P-Channel Enhancement Mode Power MOSFET

MTB300P10QL3

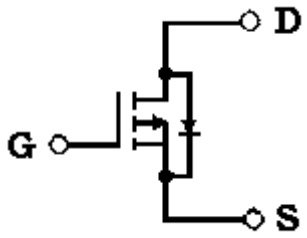
BV_{DSS}	-100V
I_D @ T_A=25°C, V_{GS}=-10V	-1.7A
R_{DSON}@V_{GS}=-10V, I_D=-1.7A	342mΩ (typ)
R_{DSON}@V_{GS}=-4.5V, I_D=-1A	446mΩ (typ)

Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating & Halogen-free package

Equivalent Circuit

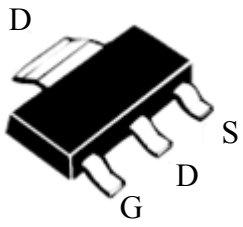
MTB300P10QL3



G：Gate D：Drain
S：Source

Outline

SOT-223



Ordering Information

Device	Package	Shipping
MTB300P10QL3-0-T3-G	SOT-223 (Pb-free lead plating & Halogen-free package)	2500 pcs / Tape & Reel

Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T3 : 2500 pcs / tape & reel, 13” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ V_{GS}=-10V, T_A=25°C	I_D	-1.7	A
Continuous Drain Current @ V_{GS}=-10V, T_A=70°C		-1.4	
Pulsed Drain Current *1	I_{DM}	-12	
Single Pulse Avalanche Current @ L=0.1mH	I_{AS}	-17	
Avalanche Energy @ L=1mH, I_D=-8A, V_{GS}=-10V, V_{DD}=-50V	E_{AS}	32	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E_{AR}	0.5	
Total Power Dissipation @T_A=25℃	P_D	2.5	W
Total Power Dissipation @T_A=70℃		1.6	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. Duty cycle ≤ 1%

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	50 (Note)	

Note : Surface mounted on a 1 in^2 pad of 2 oz. copper, t≤10s; 120°C/W when mounted on minimum copper pad.

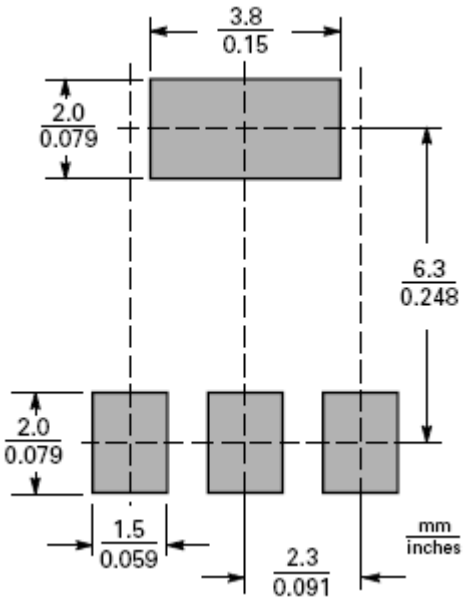
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-100	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-1	-	-2.5		V_{DS} =V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS} =-80V, V_{GS} =0V
	-	-	-25		V_{DS} =-80V, V_{GS} =0V, T_J=125°C
$R_{DS(ON)}$ *1	-	342	430	mΩ	V_{GS} =-10V, I_D=-1.7A
	-	446	620		V_{GS} =-4.5V, I_D=-1A
G_{FS} *1	-	2.6	-	S	V_{DS} =-15V, I_D=-1A
Dynamic					
Qg *1, 2	-	8.6	-	nC	I_D=-1.7A, V_{DS}=-80V, V_{GS}=-10V
Qgs *1, 2	-	1.1	-		
Qgd *1, 2	-	3.2	-		
$t_{d(ON)}$ *1, 2	-	5.8	-	ns	V_{DS}=-50V, I_D=-1.7A, V_{GS}=-10V, R_G=6Ω
tr *1, 2	-	18	-		
$t_{d(OFF)}$ *1, 2	-	20.2	-		
t_f *1, 2	-	17.4	-		

