N-Channel Logic Level Enhancement Mode Power MOSFET

MTN6515H8

BV_{DSS}	150V
I_D	20A
$R_{DSON(max)}$	65mΩ

Description

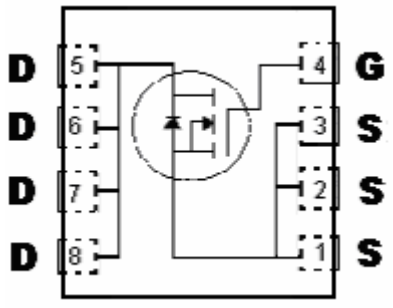
The MTN6515H8 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.

Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Dynamic dv/dt rating
- Repetitive Avalanche Rated
- Pb-free lead plating package

Symbol

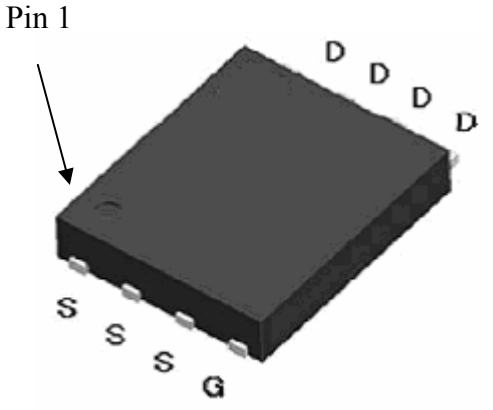
MTN6515H8



G：Gate
D：Drain
S：Source

Outline

Power pak (EDFN5×6)



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±16	
Continuous Drain Current @ T_C=25°C		I_D	20	A
Continuous Drain Current @ T_C=100°C			15	
Pulsed Drain Current		I_{DM}	80 *1	
Avalanche Current		I_{AS}	20	
Avalanche Energy @ L=0.1mH, I_D=10A, R_G=25Ω		E_{AS}	5	mJ
Repetitive Avalanche Energy @ L=0.05mH		E_{AR}	2.5 *2	
Total Power Dissipation	T_C=25℃	P_D	60	W
	T_C=100℃		32	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+175	°C

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	$R_{th,j-a}$	50 *3	°C/W

Note : 1. Pulse width limited by maximum junction temperature
2. Duty cycle≤1%
3. Surface mounted on 1 in² copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad

