

N -Channel Enhancement Mode Power MOSFET

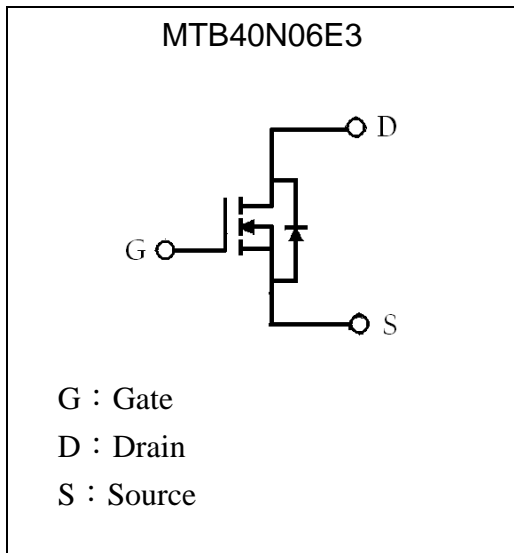
MTB40N06E3

BV_{DSS}	60V
$I_D @ V_{GS}=10V, T_C=25^\circ C$	26A
$R_{DS(on)(TYP)} @ V_{GS}=10V, I_D=10A$	35mΩ
$R_{DS(on)(TYP)} @ V_{GS}=4.5V, I_D=8A$	40mΩ

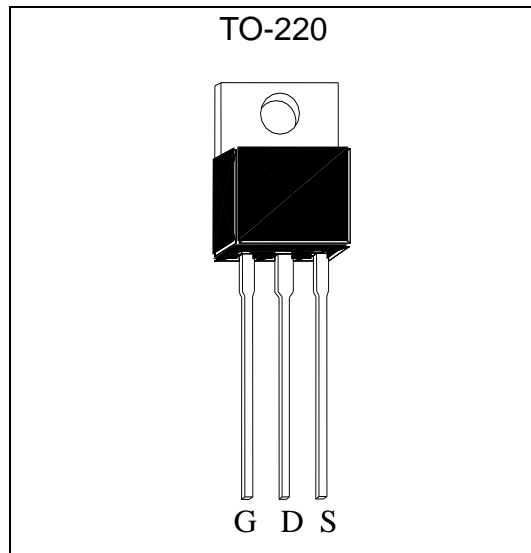
Features

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

Equivalent Circuit

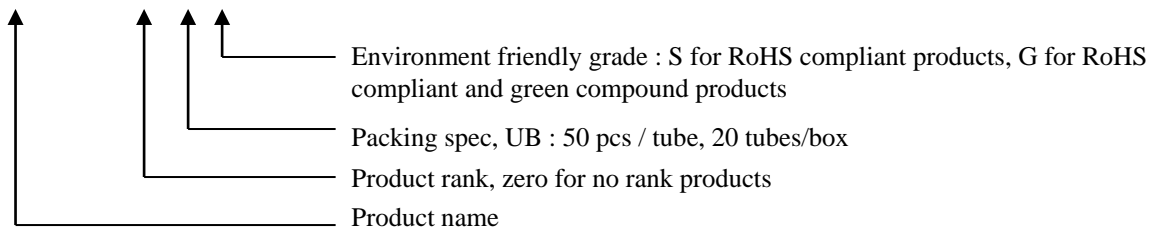


Outline



Ordering Information

Device	Package	Shipping
MTB40N06E3-0-UB-X	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton





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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	±20	
Continuous Drain Current @ V _{GS} =10V, T _C =25°C	I _D	26	A
Continuous Drain Current @ V _{GS} =10V, T _C =100°C		16	
Pulsed Drain Current *1	I _{DM}	50	
Avalanche Current	I _{AS}	26	
Avalanche Energy @ L=0.1mH, I _D =26A, R _G =25 Ω *3	E _{AS}	34	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E _{AR}	5	
Total Power Dissipation @T _C =25°C	P _D	50	W
Total Power Dissipation @T _C =100°C		20	
Operating Junction and Storage Temperature Range	T _j , T _{stg}	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
 *2. Duty cycle ≤ 1%
 *3. 100% tested by conditions of L=100μH, I_{AS}=10A, V_{GS}=10V, V_{DD}=15V

