N -Channel Logic Level Enhancement Mode Power MOSFET

MTBA5N10J3

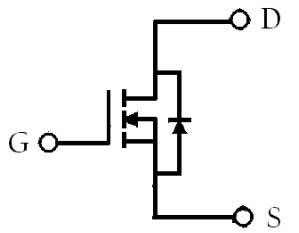
BV_{DSS}	100V
I_D	10A
$R_{DSON(MAX)}$	150mΩ

Features

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

Equivalent Circuit

MTBA5N10J3



G：Gate D：Drain
S：Source

Outline

TO-252(DPAK)

G D S

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}	±30	
Continuous Drain Current @ Tc=25°C	I_D	10	A
Continuous Drain Current @ Tc=100°C	I_D	7	
Pulsed Drain Current *1	I_{DM}	20	
Avalanche Current	I_{AS}	12	
Avalanche Energy @ L=0.15mH, I_D=10A, R_G=25Ω	E_{AS}	7.2	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E_{AR}	3.6	
Total Power Dissipation @Tc=25℃	Pd	35	W
Total Power Dissipation @Tc=100℃		15	
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	$R_{th,j-c}$	3.6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	°C/W

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1	1.8	3	V	V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±30, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS} =100V, V_{GS} =0
	-	-	25	μA	V_{DS} =80V, V_{GS} =0, T_J=125°C
$R_{DS(ON)}$ *1	-	130	150	mΩ	V_{GS} =10V, I_D=10A
	-	140	160	mΩ	V_{GS} =4.5V, I_D=10A
G_{FS} *1	-	8	-	S	V_{DS} =5V, I_D=10A
Dynamic					
Qg *1, 2	-	18.8	-	nC	I_D=10A, V_{DS}=80V, V_{GS}=10V
Qgs *1, 2	-	4.7	-		
Qgd *1, 2	-	5.8	-		
$t_{d(ON)}$ *1, 2	-	11	-	ns	V_{DS}=50V, I_D=1A, V_{GS}=10V, R_G=6Ω
tr *1, 2	-	4.5	-		
$t_{d(OFF)}$ *1, 2	-	32	-		
t_f *1, 2	-	10	-		
Ciss	-	1197	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	31	-		
Crss	-	20	-		
Rg	-	2	-	Ω	V_{GS}=15mV, V_{DS}=0, f=1MHz
Source-Drain Diode					
I_S *1	-	-	10	A	
I_{SM} *3	-	-	20		
V_{SD} *1	-	-	1.3	V	I_F=I_S, V_{GS}=0V
trr	-	120	-	ns	I_F=10A, dI_F/dt=100A/μs
Qrr	-	520	-	nC	

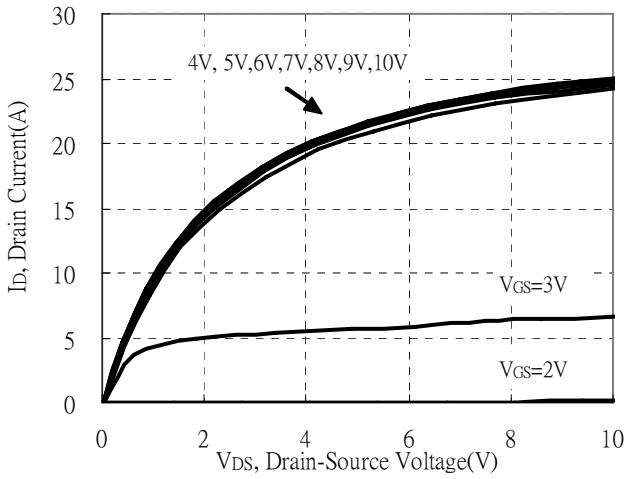
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Ordering Information

