P-Channel Enhancement Mode Power MOSFET

MTB16P04J3

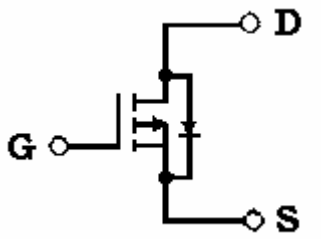
BV_{DSS}	-40V
I_D	-25A
$R_{DSON(MAX)}$	16mΩ

Features

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

Equivalent Circuit

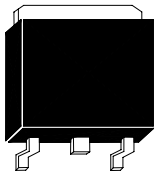
MTB16P04J3



G：Gate D：Drain
S：Source

Outline

TO-252



G D S

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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ Tc=25°C	I_D	-25	A
Continuous Drain Current @ Tc=100°C	I_D	-18	
Pulsed Drain Current *1	I_{DM}	-100	
Avalanche Current	I_{AS}	-25	
Avalanche Energy @ L=0.1mH, I_D=-25A, R_G=25Ω	E_{AS}	31.25	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E_{AR}	15	
Total Power Dissipation @Tc=25℃	Pd	50	W
Total Power Dissipation @Tc=100℃		17	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+175	°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	$R_{th,j-c}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	75	°C/W

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-40	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-1.5	-1.8	-3.2	V	V_{DS} =V_{GS}, I_D=-250μA
G_{FS} *1	-	24	-	S	V_{DS} =-5V, I_D=-25A
I_{GSS}	-	-	±100	nA	V_{GS}=±20, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS} =-32V, V_{GS} =0
	-	-	-25	μA	V_{DS} =-30V, V_{GS} =0, Tj=125°C
$I_{D(ON)}$ *1	-25	-	-	A	V_{DS} =-5V, V_{GS} =-4.5V
$R_{DS(ON)}$ *1	-	14	16	mΩ	V_{GS} =-10V, I_D=-25A
	-	22	27	mΩ	V_{GS} =-7V, I_D=-20A
Dynamic					
Qg *1, 2	-	32	-	nC	I_D=-25A, V_{DS}=-20V, V_{GS}=-10V
Qgs *1, 2	-	8.4	-		
Qgd *1, 2	-	9.8	-		
$t_{d(ON)}$ *1, 2	-	15	-	ns	V_{DS}=-20V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
tr *1, 2	-	40	-		
$t_{d(OFF)}$ *1, 2	-	60	-		
t_f *1, 2	-	50	-		
Ciss	-	4285	-	pF	V_{GS}=0V, V_{DS}=-20V, f=1MHz
Coss	-	1642	-		
Crss	-	1532	-		
Rg	-	3.5	-	Ω	V_{GS}=15mV, V_{DS}=0, f=1MHz
Source-Drain Diode					
I_S *1	-	-	-25	A	
I_{SM} *3	-	-	-100		
V_{SD} *1	-	-	-1.3	V	I_F=I_S, V_{GS}=0V
trr	-	40	-	ns	I_F=-25A, dI_F/dt=100A/μs
Qrr	-	30	-	nC	

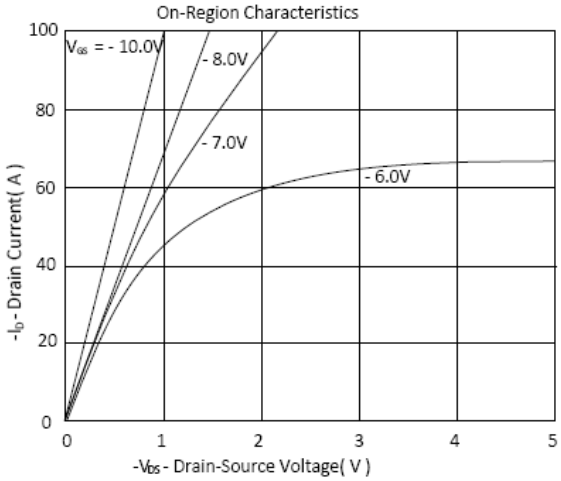
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Ordering Information

