P-Channel Enhancement Mode MOSFET

MTP658G6

BV_{DSS}	-30V
I_D	-5.2A
R_{DSON}@V_{GS}=-10V, I_D=-5A	39mΩ(typ.)
R_{DSON}@V_{GS}=-4.5V, I_D=-3.7A	61mΩ(typ.)
R_{DSON}@V_{GS}=-4V, I_D=-3A	69mΩ(typ.)
R_{DSON}@V_{GS}=-3V, I_D=-1.5A	116mΩ(typ.)

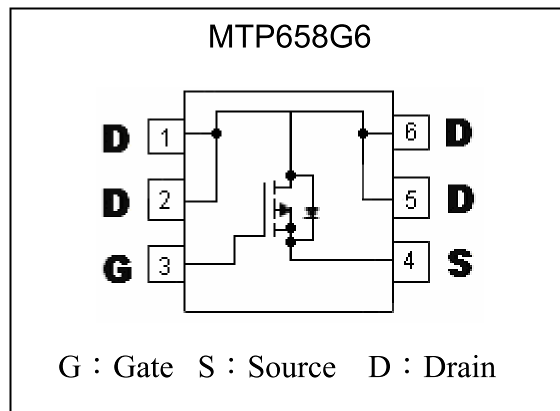
Description

The MTP658G6 is a P-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.
The TSOP-6 package is universally preferred for all commercial-industrial surface mount applications.

Features

- Simple drive requirement
- Low on-resistance
- Small package outline
- Pb-free lead plating package

Equivalent Circuit



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current @V_{GS}=-4.5V, T_A=25 °C (Note 1)	I_D	-5.2	A
Continuous Drain Current @ V_{GS}=-4.5V, T_A=70 °C (Note 1)	I_D	-4.2	A
Pulsed Drain Current (Note 2, 3)	I_{DM}	-30	A
Total Power Dissipation @ T_A=25 °C	Pd	1.6	W
Linear Derating Factor		0.013	W / °C
Operating Junction and Storage Temperature Range	Tj ; Tstg	-55~+150	°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	78	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	25	

Note : 1.Surface mounted on 1 in² copper pad of FR-4 board. 156℃/W when mounted on minimum copper pad.
2.Pulse width limited by maximum junction temperature.
3.Pulse Width ≤300μs, Duty Cycle≤2%

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

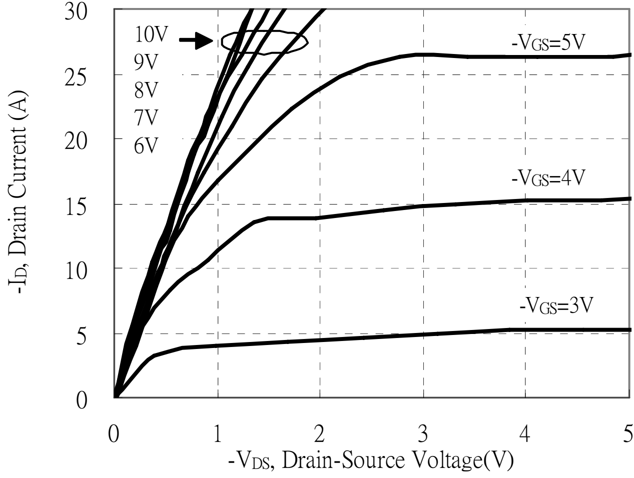
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-30	-	-	V	V_{GS}=0V, I_D=-250μA
$\Delta BV_{DSS}/\Delta Tj$	-	-0.02	-	V/℃	Reference to 25℃, I_D=-1mA
$V_{GS(th)}$	-1	-1.6	-2.5	V	V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS}=-24V, V_{GS}=0V
	-	-	-10		V_{DS}=-24V, V_{GS}=0V, Tj=55℃
*$R_{DS(ON)}$	-	39	50	mΩ	I_D=-5A, V_{GS}=-10V
	-	61	75		I_D=-3.7A, V_{GS}=-4.5V
	-	69	85		I_D=-3A, V_{GS}=-4V
	-	116	150		I_D=-1.5A, V_{GS}=-3V
*G_{FS}	-	6.2	-	S	V_{DS}=-5V, I_D=-4A
	-	3.3	-	S	V_{DS}=-10V, I_D=-1.75A
Dynamic					
Ciss	-	829	-	pF	V_{DS}=-15V, V_{GS}=0, f=1MHz
Coss	-	85	-		
Crss	-	69	-		
$t_{d(ON)}$	-	17	-	ns	V_{DS}=-15V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
t_r	-	12	-		
$t_{d(OFF)}$	-	24	-		
t_f	-	12	-		
Qg	-	10	-	nC	V_{DS}=-24V, I_D=-5A, V_{GS}=-5V
Qgs	-	2.6	-		
Qgd	-	4.9	-		
Source Drain Diode					
*I_S	-	-	-2	A	
*I_{SM}	-	-	-8		
*V_{SD}	-	-0.77	-1.2	V	I_S=-1.7A,V_{GS}=0V
*T_{rr}	-	28	-	ns	I_S=-1.7A,V_{GS}=0V,dI/dt=100A/μs
Q_{rr}	-	22	-	nC	