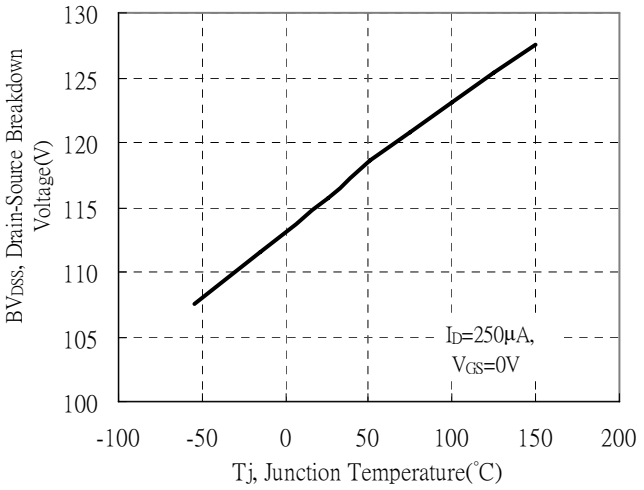
Device	Package	Shipping
MTBA5N10J3-0-T3-G	TO-252 (Pb-free lead plating & Halogen-free package)	2500 pcs / Tape & Reel

Typical Characteristics

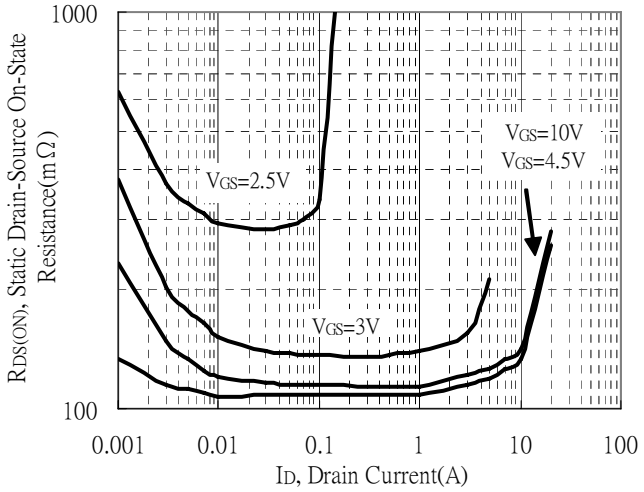
Typical Output Characteristics



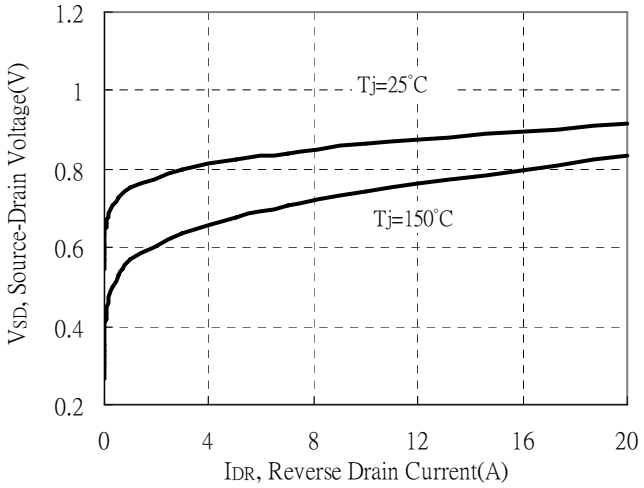
Brekdown Voltage vs Ambient Temperature



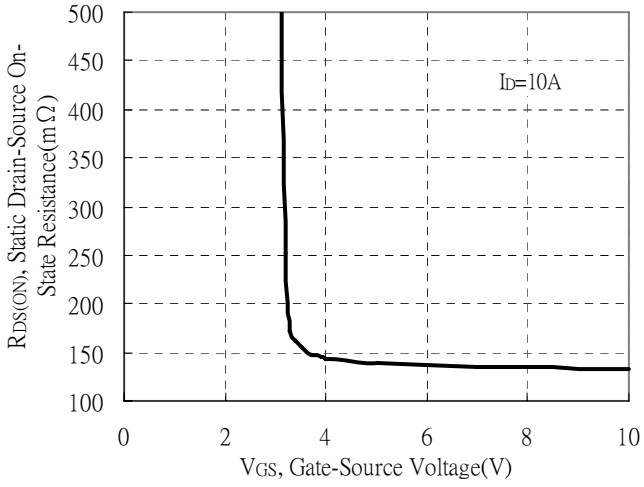
Static Drain-Source On-State resistance vs Drain Current



