N-Channel Enhancement Mode Power MOSFET

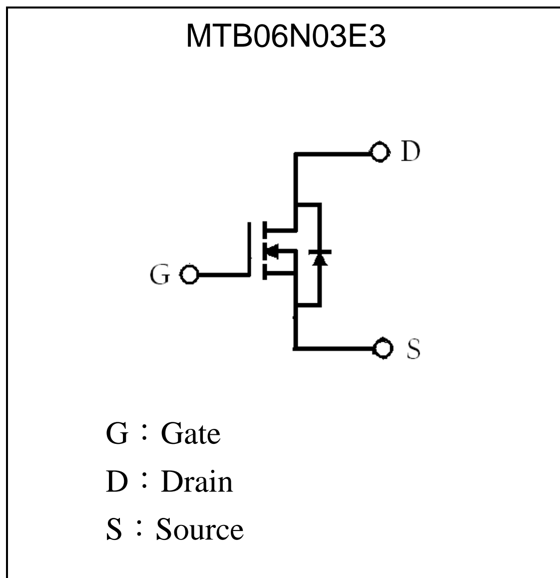
MTB06N03E3

BV_{DSS}		30V
I_D @V_{GS}=10V, T_C=25°C		102A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=30A	4 mΩ
	V_{GS}=4.5V, I_D=24A	5 mΩ

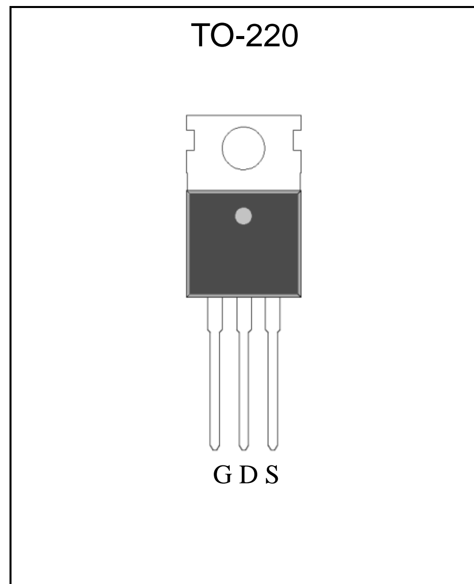
Features

- Simple Drive Requirement
- Fast Switching Characteristic
- Pb-free lead plating and RoHS compliant package

Symbol

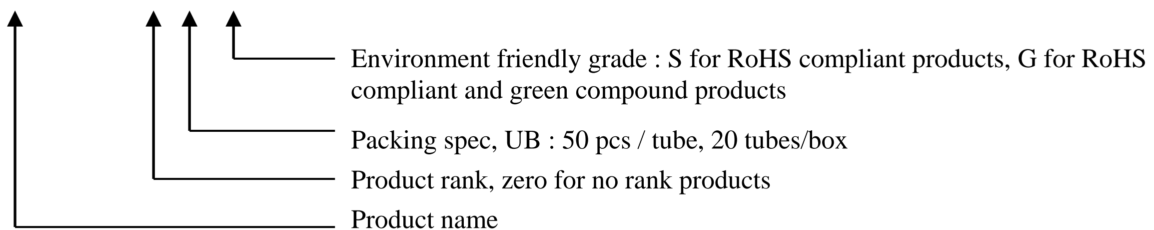


Outline



Ordering Information

Device	Package	Shipping
MTB06N03E3-0-UB-X	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @V_{GS}=10V, T_C=25°C		I_D	102	A
Continuous Drain Current @V_{GS}=10V, T_C=100°C			72	
Pulsed Drain Current		I_{DM}	408 *1	
Avalanche Current @ L=0.1mH		I_{AS}	40	
Avalanche Energy	L=2mH, I_D=16A, V_{DD}=25V *2	E_{AS}	256	mJ
Repetitive Avalanche Energy	L=0.05mH	E_{AR}	25	
Total Power Dissipation	T_C=25°C	P_D	94	W
	T_C=100°C		47	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+175	°C

Note : *1. Pulse width limited by maximum junction temperature.
*2. 100% tested by conditions of L=0.1mH, I_D=16A, V_{GS}=10V, V_{DD}=15V

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{θJC}$	1.6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{θJA}$	62.5	

