

**P-Channel Enhancement Mode MOSFET**

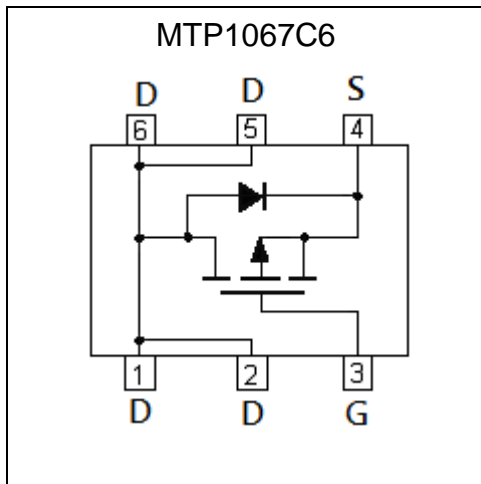
# MTP1067C6

**Features**

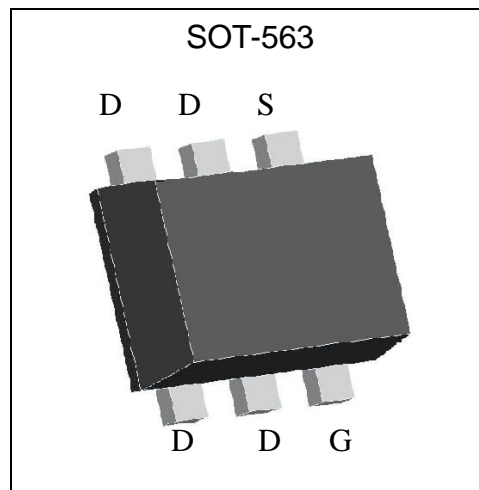
- High speed switching
- Low-voltage drive(-1.8V)
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free lead plating and halogen-free package

BV <sub>DSS</sub>		-20V
I <sub>D</sub>		-1.06A
R <sub>DS(on)(TYP)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.06A	0.112 Ω
	V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1.0A	0.149 Ω
	V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.49A	0.206 Ω

**Equivalent Circuit**

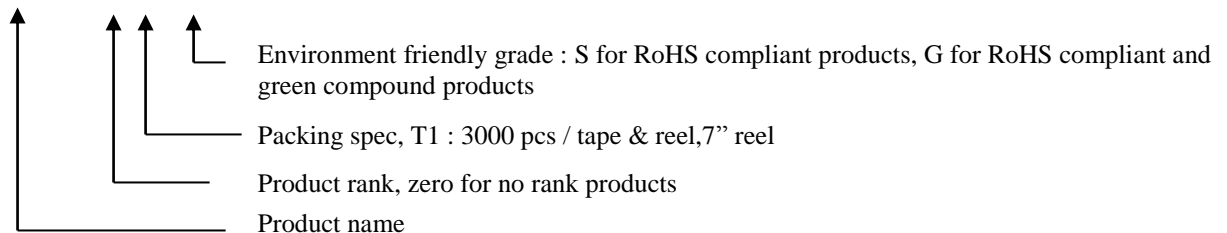


**Outline**



**Ordering Information**

Device	Package	Shipping
MTP1067C6-0-T1-G	SOT-563 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel





**Absolute Maximum Ratings** (Ta=25°C, unless otherwise specified)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	
Continuous Drain Current @ V <sub>GS</sub> =-4.5V, T <sub>A</sub> =25°C	I <sub>D</sub>	-1.06	A
Continuous Drain Current @ V <sub>GS</sub> =-4.5V, T <sub>A</sub> =70°C		-0.85	
Pulsed Drain Current	I <sub>DM</sub>	-8 (Note 1)	
Power Dissipation	P <sub>D</sub>	236 (Note 2)	mW
		151 (Note 2)	
Operating Junction and Storage Temperature Range	T <sub>j</sub> ; T <sub>stg</sub>	-55~+150	°C

**Thermal Data**

Parameter	Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-ambient (Note 2)	R <sub>θJA</sub>	440	530	°C/W
Thermal Resistance, Junction-to-ambient, steady state (Note 2)		540	650	

Note : 1. Pulse test, pulse width ≤ 300µs, duty ≤ 2%  
 2. When device is mounted on a 1"×1" FR-4 board, t ≤ 5s.

