N-Channel Enhancement Mode Power MOSFET

MTEB6N20E3

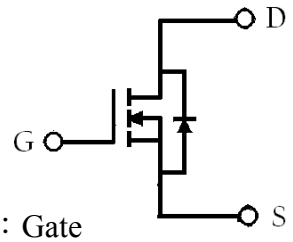
BV_{DSS}	200V
I_D@V_{GS}=10V, T_C=25°C	9A
$R_{DS(ON)}$@V_{GS}=10V, I_D=5.4A	308mΩ (typ)

Features

- Low Gate Charge
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- Pb-free lead plating and RoHS compliant package

Symbol

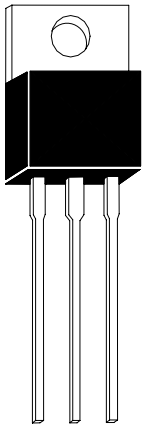
MTEB6N20E3



G：Gate
D：Drain
S：Source

Outline

TO-220



G D S

Ordering Information

Device	Package	Shipping
MTEB6N20E3-0-UB-X	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

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

Packing spec, UB : 50 pcs / tube, 20 tubes/box

Product rank, zero for no rank products

Product name

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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current @V_{GS}=10V, T_C=25°C	I_D	9	A
Continuous Drain Current @V_{GS}=10V, T_C=100°C		5.7	
Pulsed Drain Current (Note 1)	I_{DM}	20	
Avalanche Current	I_{AS}	2.7	
Avalanche Energy @ L=2m H, I_D=2.7A, V_{DD}=50V	E_{AS}	7.3	mJ
Repetitive Avalanche Energy@ L=0.05mH (Note 2)	E_{AR}	5	
Total Power Dissipation (T_C=25℃)	P_D	57	W
Total Power Dissipation (T_C=100℃)		23	
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

*100% UIS tested at condition of L=2mH, I_{AS}=1A, VDD=50V.

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	$R_{th,j-c}$	2.2	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	

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

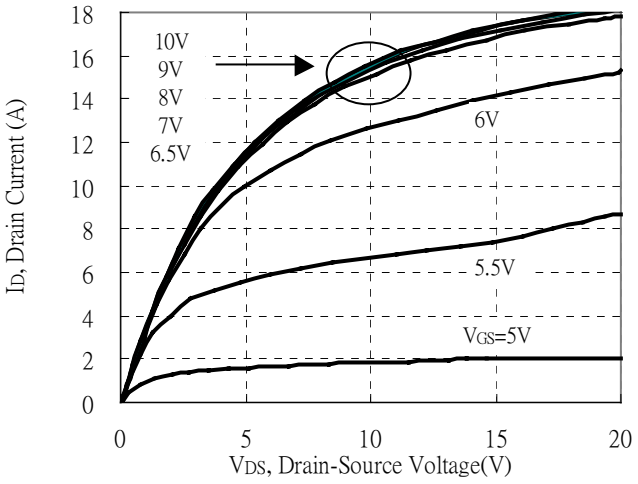
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	200	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.16	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	-	4.0	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS}	-	5.3	-	S	V_{DS} =15V, I_D=5A
I_{GSS}	-	-	±100	nA	V_{GS}=±30V
I_{DSS}	-	-	1	μA	V_{DS} =200V, V_{GS} =0V
	-	-	25		V_{DS} =160V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	308	400	mΩ	V_{GS} =10V, I_D=5.4A
Dynamic					
*Qg	-	10.6	-	nC	I_D=3A, V_{DS}=160V, V_{GS}=10V
*Qgs	-	2.3	-		
*Qgd	-	3.9	-		
*$t_{d(ON)}$	-	8.8	-	ns	V_{DS}=100V, I_D=3A, V_{GS}=10V, R_G=25Ω
*tr	-	16.8	-		
*$t_{d(OFF)}$	-	21.2	-		
*t_f	-	19.6	-		
Ciss	-	395	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	47	-		
Crss	-	23	-		

Source-Drain Diode					
*I_S	-	-	9	A	
*I_{SM}	-	-	20		
*V_{SD}	-	-	1.3	V	I_F=I_S, V_{GS}=0V
*trr	-	50	-	ns	I_F=3A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	86	-	nC	

