

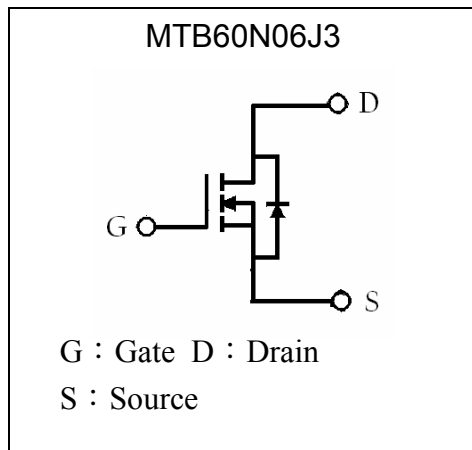
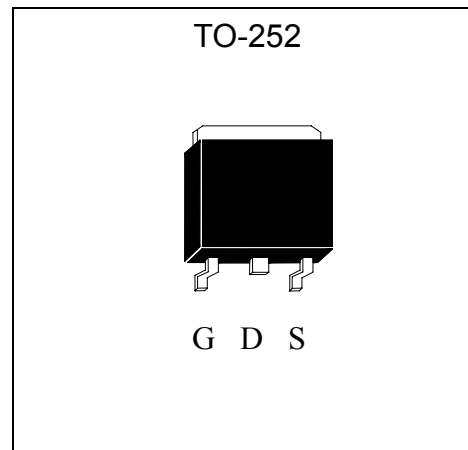
N-Channel Enhancement Mode Power MOSFET

MTB60N06J3

BV_{DSS}	60V
I_D	12A
$R_{DSON(MAX)}$	60m Ω

Features

- Low Gate Charge
- Simple Drive Requirement
- RoHS compliant & Halogen-free package

Equivalent Circuit

Outline

Absolute Maximum Ratings ($T_c=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current @ $T_c=25^\circ\text{C}$	I_D	12	A
Continuous Drain Current @ $T_c=100^\circ\text{C}$	I_D	8	
Pulsed Drain Current *1	I_{DM}	30	
Avalanche Current	I_{AS}	12	
Avalanche Energy @ $L=0.1\text{mH}$, $I_D=12\text{A}$, $R_G=25\Omega$	E_{AS}	7.2	mJ
Repetitive Avalanche Energy @ $L=0.05\text{mH}$ *2	E_{AR}	3.6	
Total Power Dissipation @ $T_c=25^\circ\text{C}$	P_d	20	W
Total Power Dissipation @ $T_c=100^\circ\text{C}$		10	
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55~+175	$^\circ\text{C}$

Note : *1. Pulse width limited by maximum junction temperature

 *2. Duty cycle $\leq 1\%$



Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	7.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	80	°C/W