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}	62.5	

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	60	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	1.0	-	3.0		V _{DS} =V _{GS} , I _D =250μA
G _{FS} *1	-	36	-	S	V _{DS} =5V, I _D =10A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	1	μA	V _{DS} =48V, V _{GS} =0V
	-	-	25		V _{DS} =48V, V _{GS} =0V, T _j =125°C
R _{DS(ON)} *1	-	35	45	mΩ	V _{GS} =10V, I _D =10A
	-	40	50		V _{GS} =4.5V, I _D =8A
Dynamic					
Q _g *1, 2	-	12	-	nC	I _D =10A, V _{DS} =20V, V _{GS} =10V
Q _{gs} *1, 2	-	3.4	-		
Q _{gd} *1, 2	-	3.8	-		
t _{d(ON)} *1, 2	-	10	-	ns	V _{DS} =20V, I _D =1A, V _{GS} =10V, R _G =6Ω
t _r *1, 2	-	3.5	-		
t _{d(OFF)} *1, 2	-	32	-		
t _f *1, 2	-	7.5	-		

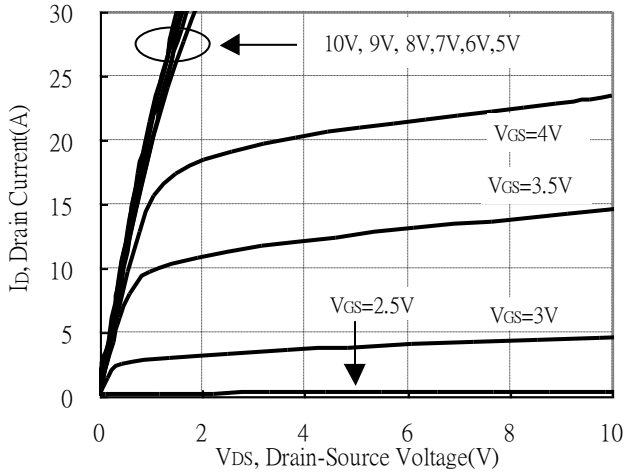


Ciss	-	882	-	pF	V _{GS} =0V, V _{DS} =30V, f=1MHz
Coss	-	43	-		
Crss	-	37	-		
Source-Drain Diode					
I _S *1	-	-	26	A	
I _{SM} *3	-	-	50		
V _{SD} *1	-	-	1.3	V	I _F =I _S , V _{GS} =0V
trr	-	11.4	-	ns	I _F =5A, dI _F /dt=100A/μs
Qrr	-	7	-	nC	

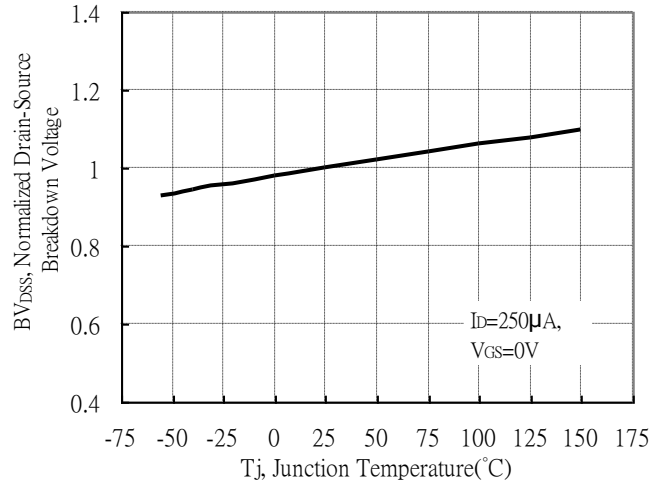
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Typical Characteristics