Ciss	-	240	-	pF	V_{GS}=0V, V_{DS}=-50V, f=1MHz
Coss	-	33	-		
Crss	-	22	-		
Rg	-	4.2	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	-1.7	A	
I_{SM} *3	-	-	-12		
V_{SD} *1	-	-0.83	-1.2	V	I_S=-1A, V_{GS}=0V
trr	-	19.2	-	ns	I_F=-1A, dI_F/dt=100A/μs
Qrr	-	12	-	nC	

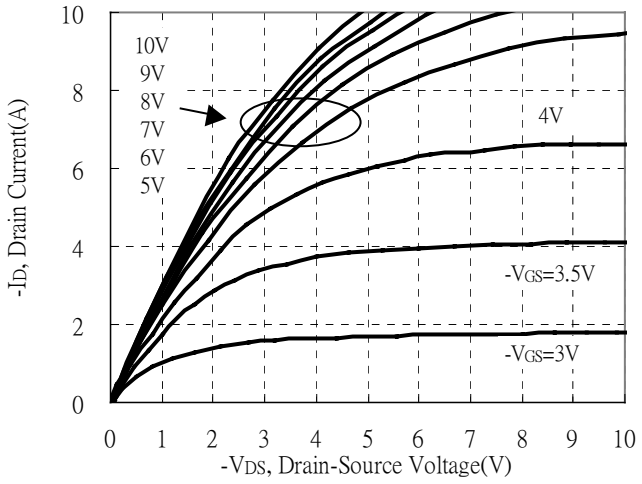
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Recommended soldering footprint