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

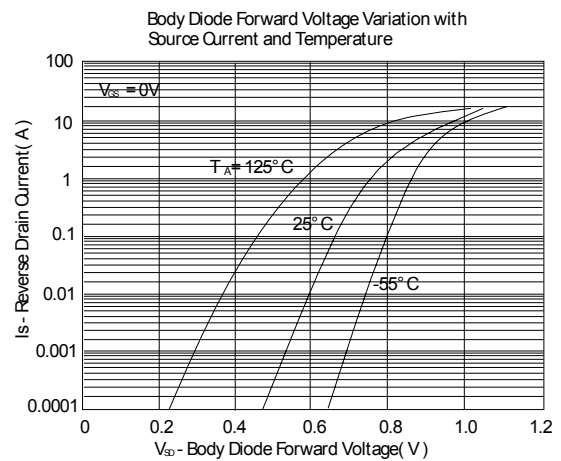
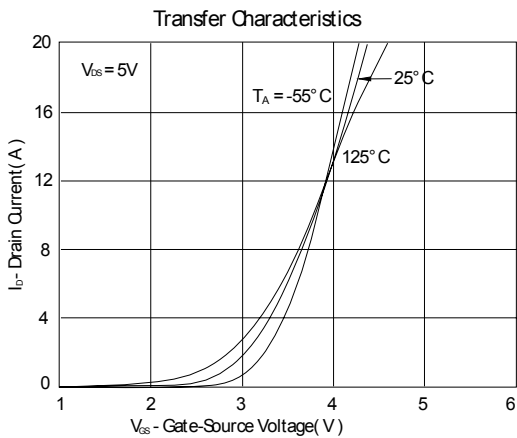
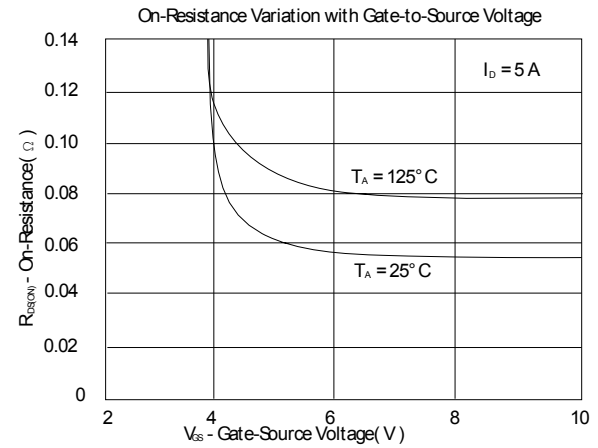
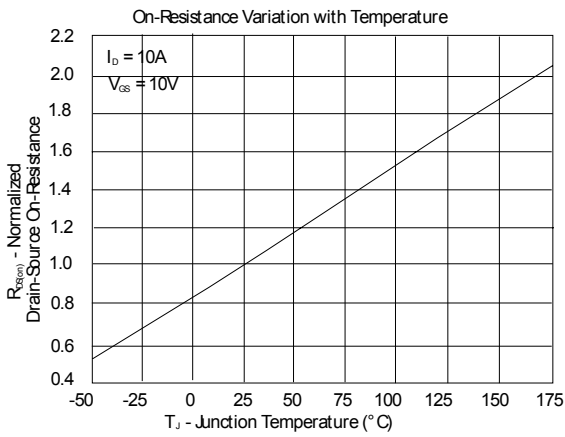
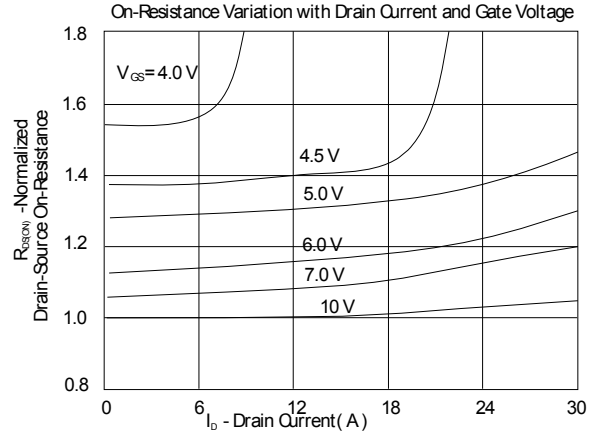
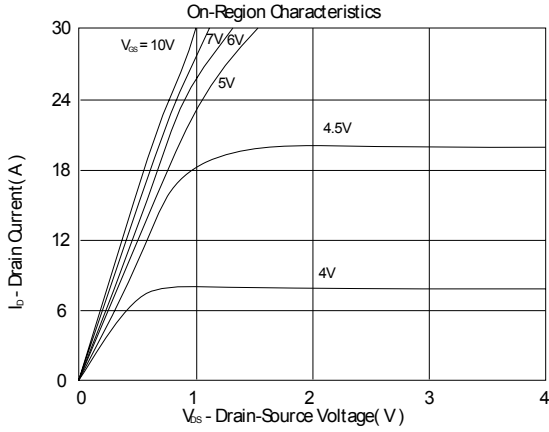
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	$V_{GS}=0, I_D=250\mu A$
$V_{GS(th)}$	1.0	2.0	3.2	V	$V_{DS}=V_{GS}, I_D=250\mu A$
$G_{FS} *1$	-	19	-	S	$V_{DS}=5V, I_D=10A$
I_{GSS}	-	-	±100	nA	$V_{GS}=±20, V_{DS}=0$
I_{DSS}	-	-	1	μA	$V_{DS}=48V, V_{GS}=0$
	-	-	25	μA	$V_{DS}=40V, V_{GS}=0, T_j=125°C$
$I_{D(ON)} *1$	12	-	-	A	$V_{DS}=10V, V_{GS}=10V$