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

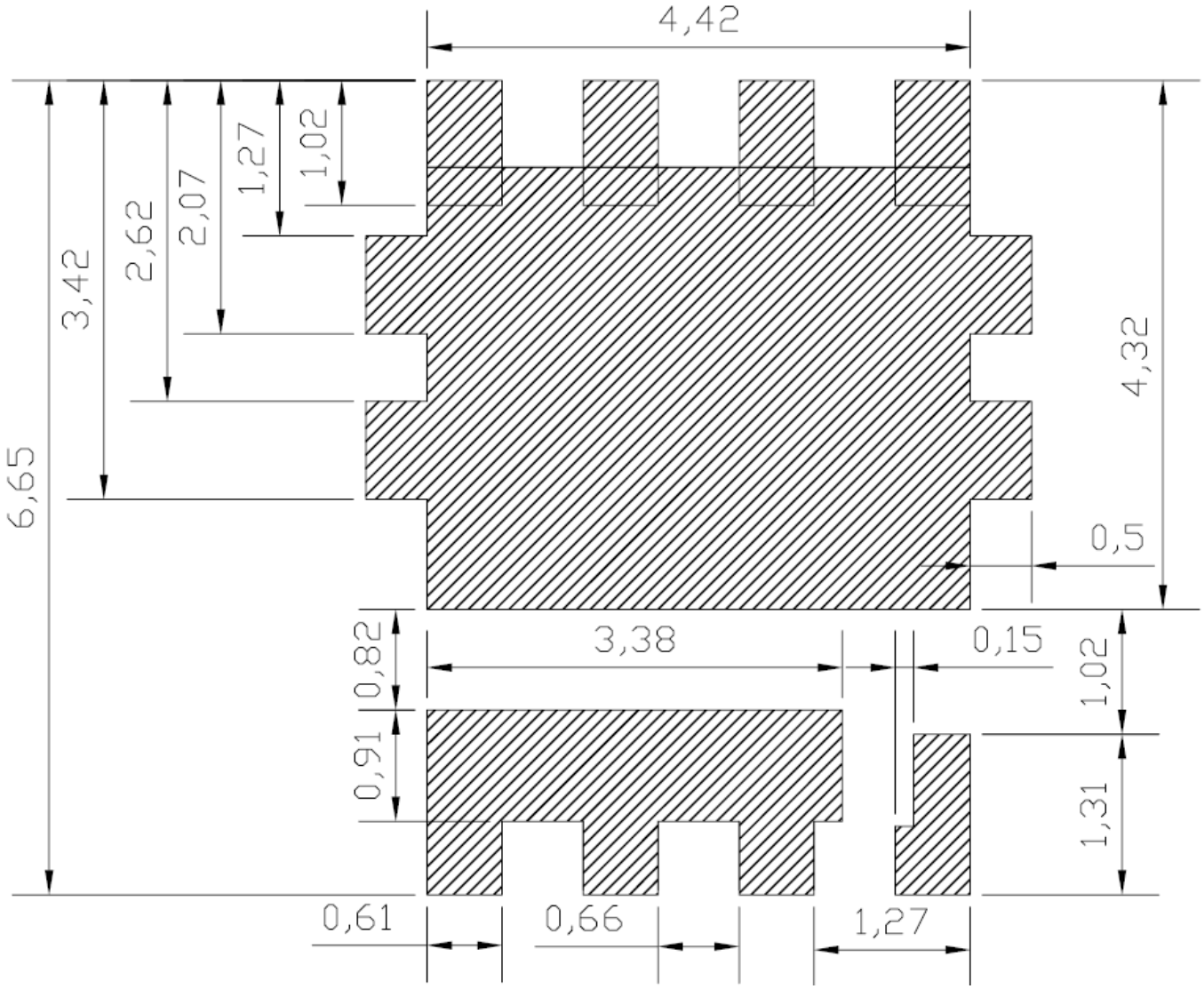
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
$V_{GS(th)}$	0.45	0.75	1.20	V	V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±12, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS} =120V, V_{GS} =0
	-	-	25		V_{DS} =100V, V_{GS} =0, T_J=125°C
$I_{D(ON)}$ *1	20	-	-	A	V_{DS} =10V, V_{GS} =10V
$R_{DS(ON)}$ *1	-	40	55	mΩ	V_{GS} =10V, I_D=15A
	-	50	65		V_{GS} =5V, I_D=10A
	-	60	75		V_{GS} =3V, I_D=3A
G_{FS} *1	-	25	-	S	V_{DS} =5V, I_D=10A
Dynamic					
Ciss	-	7660	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	725	-		
Crss	-	420	-		

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg *1, 2	-	107	-	nC	I_D=10A, V_{DS}=80V, V_{GS}=5V
Qgs *1, 2	-	18	-		
Qgd *1, 2	-	60	-		
$t_{d(ON)}$ *1, 2	-	20	-	ns	V_{DS}=75V, I_D=1A, V_{GS}=4.5V, R_G=6Ω
tr *1, 2	-	115	-		
$t_{d(OFF)}$ *1, 2	-	330	-		
t_f *1, 2	-	380	-		
Source-Drain Diode					
I_S *1	-	-	20	A	
I_{SM} *3	-	-	80		
V_{SD} *1	-	-	1.3	V	I_F=I_S, V_{GS}=0V
trr	-	60	-	ns	I_F=20A, dI_F/dt=100A/μs
Qrr	-	130	-	nC	

