20V P-CHANNEL Enhancement Mode MOSFET

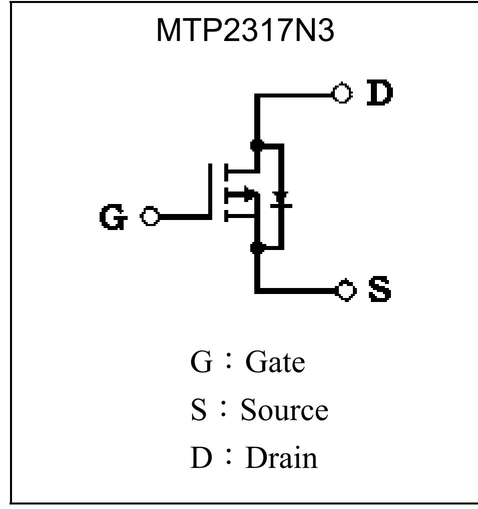
MTP2317N3

BV_{DSS}	-20V
I_D @V_{GS}=-4.5V	-5.8A
R_{DSON}@V_{GS}=-4.5V, I_D=-4.5A	28mΩ(typ.)
R_{DSON}@V_{GS}=-4.5V, I_D=-3A	25mΩ(typ.)
R_{DSON}@V_{GS}=-2.5V, I_D=-2.5A	33mΩ(typ.)
R_{DSON}@V_{GS}=-1.8V, I_D=-2A	51mΩ(typ.)
R_{DSON}@V_{GS}=-1.8V, I_D=-1.5A	48mΩ(typ.)
R_{DSON}@V_{GS}=-1.5V, I_D=-0.5A	61mΩ(typ.)
R_{DSON}@V_{GS}=-1.35V, I_D=-0.1A	60mΩ(typ.)

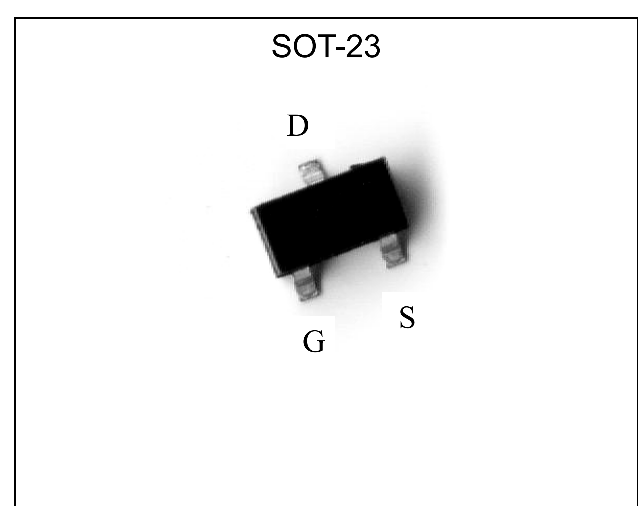
Features

- Advanced trench process technology
- High density cell design for ultra low on resistance
- Excellent thermal and electrical capabilities
- Compact and low profile SOT-23 package
- Pb-free lead plating and halogen-free package

Equivalent Circuit



Outline



Ordering Information

Device	Package	Shipping
MTP2317N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

- Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products
- Packing spec, T1 : 3000 pcs / tape & reel,7” reel
- Product rank, zero for no rank products
- Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current (Note)	T_A=25°C, V_{GS}=-4.5V	I_D	-5.8	A
	T_A=70°C, V_{GS}=-4.5V		-4.6	
Pulsed Drain Current		I_{DM}	-30	
Maximum Power Dissipation (Note)	Ta=25℃	P_D	1.38	W
	Ta=70℃		0.88	
Operating Junction and Storage Temperature Range		Tj ; Tstg	-55~+150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient(PCB mounted)	Rth,ja	90 (Note)	°C/W
Lead Temperature, for 5 second soldering(1/8" from case)	T_L	260	°C

Note : Surface mounted on 1 in ^{2} FR-4 board with 2 oz. copper, t≦5sec; 270°C/W when mounted on minimum copper pad.