**Electrical Characteristics** (Ta=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub> *	-20	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =-250µA
V <sub>GS(th)</sub>	-0.45	-	-0.95		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250µA
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	-1	µA	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V
	-	-	-10		V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C
R <sub>DS(ON)</sub> *	-	0.112	0.150	Ω	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.06A
	-	0.149	0.200		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1.0A
	-	0.206	0.250		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.49A
G <sub>FS</sub>	-	2.7	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1.06A
<b>Dynamic</b>					
C <sub>iss</sub>	-	386	-	pF	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0, f=1MHz
C <sub>oss</sub>	-	37	-		
C <sub>rss</sub>	-	32	-		
Q <sub>g</sub>	-	4.3	-	nC	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1.06A, V <sub>GS</sub> =-4.5V
Q <sub>gs</sub>	-	0.69	-		
Q <sub>gd</sub>	-	1.01	-		
t <sub>d(on)</sub>	-	7	10.5	ns	V <sub>DD</sub> =-10V, I <sub>D</sub> =-0.76A, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =1Ω
t <sub>r</sub>	-	17.4	26		
t <sub>d(off)</sub>	-	26.4	40		
t <sub>f</sub>	-	6.4	9.6		
R <sub>g</sub>	-	10.5	15	Ω	f=1MHz

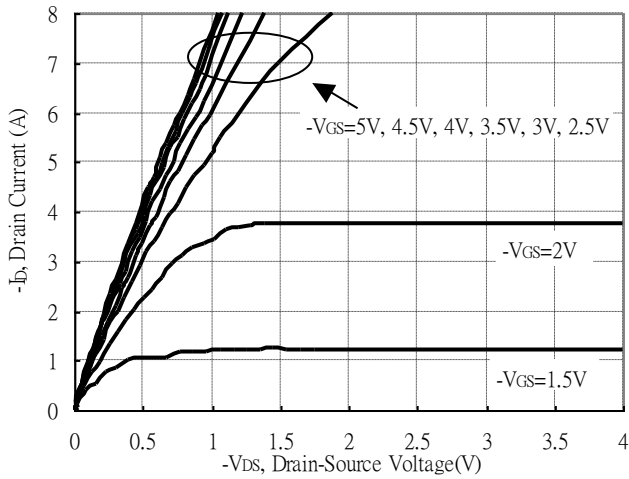


<b>Source-Drain Diode</b>					
$I_S$	-	-	-1.06	A	
$I_{SM}$	-	-	-8		
$V_{SD}$	-	-0.8	-1.2	V	$I_S=-0.63A, V_{GS}=0V$
$trr^*$	-	5.3	-	ns	$I_F=-1A, dI_F/dt=100A/\mu s$
$Q_{rr}^*$	-	2.1	-	nC	
$t_a$	-	4.8	-	ns	
$t_b$	-	0.5	-	ns	

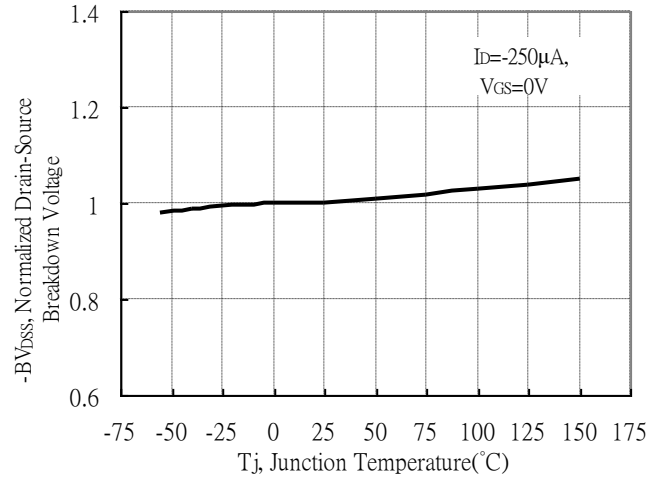
\*Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