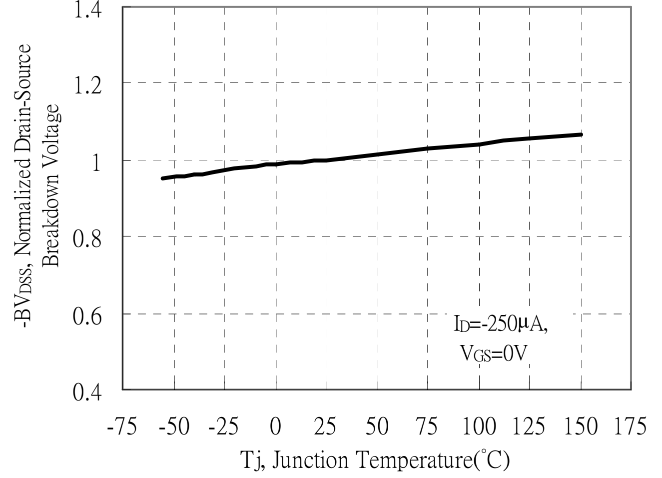
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

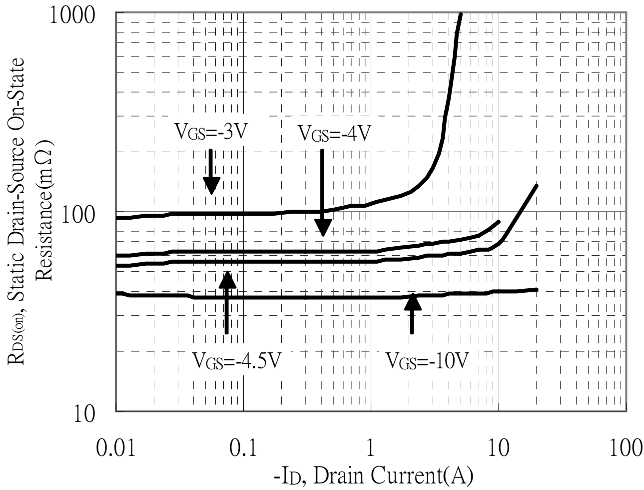
Ordering Information

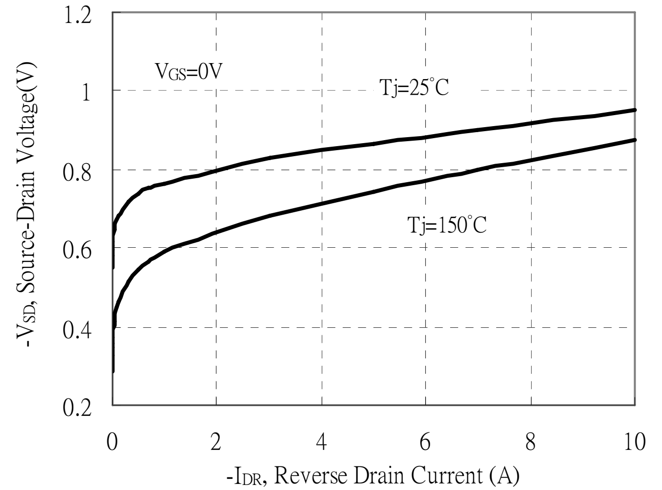
Device	Package	Shipping
MTP658G6-0-T1-G	TSOP-6 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