$R_{DS(ON)} *1$	-	53	60	mΩ	$V_{GS}=10V, I_D=10A$
	-	80	96	mΩ	$V_{GS}=5V, I_D=8A$
Dynamic					
$Q_g *1, 2$	-	11	-	nC	$I_D=10A, V_{DS}=20V, V_{GS}=10V$
$Q_{gs} *1, 2$	-	2.2	-		
$Q_{gd} *1, 2$	-	2.4	-		
$t_{d(ON)} *1, 2$	-	10	-	ns	$V_{DS}=20V, I_D=1A, V_{GS}=10V, R_G=6\Omega$
$t_r *1, 2$	-	7.5	-		
$t_{d(OFF)} *1, 2$	-	18	-		
$t_f *1, 2$	-	6	-		
C_{iss}	-	913	-	pF	$V_{GS}=0V, V_{DS}=20V, f=1MHz$
C_{oss}	-	65	-		
C_{rSS}	-	53	-		
R_g	-	2.5	-	Ω	$V_{GS}=15mV, V_{DS}=0, f=1MHz$
Source-Drain Diode					
$I_S *1$	-	-	12	A	
$I_{SM} *3$	-	-	48		
$V_{SD} *1$	-	-	1.3	V	$I_F=I_S, V_{GS}=0V$
t_{rr}	-	15	-	ns	$I_F=5A, dI_F/dt=100A/\mu s$
Q_{rr}	-	8	-	nC	