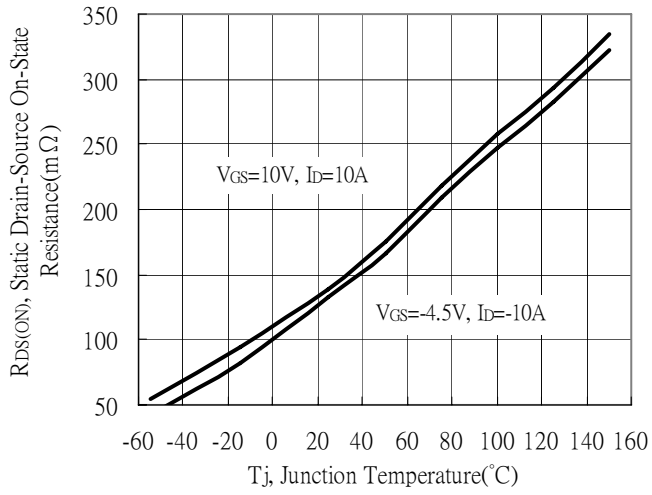
Reverse Drain Current vs Source-Drain Voltage



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

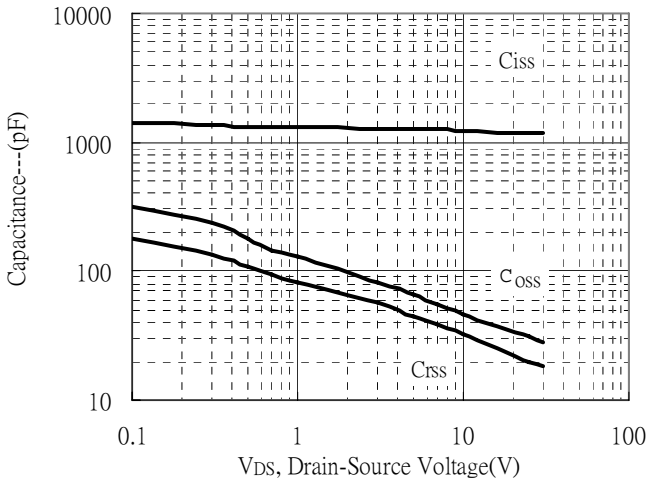


Drain-Source On-State Resistance vs Junction Tempearture

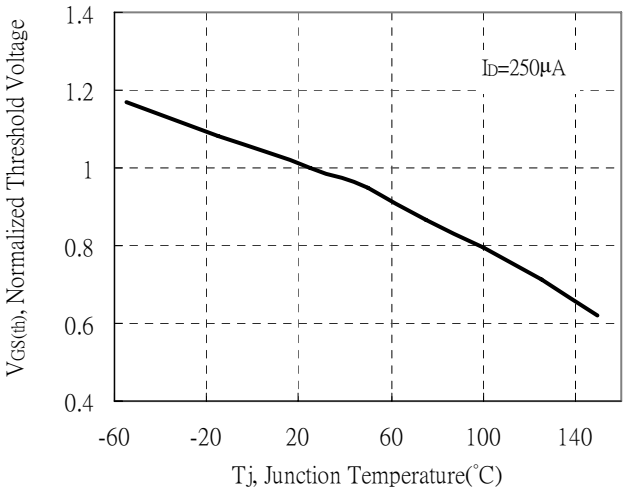


Typical Characteristics(Cont.)