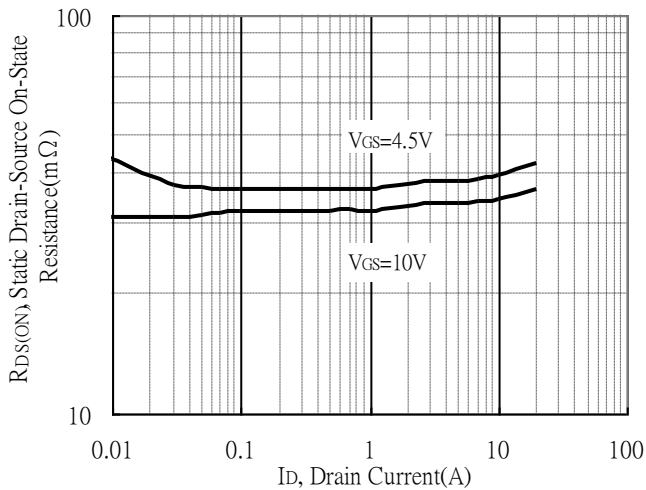
Typical Output Characteristics



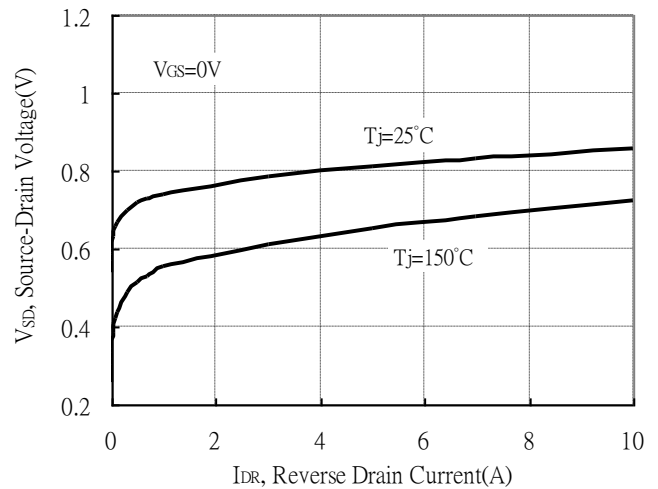
Brekdown Voltage vs Ambient Temperature



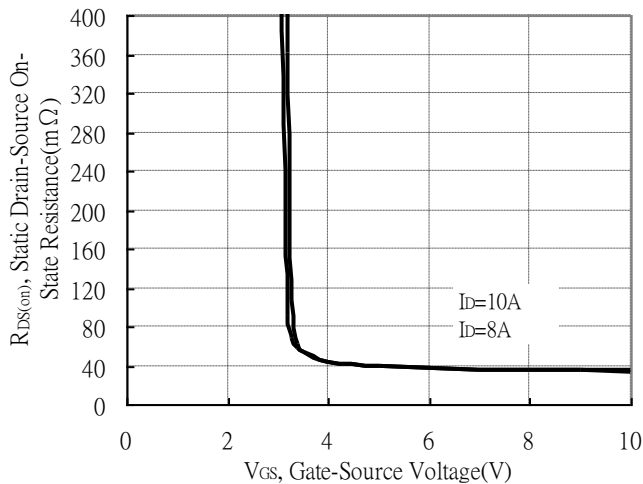
Static Drain-Source On-State resistance vs Drain Current



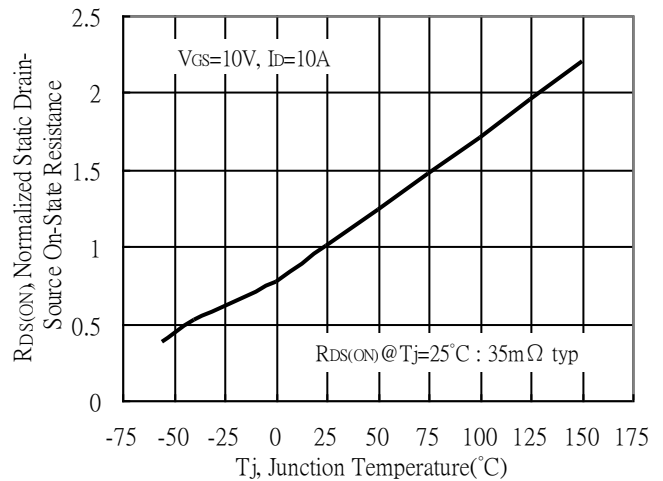
Reverse Drain Current vs Source-Drain Voltage