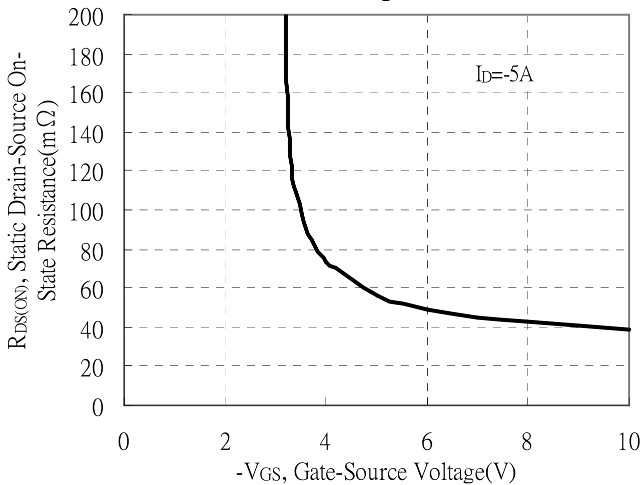
Typical Characteristics

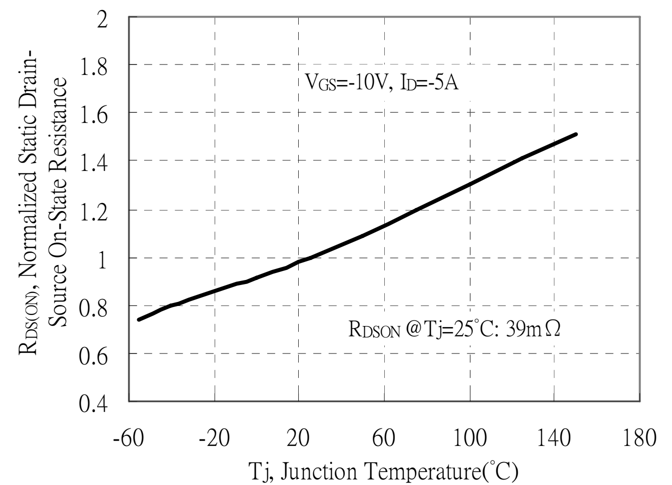




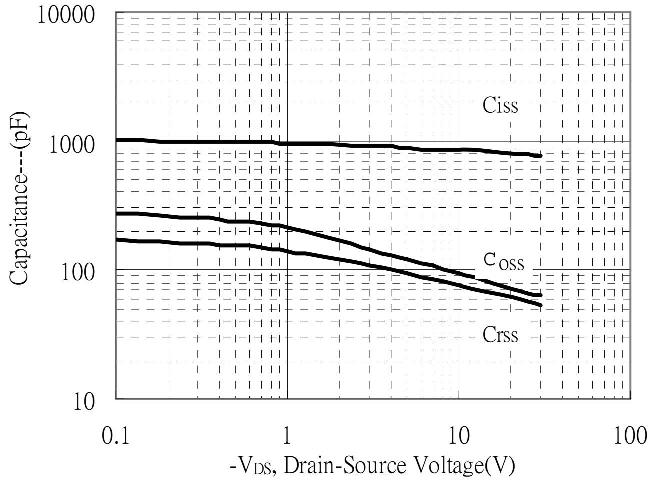


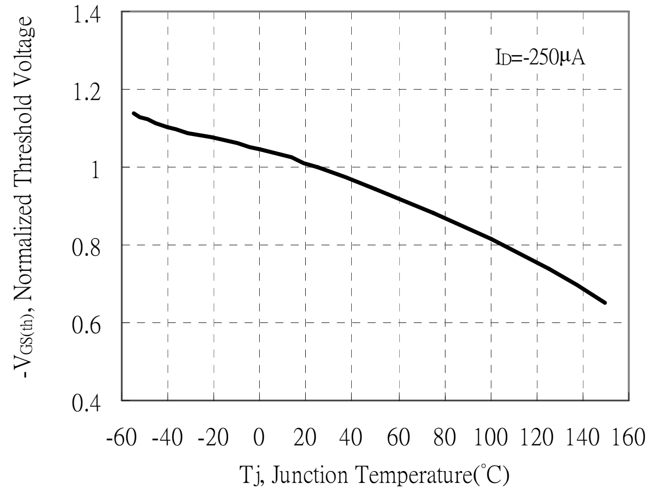