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

Ordering Information

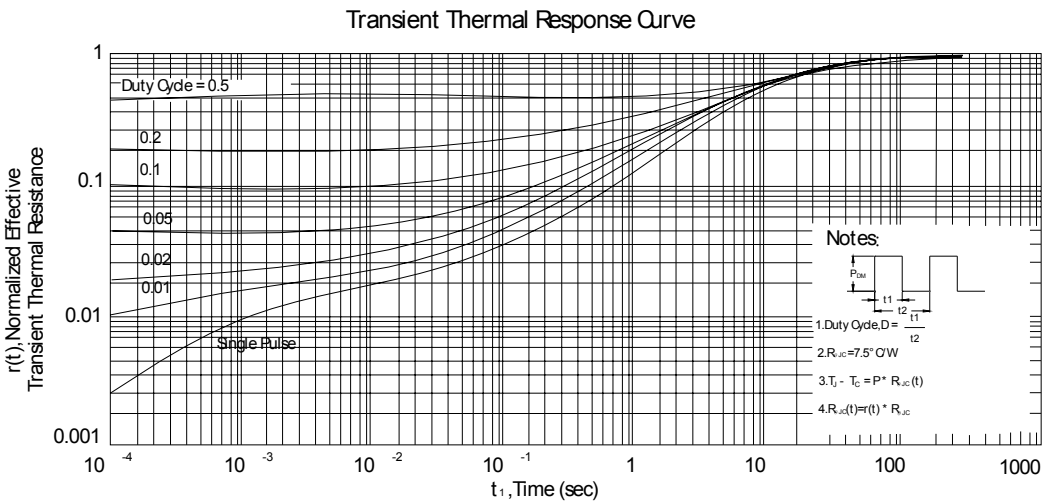
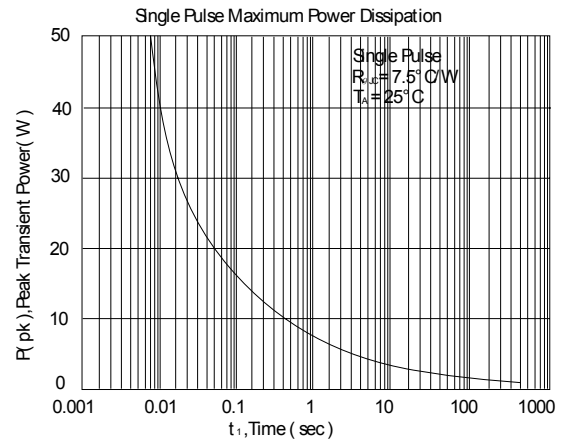
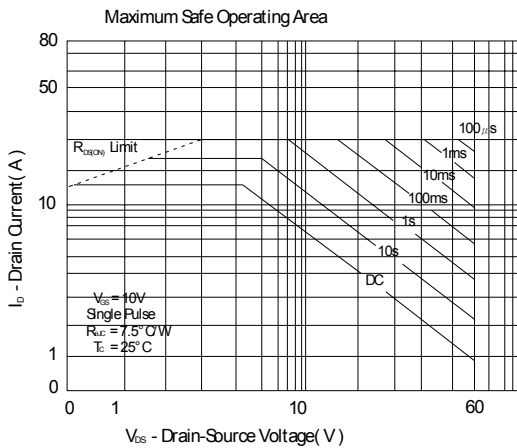
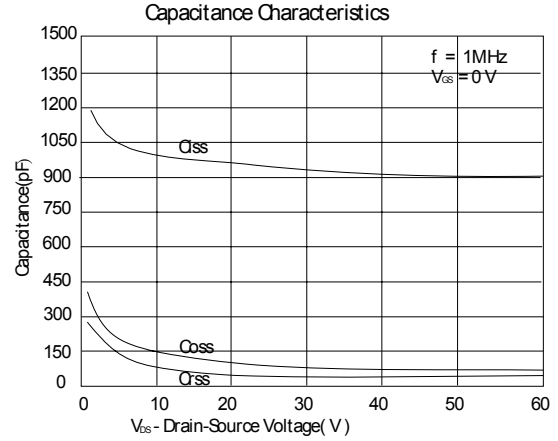
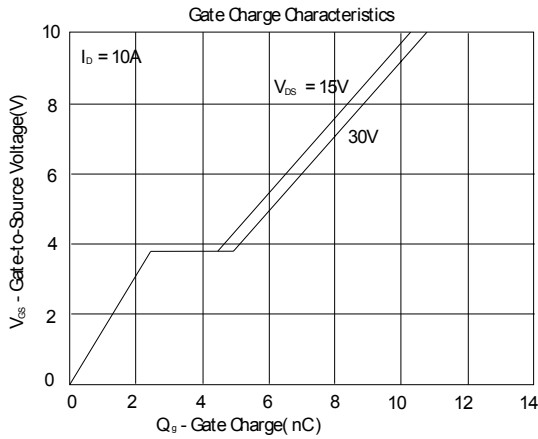
Device	Package	Shipping	Marking
MTB60N06J3	TO-252 (RoHS compliant & Halogen-free package)	2500 pcs / Tape & Reel	B60N06

