

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage	-40	V	
V _{GSS}	Gate-Source Voltage	20	V	
T _J	Junction Temperature Range	-55 to 175	°C	
T _{STG}	Storage Temperature Range		°C	
I _S	Source Current-Continuous(Body Diode)	Tc=25°C	-80	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	-240	A
I _D	Continuous Drain Current	Tc=25°C	-80	A
		Tc=100°C	-56	A
P _D	Maximum Power Dissipation	Tc=25°C	118	W
		Tc=100°C	59	W

R

Electrical Characteristics (Cont.) (T_c =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYA090P04LQ1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=500KHz	-	4.6	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-25V, Frequency=500kHz	-	3314	-	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, R _G =2.5 I _{DS} =-20A, V _{GS} =-10V	-	9.9	-	ns
T _r	Turn-on Rise Time					
t _{d(OFF)}	Turn-off Delay Time					
T _f	Turn-off Fall Time					
Gate Charge Characteristics						
Q _g	Total Gate Charge(V _{GS} =-10V)	V _{DS} =-32V, I _{DS} =-20A	-	76	-	nC
	Total Gate Charge(V _{GS} =-4.5V)			39		
Q _{gs}	Gate-Source Charge		-	11	-	
Q _{gd}	Gate-Drain Charge		-	21	-	
V _{plateau}	Gate plateau voltage		-	-3.2	-	V