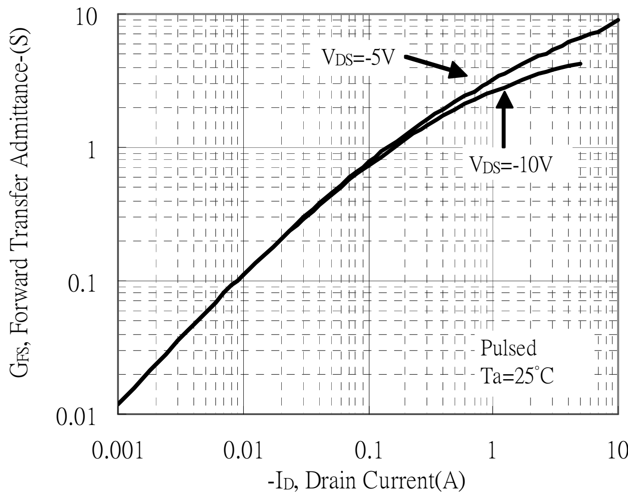


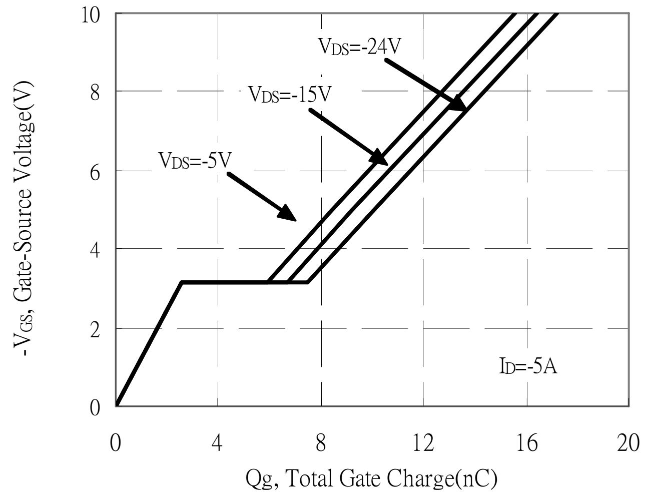


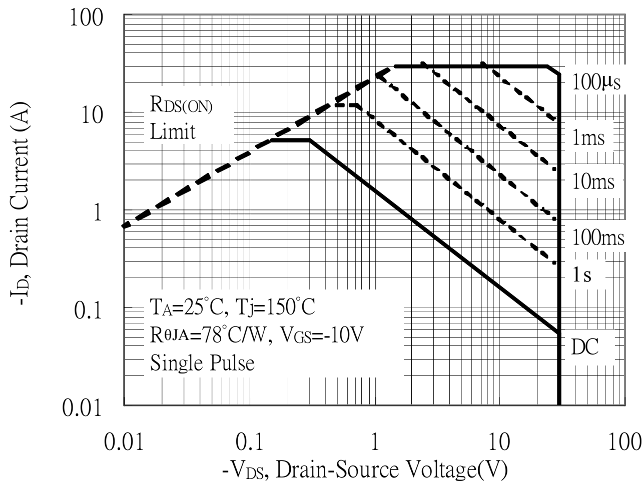
Typical Characteristics(Cont.)