Characteristic Curves

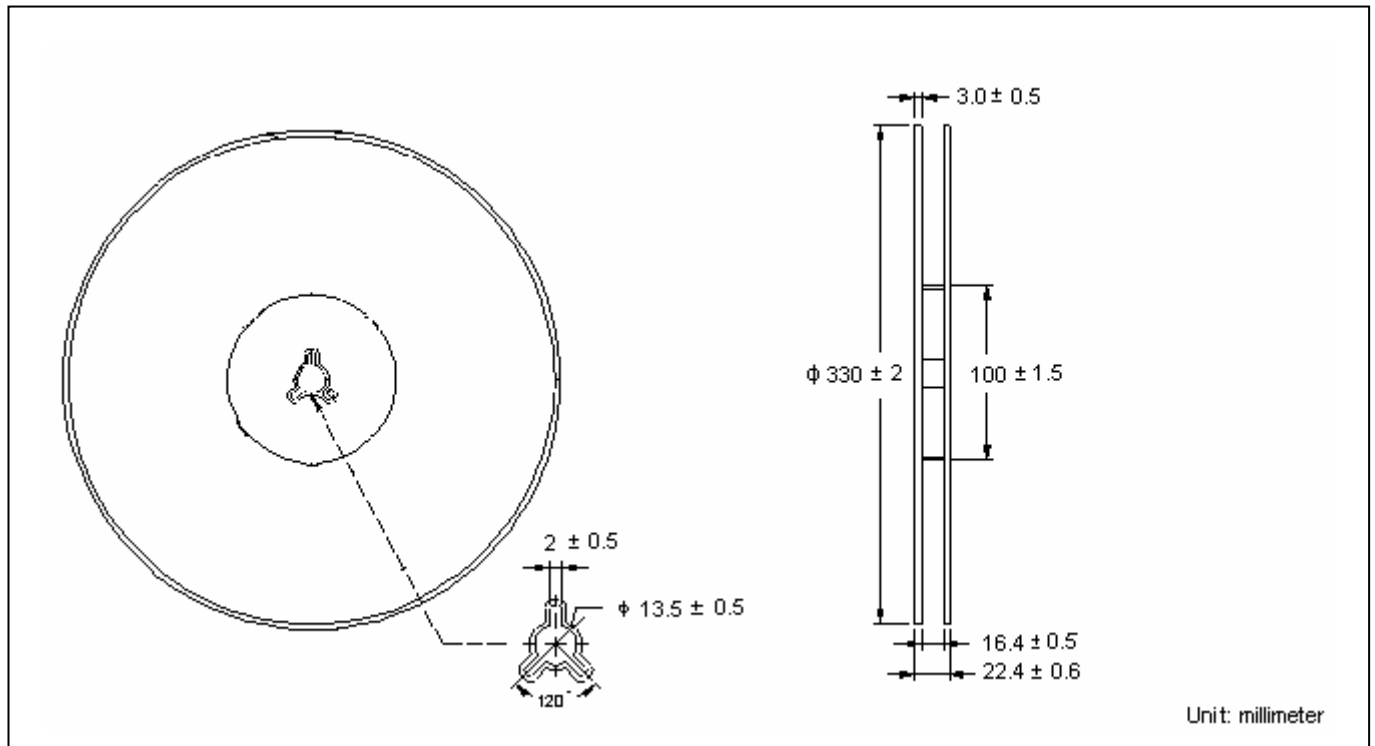