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

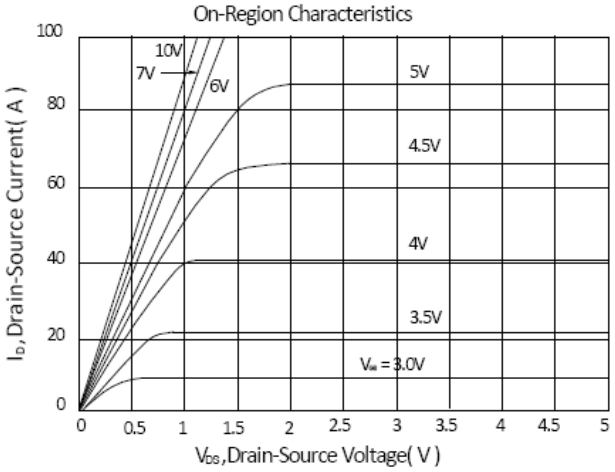
Recommended Soldering Footprint



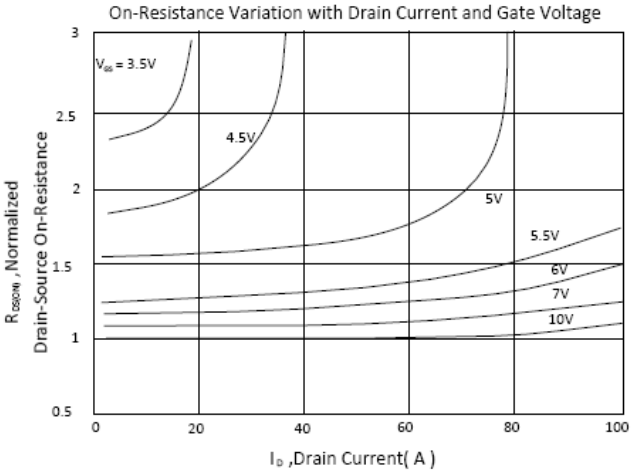
unit : mm

Typical Characteristics

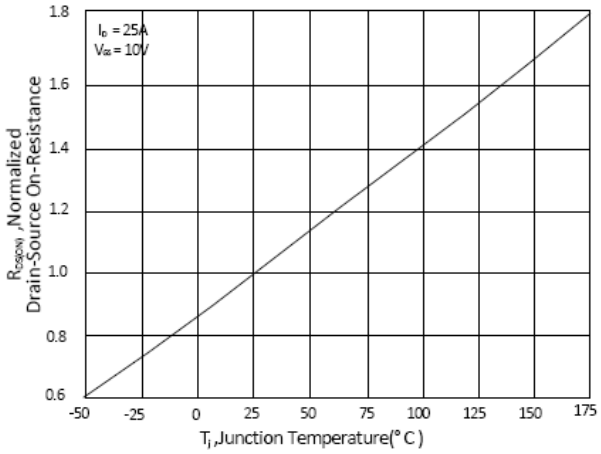
On-Region Characteristics



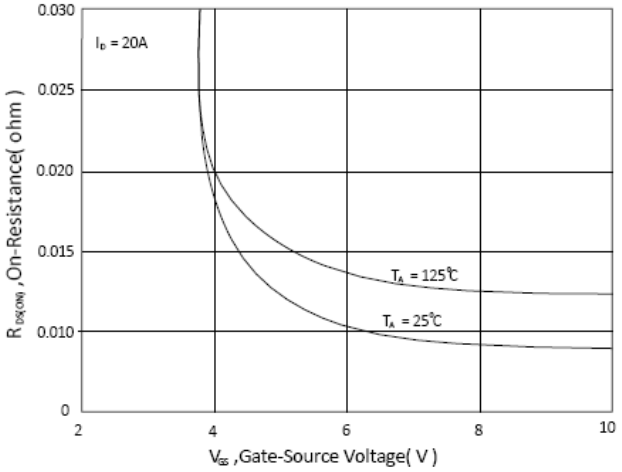
On-Resistance Variation with Drain Current and Gate Voltage



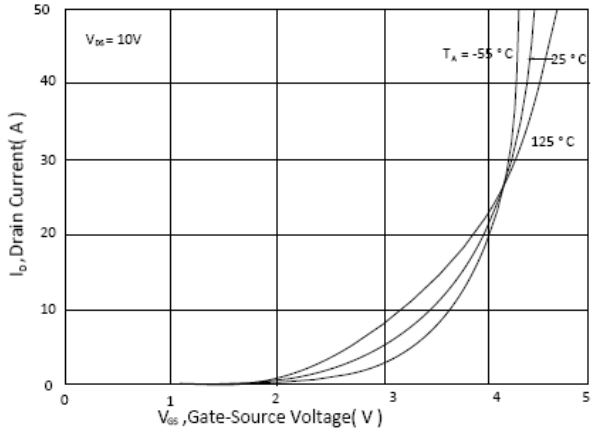
On-Resistance Variation with Temperature