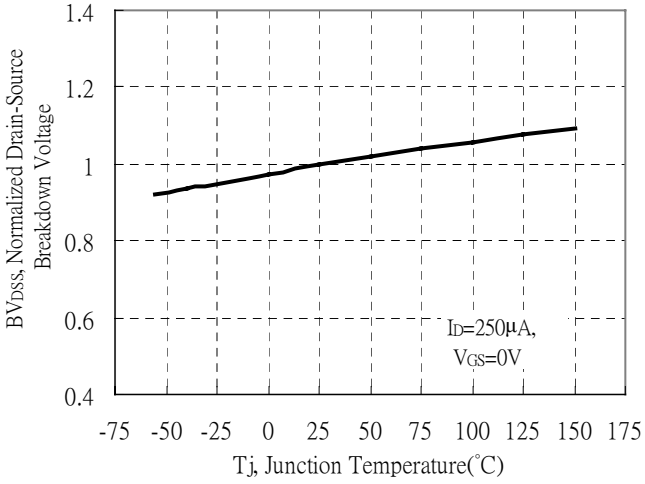
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

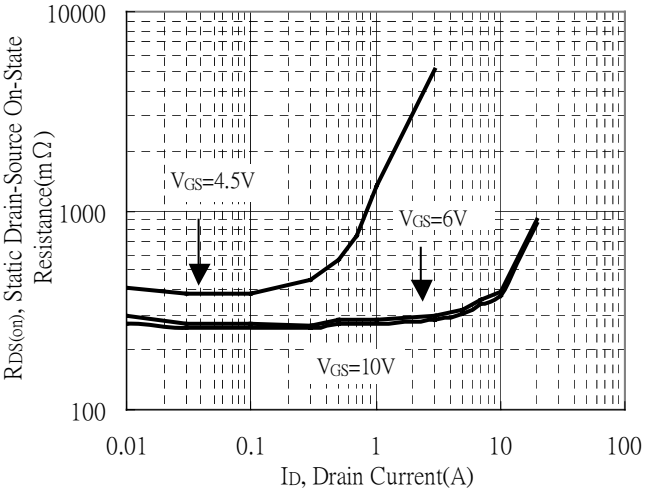
Typical Output Characteristics



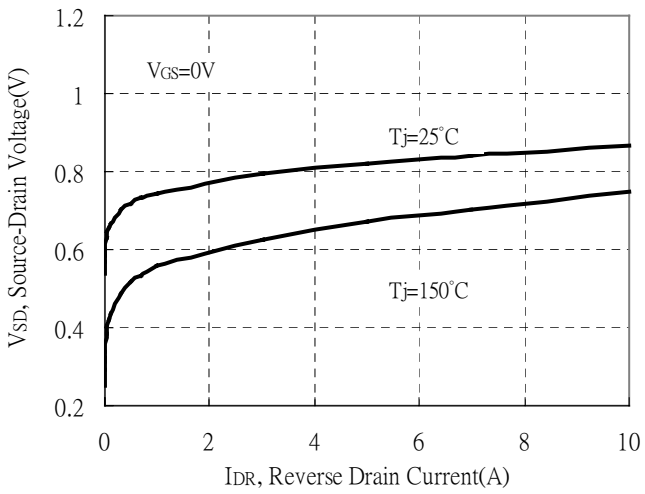
Brekdown Voltage vs Ambient Temperature



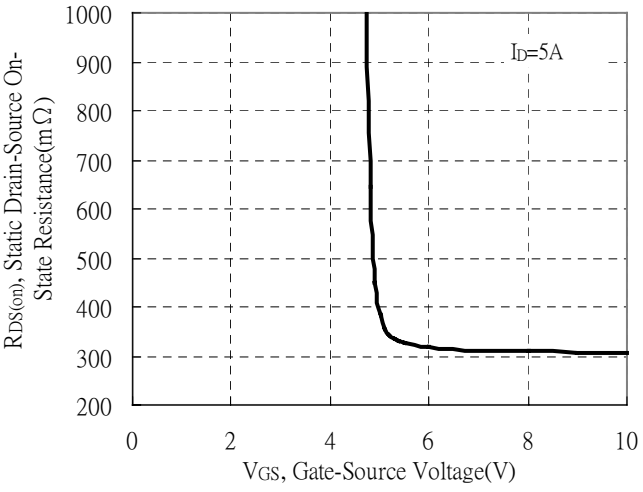
Static Drain-Source On-State resistance vs Drain Current