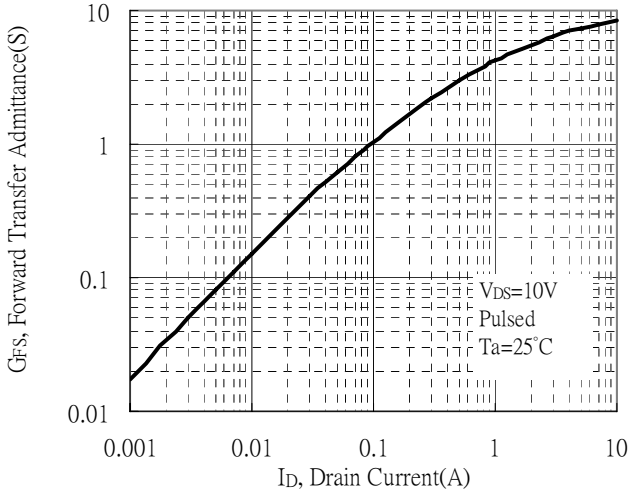
Capacitance vs Drain-to-Source Voltage



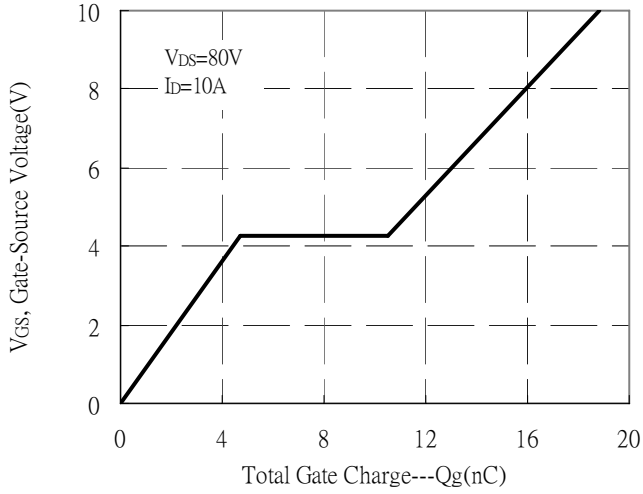
NormalizedThreshold Voltage vs Junction Tempearture



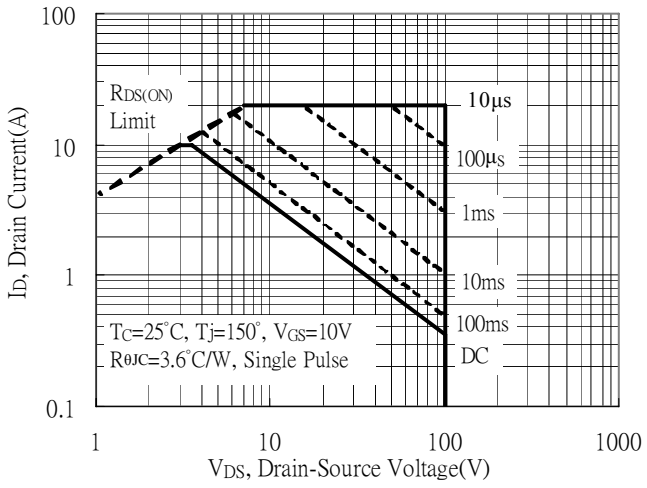
Forward Transfer Admittance vs Drain Current