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

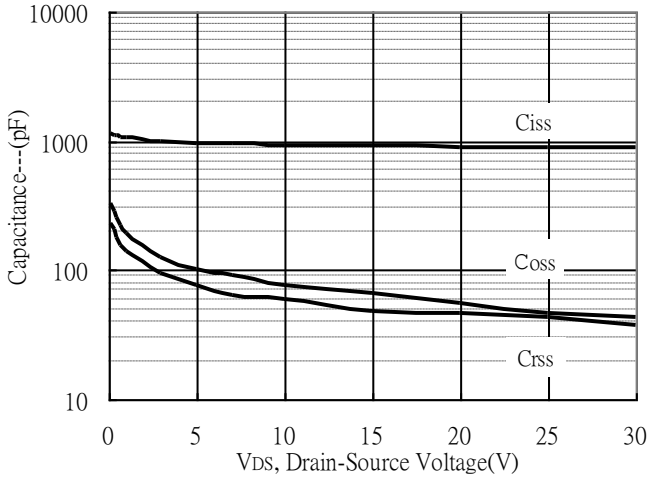


Drain-Source On-State Resistance vs Junction Temperature

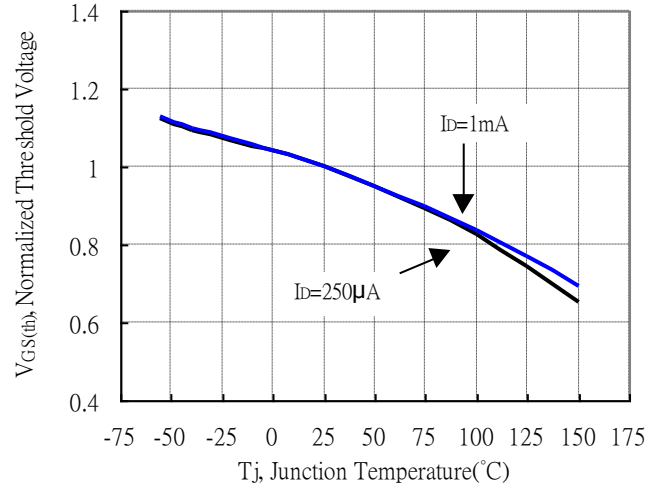


Typical Characteristics(Cont.)

