P-Channel Logic Level Enhancement Mode Power MOSFET

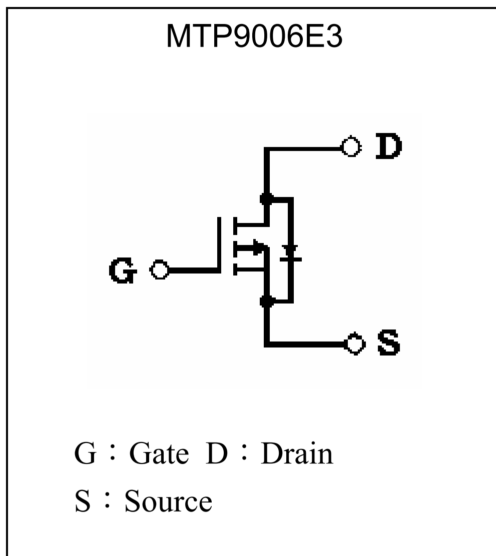
MTP9006E3

BV_{DSS}	-60V
I_D	-10A
$R_{DSON(MAX)}$	95mΩ

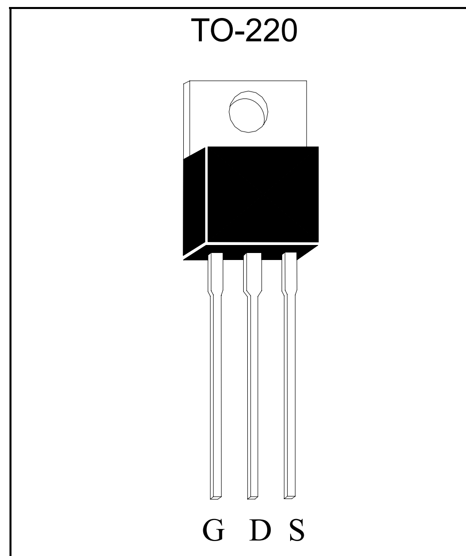
Features

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

Equivalent Circuit



Outline



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 @ T_C=25°C	I_D	-10	A
Continuous Drain Current @ T_C=100°C	I_D	-7	
Pulsed Drain Current *1	I_{DM}	-40	
Avalanche Current	I_{AS}	-10	
Avalanche Energy @ L=0.1mH, I_D=-10A, R_G=25Ω	E_{AS}	5	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E_{AR}	2	
Total Power Dissipation @T_C=25℃	Pd	50	W
Total Power Dissipation @T_C=100℃		25	
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	$R_{th,j-c}$	3	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	°C/W

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

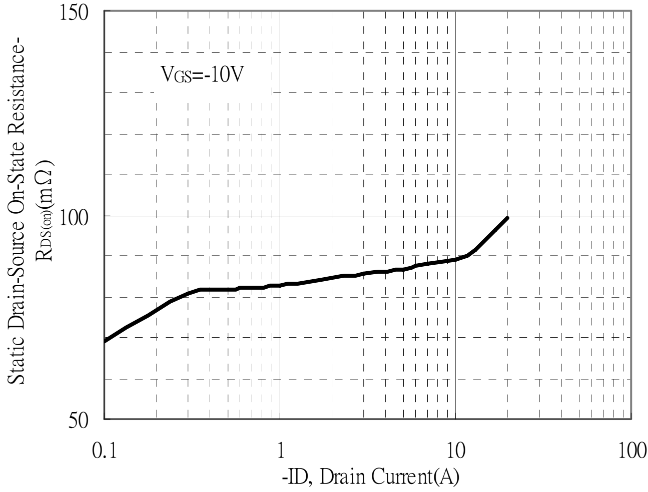
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-60	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-1	-1.8	-3	V	V_{DS} =V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS} =-32V, V_{GS} =0
	-	-	-25		V_{DS} =-30V, V_{GS} =0, T_J=125°C
$I_{D(ON)}$ *1	-10	-	-	A	V_{DS} =-5V, V_{GS} =-4.5V
$R_{DS(ON)}$ *1	-	89	95	mΩ	V_{GS} =-10V, I_D=-10A
	-	98	120		V_{GS} =-5V, I_D=-8A
G_{FS} *1	-	9	-	S	V_{DS} =-5V, I_D=-10A
Dynamic					
Qg *1, 2	-	16.2	-	nC	I_D=-10A, V_{DS}=-30V, V_{GS}=-10V
Qgs *1, 2	-	2	-		
Qgd *1, 2	-	3.5	-		
$t_{d(ON)}$ *1, 2	-	8	-	ns	V_{DS}=-10V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
tr *1, 2	-	12	-		
$t_{d(OFF)}$ *1, 2	-	20	-		
t_f *1, 2	-	12	-		
Ciss	-	953	-	pF	V_{GS}=0V, V_{DS}=-25V, f=1MHz
Coss	-	69	-		
Crss	-	56	-		
Rg	-	6.8	-	Ω	V_{GS}=15mV, V_{DS}=0, f=1MHz
Source-Drain Diode					
I_S *1	-	-	-10	A	
I_{SM} *3	-	-	-40		
V_{SD} *1	-	-	-1.3	V	I_F=I_S, V_{GS}=0V
trr	-	12	-	ns	I_F=-5A, dI_F/dt=100A/μs
Qrr	-	9	-	nC	