Note: *Pulse test pulse width 300us duty cycle 2%

Typical Operating Characteristics

Figure 1: Power Dissipation

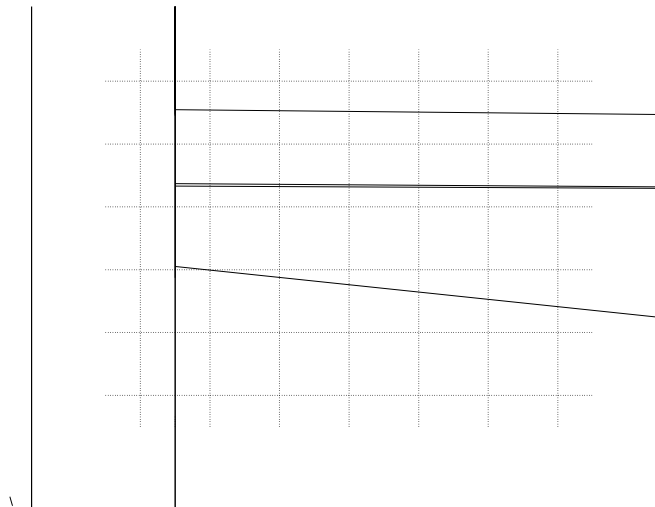


Figure 2: Drain Current

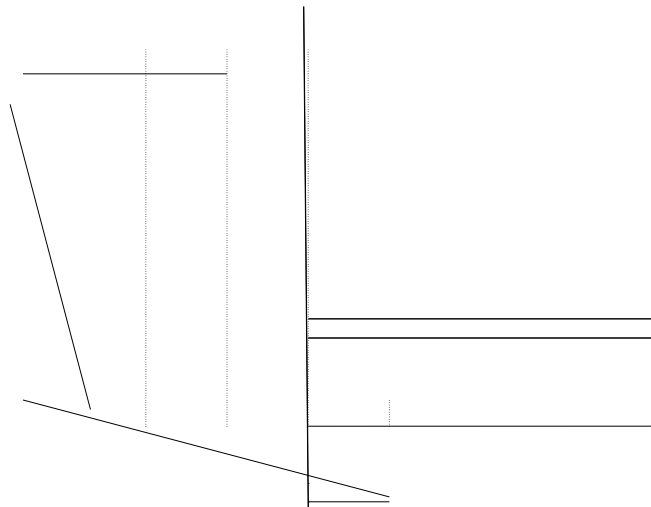


Figure 3: Safe Operation Area

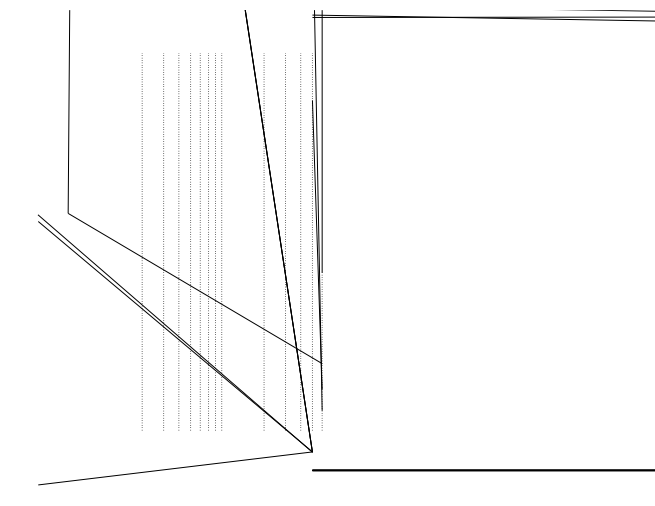


Figure 4: Thermal Transient Impedance

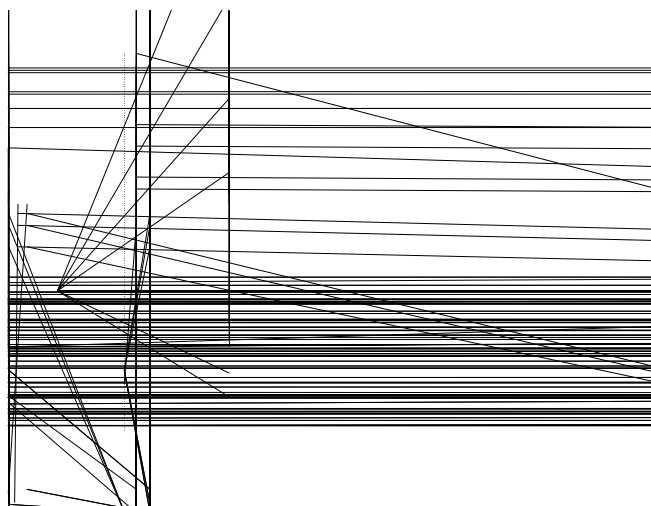


Figure 5: Output Characteristics

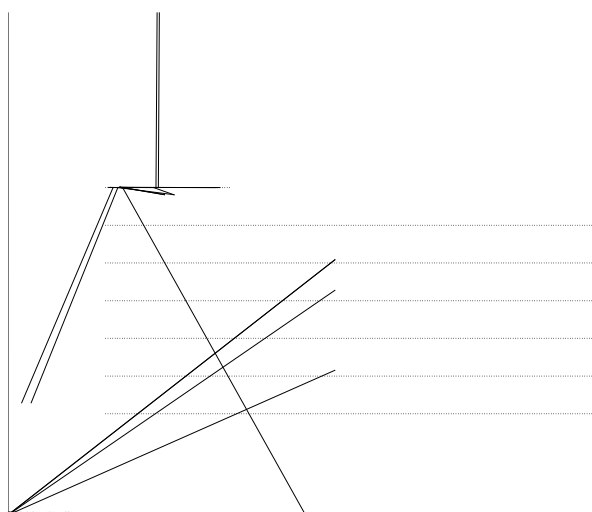
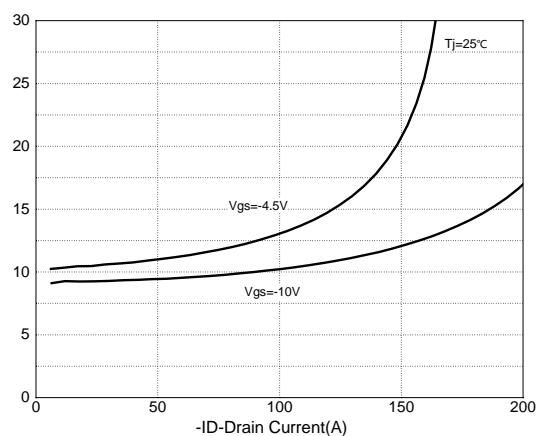


Figure 6: Drain-Source On Resistance



HYA090P04LQ1C2

Typical Operating Characteristics(Cont.)