## Typical Characteristics

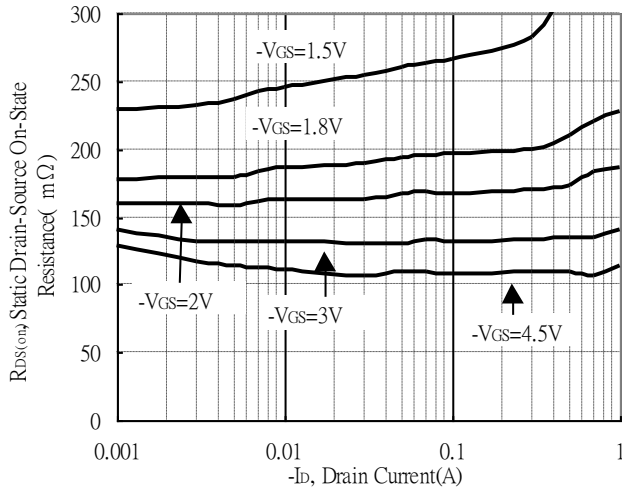
Typical Output Characteristics



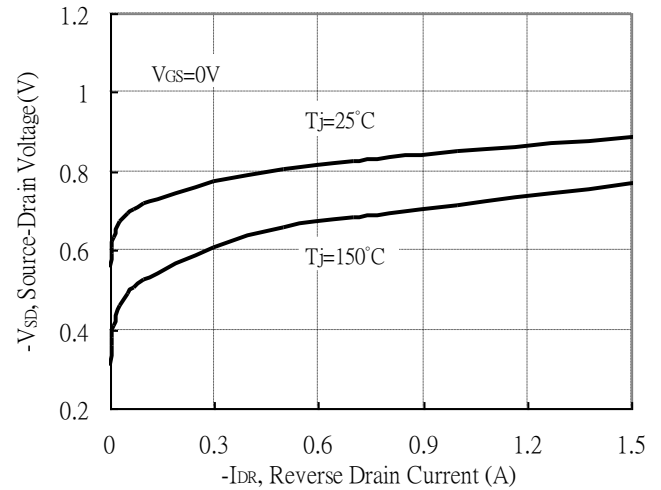
Brekdown Voltage vs Ambient Temperature



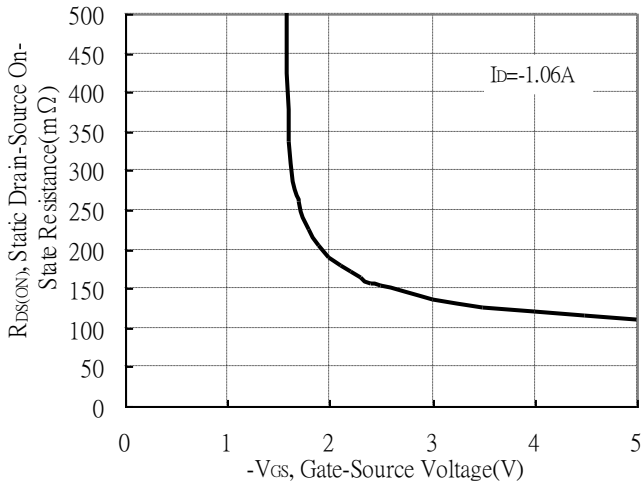
Static Drain-Source On-State resistance vs Drain Current



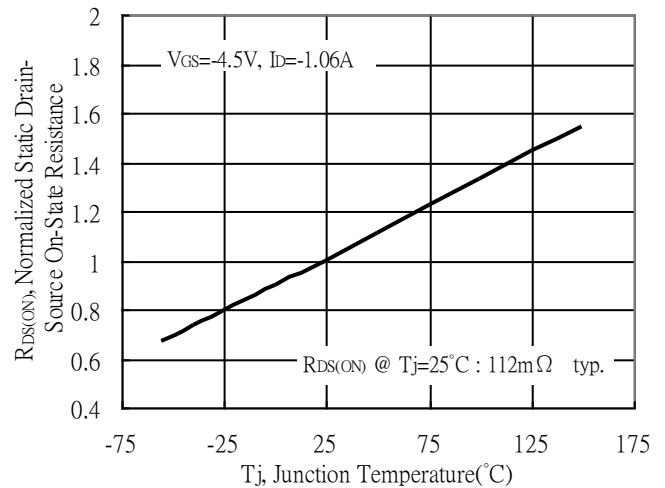
Reverse Drain Current vs Source-Drain Voltage