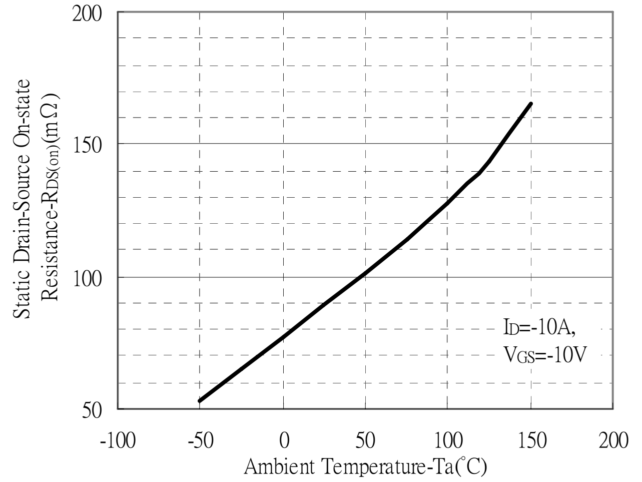
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

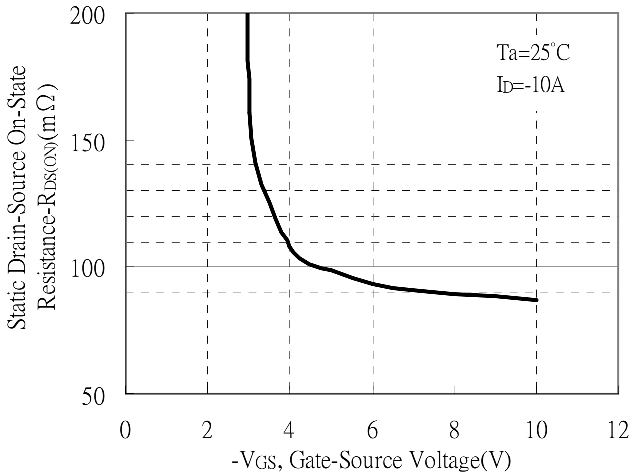
Ordering Information

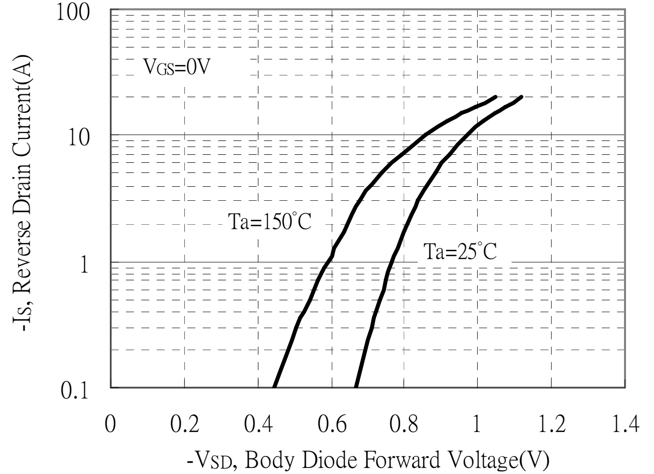
Device	Package	Shipping
MTP9006E3	TO-220 (Pb-free lead plating package)	50 pcs / tube, 20 tubes/box, 4 boxes/carton