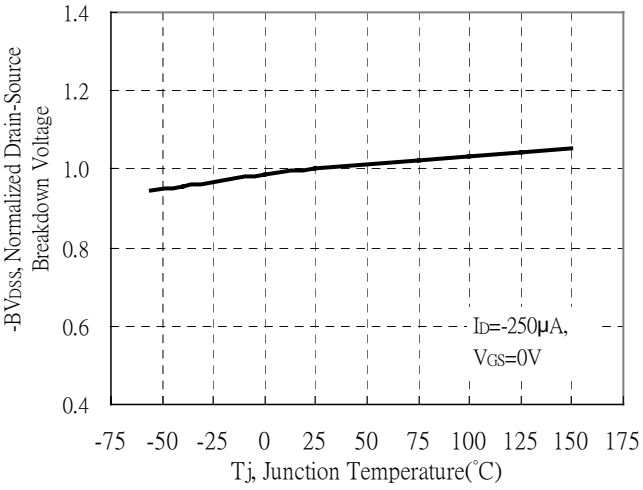


Typical Characteristics

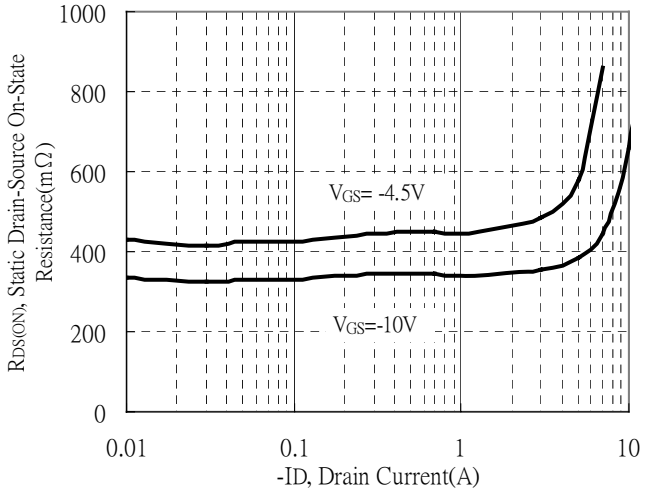
Typical Output Characteristics



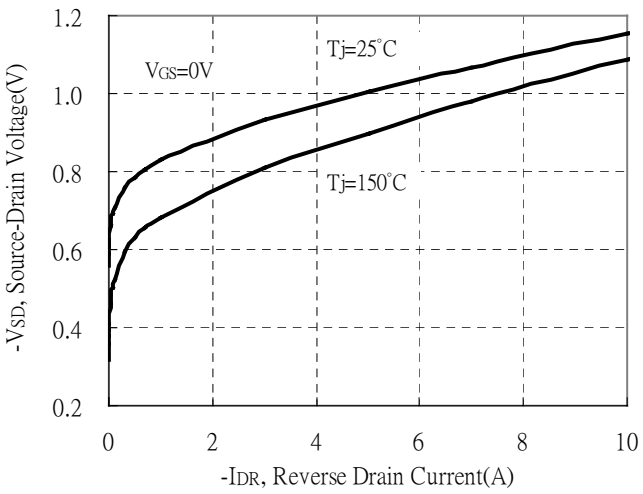
Brekdown Voltage vs Ambient Temperature



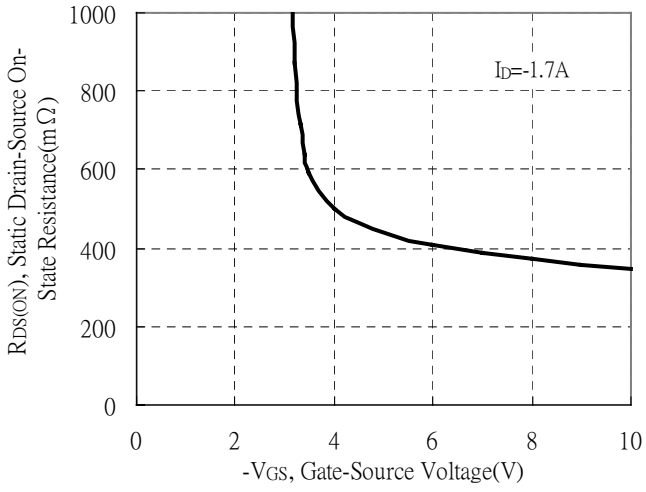
Static Drain-Source On-State resistance vs Drain Current