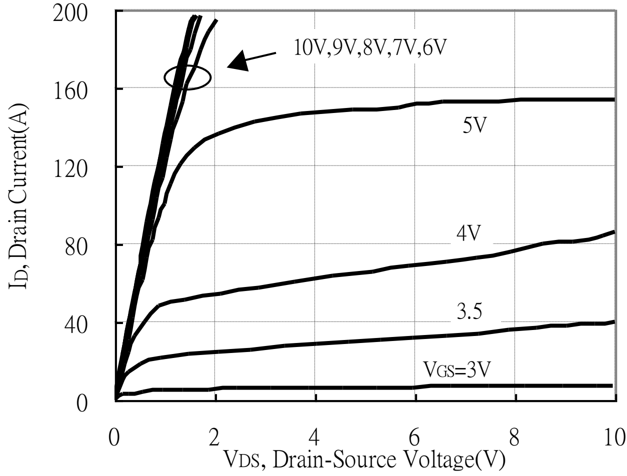
Characteristics (Tj=25°C, unless otherwise specified)

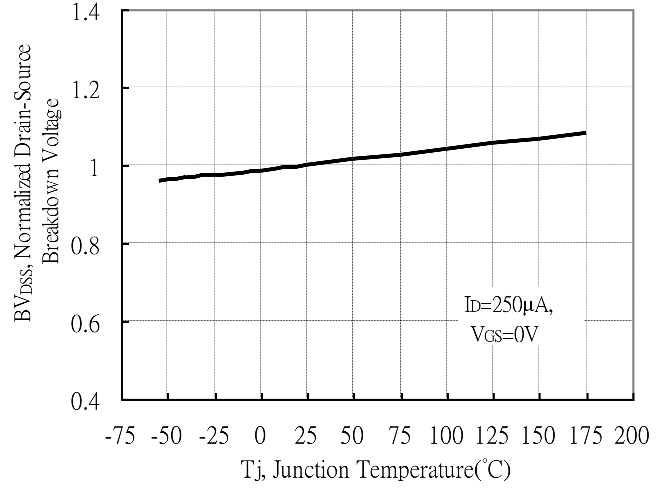
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	3		V_{DS} = V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =30V, V_{GS} =0V
	-	-	25		V_{DS} =30V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	4	5.3	mΩ	V_{GS} =10V, I_D=30A
	-	5	8.6		V_{GS} =4.5V, I_D=24A
*G_{FS}	-	28	-	S	V_{DS} =5V, I_D=24A
Dynamic					
*Qg(V_{GS}=10V)	-	43.9	-	nC	V_{DS}=15V, I_D=30A,V_{GS}=10V
*Qg(V_{GS}=4.5V)	-	22.2	-		
*Qgs	-	5.8	-		
*Qgd	-	10	-		
*$t_{d(ON)}$	-	15.6	-	ns	V_{DS}=15V, I_D=30A, V_{GS}=10V, R_{GS}=1Ω
*t_r	-	15.8	-		
*$t_{d(OFF)}$	-	50.4	-		
*t_f	-	8.4	-		

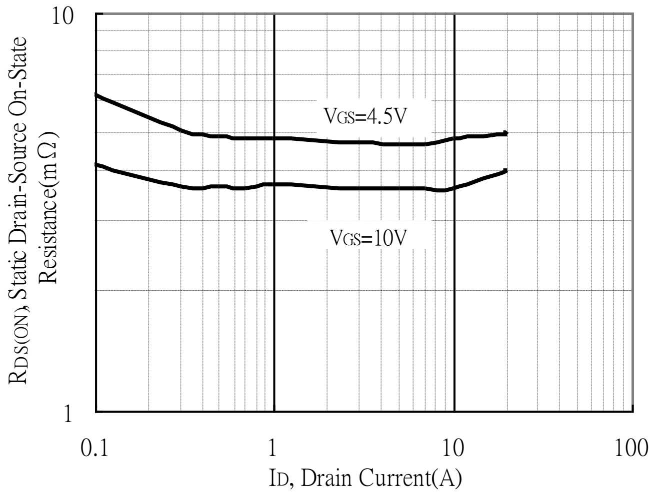
Ciss	-	1912	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	203	-		
Crss	-	160	-		
Source-Drain Diode					
*I_S	-	-	102	A	
*I_{SM}	-	-	408		
*V_{SD}	-	0.86	1.2	V	I_F=30A, V_{GS}=0V
*trr	-	10.7	-	ns	I_F=30A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	4.6	-	nC	