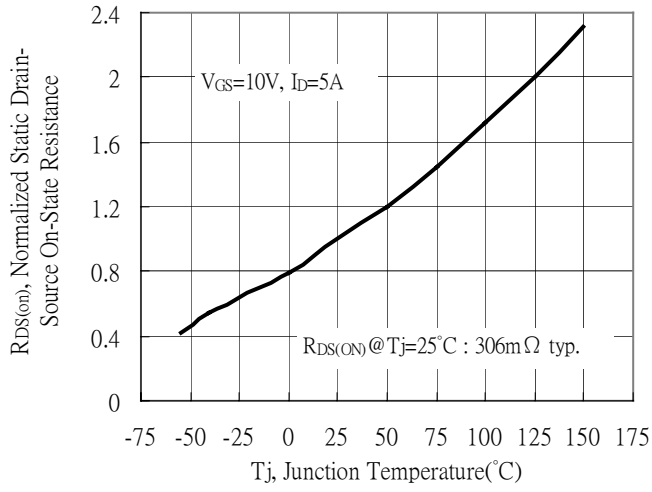
Reverse Drain Current vs Source-Drain Voltage



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

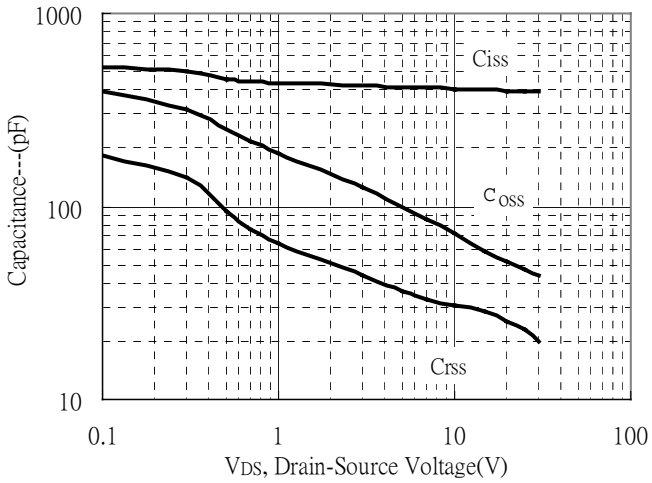


Drain-Source On-State Resistance vs Junction Tempearture

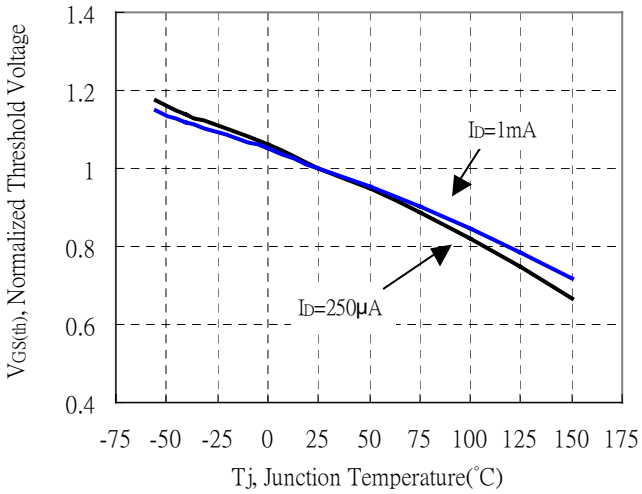


Typical Characteristics(Cont.)