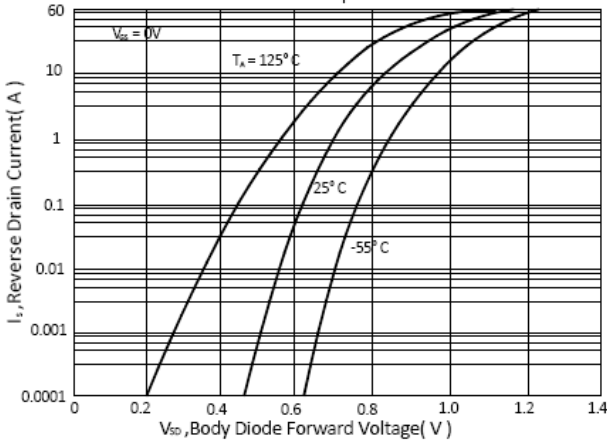
On-Resistance Variation with Gate-Source Voltage



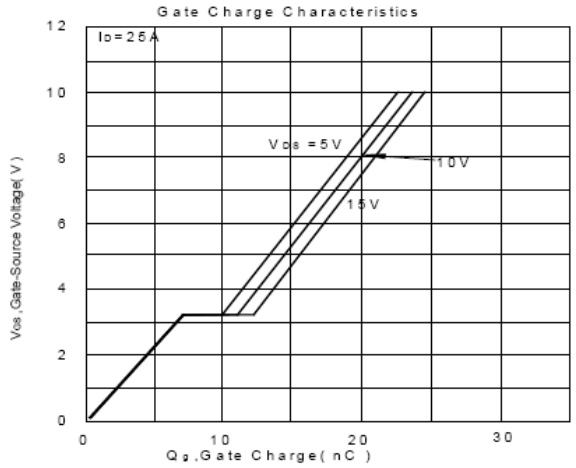
Transfer Characteristics

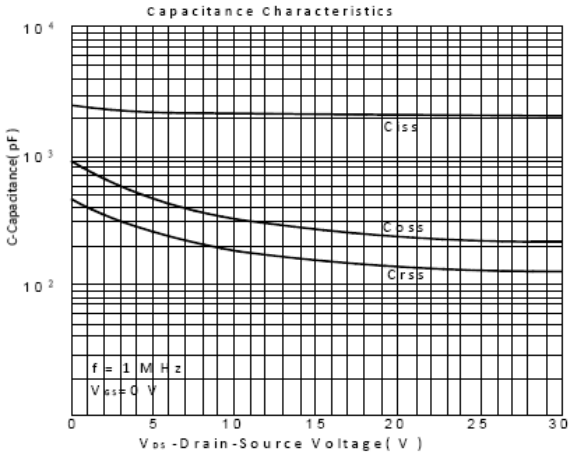


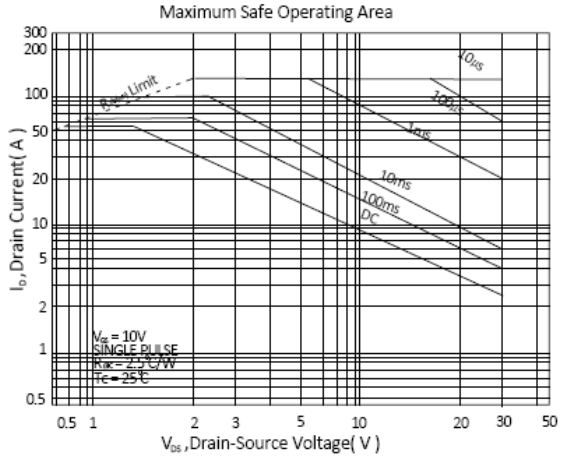
Body Diode Forward Voltage Variation with Source Current and Temperature