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

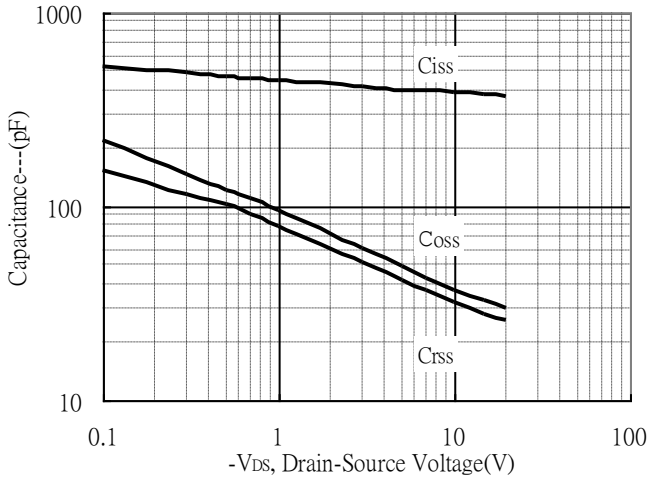


Drain-Source On-State Resistance vs Junction Temperature

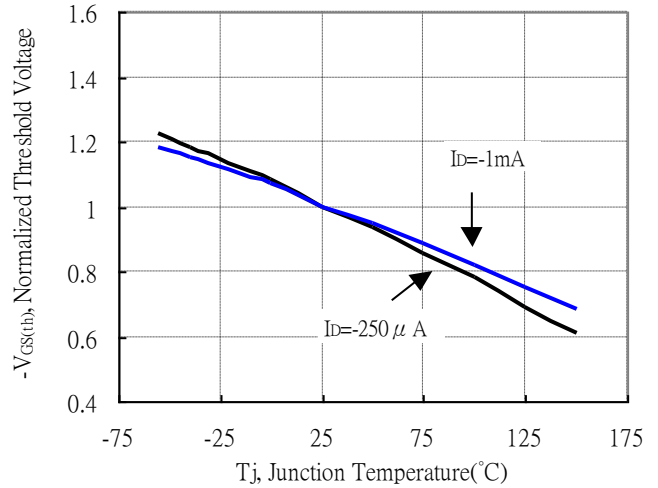


## Typical Characteristics(Cont.)

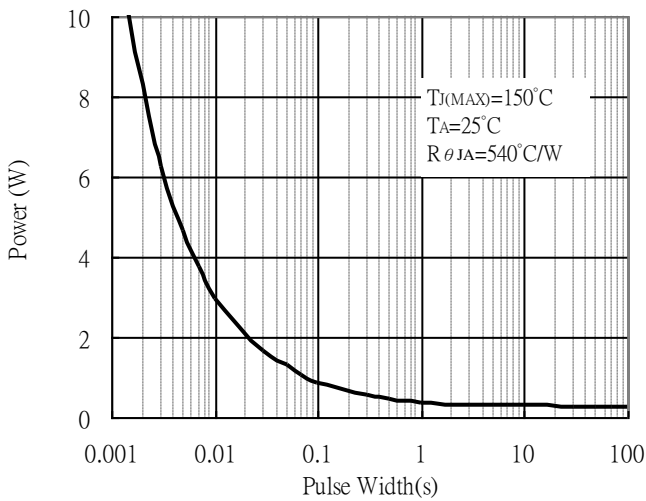
Capacitance vs Drain-to-Source Voltage



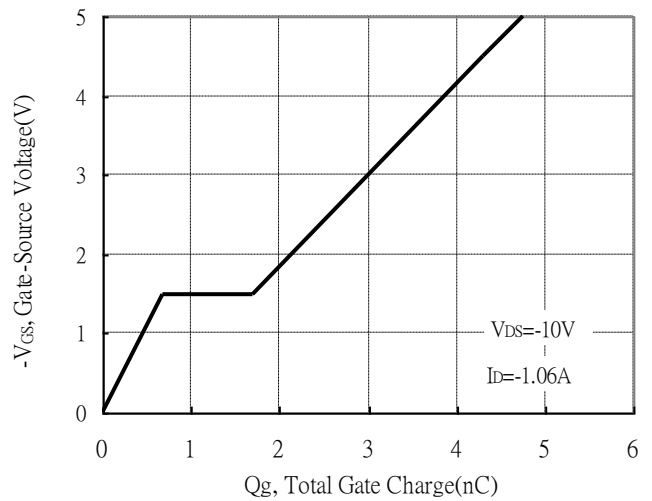
Threshold Voltage vs Junction Temperature



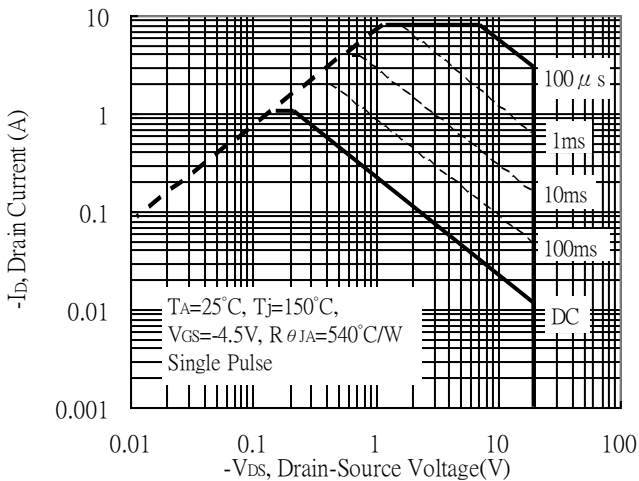
Single Pulse Power Rating, Junction to Ambient