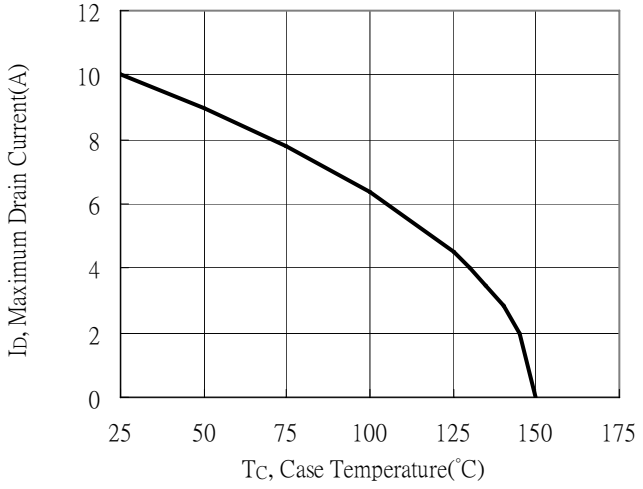
Gate Charge Characteristics



Maximum Safe Operating Area

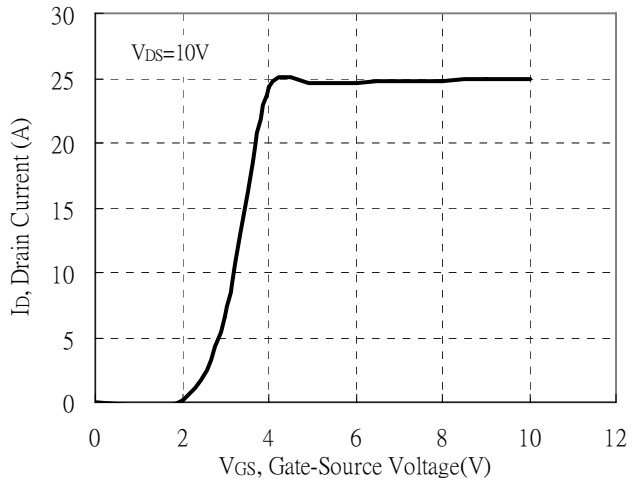


Maximum Drain Current vs Case Temperature

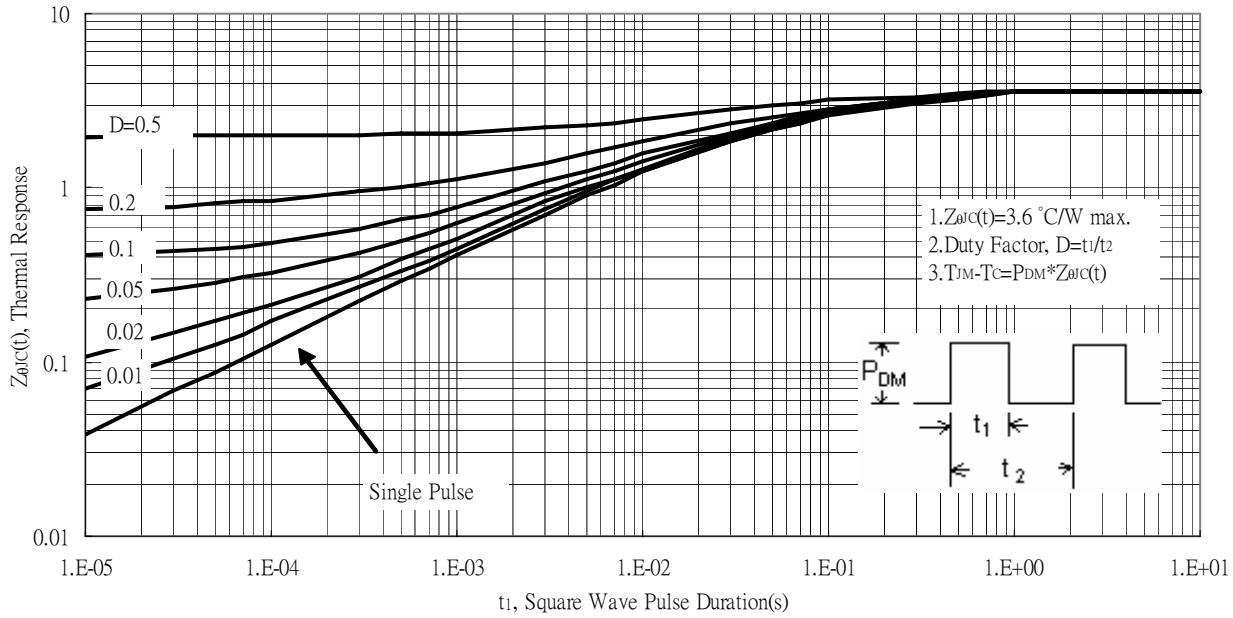


Typical Characteristics(Cont.)