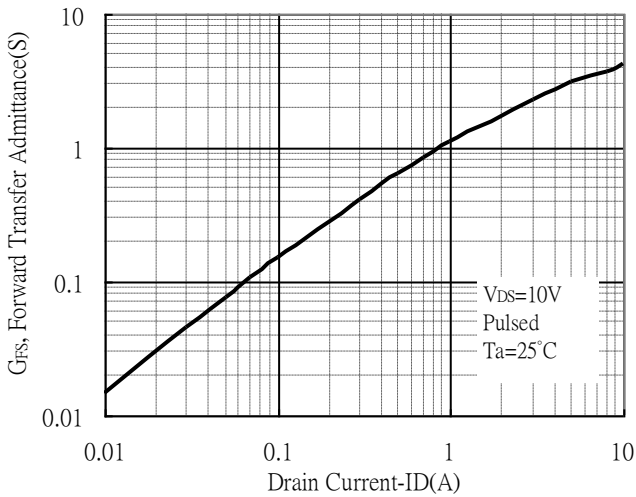
Capacitance vs Drain-to-Source Voltage



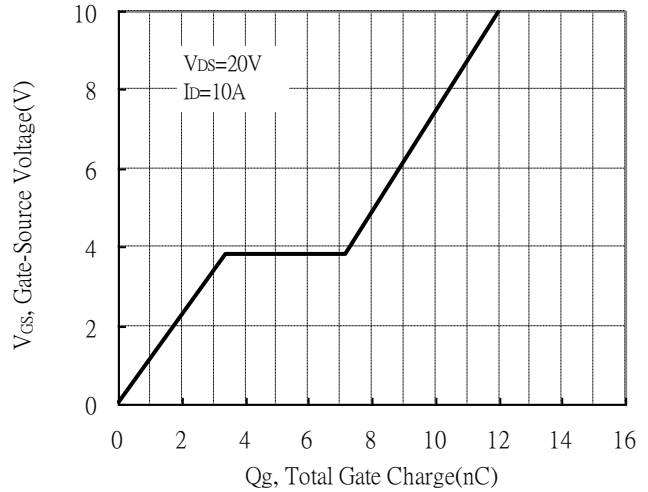
Normalized Threshold Voltage vs Junction Temperature



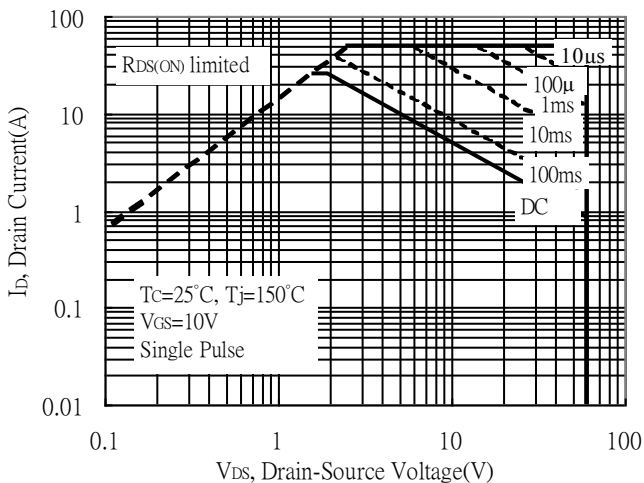
Forward Transfer Admittance vs Drain Current



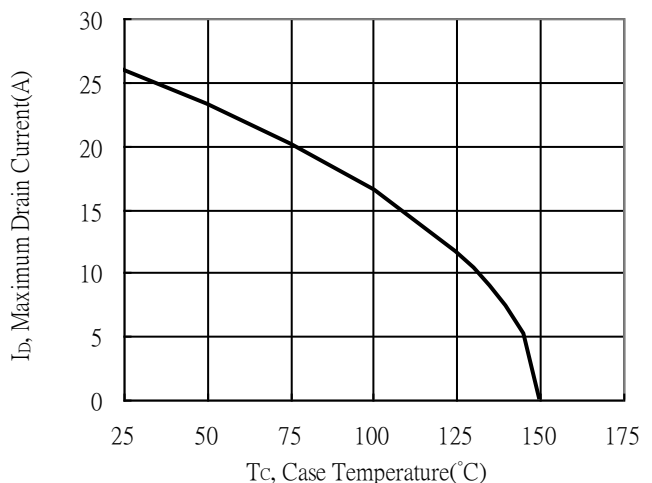
Gate Charge Characteristics



Maximum Safe Operating Area



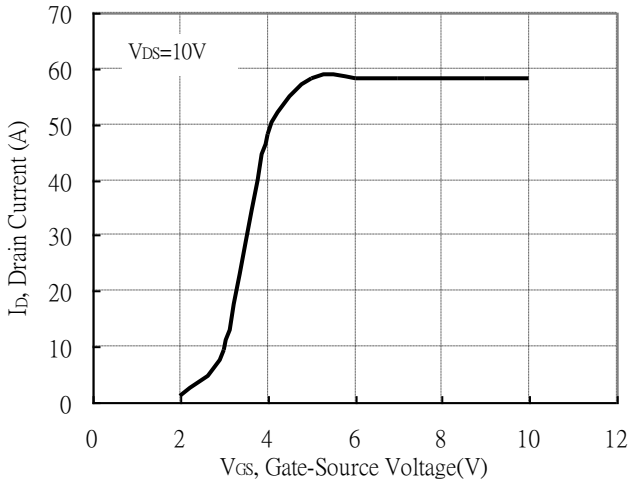
Maximum Drain Current vs Case Temperature