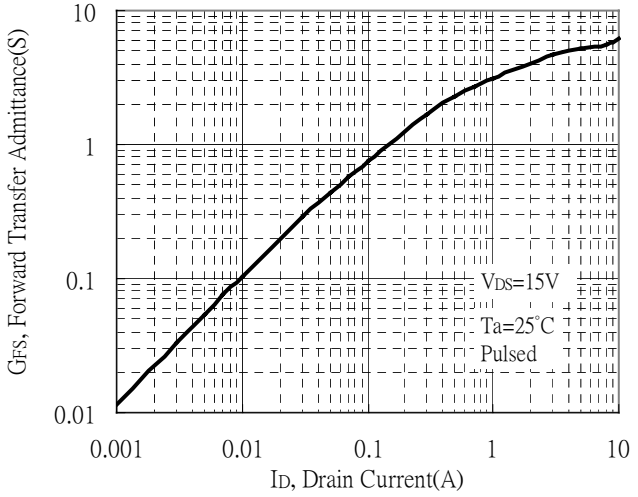
Capacitance vs Drain-to-Source Voltage



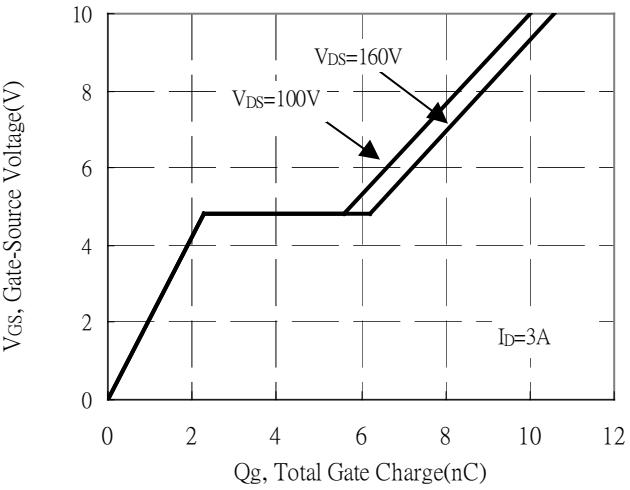
Threshold Voltage vs Junction Tempearture



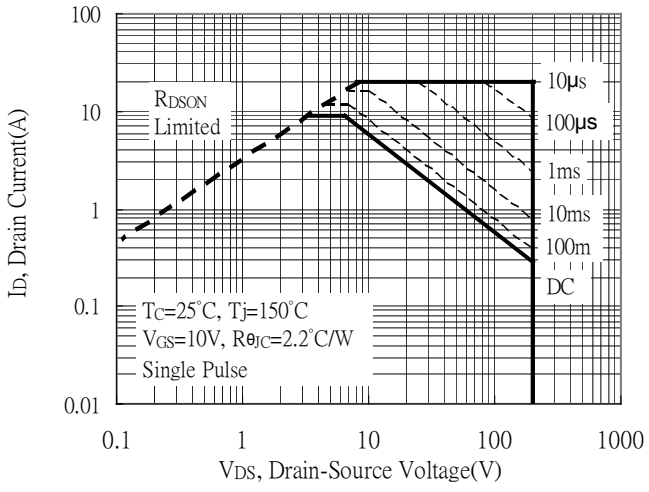
Forward Transfer Admittance vs Drain Current