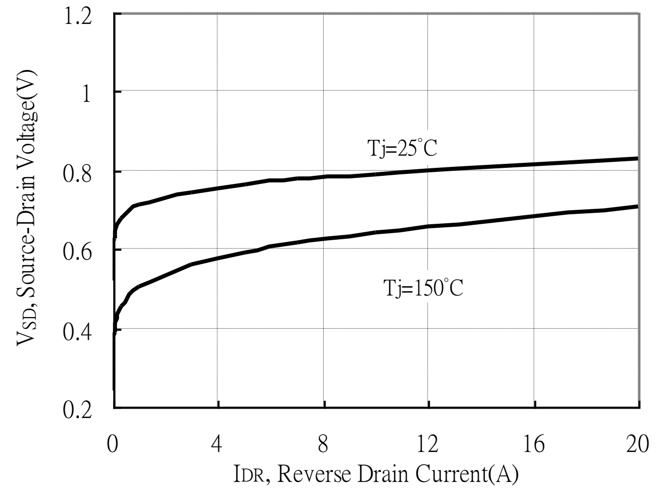
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

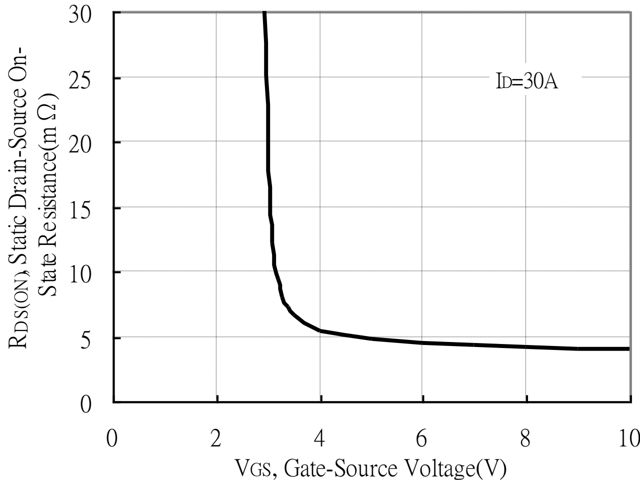
Typical Characteristics

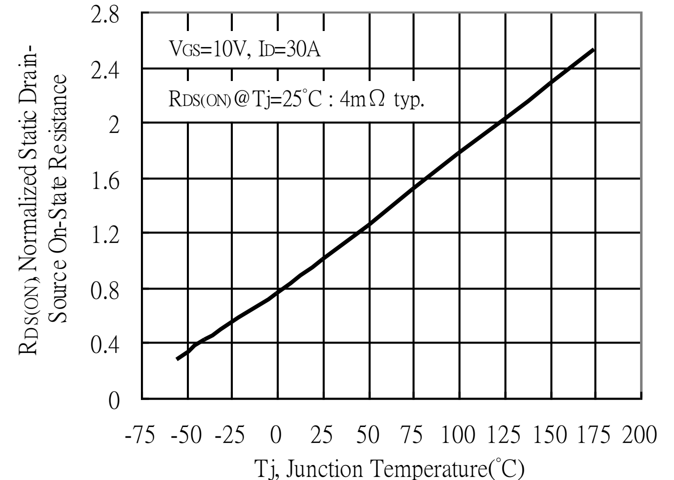