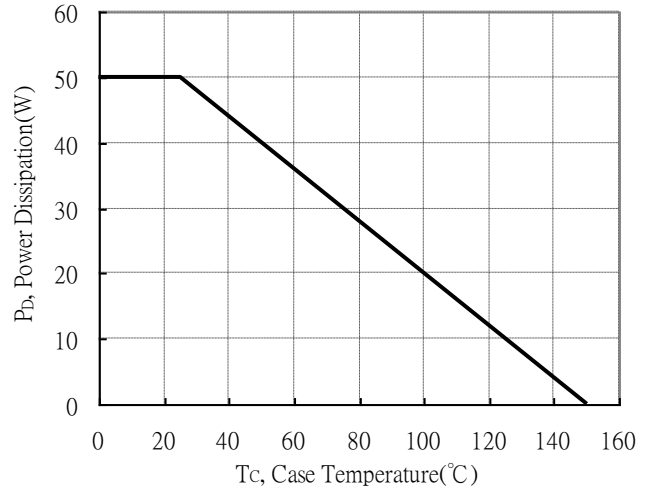


Typical Characteristics(Cont.)

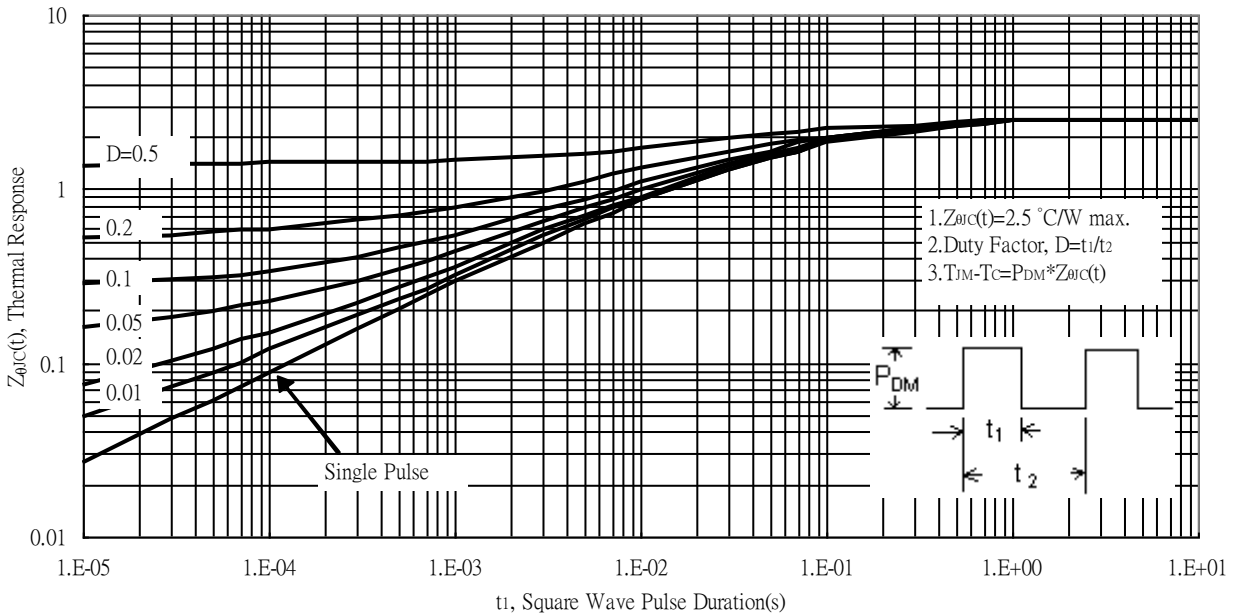
Typical Transfer Characteristics



Power Derating Curve



Transient Thermal Response Curves



Recommended wave soldering condition

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