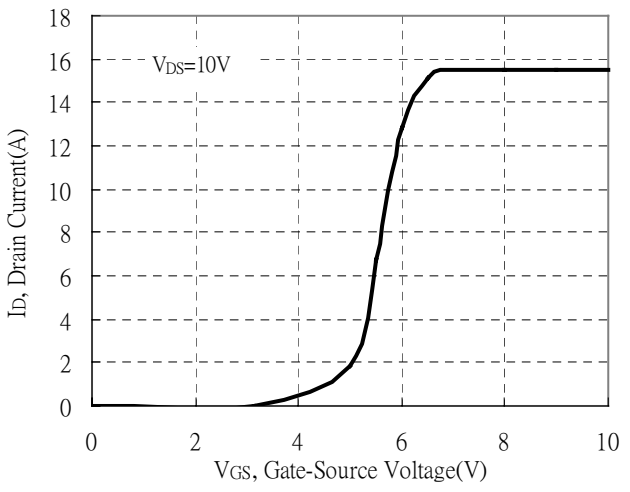
Gate Charge Characteristics



Maximum Safe Operating Area

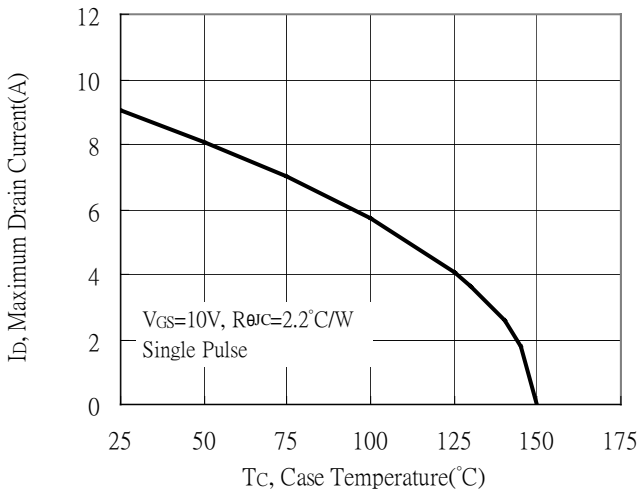


Typical Transfer Characteristics

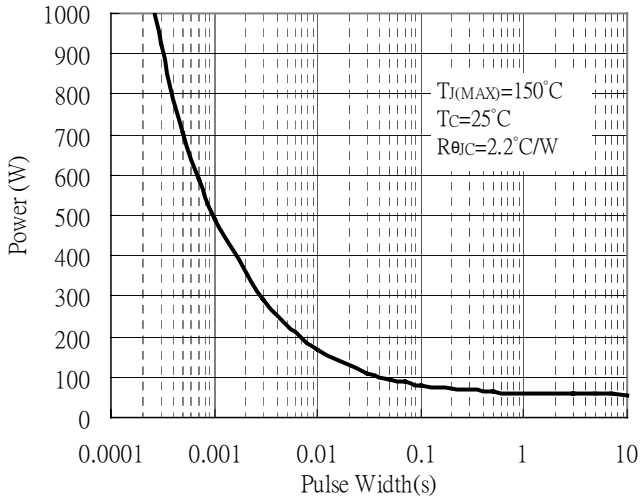


Typical Characteristics(Cont.)

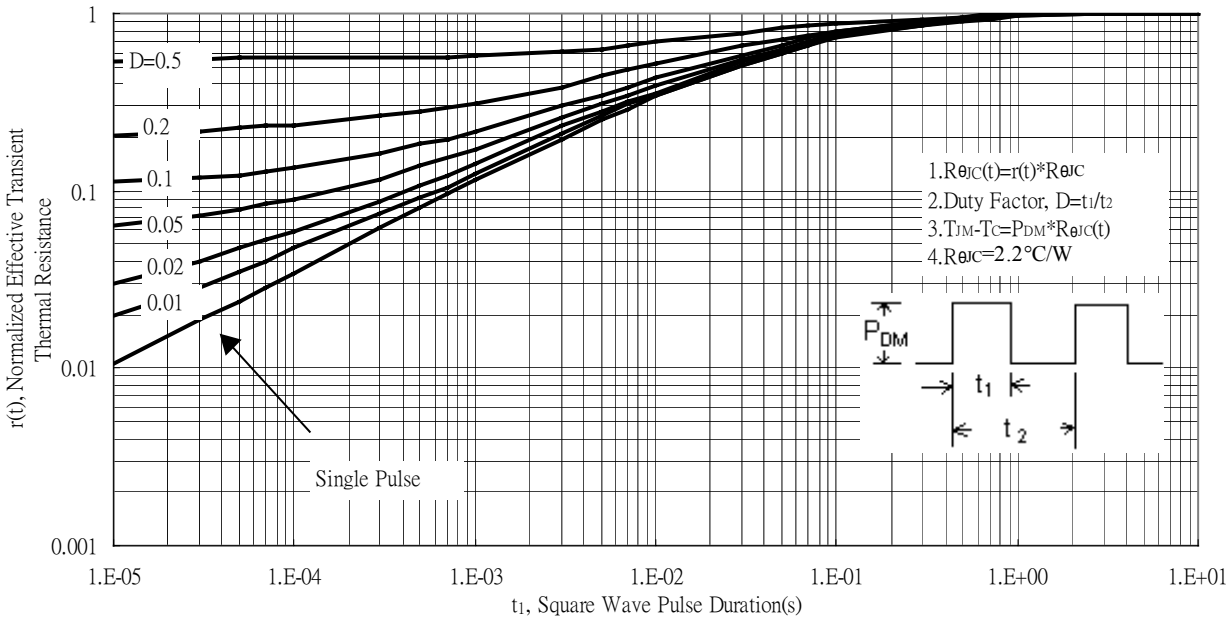
Maximum Drain Current vs Case Temperature