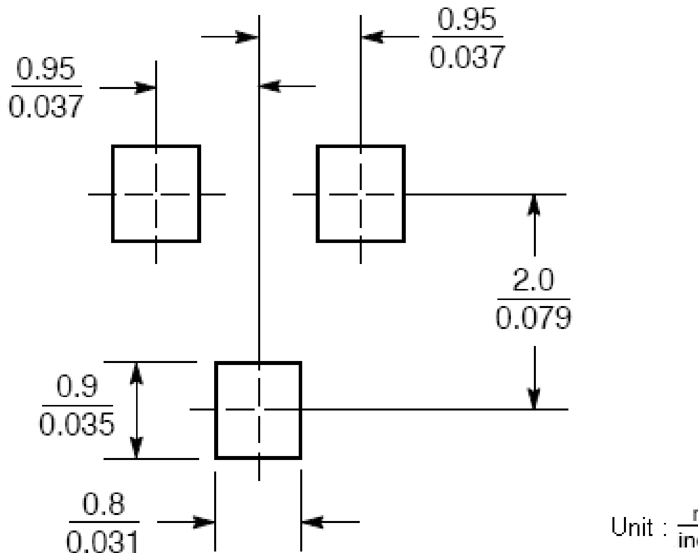
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-20	-	-	V	V_{GS}=0V, I_D=-250μA
BV_{DSX}	-15	-	-	V	V_{GS}=5V, I_D=-1mA
$V_{GS(th)}$	-0.5	-0.7	-1.0	V	V_{DS}=V_{GS}, I_D=-250μA
	-0.5	-0.8	-1.1	V	V_{DS}=-3V, I_D=-1mA
I_{GSS}	-	-	±100	nA	V_{GS}=±12V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS}=-20V, V_{GS}=0V
*$R_{DS(ON)}$	-	28	35	mΩ	V_{GS}=-4.5V, I_D=-4.5A
	-	25	32		V_{GS}=-4.5V, I_D=-3A
	-	33	43		V_{GS}=-2.5V, I_D=-2.5A
	-	51	66		V_{GS}=-1.8V, I_D=-2A
	-	48	62		V_{GS}=-1.8V, I_D=-1.5A
	-	61	88		V_{GS}=-1.5V, I_D=-0.5A
	-	60	100		V_{GS}=-1.35V, I_D=-0.1A
*G_{FS}	-	10.7	-	S	V_{DS}=-5V, I_D=-3A
	-	6.7	-		V_{DS}=-3V, I_D=-1A
Dynamic					
Ciss	-	1916	-	pF	V_{DS}=-10V, V_{GS}=0V, f=1MHz
Coss	-	159	-		
Crss	-	132	-		

$t_{d(ON)}$	-	12	-	ns	V_{DD}=-10V, I_D=-1A, R_L=10Ω, V_{GEN}=-4.5V, R_G=6Ω
t_r	-	18	-		
$t_{d(OFF)}$	-	54	-		
t_f	-	35	-		
Qg	-	15	-	nC	V_{DS}=-10V, I_D=-4.5A, V_{GS}=-4.5V
Qgs	-	3.2	-		
Qgd	-	3.9	-		
Source-Drain Diode					
I_S	-	-	-2	A	
I_{SM}	-	-	-8		
V_{SD}	-	-0.72	-1.3	V	V_{GS}=0V, I_S=-1A
trr*	-	21	-	ns	I_F=-4.5A, dI_F/dt=100A/μs
Qrr*	-	10	-	nC	

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

Recommended Soldering Footprint



Typical Characteristics

Typical Output Characteristics

5V, 4.5V, 4V, 3.5V, 3V
-VGS=2.5V
-VGS=2V
-VGS=1.5V
-VGS=1V
-ID, Drain Current (A)
-VDS, Drain-Source Voltage(V)

Typical Output Characteristics

5V, 4.5V, 4V, 3.5V, 3V, 2.5V, 2V
-VGS=1.5V
-VGS=1V
-ID, Drain Current (A)
-VDS, Drain-Source Voltage(V)

Brekdown Voltage vs Ambient Temperature

ID=-250μA,
VGS=0V
-BVDSS, Normalized Drain-Source Breakdown Voltage
Tj, Junction Temperature(°C)

Static Drain-Source On-State resistance vs Drain Current

-VGS=1.5V
-VGS=1.8V
-VGS=2.5V
-VGS=4.5V
RDS(on), Static Drain-Source On-State Resistance(mΩ)
-ID, Drain Current(A)