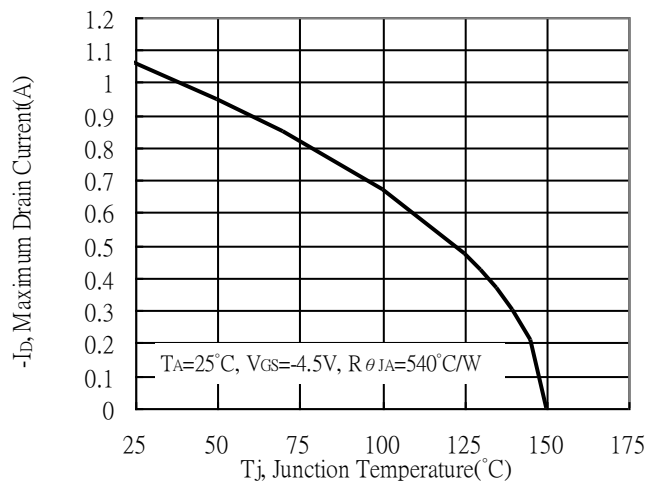
Gate Charge Characteristics



Maximum Safe Operating Area

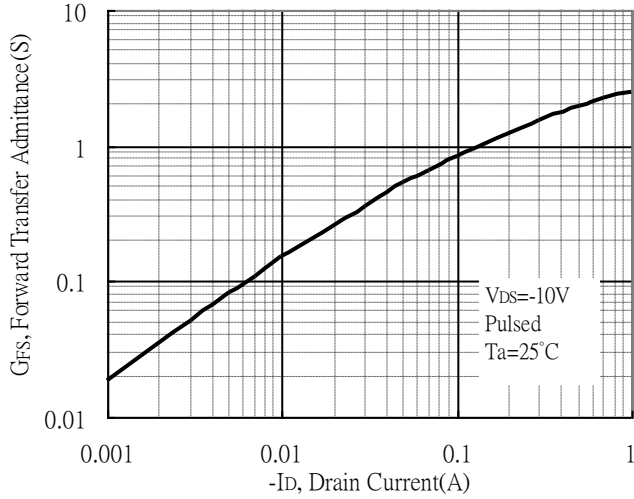


Maximum Drain Current vs Junction Temperature