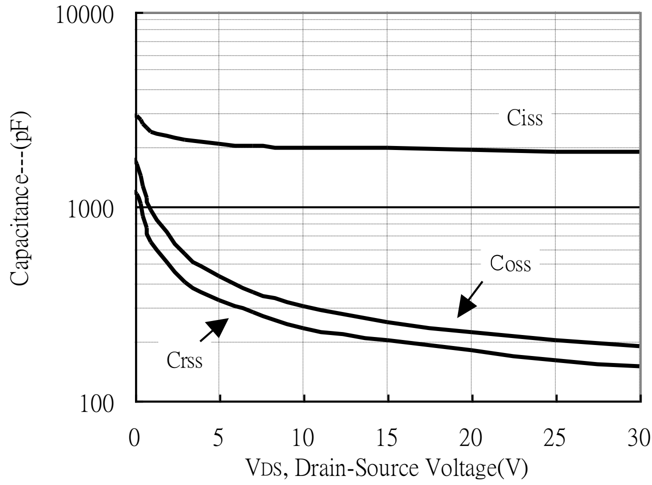


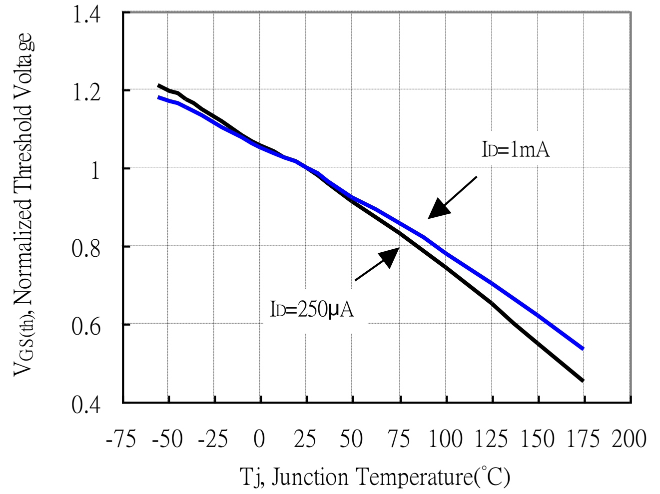


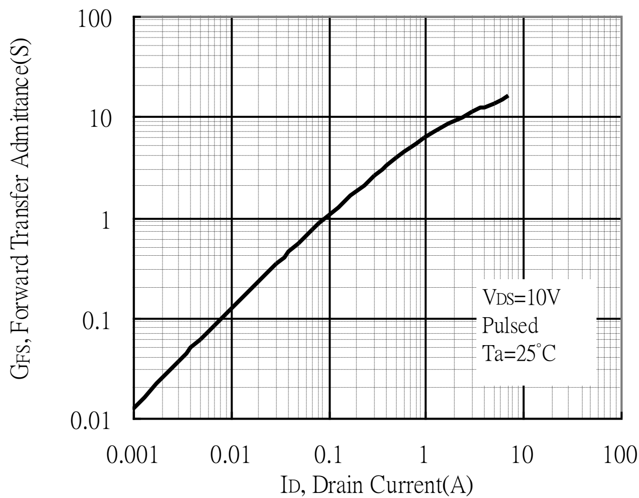


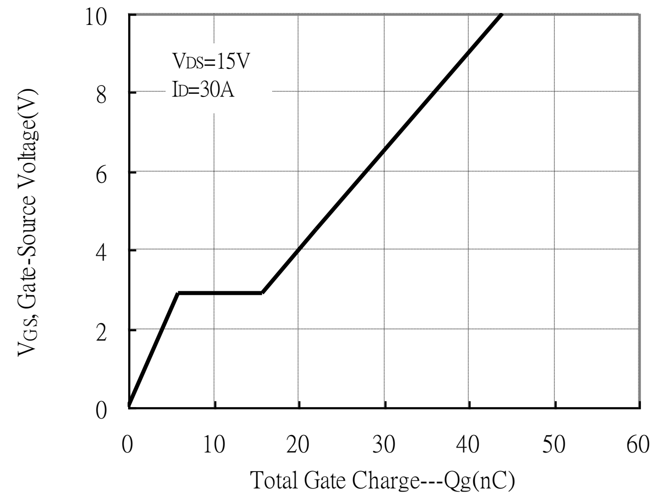


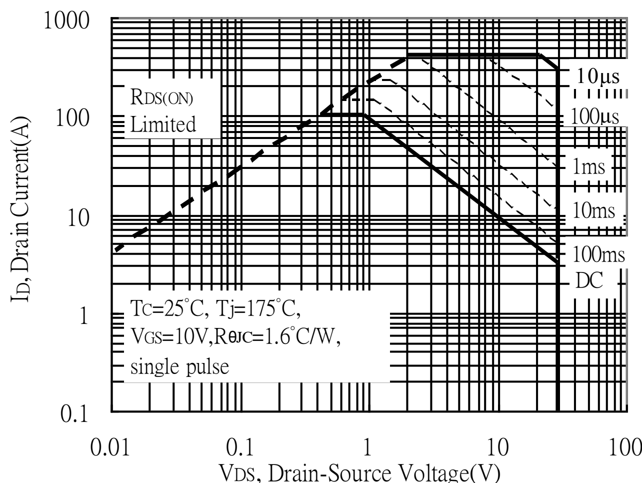
Typical Characteristics(Cont.)