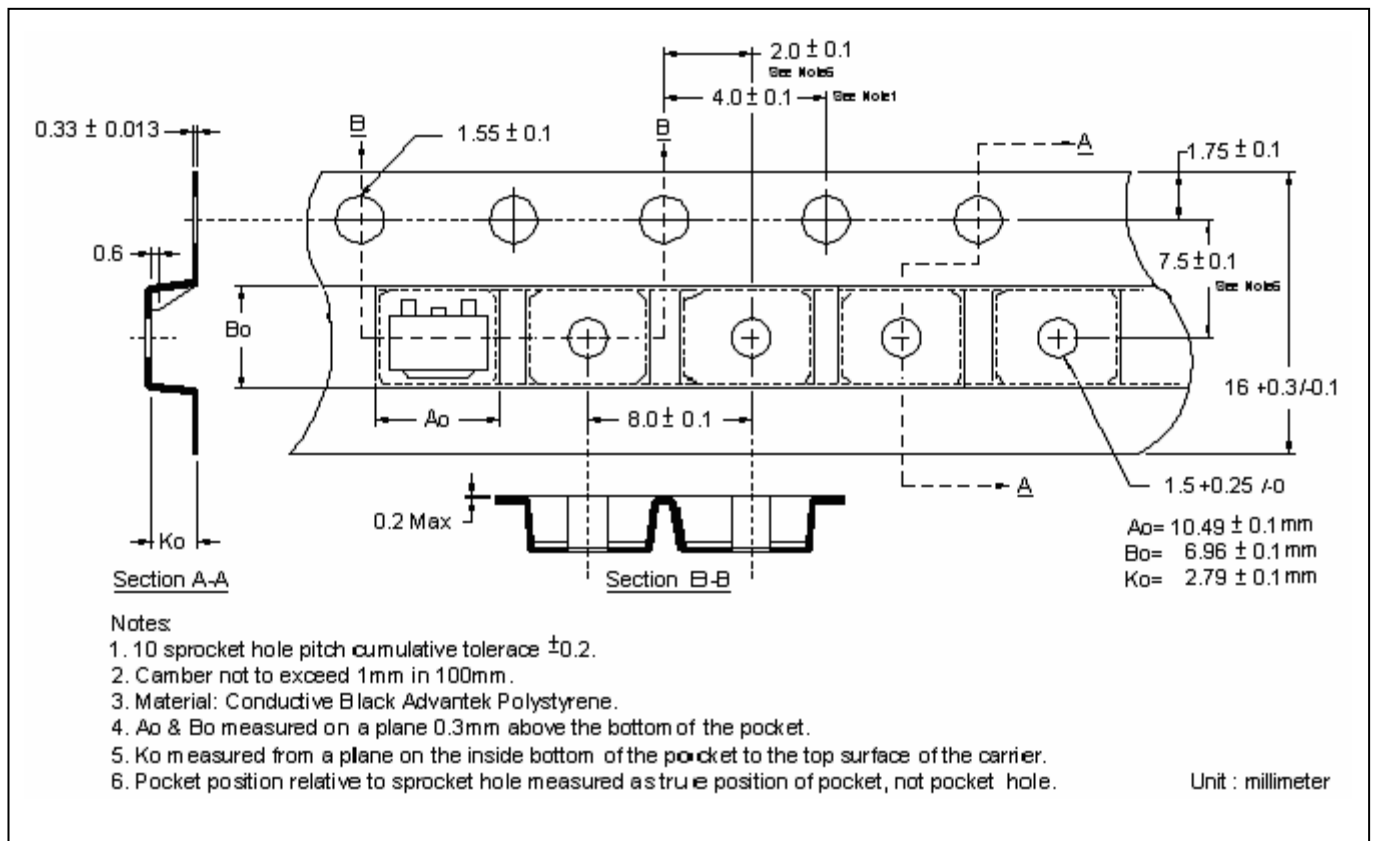
Characteristic Curves(Cont.)