Figure 13: Drain-Source Breakdown

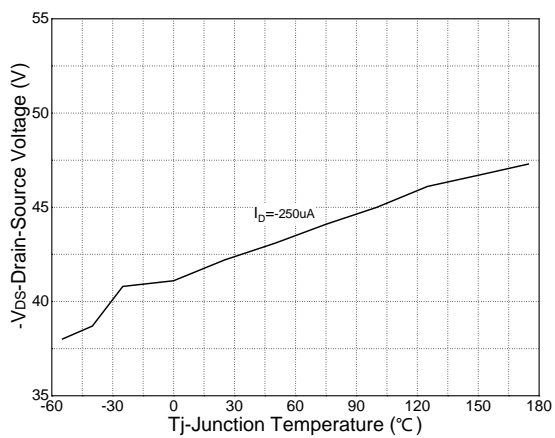


Figure 14: R_{ds(on)} vs. Gate Voltage

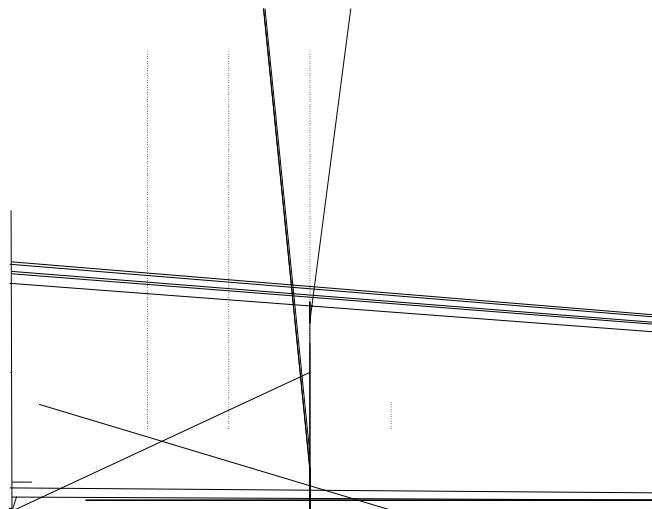
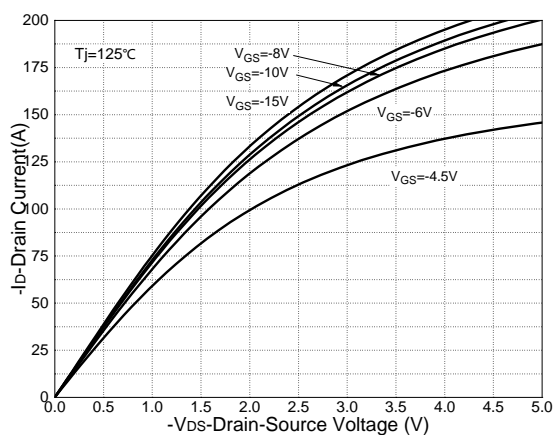
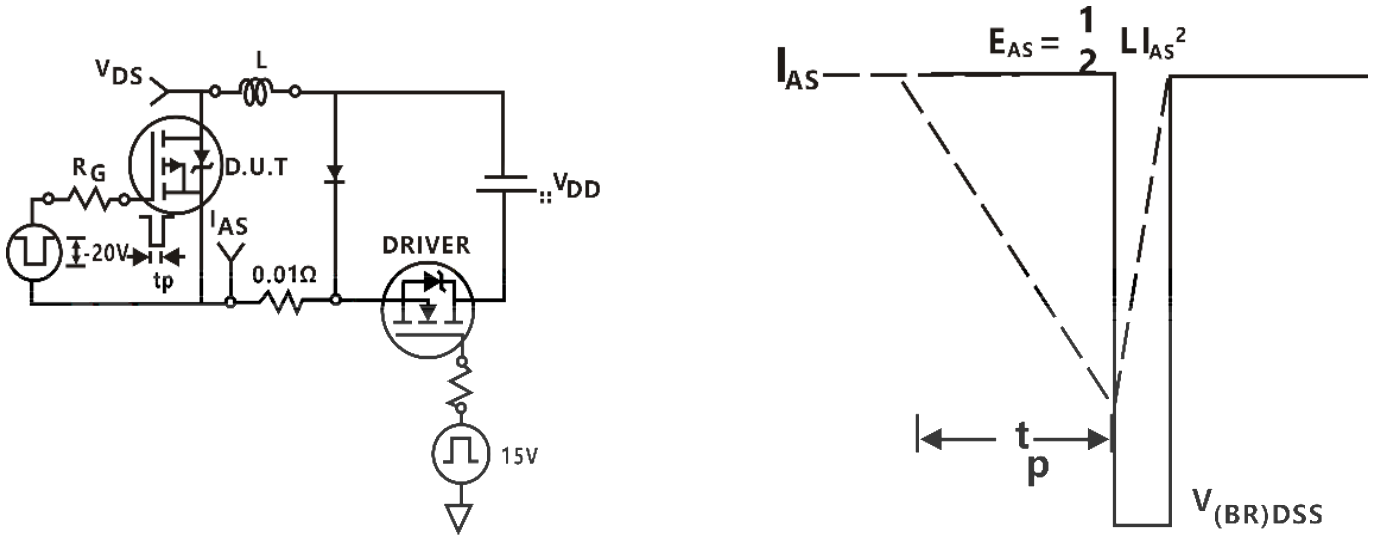