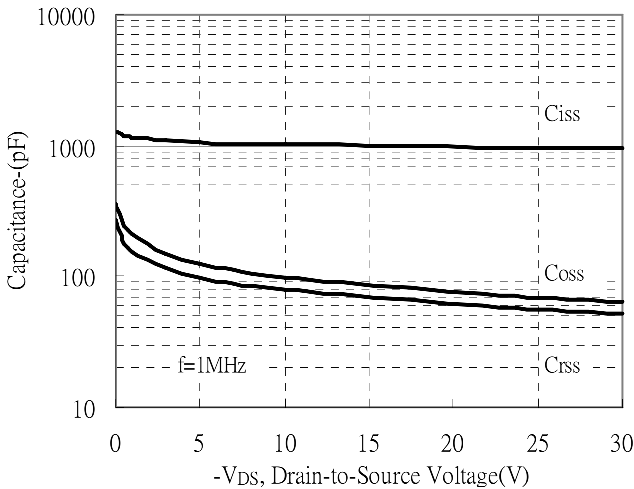
Typical Characteristics

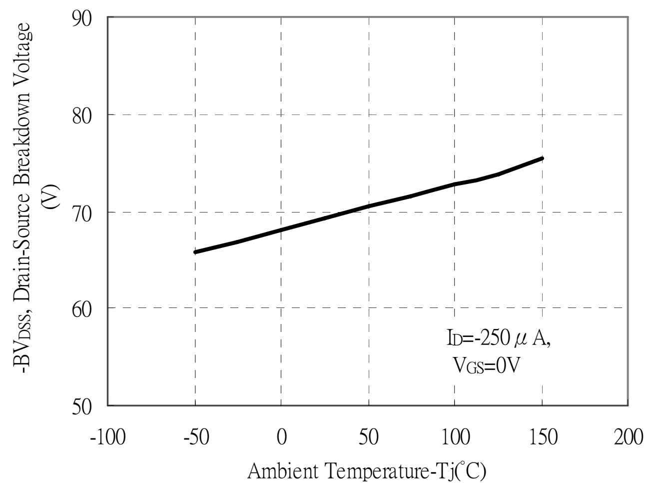




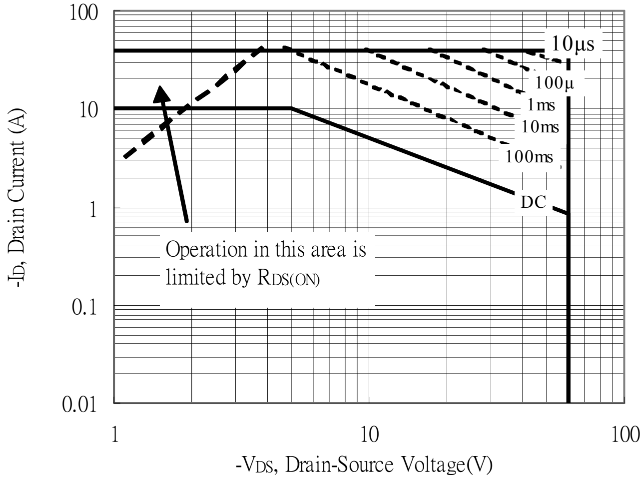


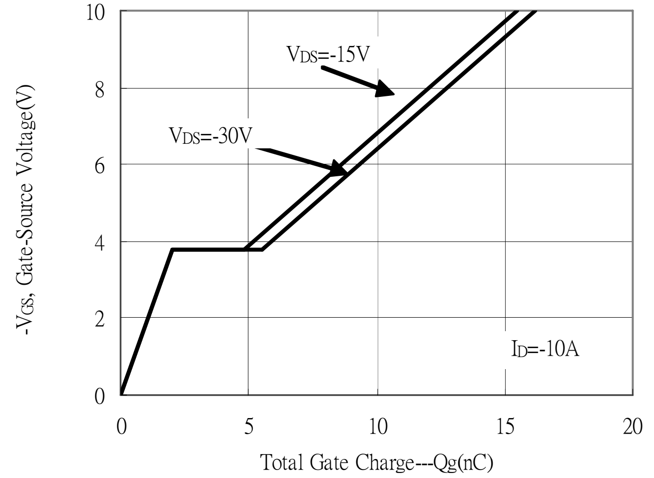


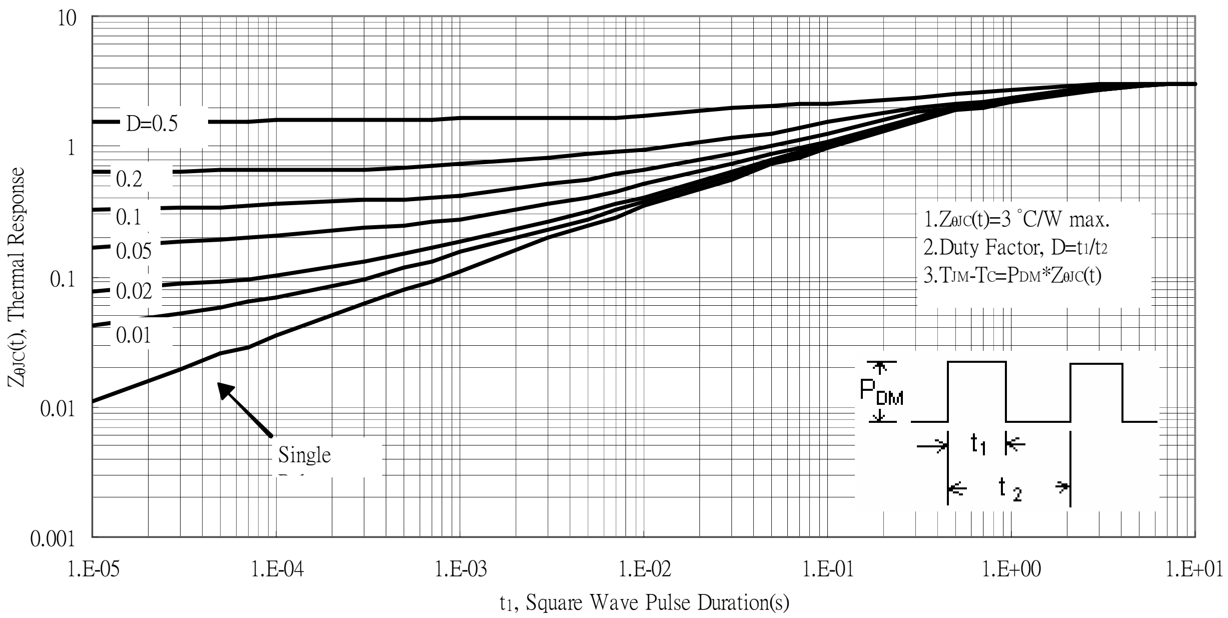




Typical Characteristics(Cont.)