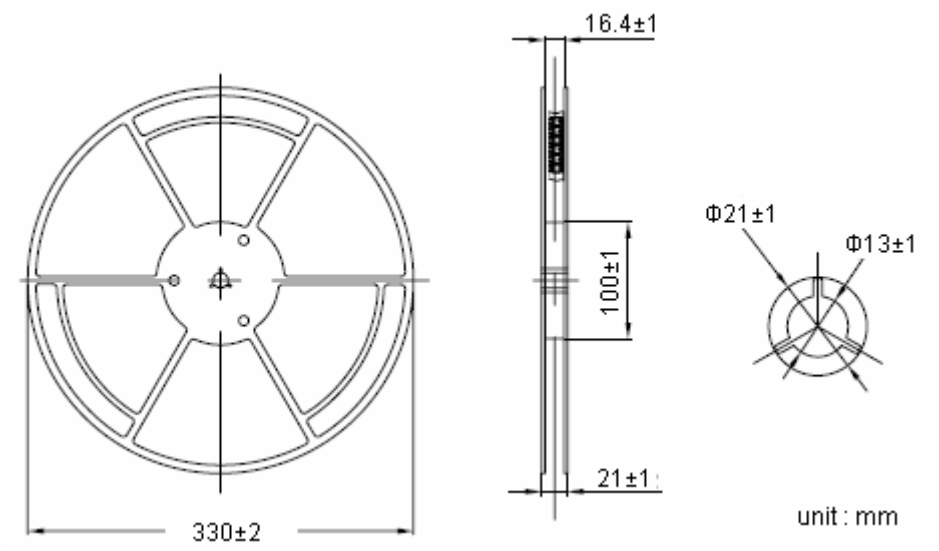
Typical Transfer Characteristics



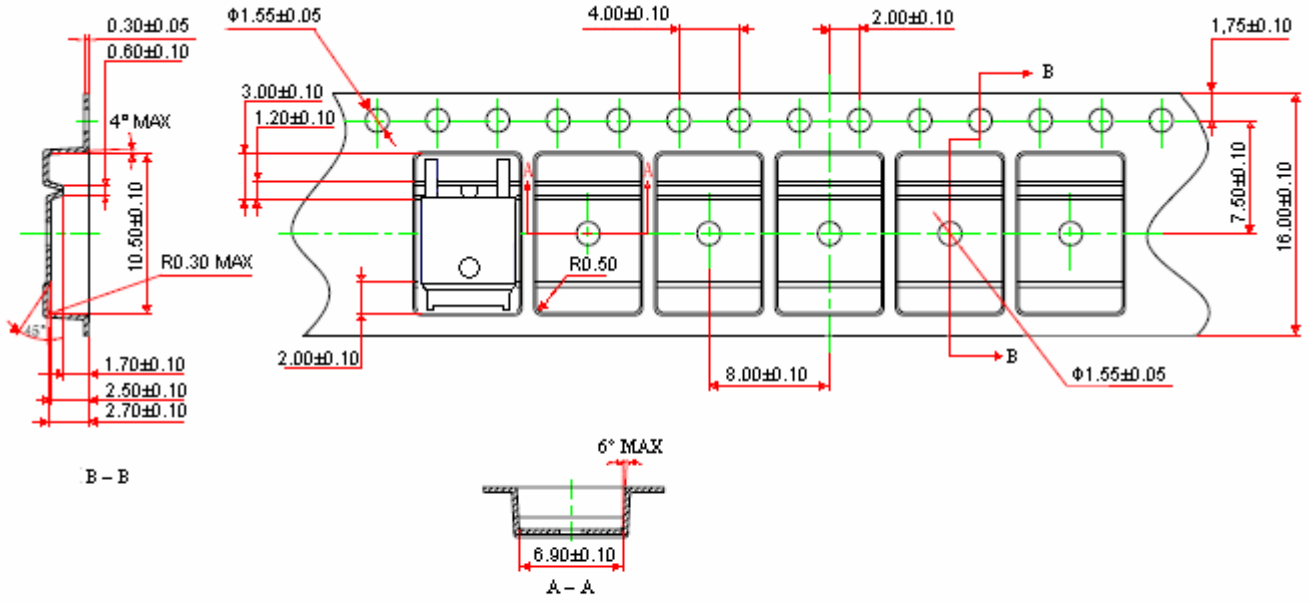
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension