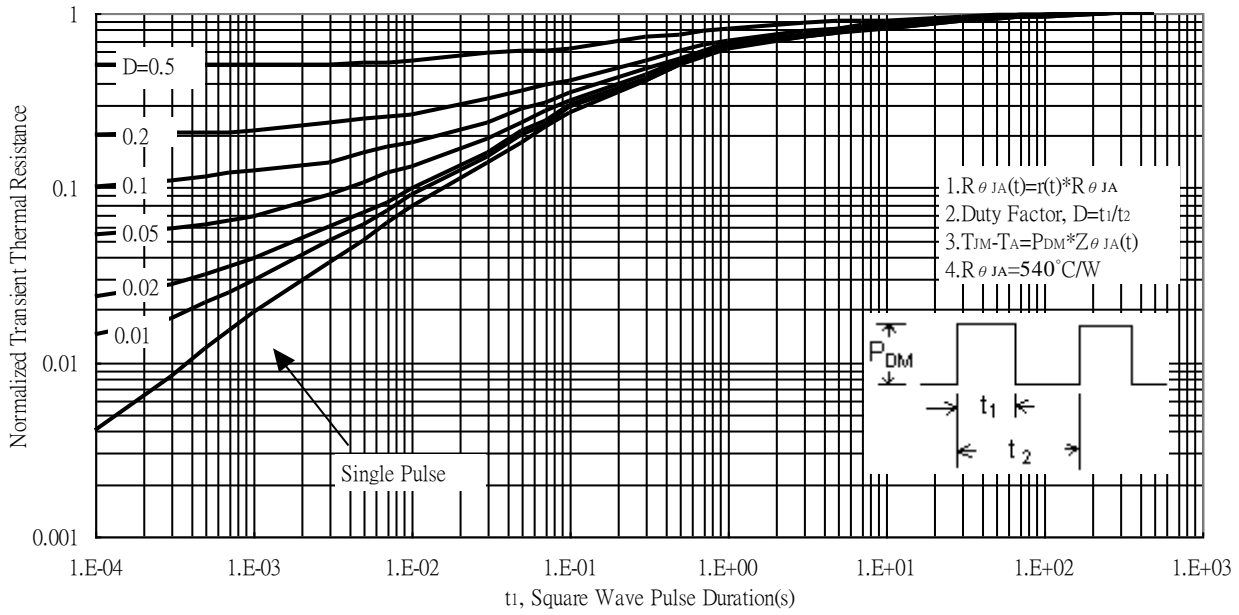


**Typical Characteristics(Cont.)**

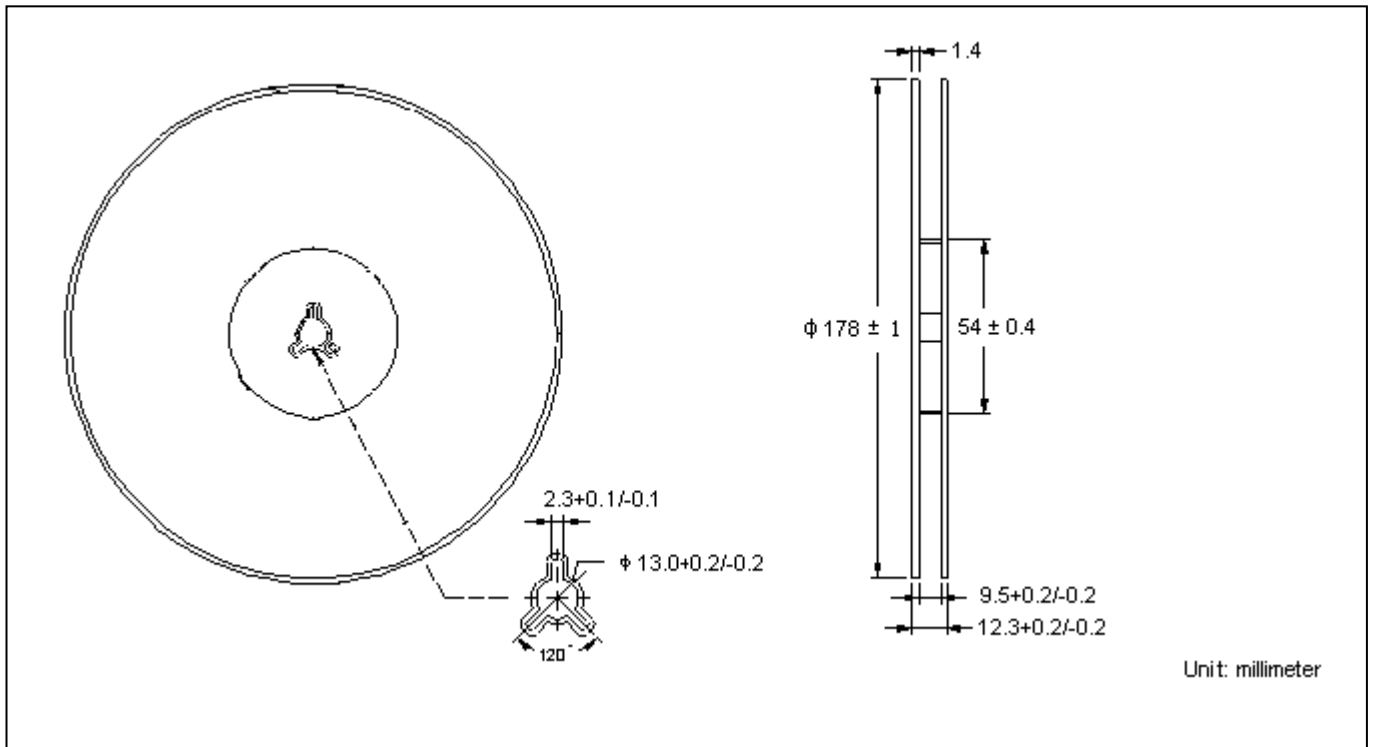
Forward Transfer Admittance vs Drain Current