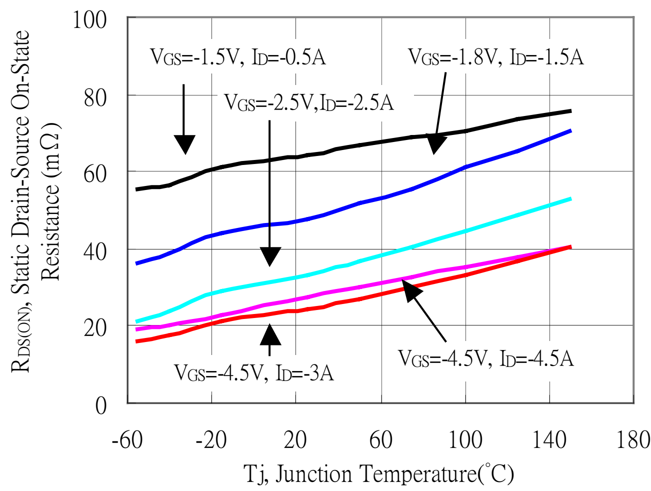
Reverse Drain Current vs Source-Drain Voltage

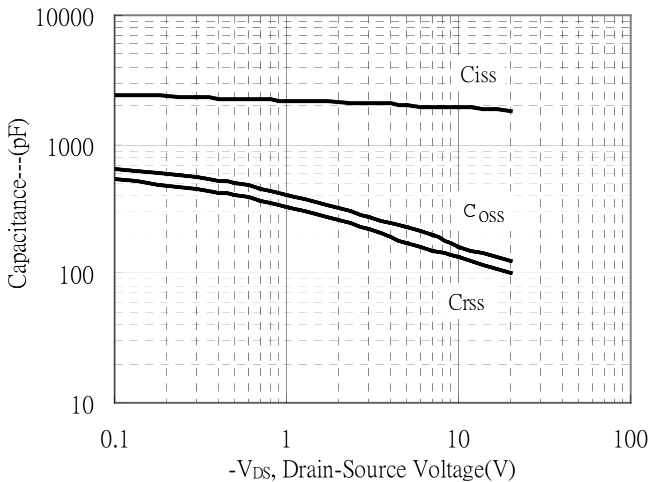
VGS=0V
Tj=25°C
Tj=150°C
-VSD, Source-Drain Voltage(V)
-IDR, Reverse Drain Current (A)

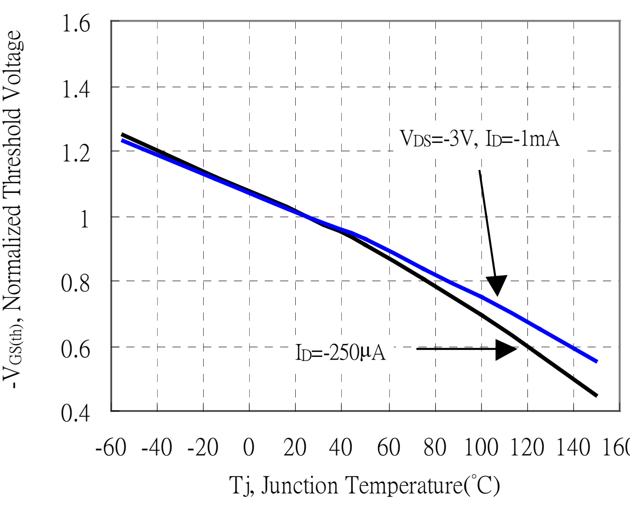
Static Drain-Source On-State Resistance vs Gate-Source Voltage

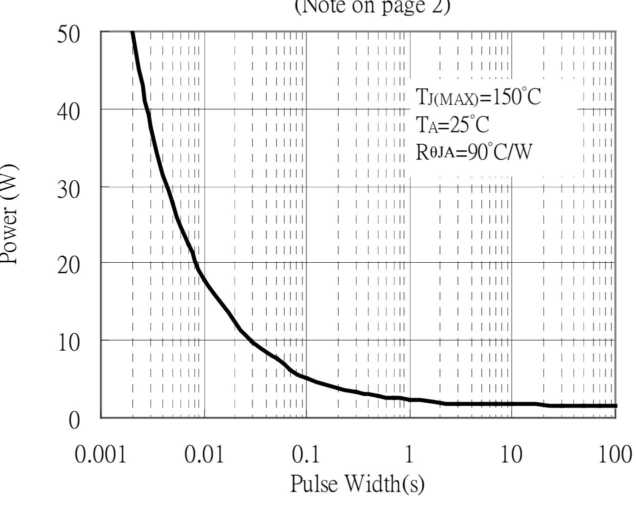
ID=-4.5A
-2.5A
-0.5A
-0.2A
-0.1A
RDS(ON), Static Drain-Source On-State Resistance(mΩ)
-VGS, Gate-Source Voltage(V)