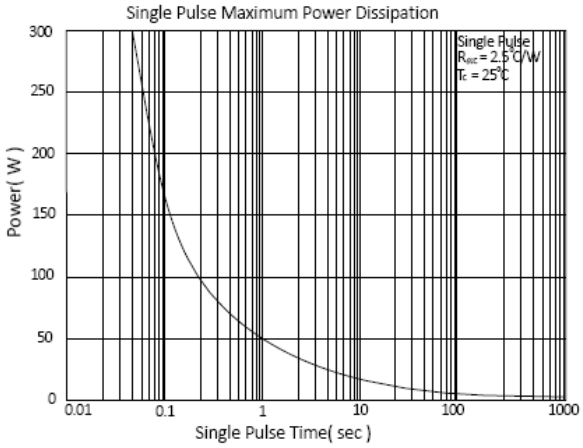


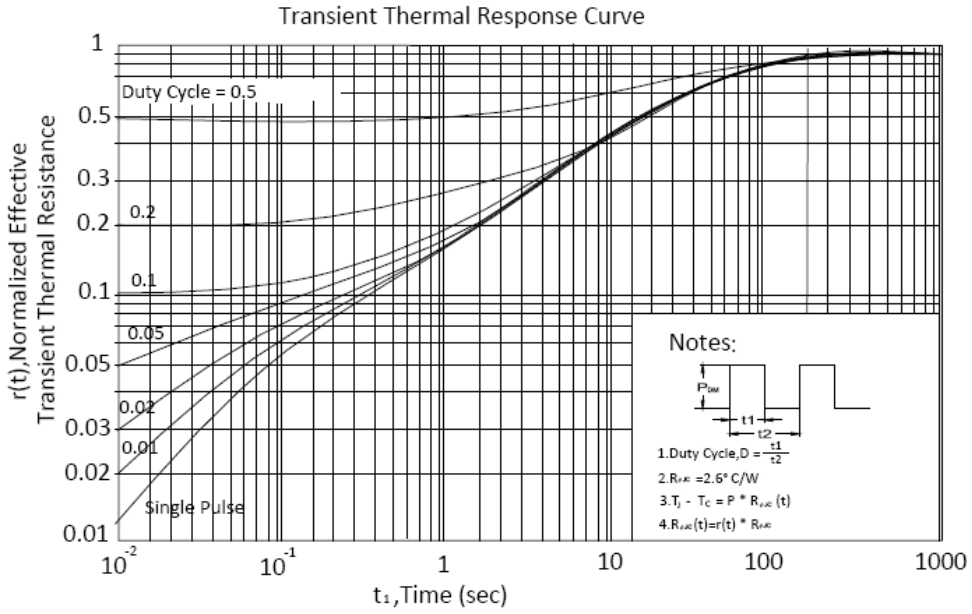
Typical Characteristics(Cont.)