Single Pulse Power Rating, Junction to Case



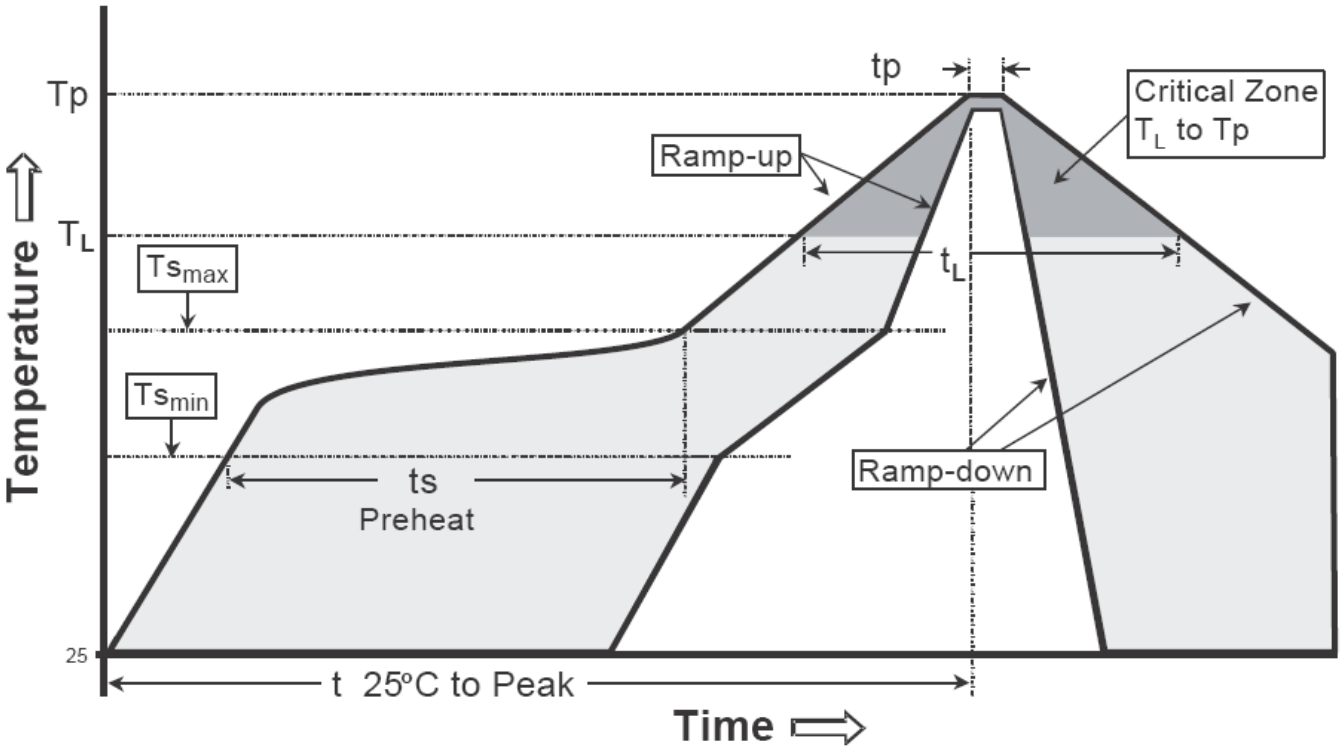
Transient Thermal Response Curves



Recommended wave soldering condition

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

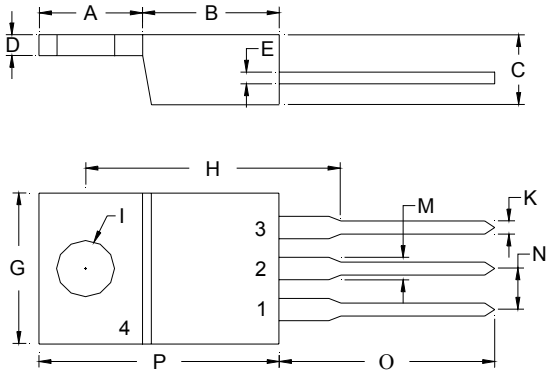
Recommended temperature profile for IR reflow



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(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.

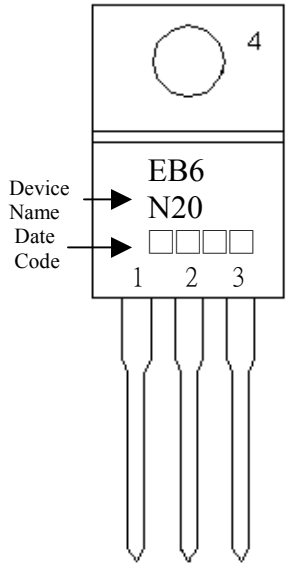
Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-220 Dimension



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

Marking:



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

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2441	0.2598	6.20	6.60	I	-	*0.1508	-	*3.83
B	0.3386	0.3543	8.60	9.00	K	0.0299	0.0394	0.76	1.00
C	0.1732	0.1890	4.40	4.80	M	0.0461	0.0579	1.17	1.47
D	0.0492	0.0571	1.25	1.45	N	-	*0.1000	-	*2.54
E	0.0142	0.0197	0.36	0.50	O	0.5217	0.5610	13.25	14.25
G	0.3858	0.4094	9.80	10.40	P	0.5787	0.6024	14.70	15.30
H	-	*0.6398	-	*16.25					

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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