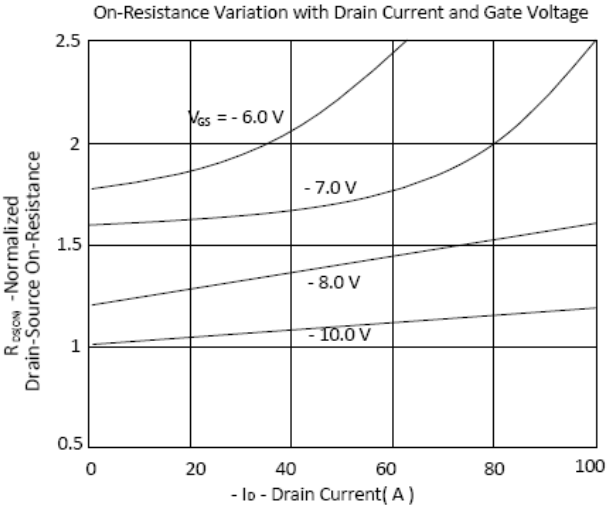
Device	Package	Shipping	Marking
MTB16P04J3	TO-252 (RoHS compliant & Halogen-free package)	2500 pcs / Tape & Reel	B16P04

Characteristic Curves

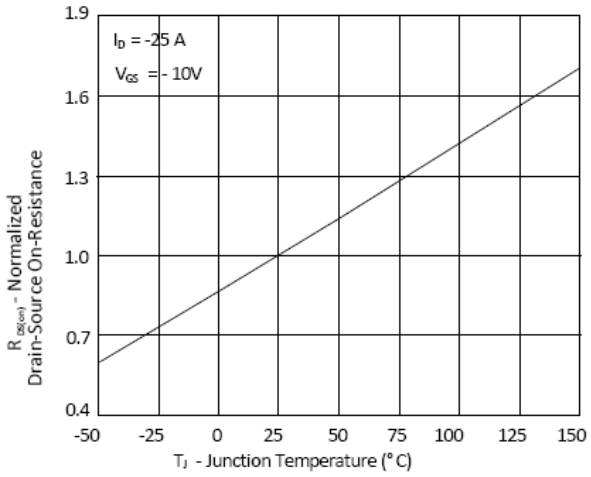
On-Region Characteristics



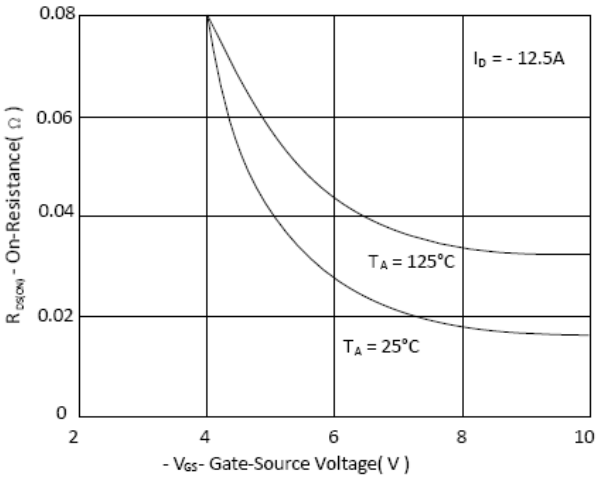
On-Resistance Variation with Drain Current and Gate Voltage



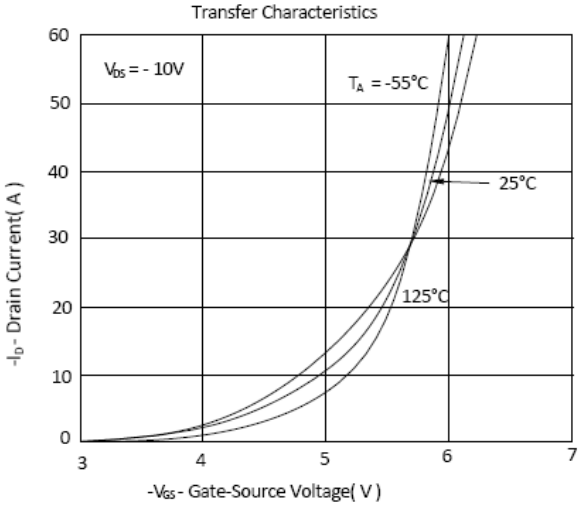
On-Resistance Variation with Temperature



