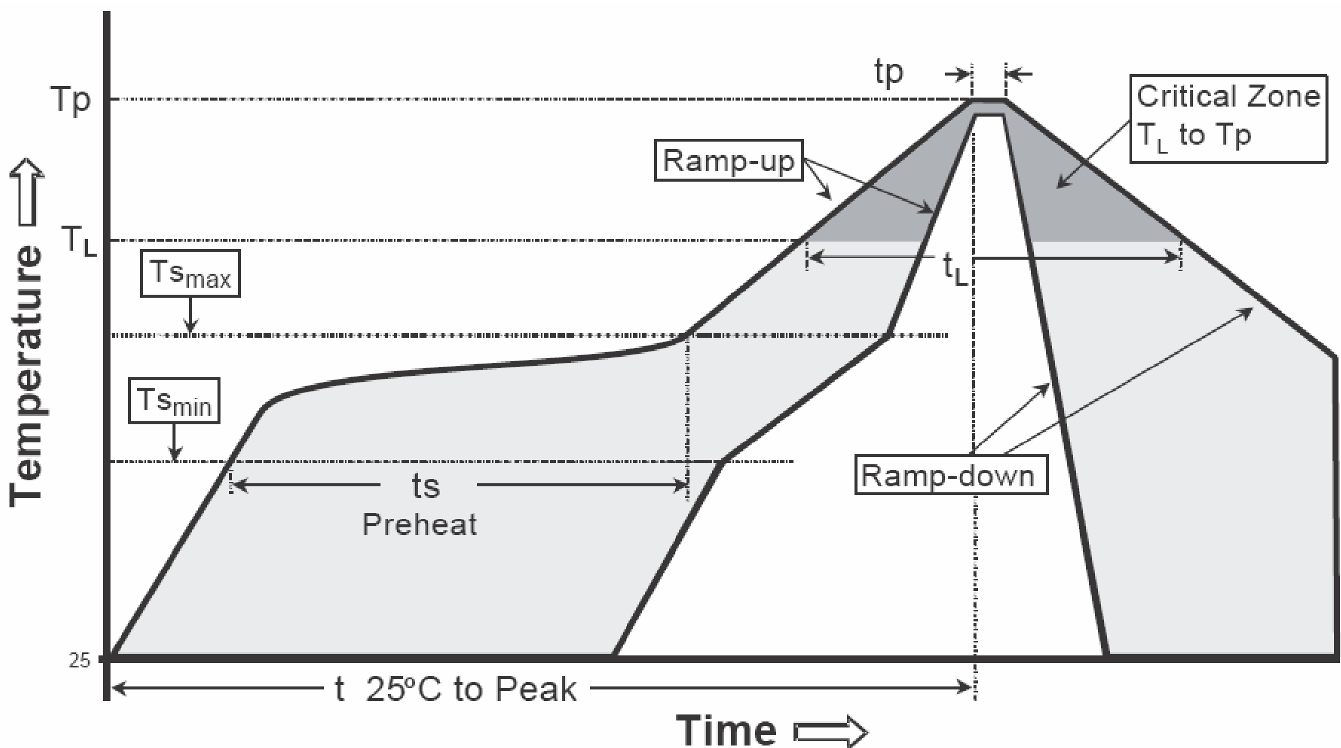
Carrier Tape Dimension



Recommended wave soldering condition

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

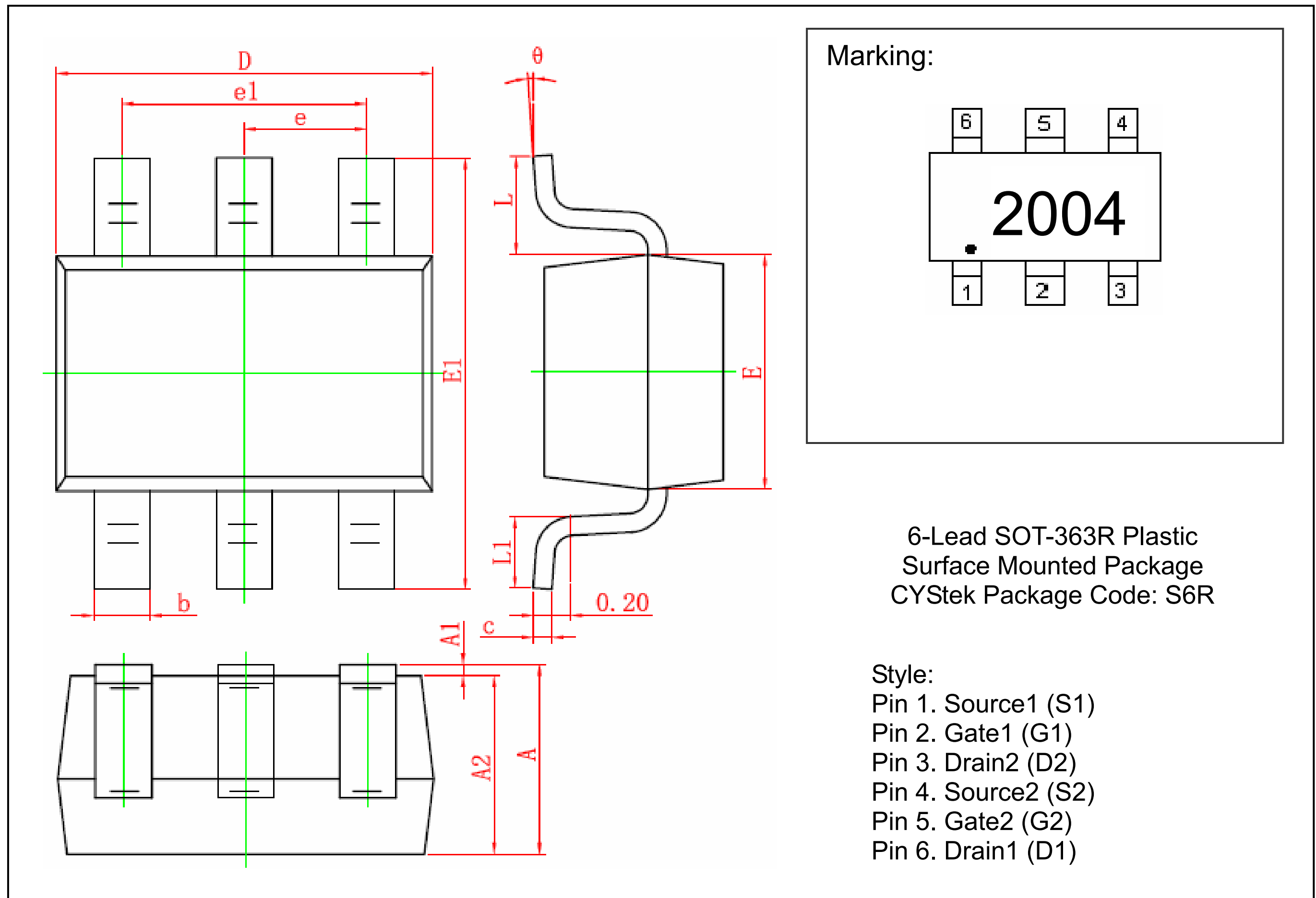
Recommended temperature profile for IR reflow



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) −Temperature Max(Ts 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 (TL) − Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	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



6-Lead SOT-363R 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.

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.

- CYStek reserves the right to make changes to its products without notice.
- CYStek ***semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.***
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.