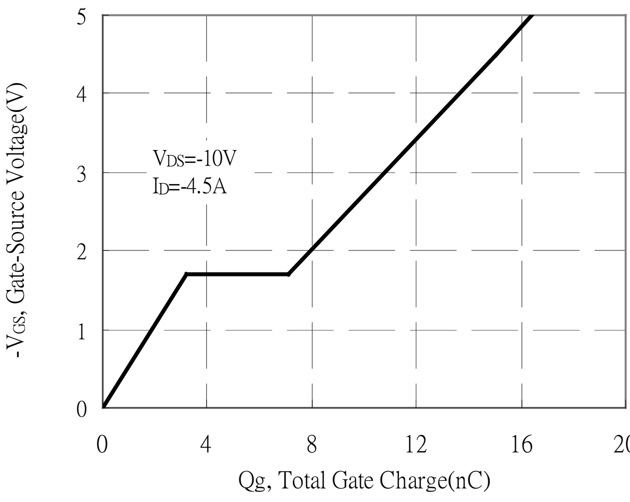
Typical Characteristics(Cont.)

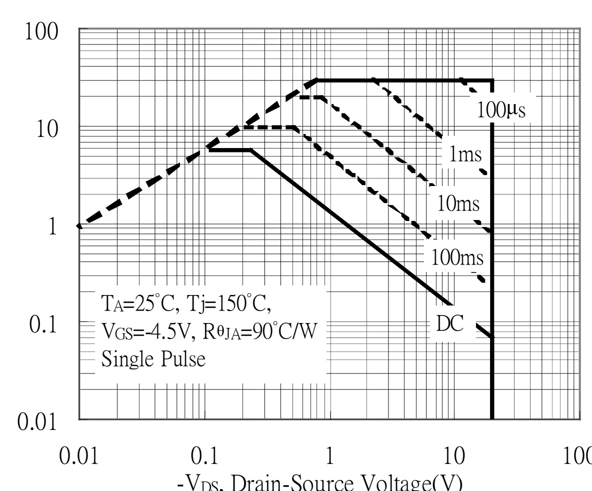




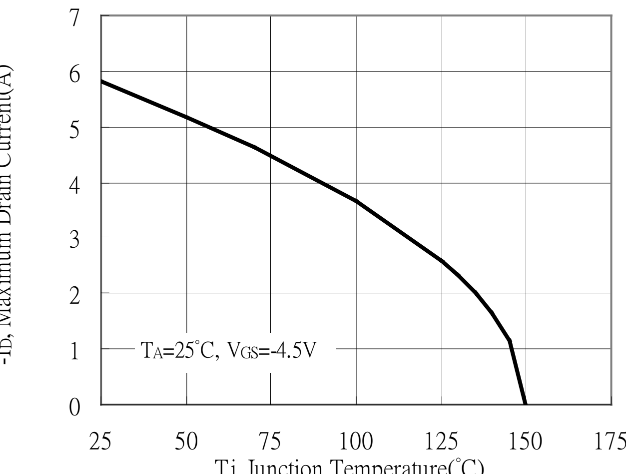




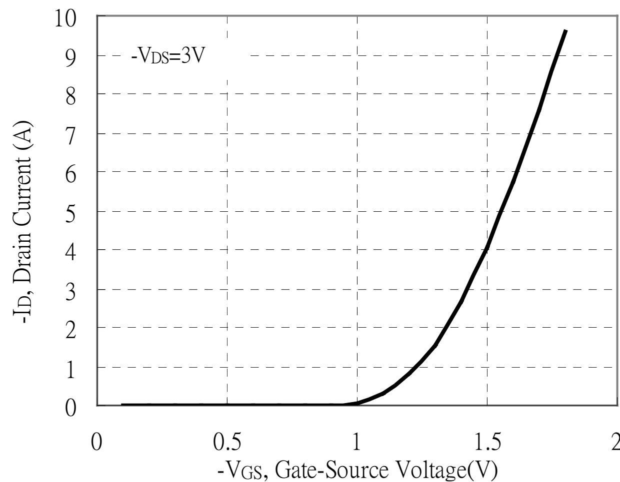




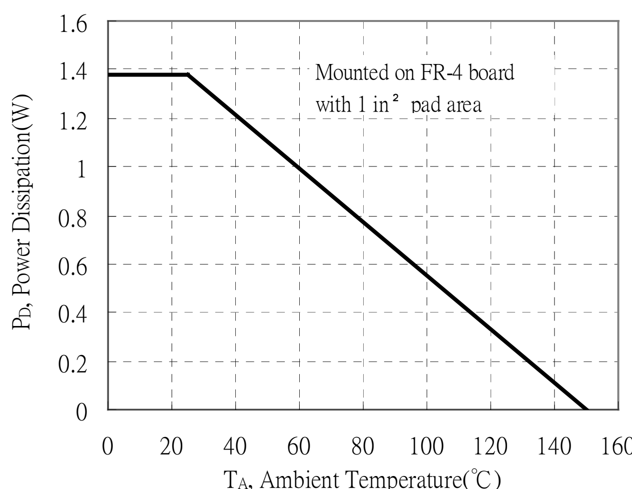
Typical Characteristics(Cont.)