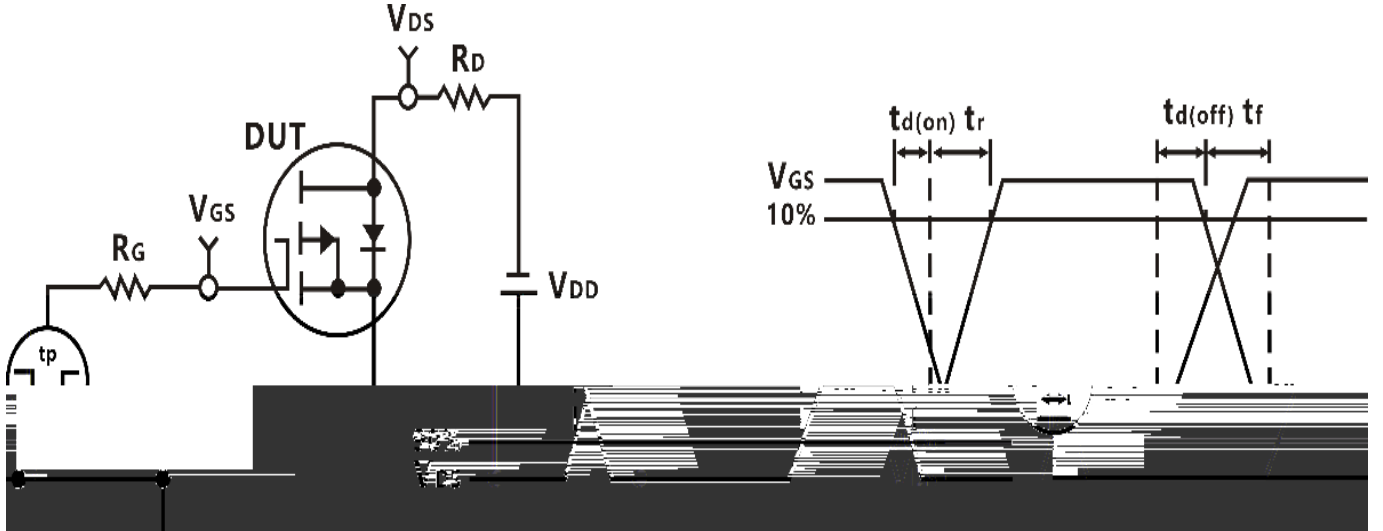
Figure 15: Output Characteristics 125



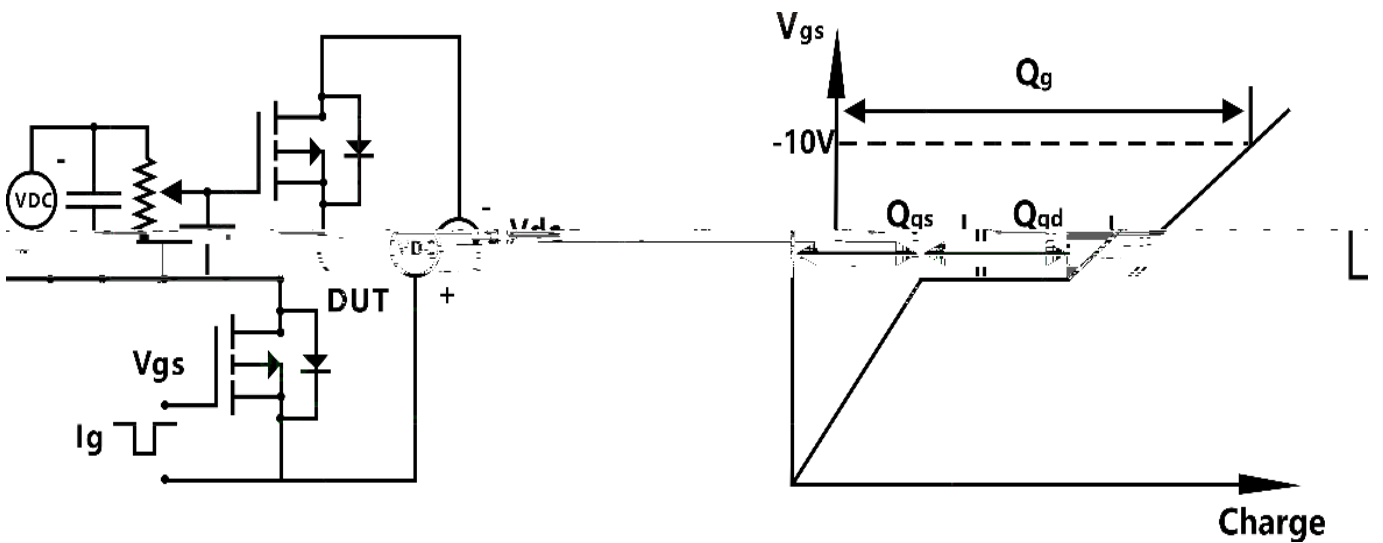