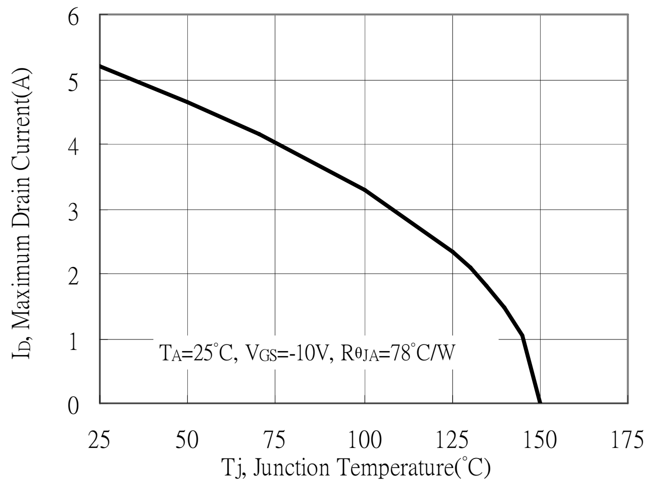




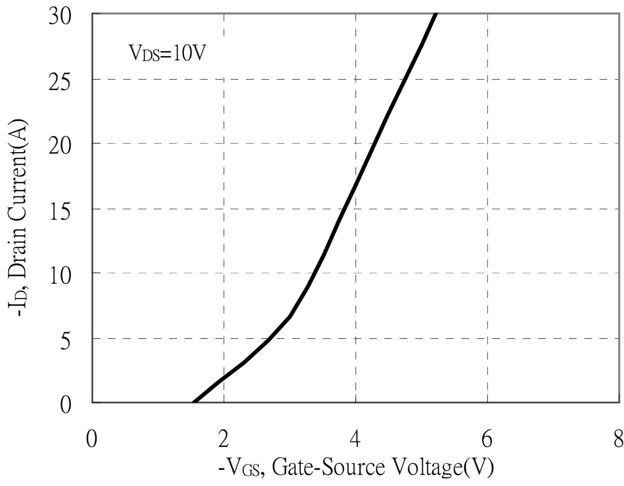


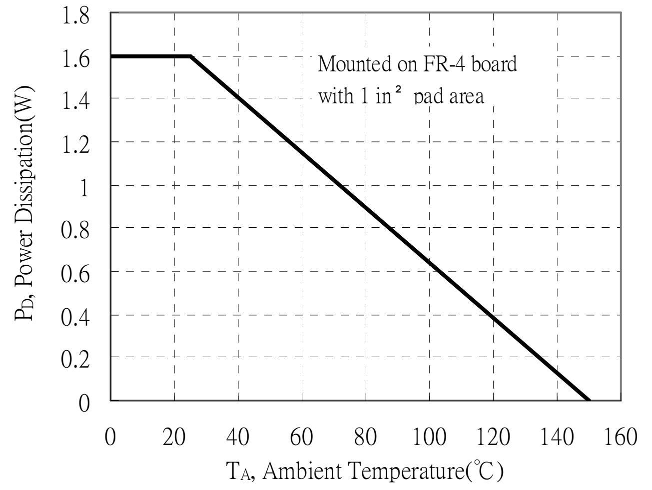