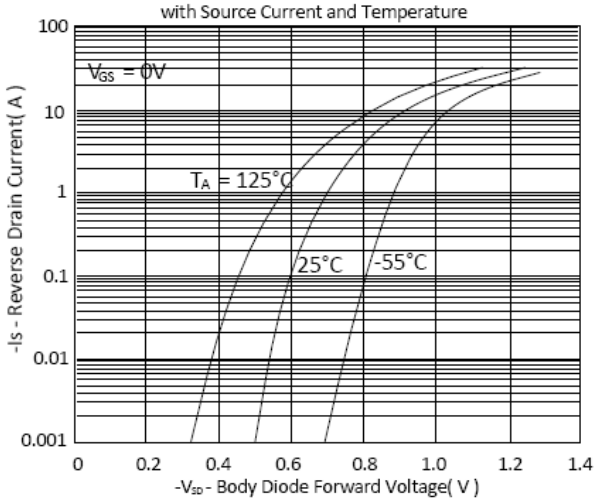
On-Resistance Variation with Gate-Source Voltage



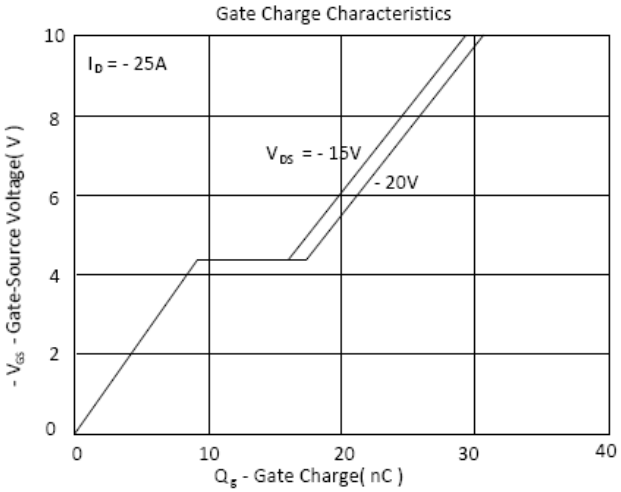
Transfer Characteristics

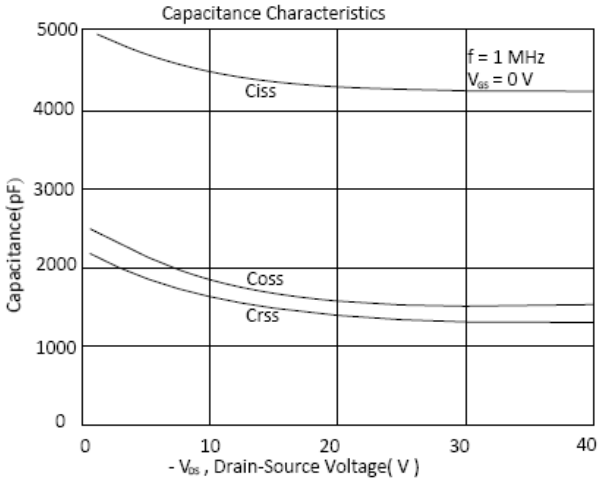


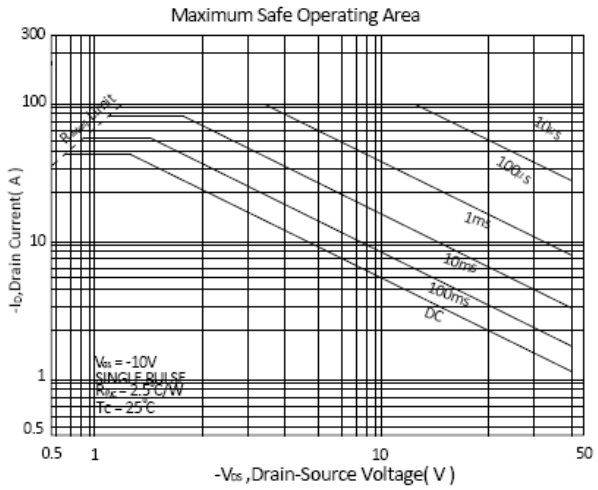
Body Diode Forward Voltage Variation
with Source Current and Temperature