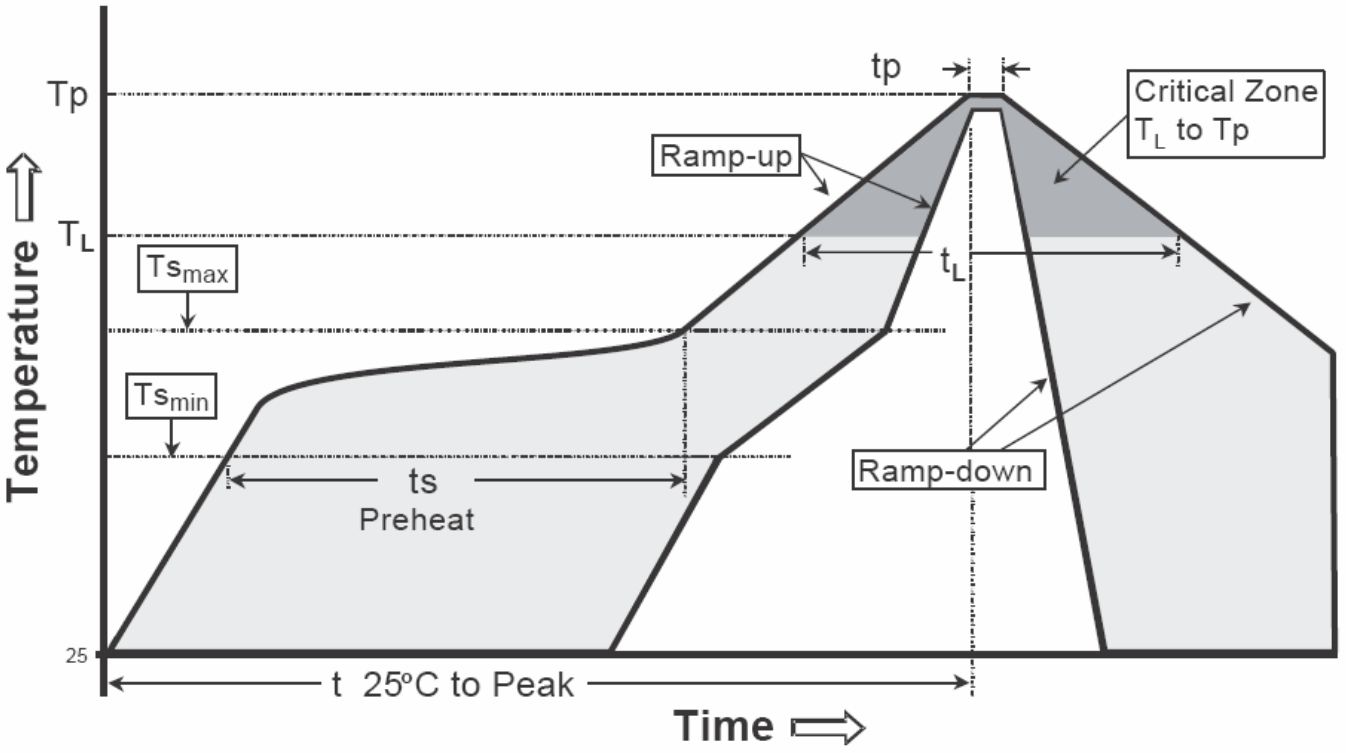




Recommended wave soldering condition

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

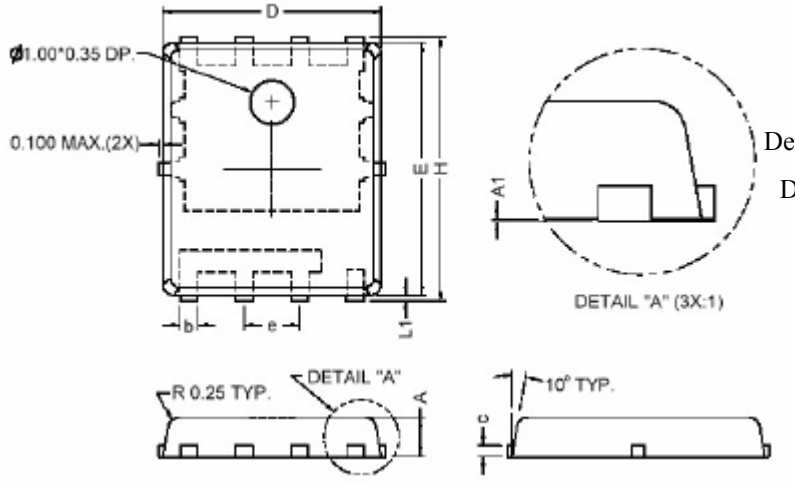
Recommended temperature profile for IR reflow

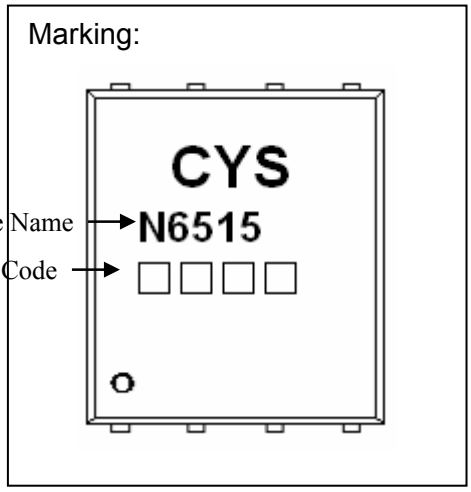


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(TP)	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.

Power pak (EDFN5x6) Dimension





8-Lead power pak Plastic Package
CYStek Package Code: H8

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0315	0.0394	0.80	1.00	E	0.2253	0.2332	5.70	5.90
A1	0.0000	0.0020	0.00	0.05	e			1.27 BSC	
b	0.0138	0.0194	0.35	0.49	H	0.2352	0.2431	5.95	6.15
c	0.0089	0.0112	0.224	0.284	L1	0.0040	0.0198	0.10	0.50
D	0.1937	0.2016	4.90	5.10					

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