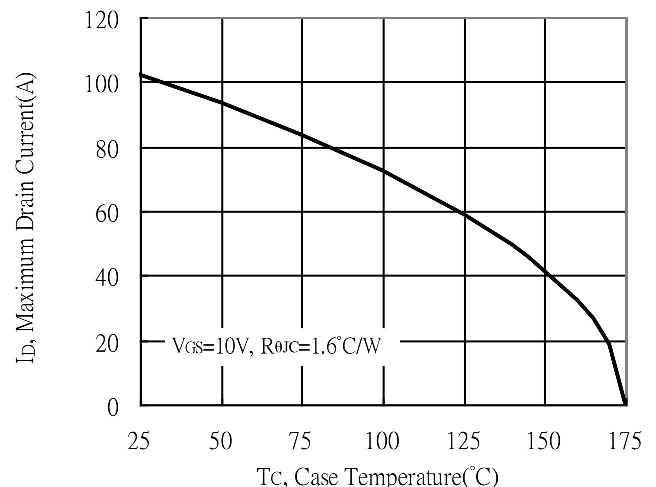




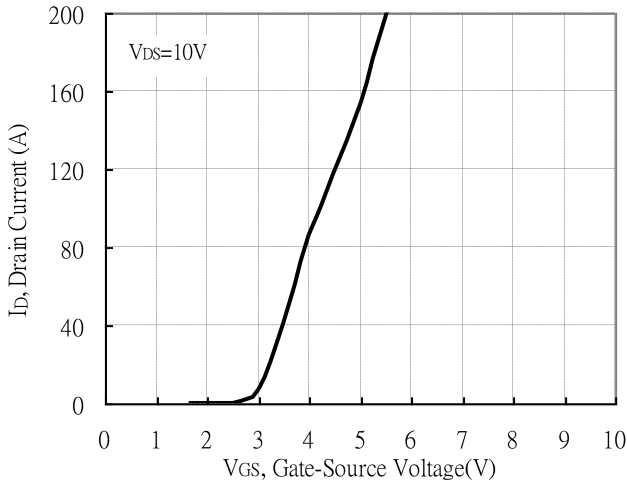


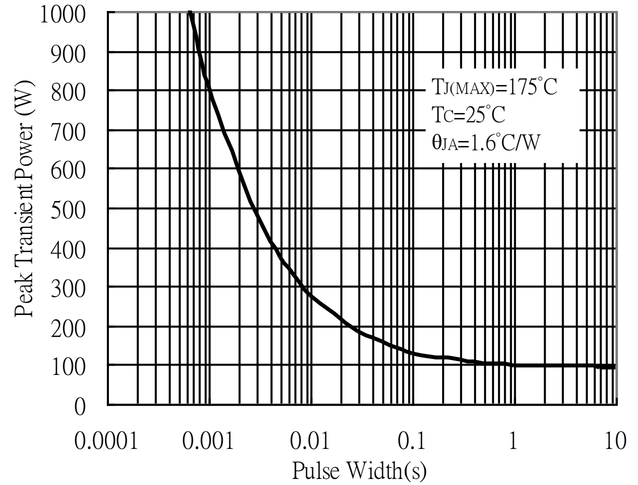


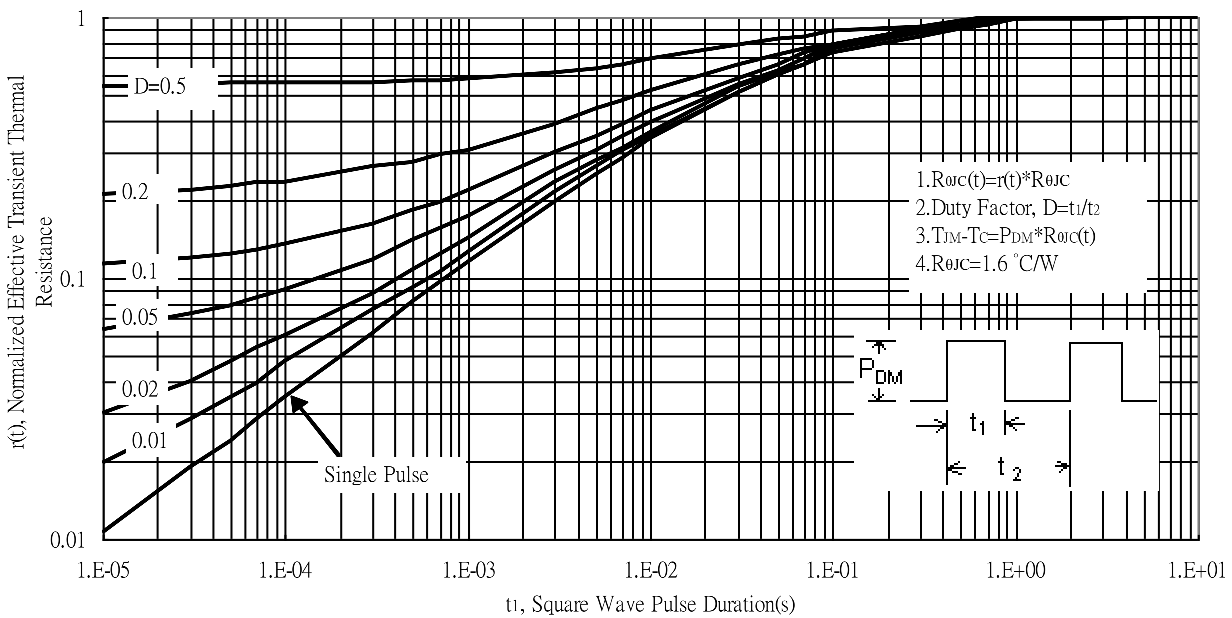




Typical Characteristics(Cont.)