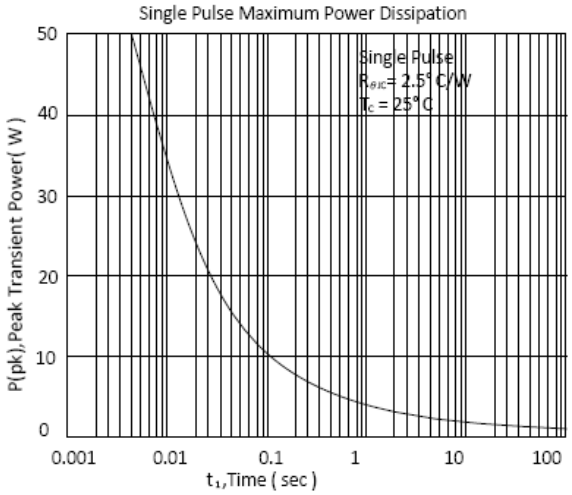


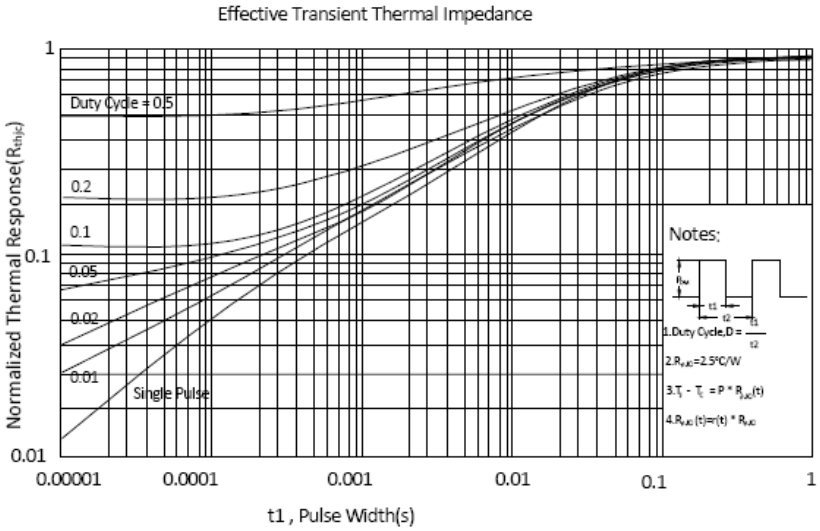
Characteristic Curves(Cont.)