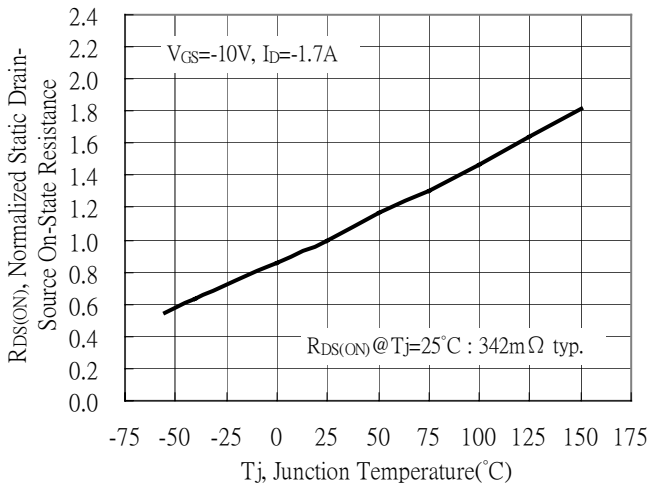
Reverse Drain Current vs Source-Drain Voltage



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

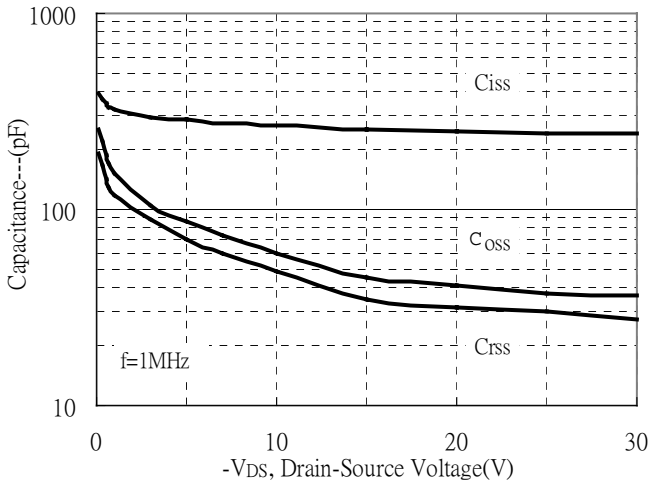


Drain-Source On-State Resistance vs Junction Tempearture

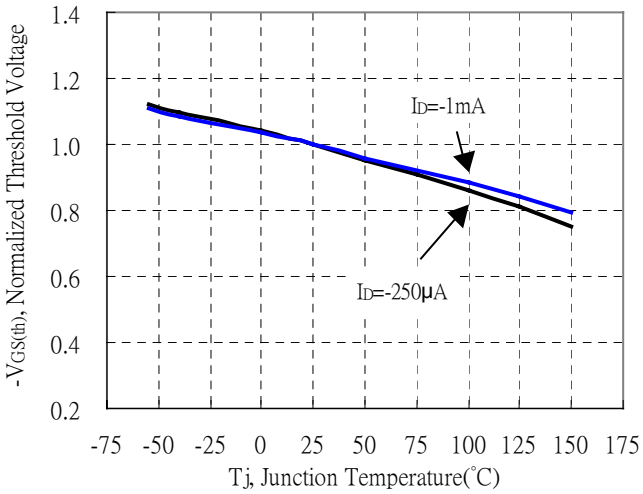


Typical Characteristics(Cont.)