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit

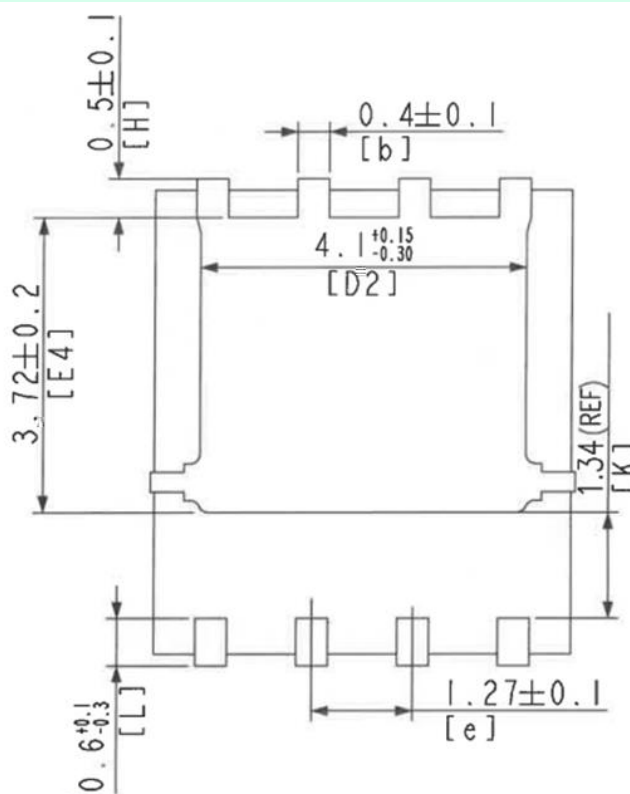
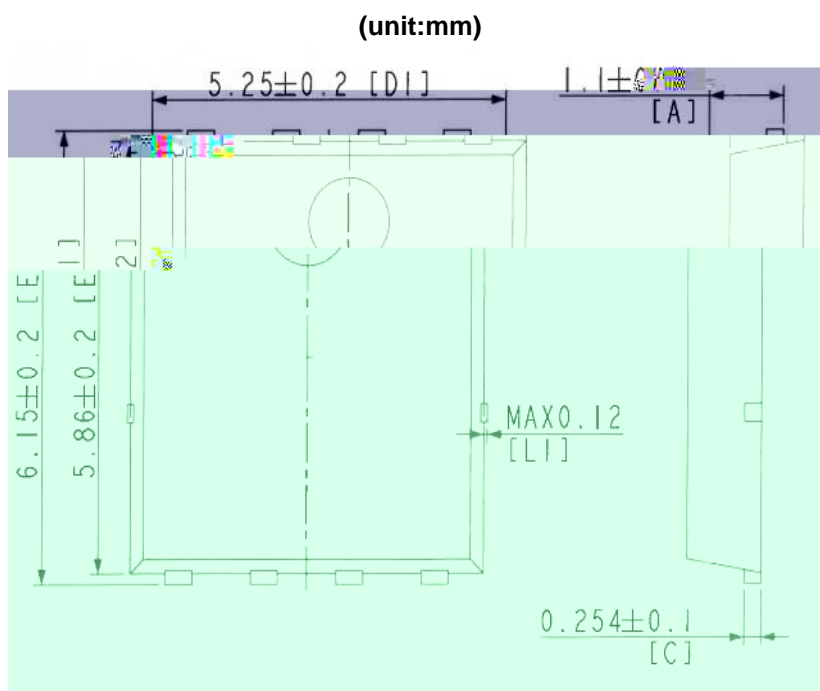