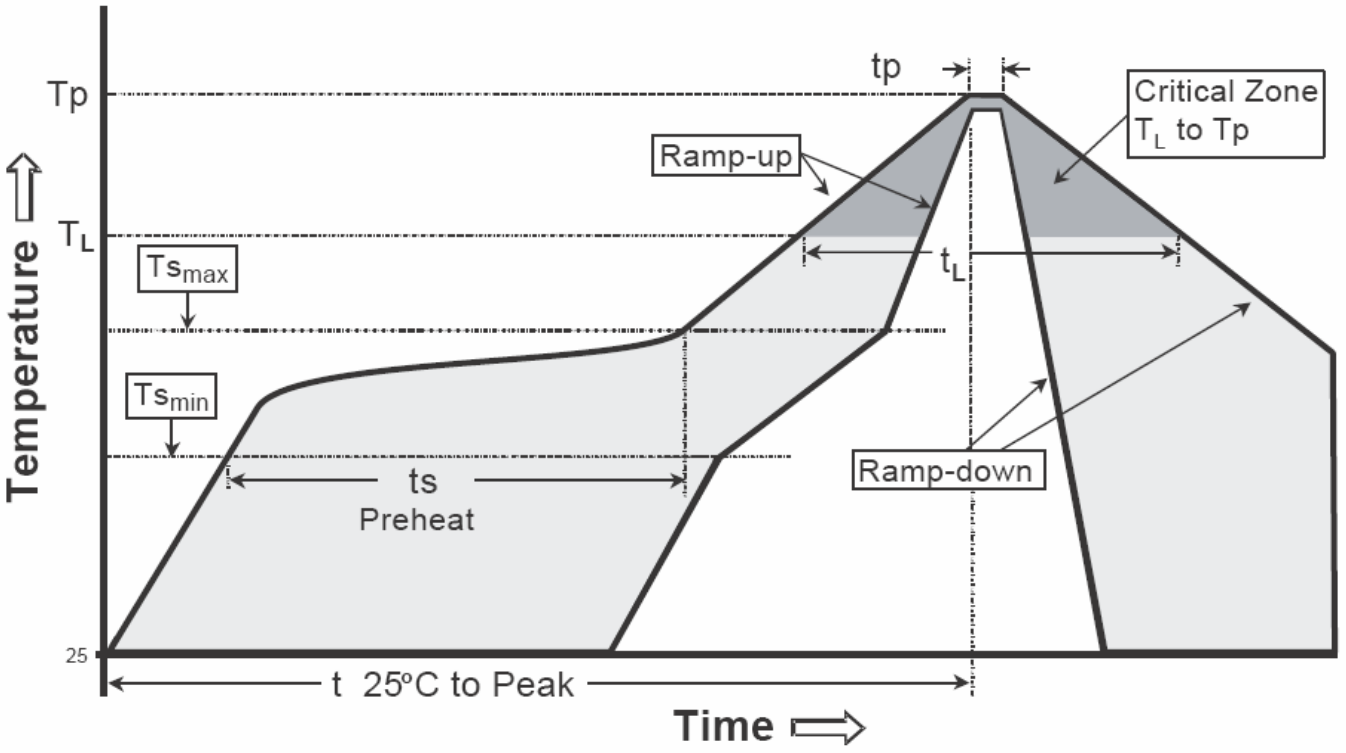


Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene, antistatic coated : 10^{5} Ω/□~ 10^{11} Ω/□ unit : mm

Recommended wave soldering condition

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

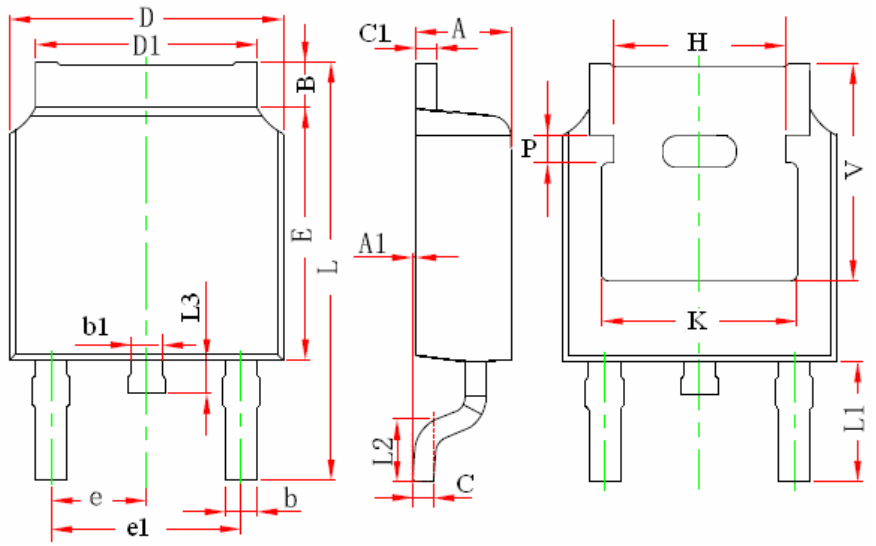
Recommended temperature profile for IR reflow

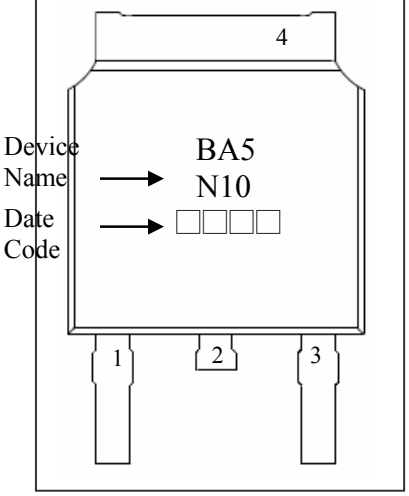


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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

TO-252 Dimension





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

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	REF

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.