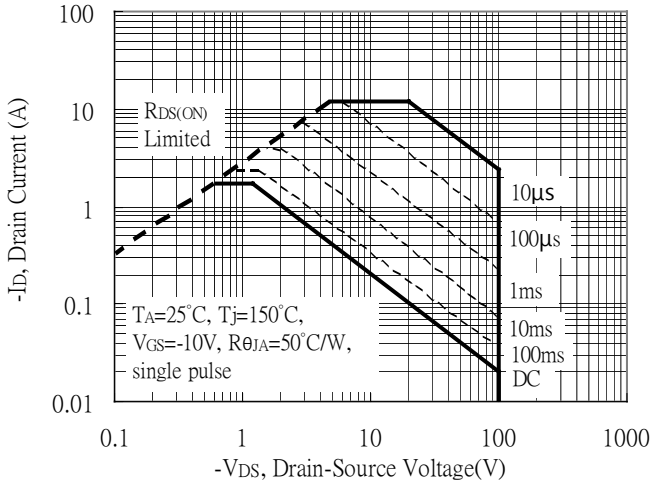
Capacitance vs Drain-to-Source Voltage



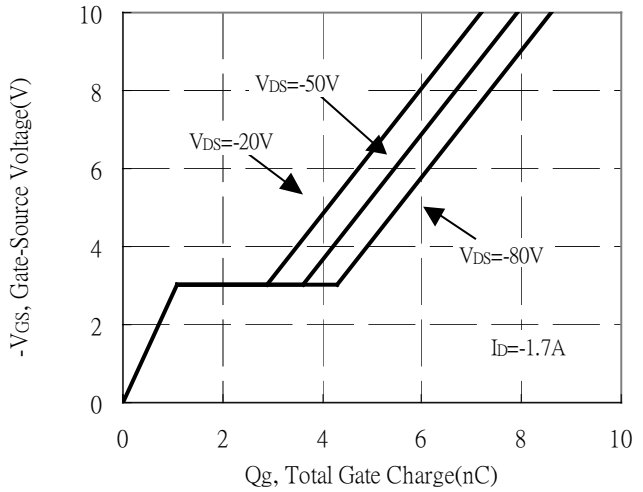
Threshold Voltage vs Junction Tempearture