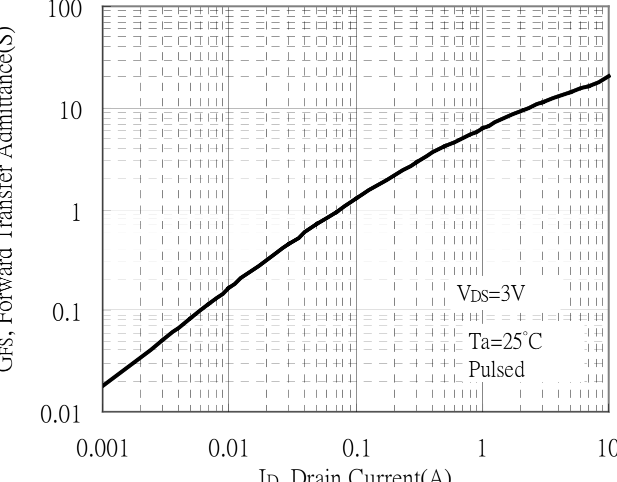
Typical Transfer Characteristics



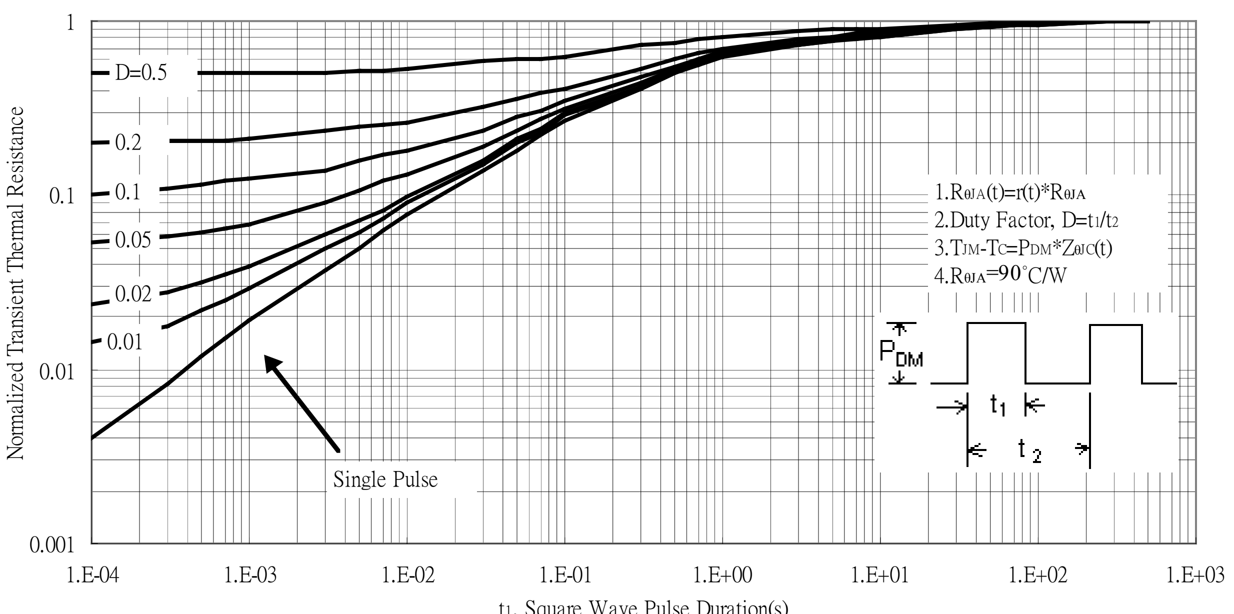