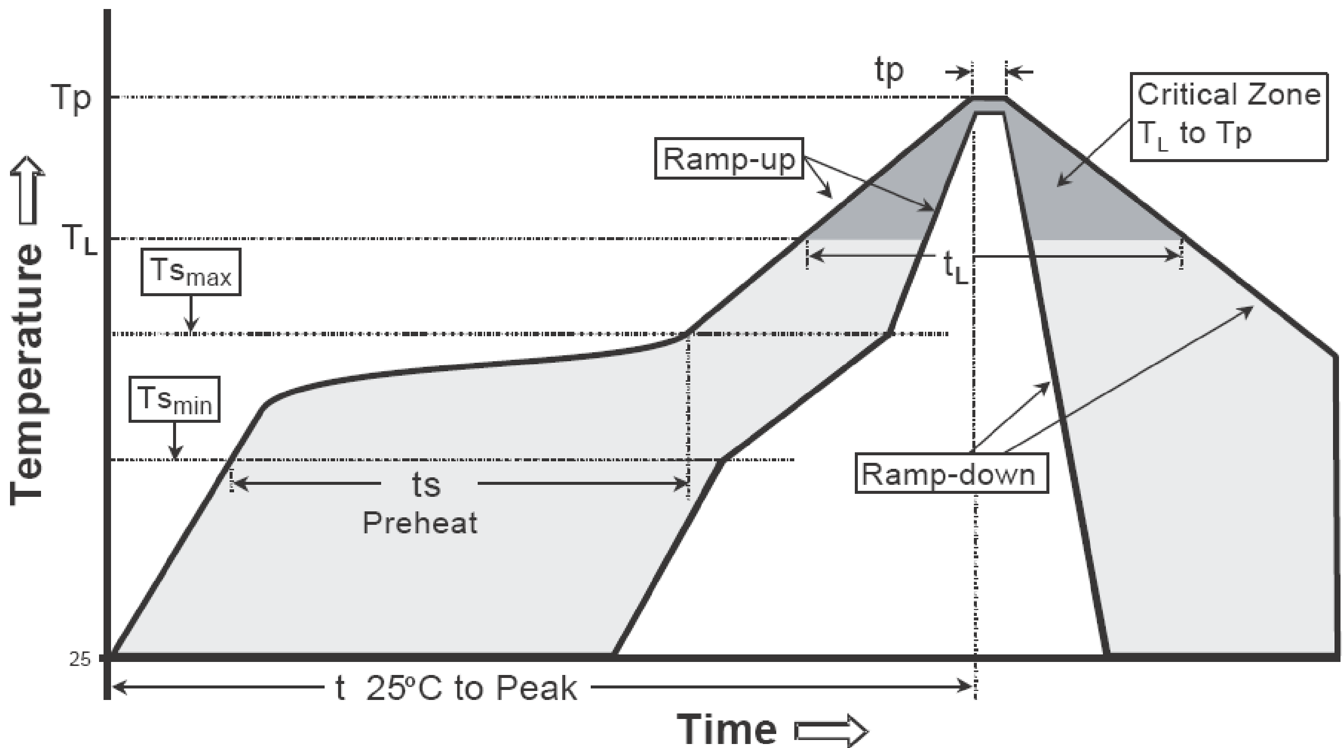




Recommended wave soldering condition

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

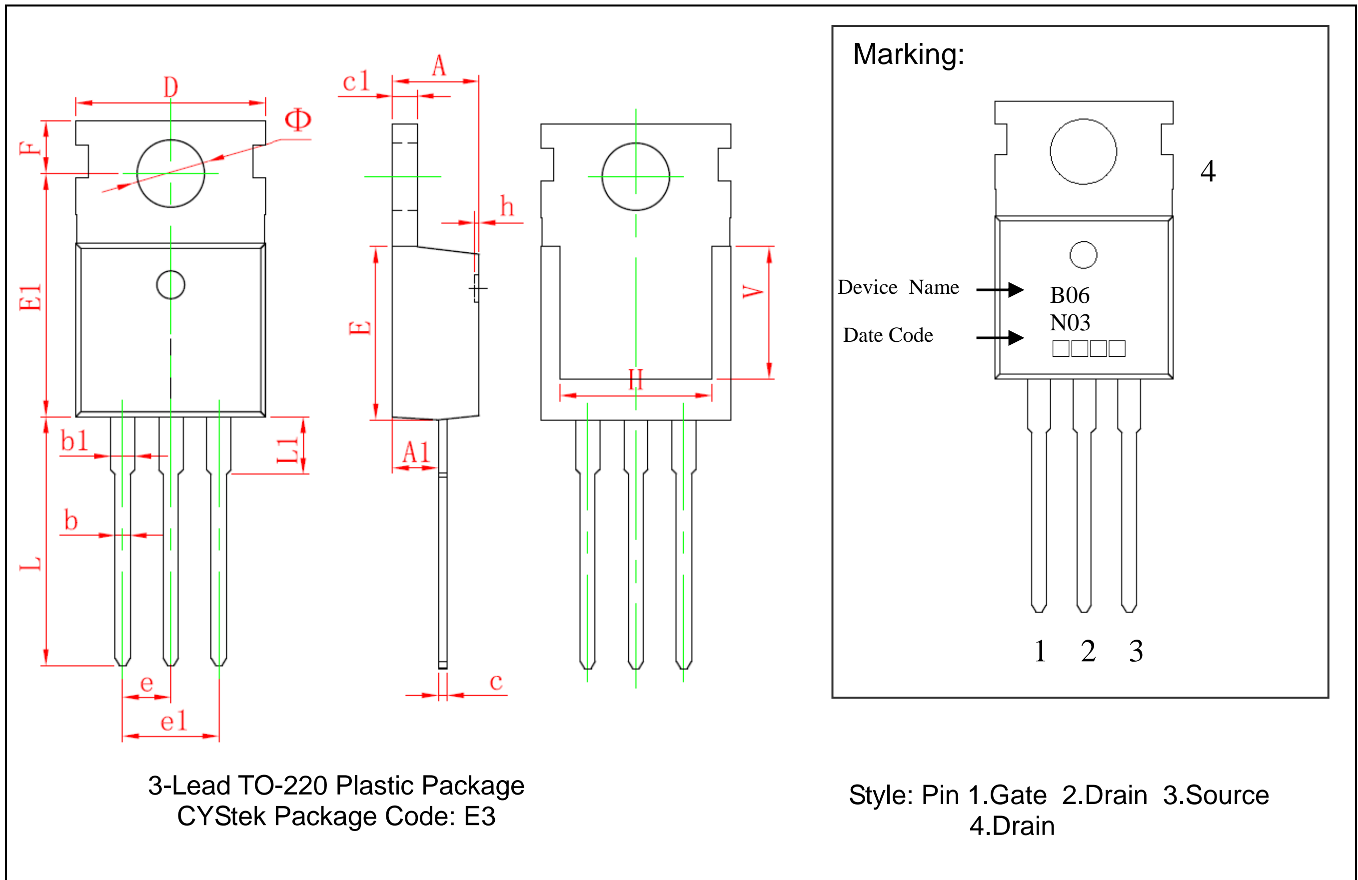
Recommended temperature profile for IR reflow



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 (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-220 Dimension



3-Lead TO-220 Plastic Package
CYStek Package Code: E3

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

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7.500	REF	0.295	REF
E1	12.650	12.950	0.498	0.510	Φ	3.600	3.800	0.142	0.150

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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