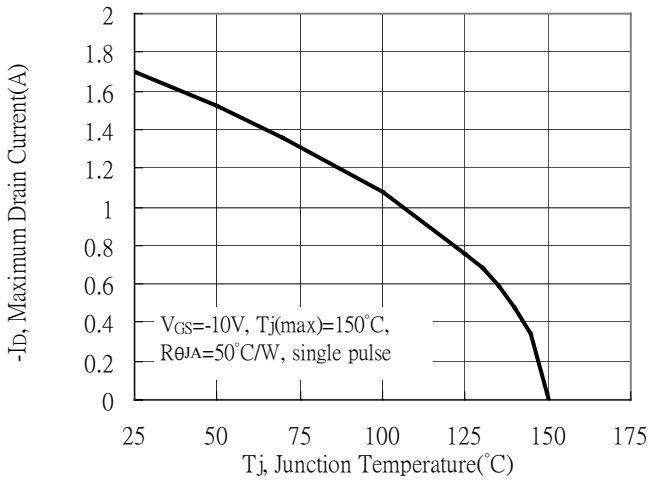
Maximum Safe Operating Area



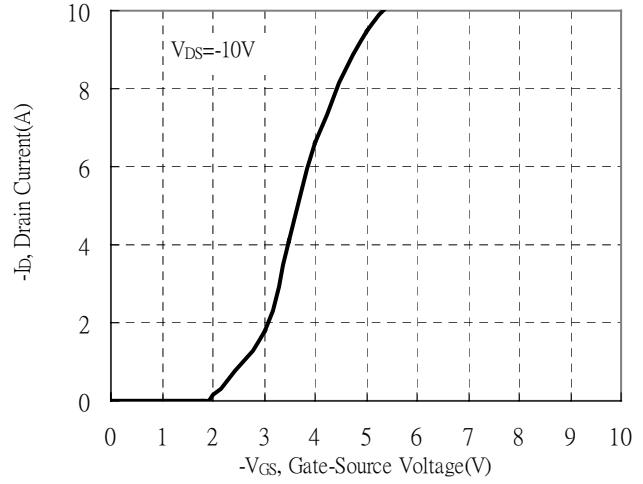
Gate Charge Characteristics



Maximum Drain Current vs Junction Temperature

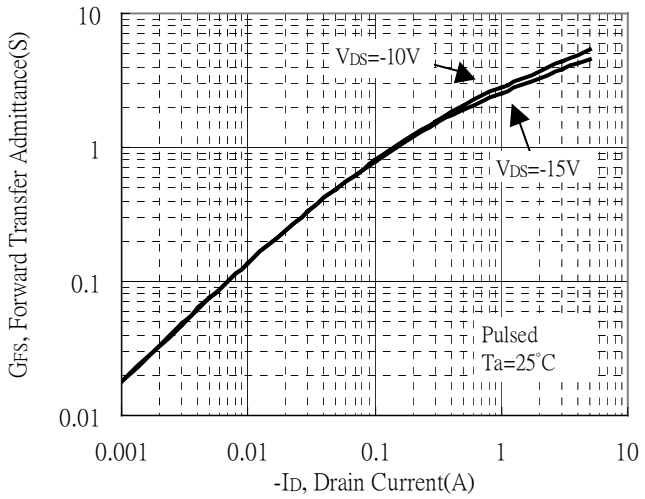


Typical Transfer Characteristics

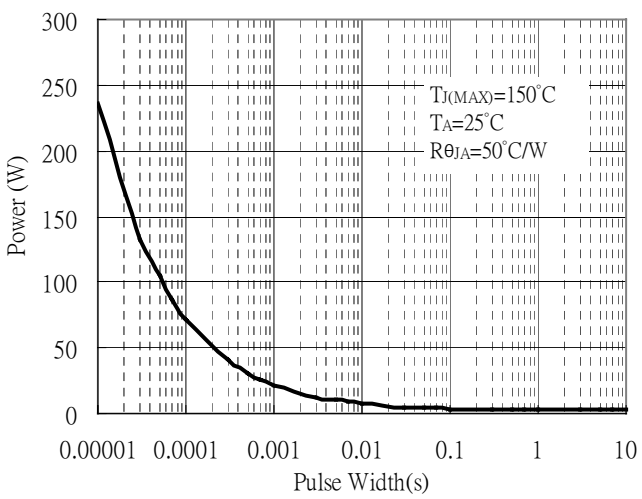


Typical Characteristics(Cont.)