Power Derating Curve



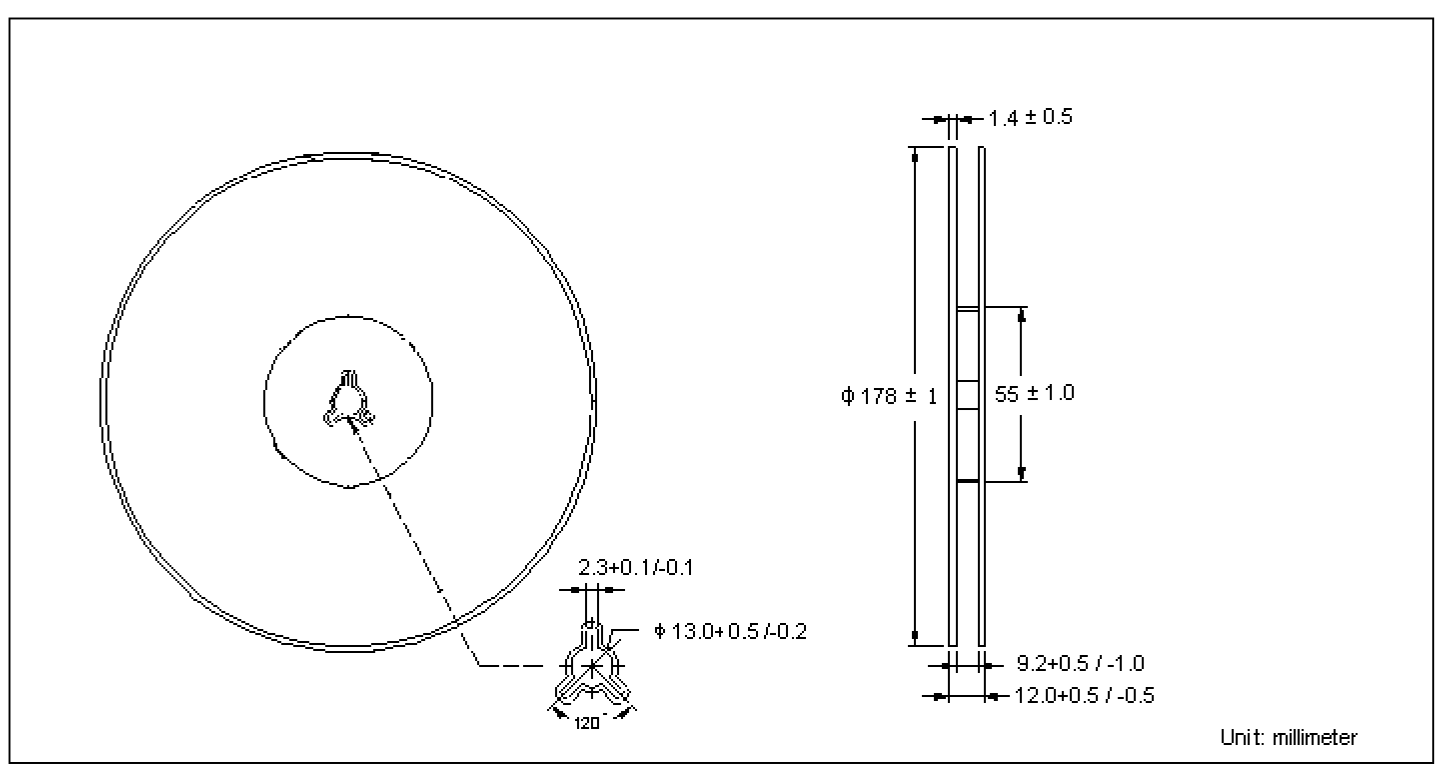
Forward Transfer Admittance vs Drain Current