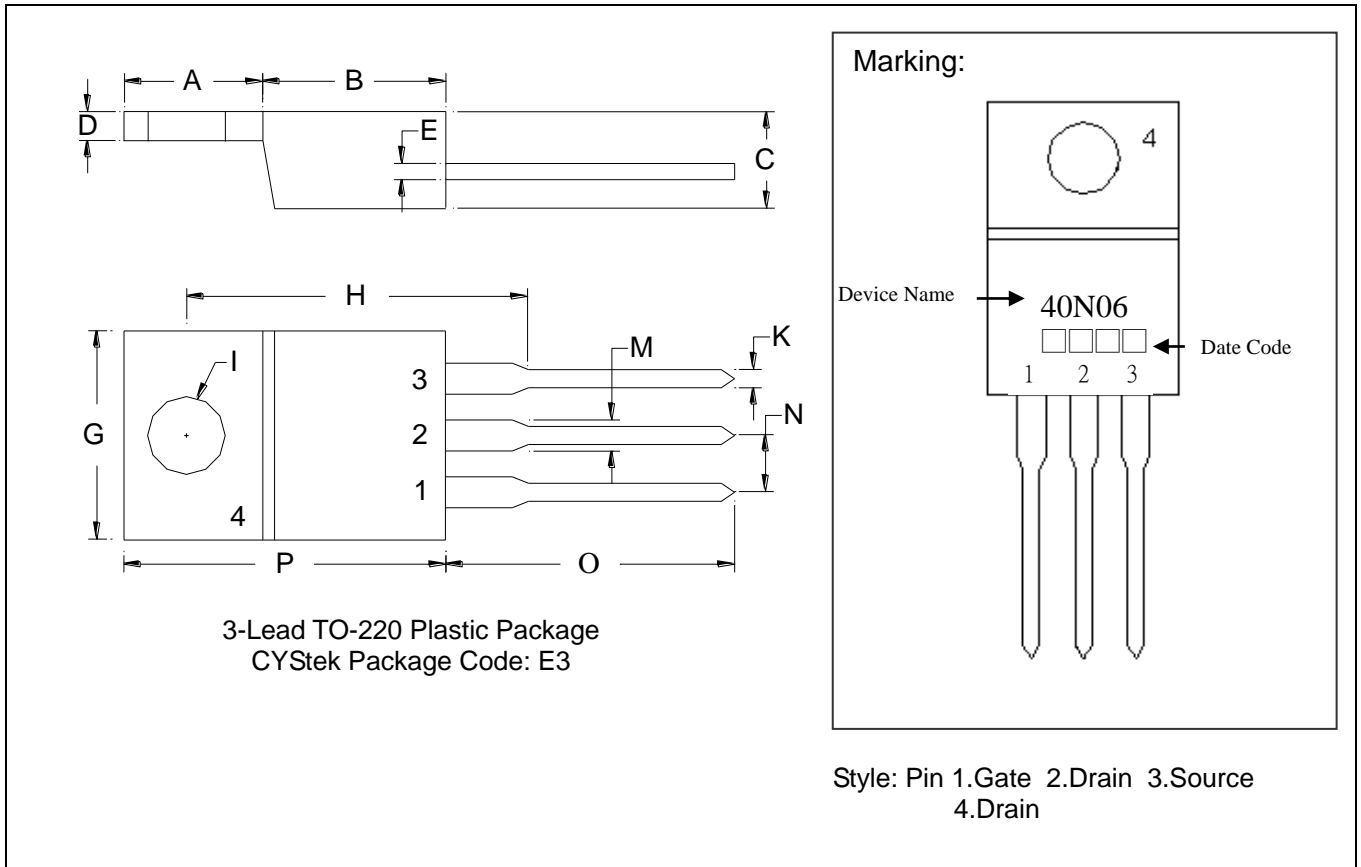
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	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



*: 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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