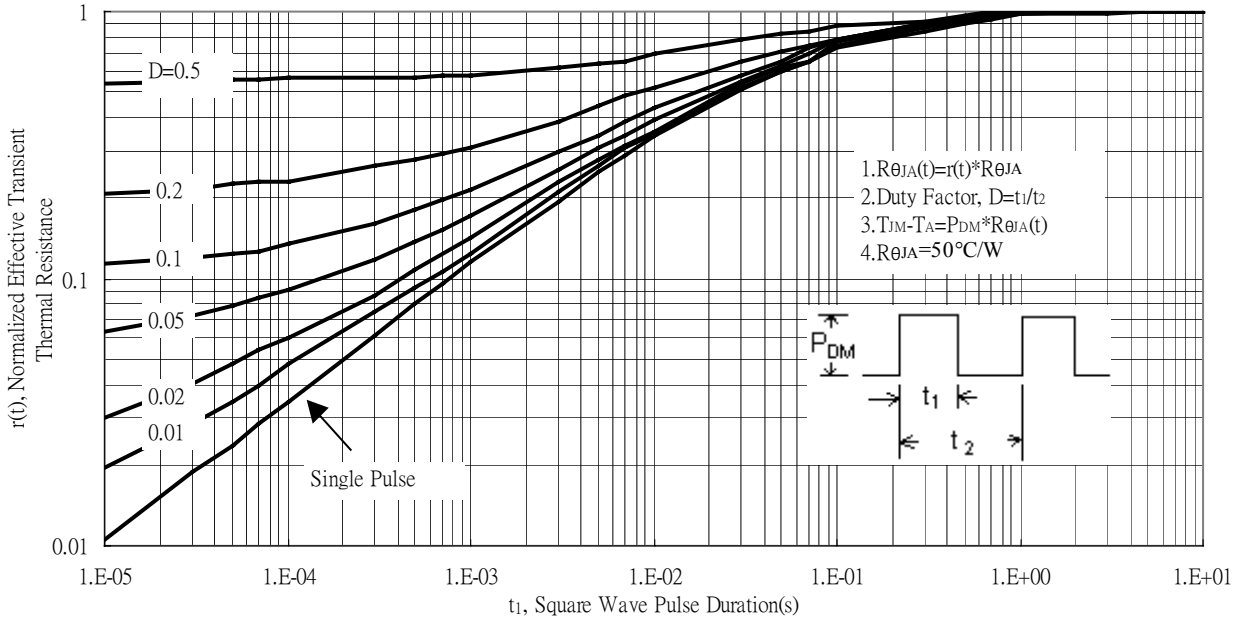
Forward Transfer Admittance vs Drain Current



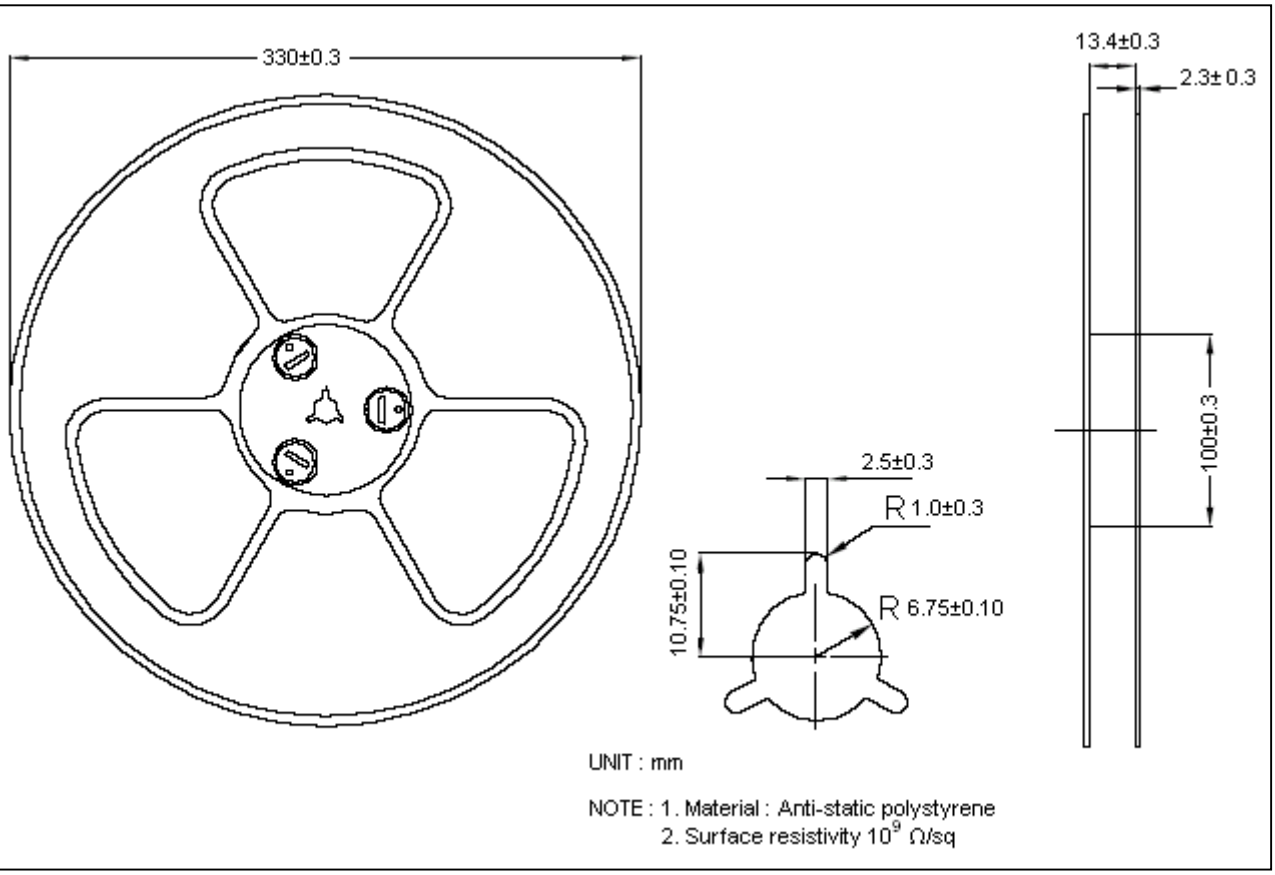
Single Pulse Power Rating, Junction to Case