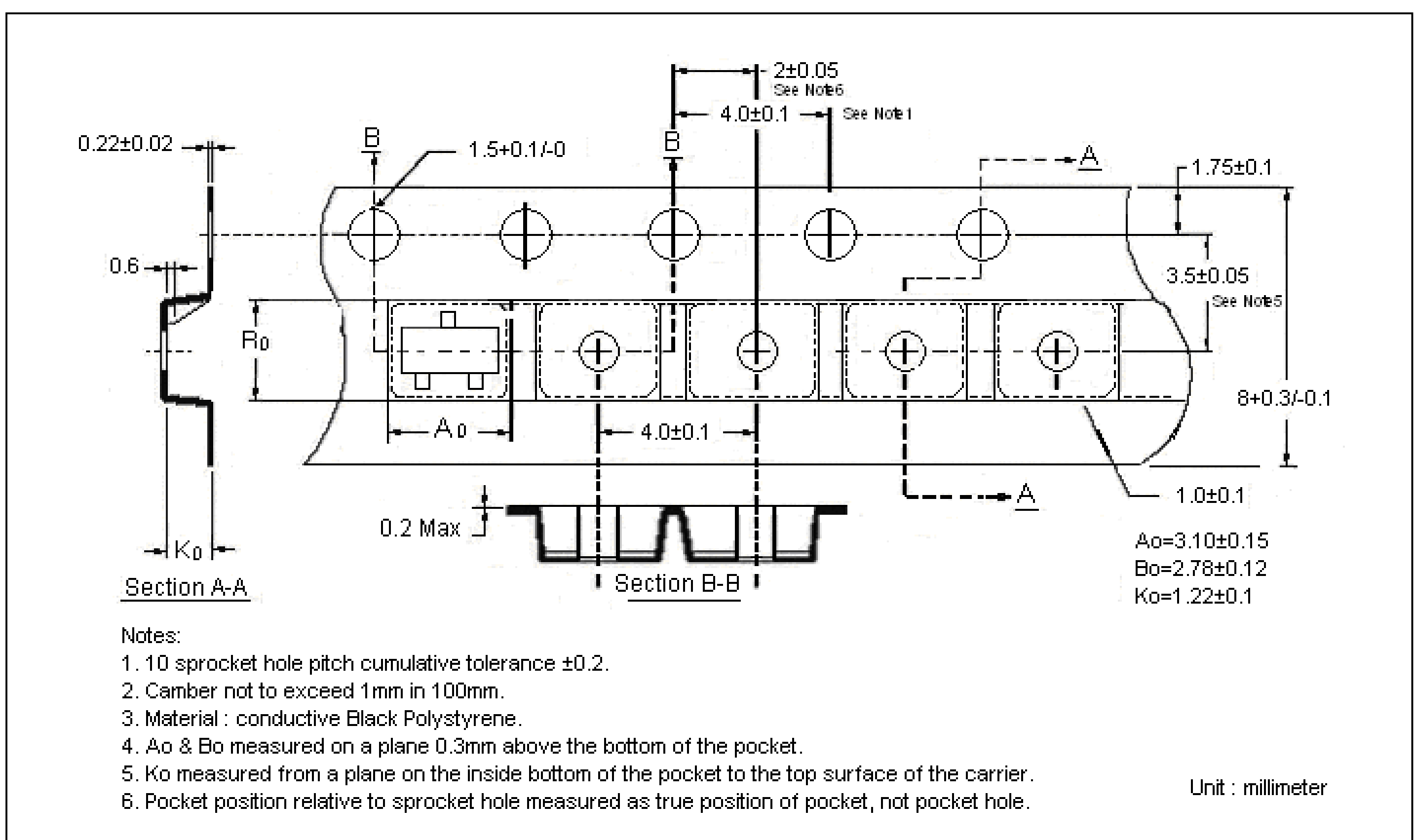
Typical Characteristics(Cont.)