Device Per Unit

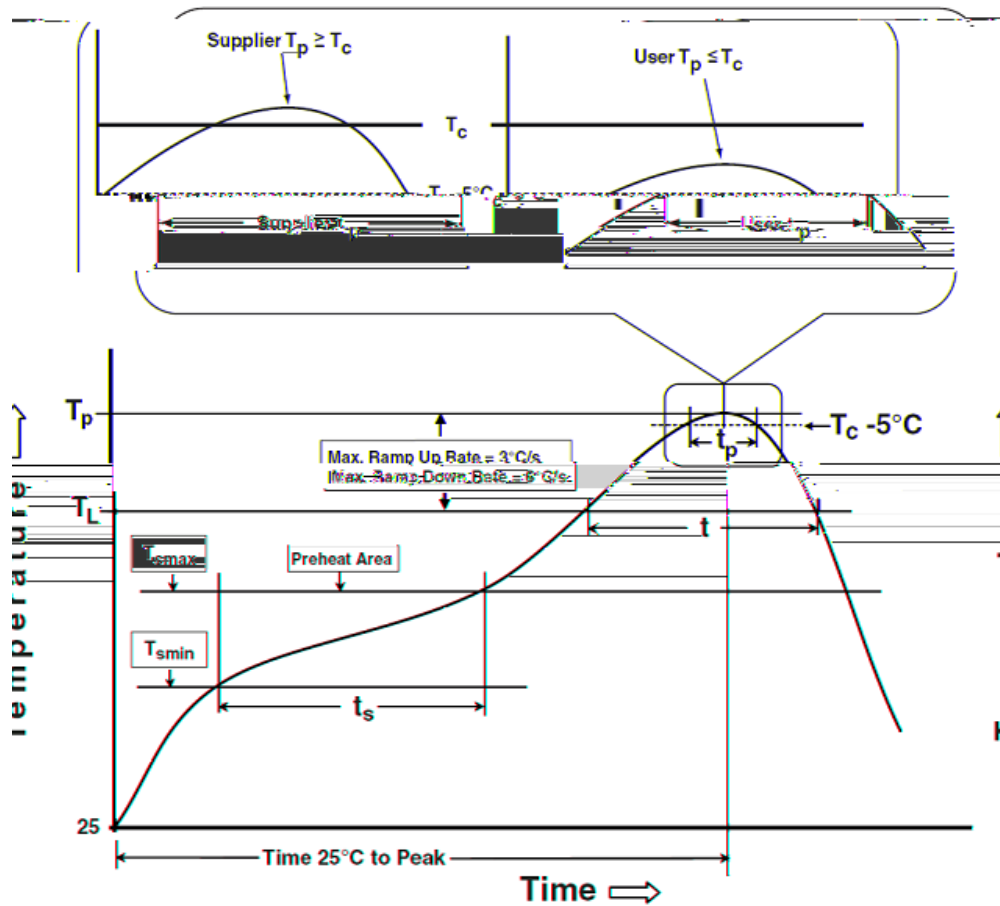
Package Type	Unit	Quantity
PDFN8L(5x6)	Reel	5000

Package Information

PDFN8L(5x6)



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})	100 °C	150 °C
Temperature max (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T_{smax} to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_l)	60-150 seconds	60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

*Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

Table 1. SnPb Eutectic Process Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350
2.5 mm	235 °C	220 °C
	220 °C	220 °C

Table 2. Pb-free Process Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350-2000	Volume mm 2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm 2.5 mm	260 °C	250 °C	245 °C
2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program