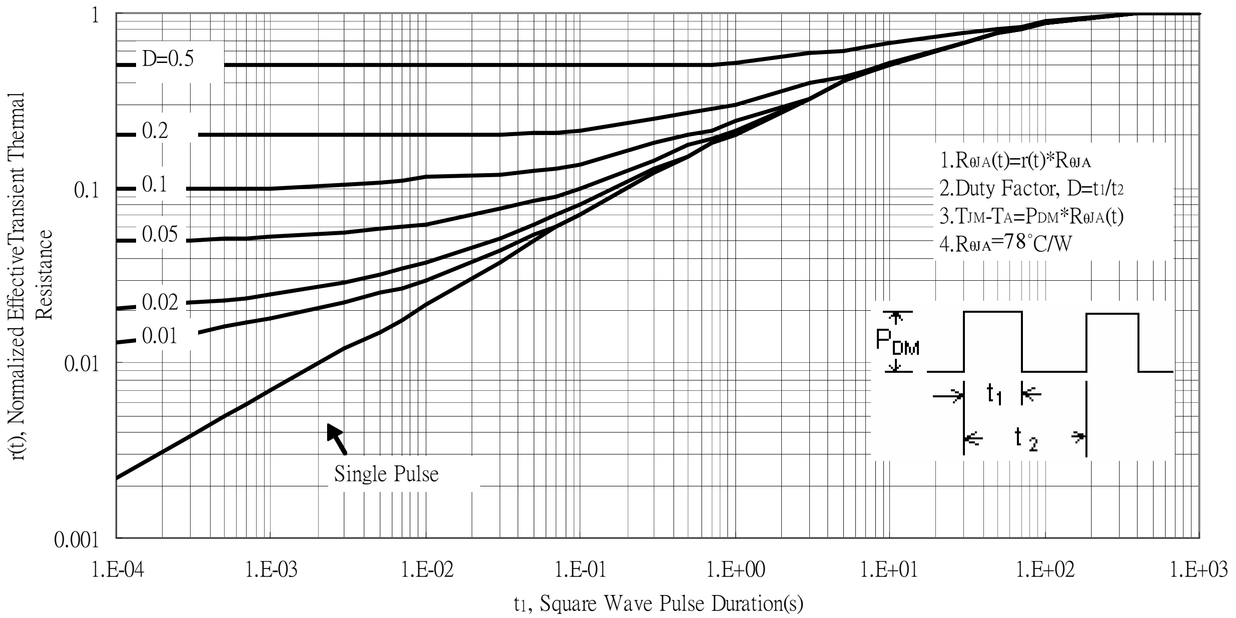




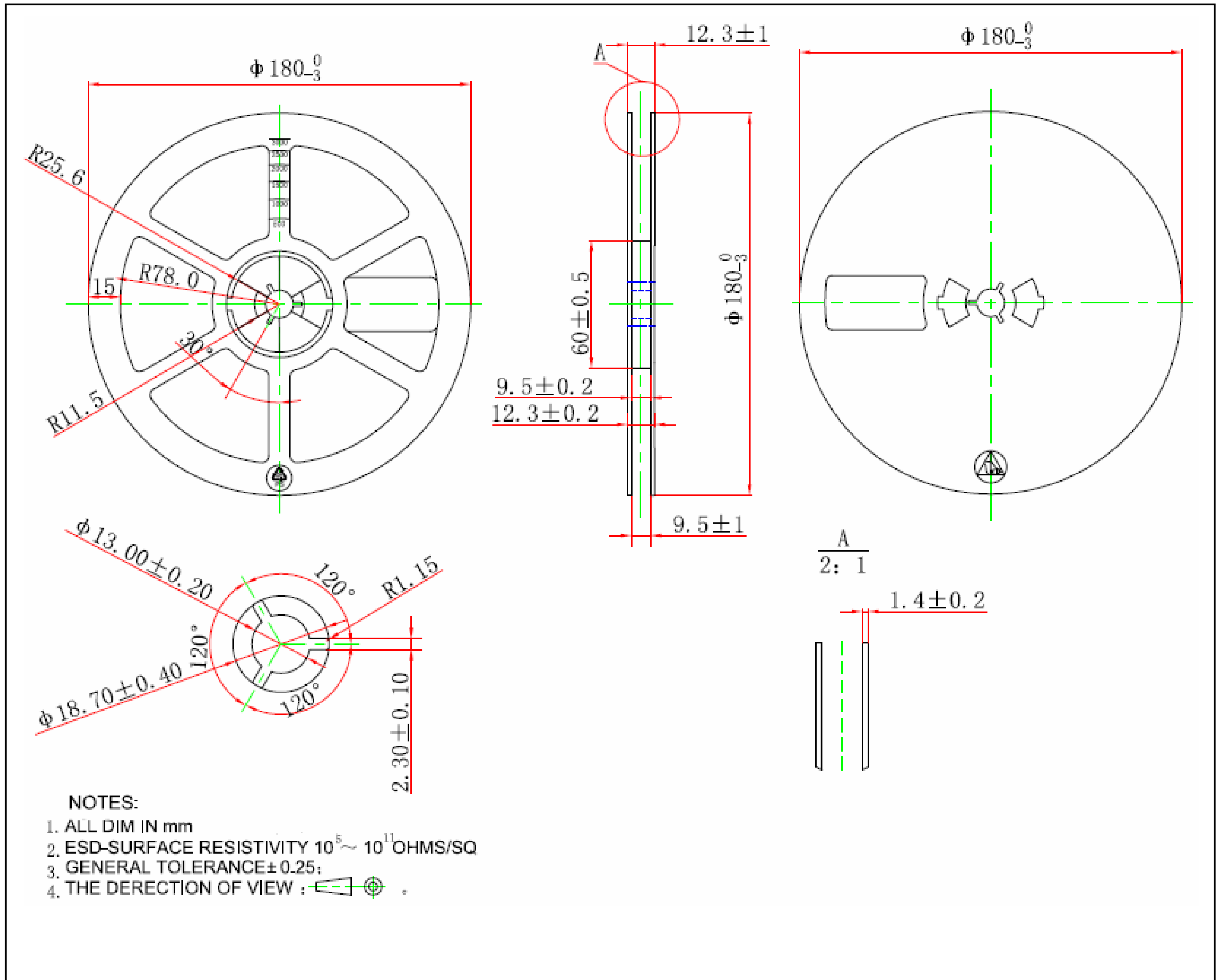
Typical Characteristics(Cont.)