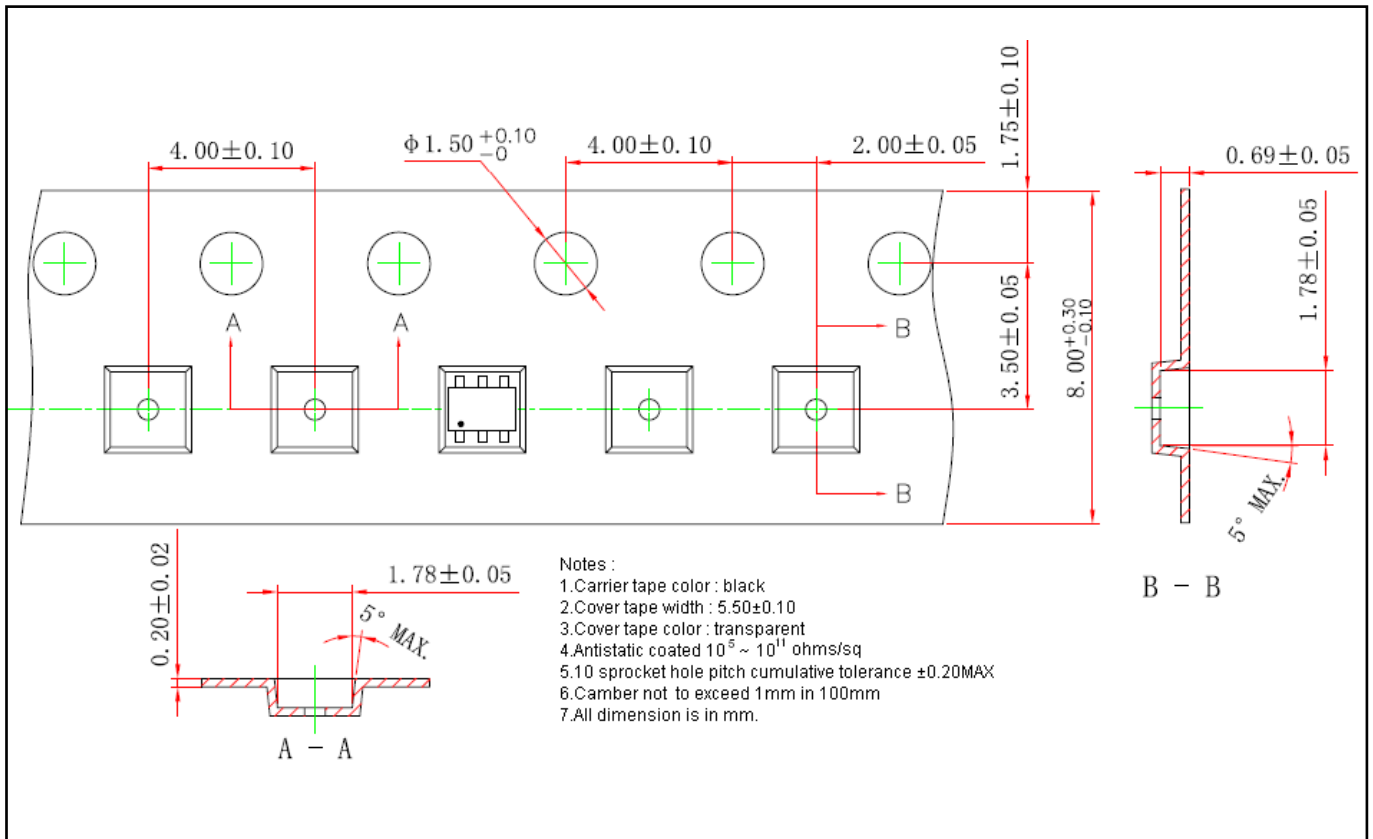
Transient Thermal Response Curves



**Reel Dimension**



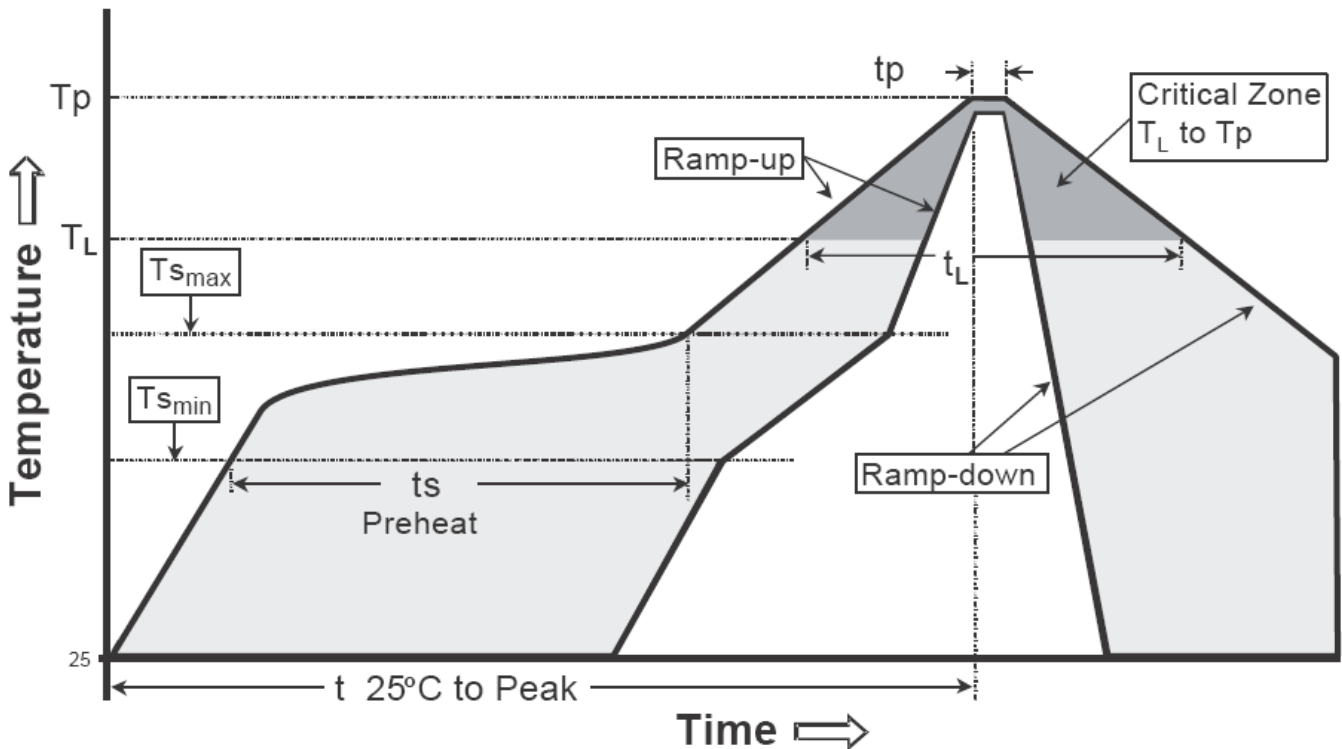
**Carrier Tape Dimension**



**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**

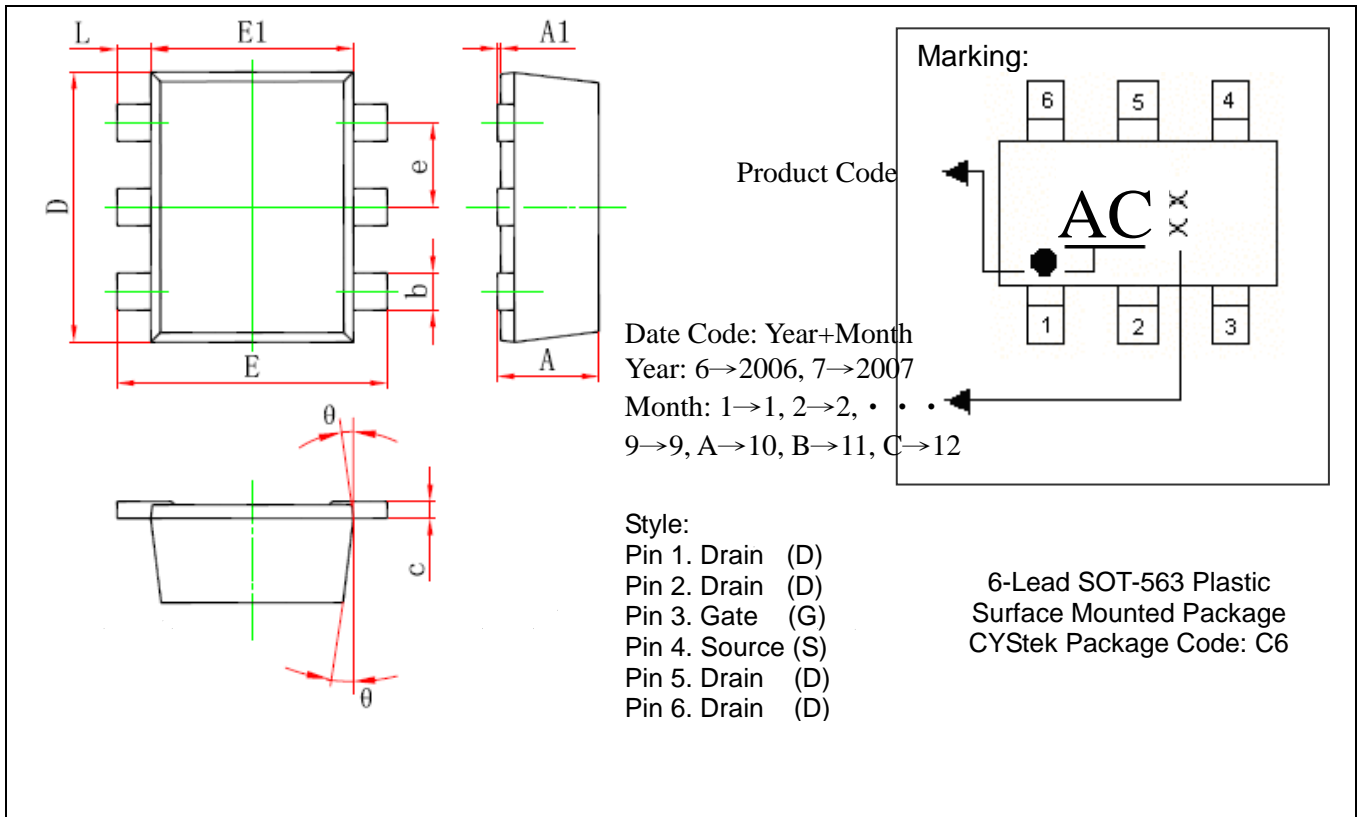


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	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 : All temperatures refer to topside of the package, measured on the package body surface.



**SOT-563 Dimension**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.021	0.024	0.525	0.600	b	0.007	0.011	0.170	0.270
A1	0.000	0.002	0.000	0.050	E1	0.043	0.051	1.100	1.300
e	0.018	0.022	0.450	0.550	E	0.059	0.067	1.500	1.700
c	0.004	0.006	0.090	0.160	L	0.004	0.012	0.100	0.300
D	0.059	0.067	1.500	1.700	θ	7° REF		7° REF	

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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