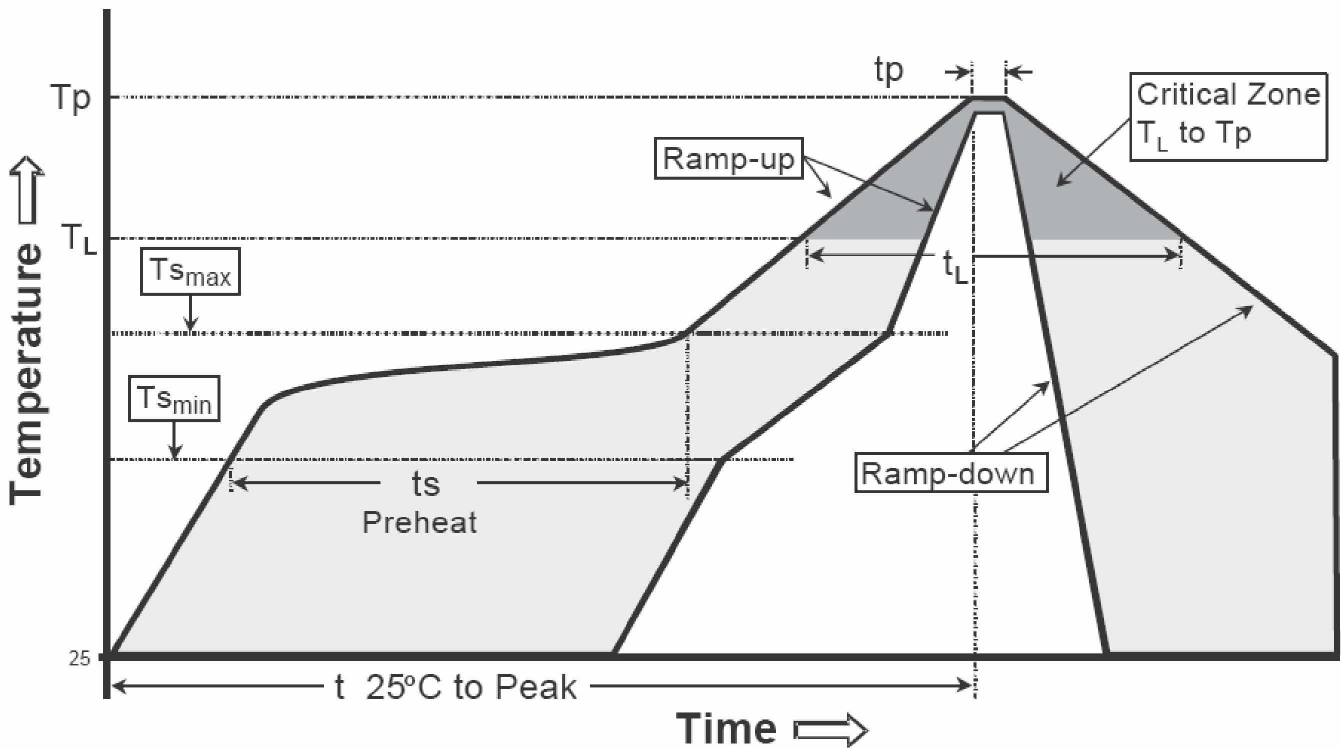




Recommended wave soldering condition

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

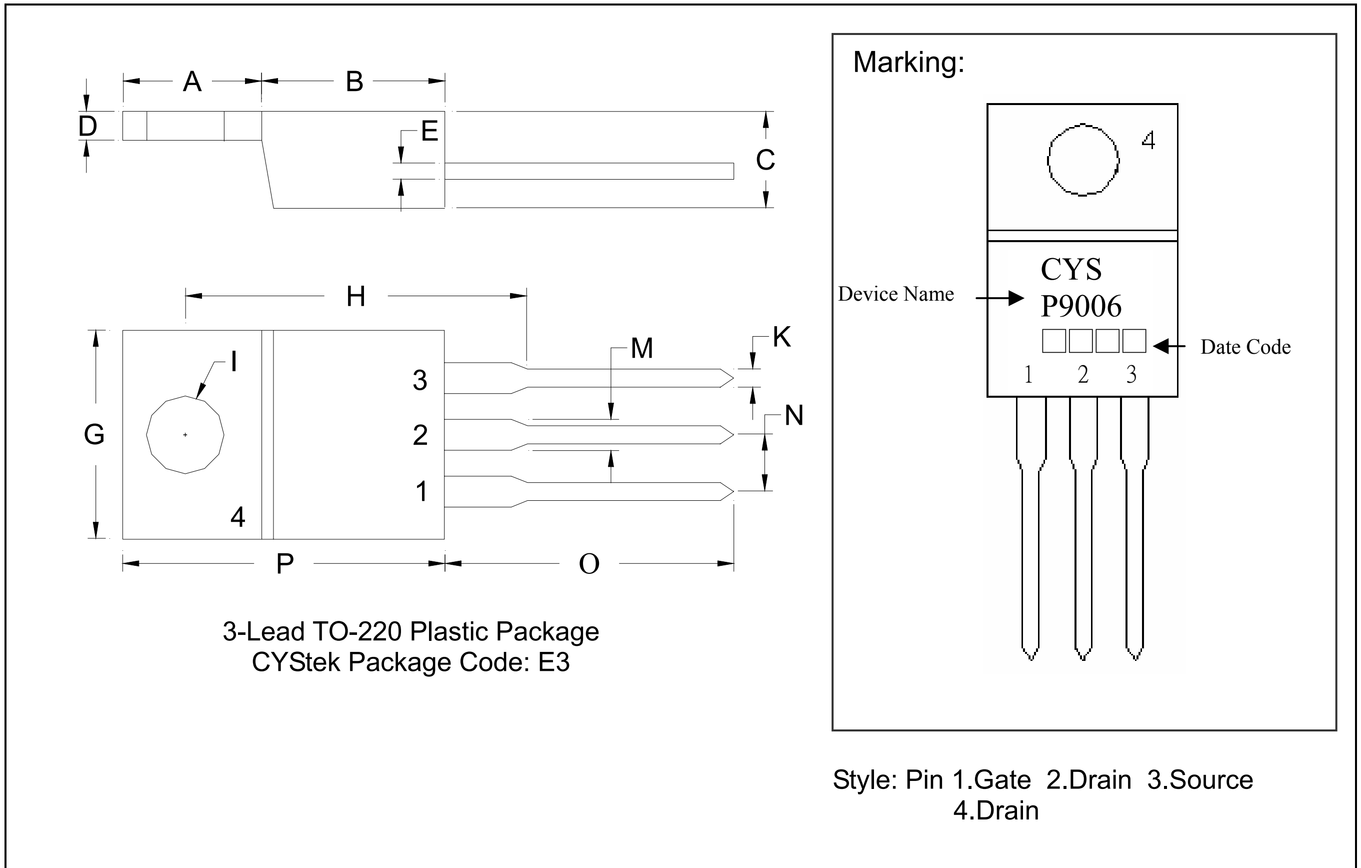
Recommended temperature profile for IR reflow



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	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: KFC ; pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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