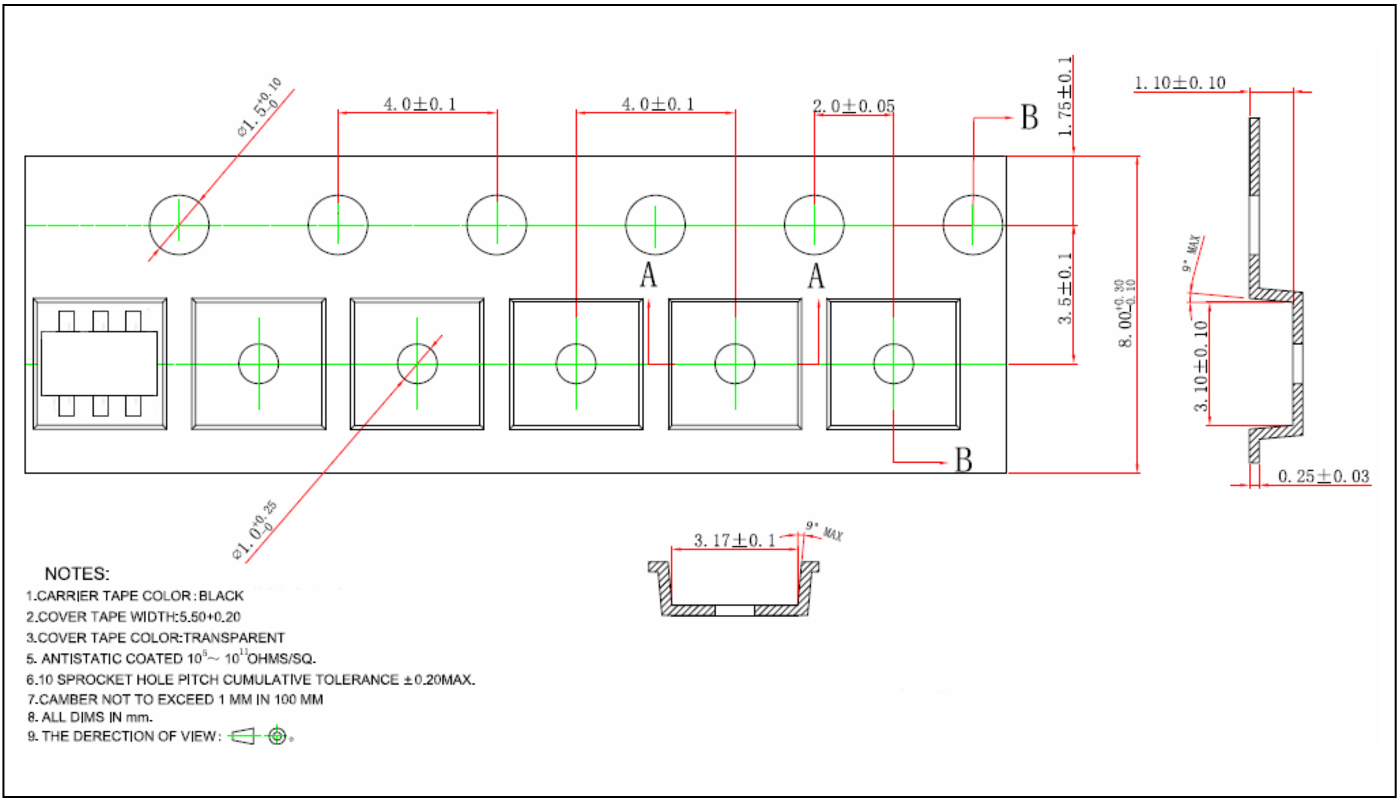




Reel Dimension



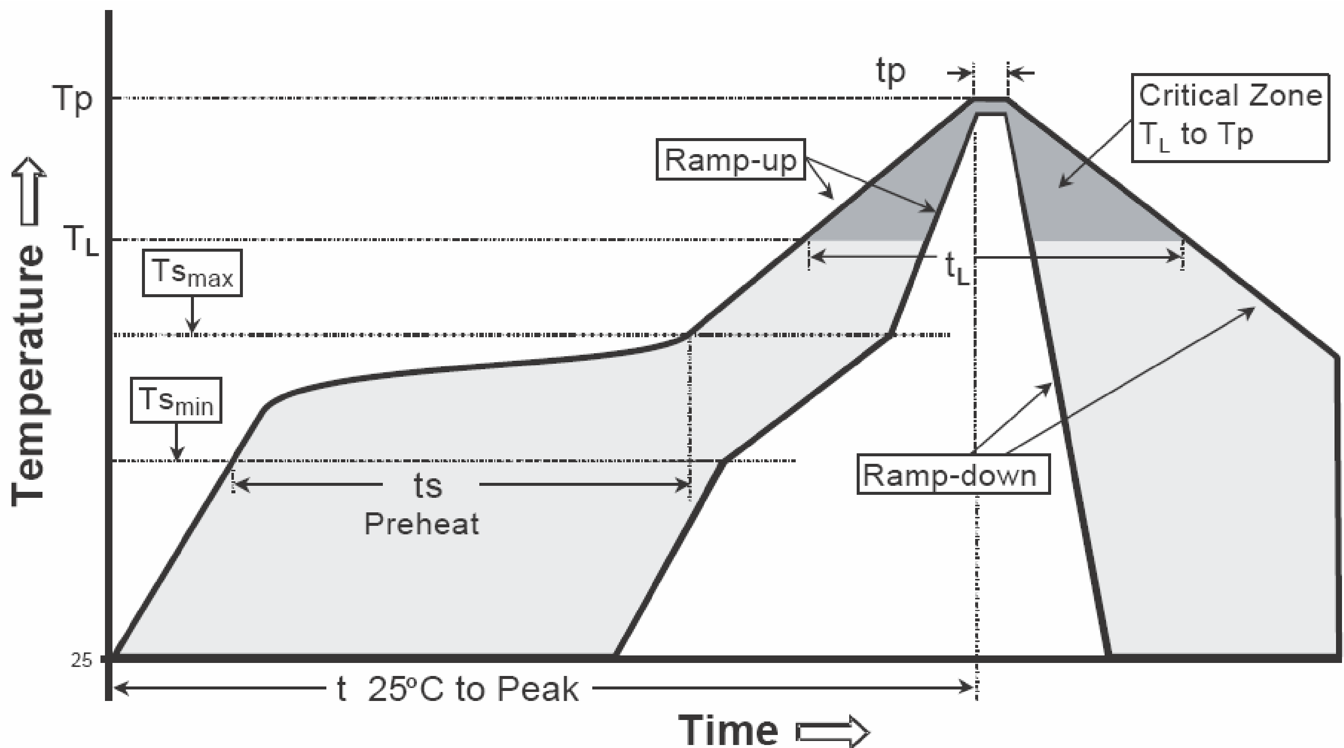
Carrier Tape Dimension



Recommended wave soldering condition

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

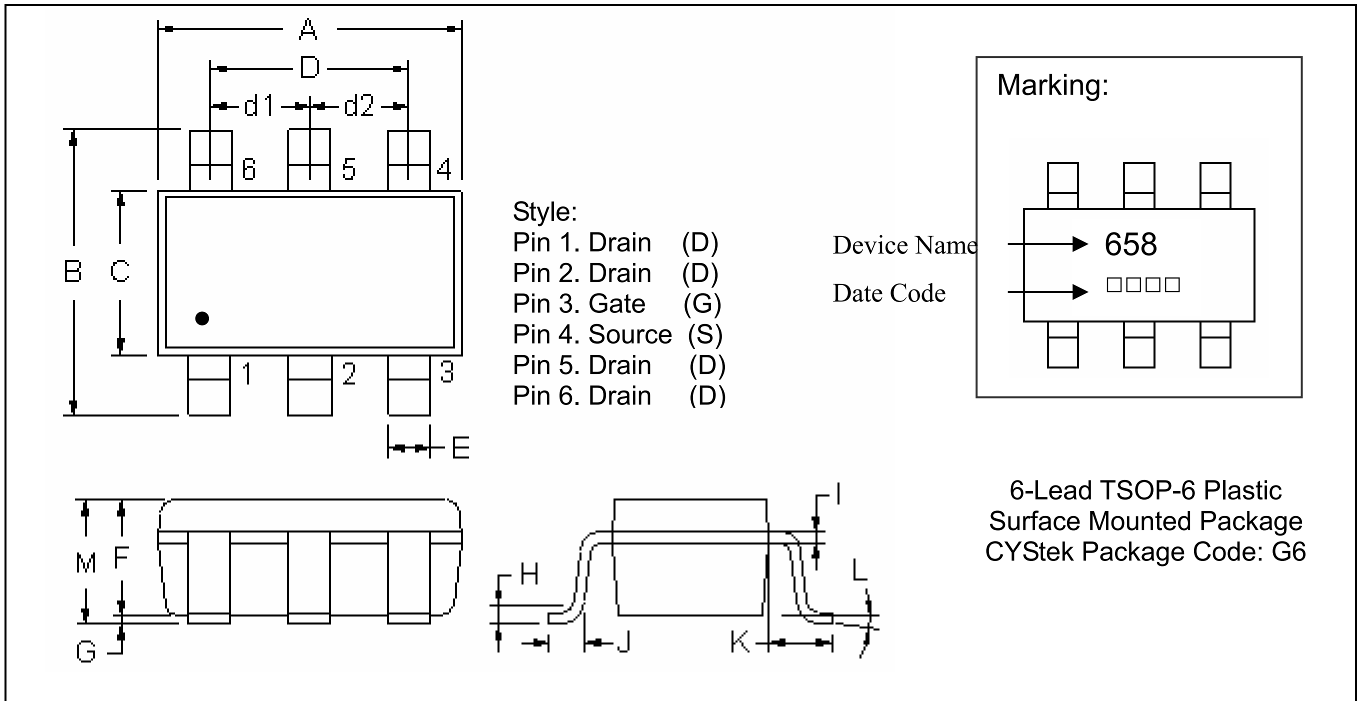
Recommended temperature profile for IR reflow



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(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.

TSOP-6 Dimension



6-Lead TSOP-6 Plastic Surface Mounted Package
CYStek Package Code: G6

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1063	0.1220	2.70	3.10	G	0	0.0039	0	0.10
B	0.1024	0.1181	2.60	3.00	H	-	0.0098	-	0.25
C	0.0551	0.0709	1.40	1.80	I	0.0047 REF		0.12 REF	
D	0.0748 REF		1.90 REF		J	0.0177 REF		0.45 REF	
d1	0.0374 REF		0.95 REF		K	0.0236 REF		0.60 REF	
d2	0.0374 REF		0.95 REF		L	0°	10°	0°	10°
E	0.0118	0.0197	0.30	0.50	M	-	0.0433	-	1.10
F	0.0276	0.0394	0.70	1.00					

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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