Reel Dimension



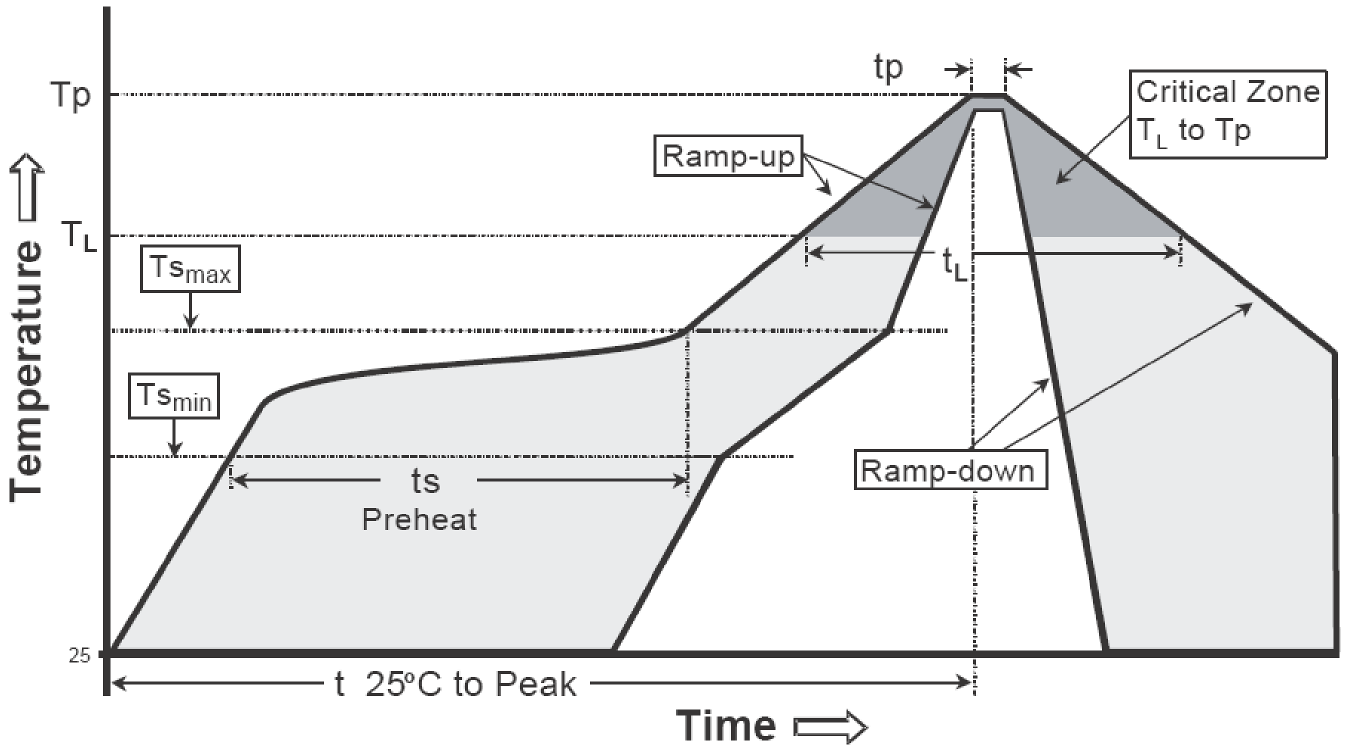
Carrier Tape Dimension



Recommended wave soldering condition

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

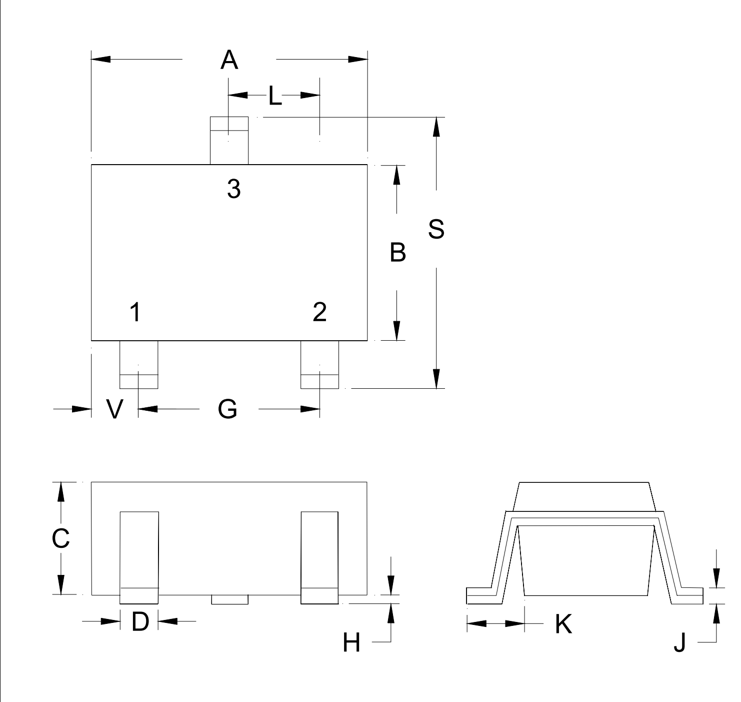
Recommended temperature profile for IR reflow

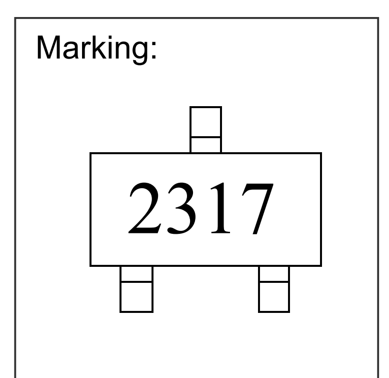


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − 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-23 Dimension





3-Lead SOT-23 Plastic
Surface Mounted Package
CYStek Package Code: N3

Style: Pin 1.Gate 2.Source 3.Drain

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10					

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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