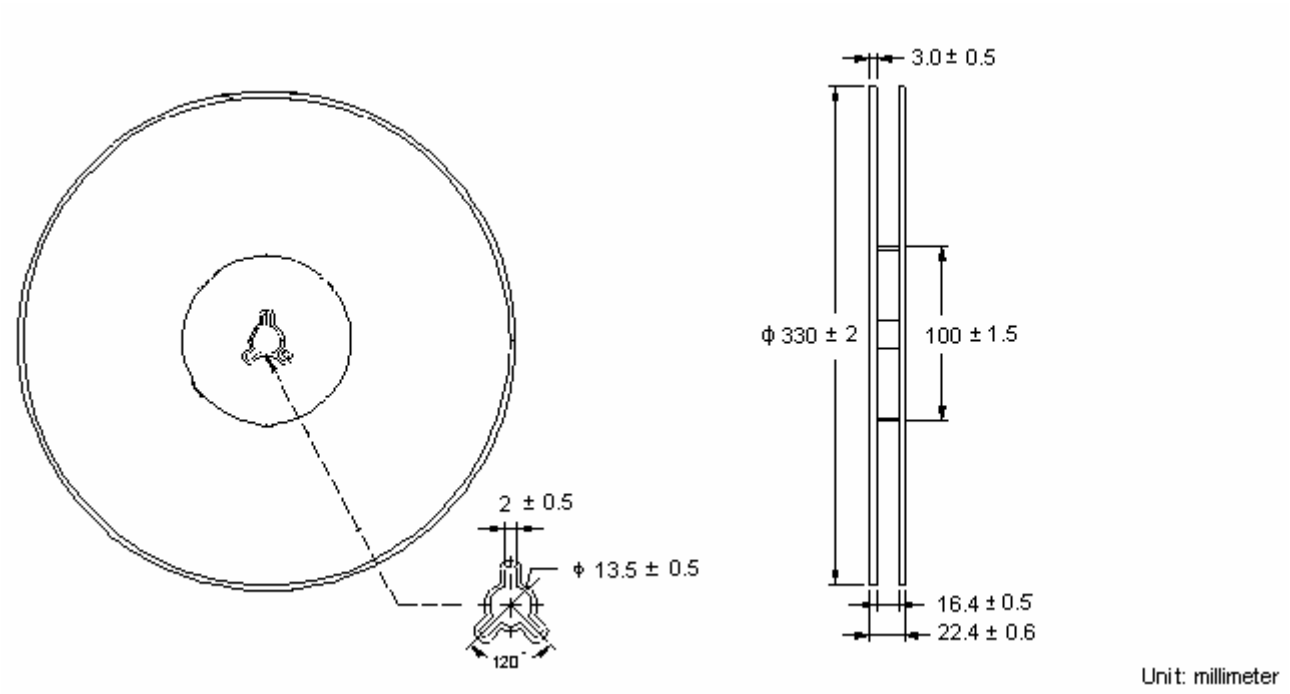




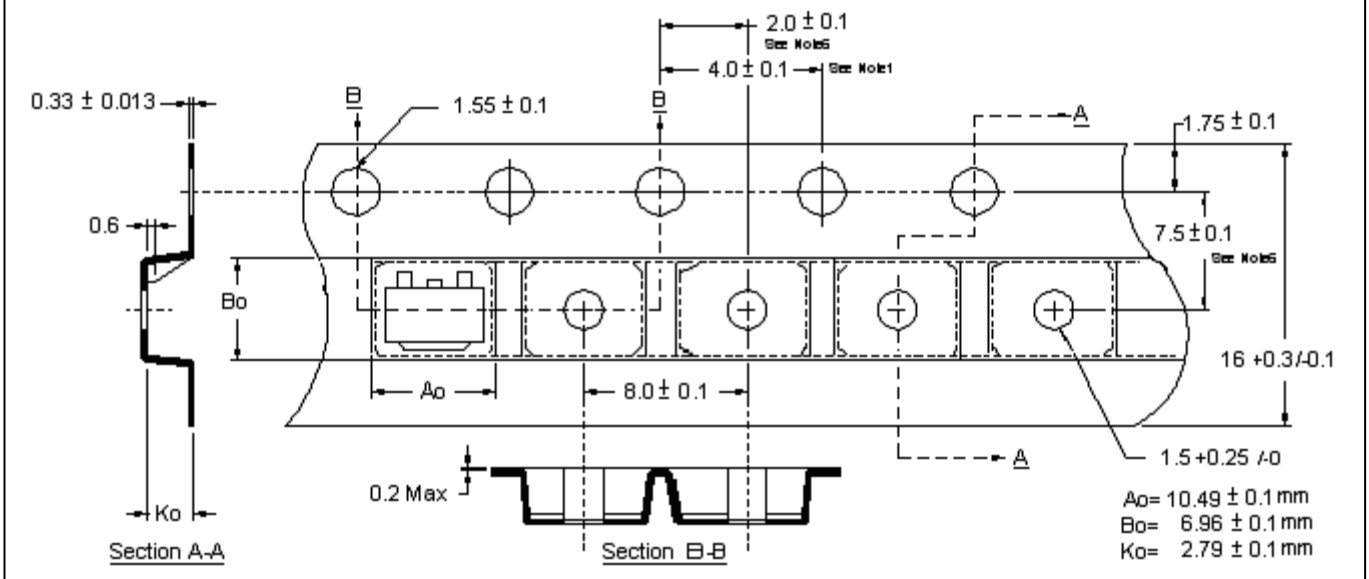




Reel Dimension



Carrier Tape Dimension



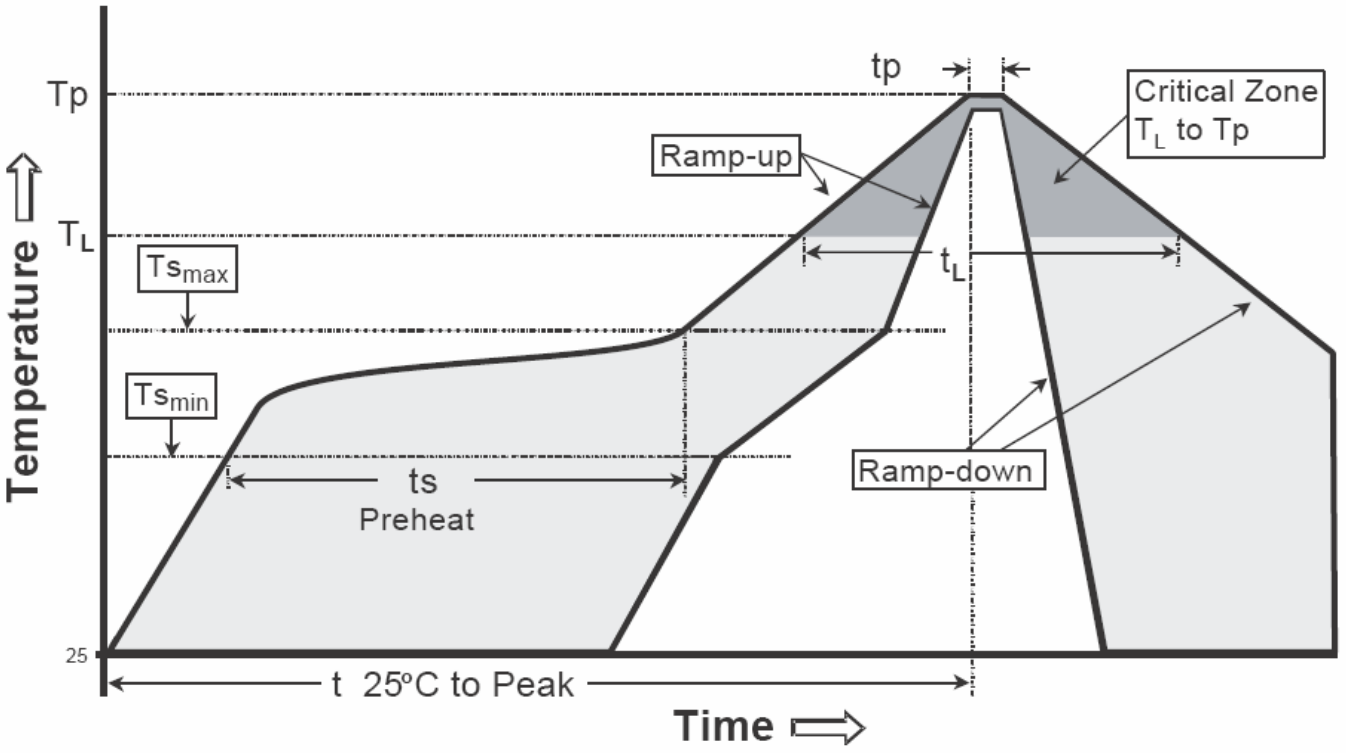
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

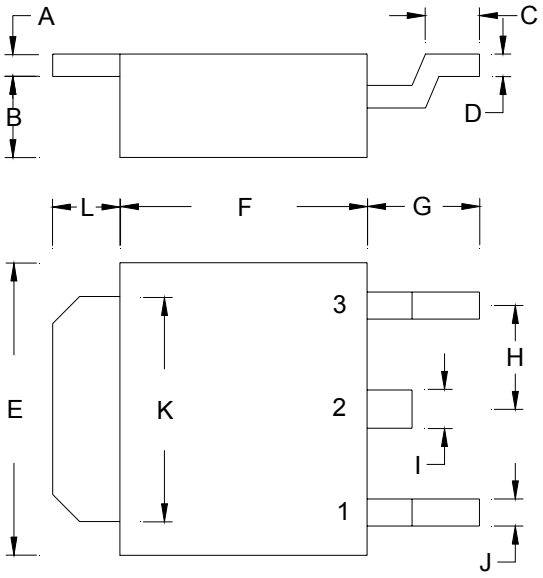
Recommended temperature profile for IR reflow



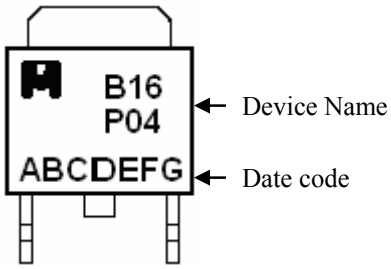
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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 : All temperatures refer to topside of the package, measured on the package body surface.

TO-252 Dimension



Marking:



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

3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

*: 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

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek ***semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.***
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.