Transient Thermal Response Curves



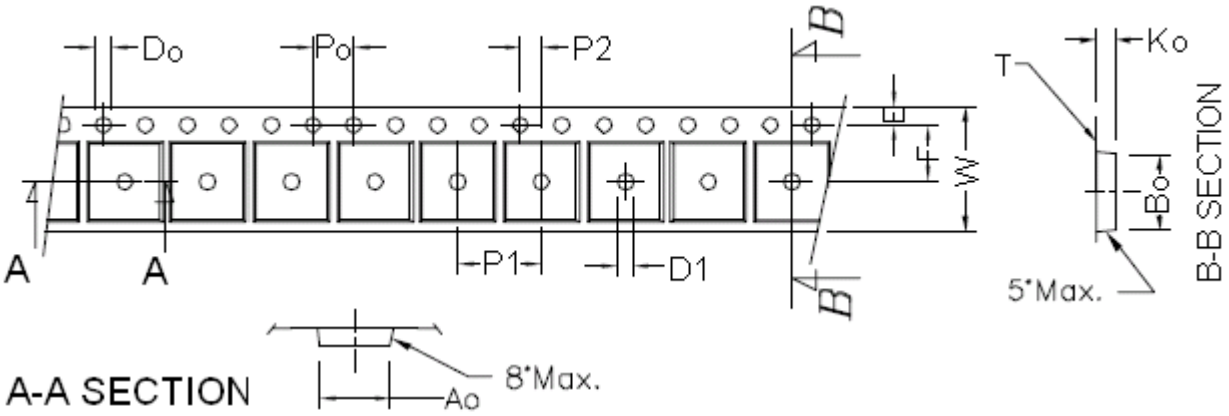
Reel Dimension



UNIT : mm

NOTE : 1. Material : Anti-static polystyrene
2. Surface resistivity 10^9 Ω/sq

Carrier Tape Dimension



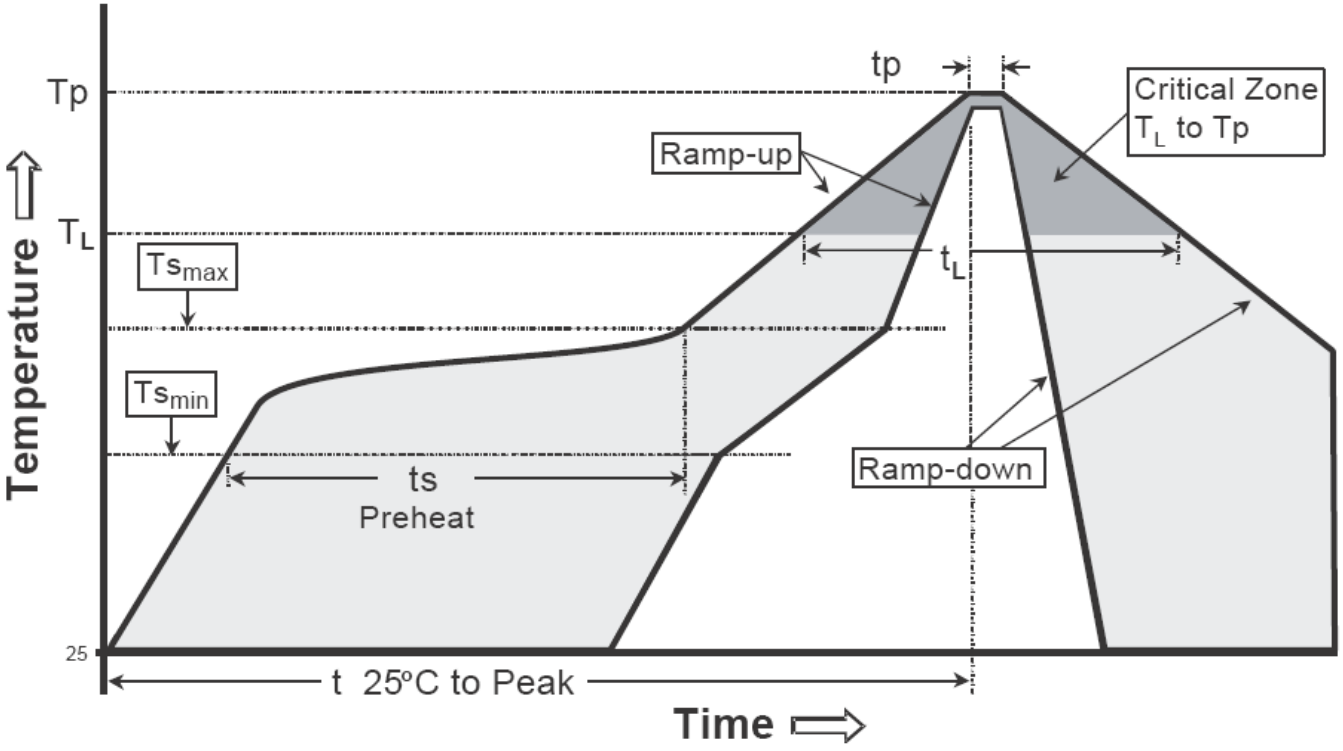
Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

Unit : mm

Recommended wave soldering condition

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

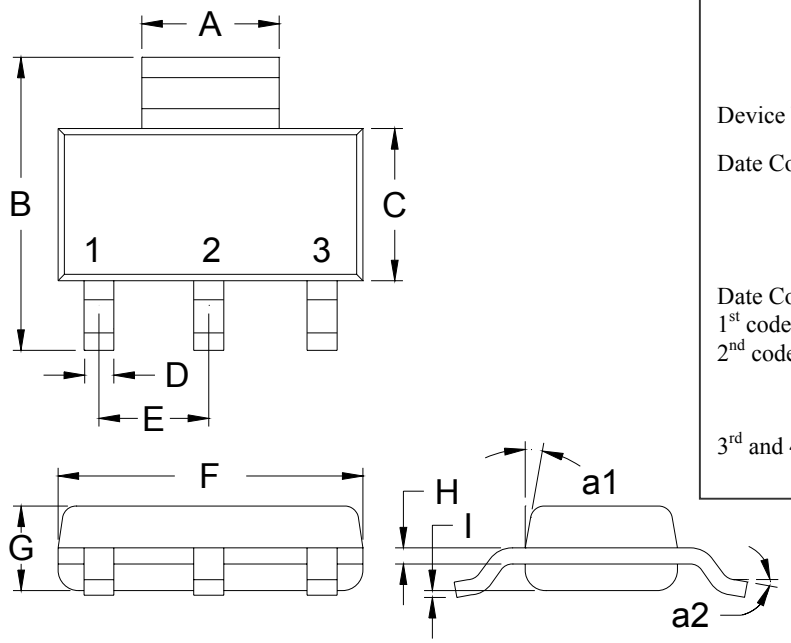
Recommended temperature profile for IR reflow



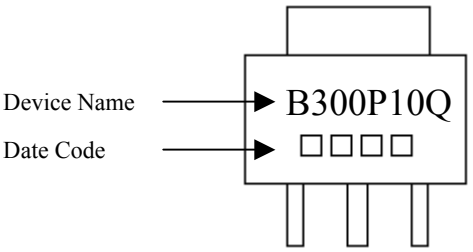
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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 :1. All temperatures refer to topside of the package, measured on the package body surface.
2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

SOT-223 Dimension



Marking:



Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D, May→E, Jun→F, Jul→G, Aug→H, Sep→J, Oct→K, Nov→L, Dec→M
3rd and 4th codes : prodcution serial number, 01~99

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

3-Lead SOT-223 Plastic
Surface Mounted Package
CYStek Package Code: L3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.25	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					

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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