Reel Dimension



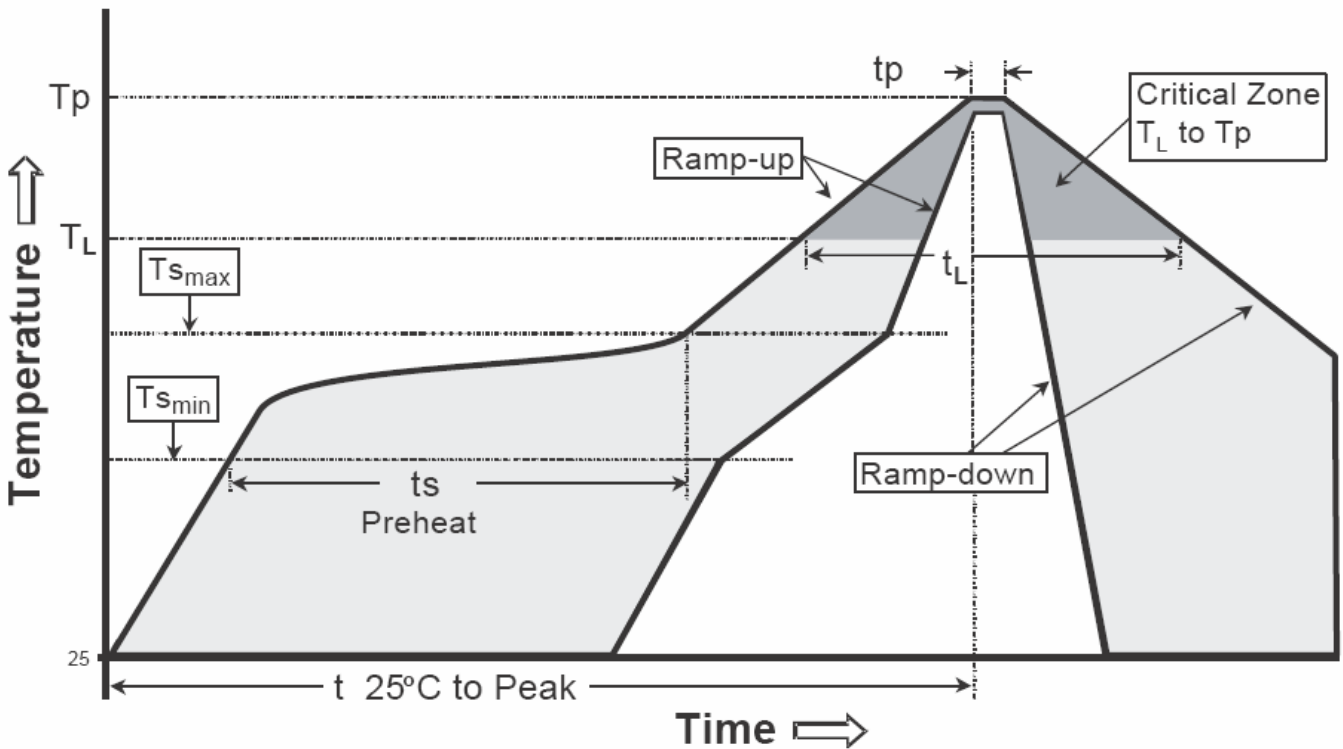
Carrier Tape Dimension



Recommended wave soldering condition

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

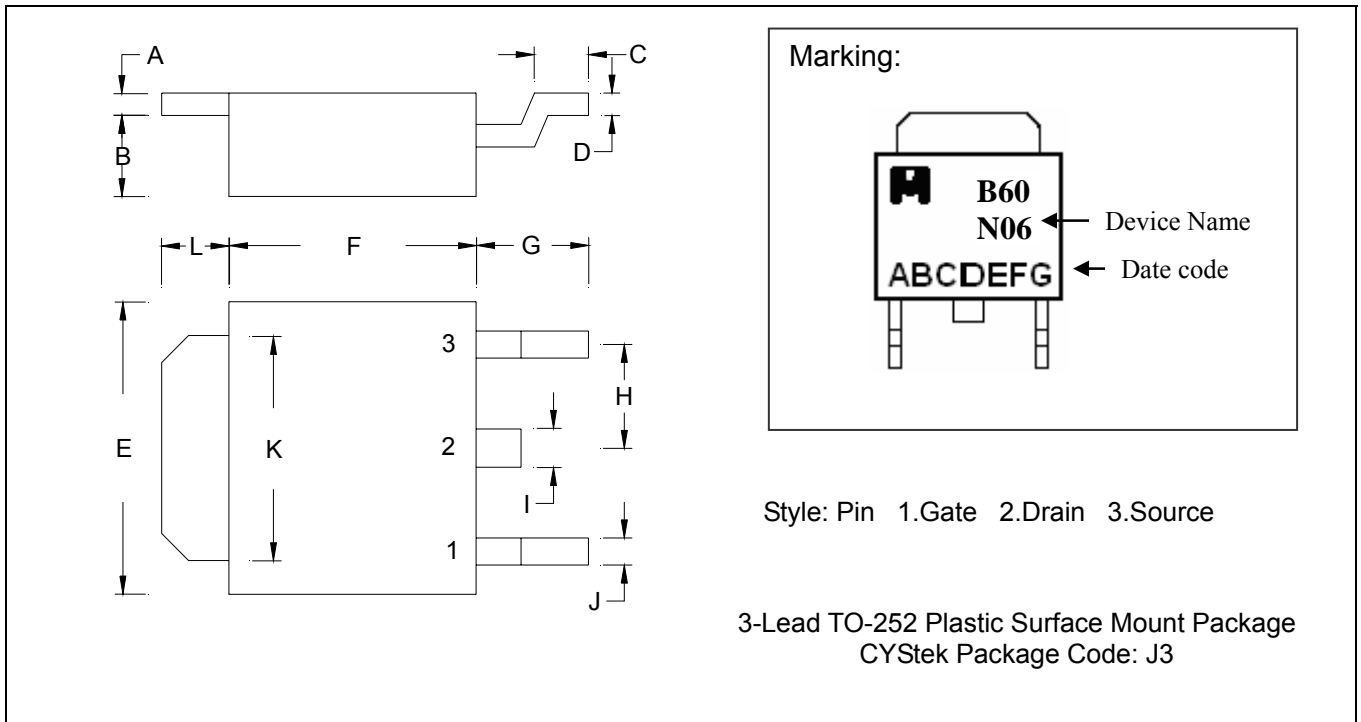
Recommended temperature profile for IR reflow



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)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	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.

TO-252 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0177	0.0217	0.45	0.55	G	0.0866	0.1102	2.20	2.80
B	0.0650	0.0768	1.65	1.95	H	-	*0.0906	-	*2.30
C	0.0354	0.0591	0.90	1.50	I	-	0.0449	-	1.14
D	0.0177	0.0236	0.45	0.60	J	-	0.0346	-	0.88
E	0.2441	0.2677	6.20	6.80	K	0.2047	0.2165	5.20	5.50
F	0.2125	0.2283	5.40	5.80	L	0.0551	0.0630	1.40	1.60

- 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 : KFC; pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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