N -Channel Enhancement Mode Power MOSFET

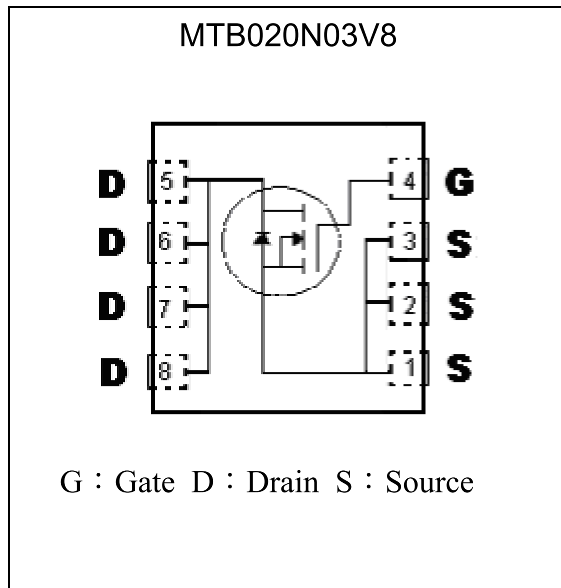
MTB020N03V8

BV_{DSS}		30V
I_D@V_{GS}=10V, T_A=25°C		10A
I_D@V_{GS}=10V, T_C=25°C		18A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=10A	14.0mΩ
	V_{GS}=4.5V, I_D=8A	17.5mΩ

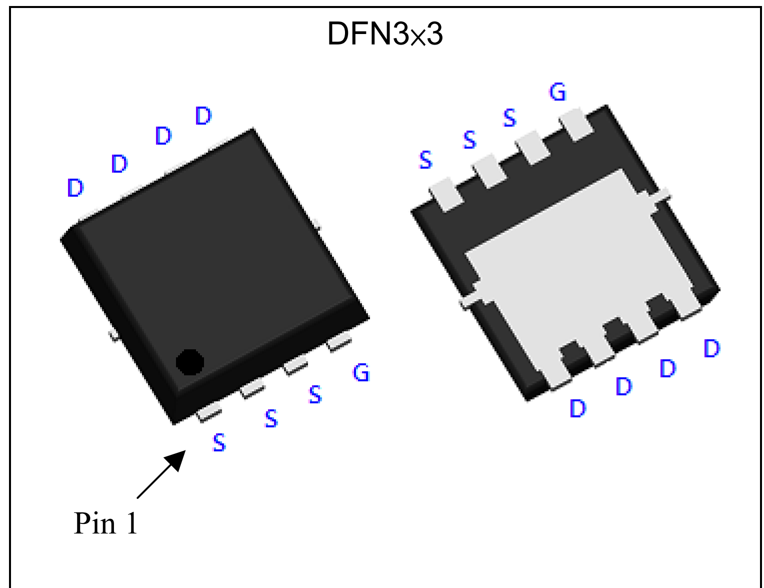
Features

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

Equivalent Circuit

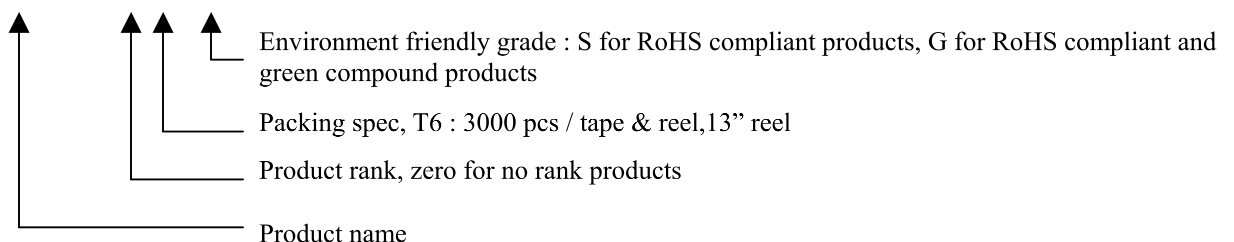


Outline



Ordering Information

Device	Package	Shipping
MTB020N03V8-0-T6-G	DFN3x3 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C	I_D	18	A
Continuous Drain Current @ V_{GS}=10V, T_C=100°C		11.4	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C		10	
Continuous Drain Current @ V_{GS}=10V, T_A=70°C		8	
Pulsed Drain Current *1	I_{DM}	72	
Single Pulse Avalanche Current	I_{AS}	18	
Single Pulse Avalanche Current @ L=0.1mH, V_{GS}=10V, V_{DD}=15V *2	E_{AS}	16.2	mJ
Total Power Dissipation @T_C=25℃	P_D	8	W
Total Power Dissipation @T_A=25℃		2.5	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. 100% tested by conditions of L=0.1mH, I_{AS}=6A, V_{GS}=10V, V_{DD}=15V

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	16	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	50 *	

* Surface mounted on a 1 in² pad of 2oz copper.

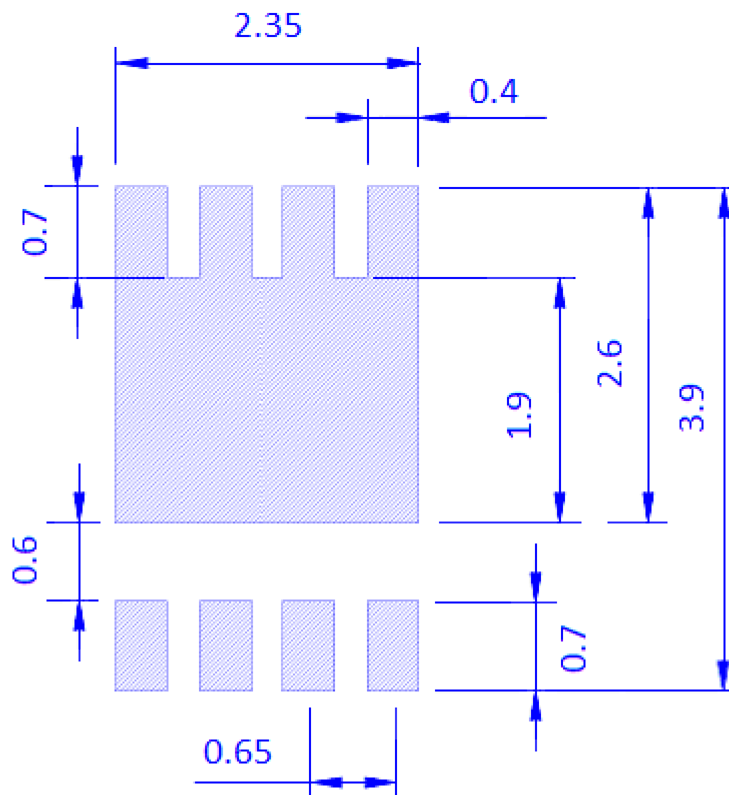
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.02	-	V/℃	Reference to 25℃, I_D=1mA
$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
	-	-	25		V_{DS}=24V, V_{GS}=0V, Tj=125℃
*$R_{DS(ON)}$	-	14	18	mΩ	I_D=10A, V_{GS}=10V
	-	17.5	25		I_D=8A, V_{GS}=4.5V
*G_{FS}	-	3.8	-	S	V_{DS}=10V, I_D=1A
Dynamic					
Ciss	-	492	-	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
Coss	-	67	-		
Crss	-	49	-		
$t_{d(ON)}$	-	5.8	-	ns	V_{DS}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω
t_r	-	16.6	-		
$t_{d(OFF)}$	-	31.2	-		
t_f	-	7.6	-		

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg	-	12.6	-	nC	V_{DS}=15V, I_D=10A, V_{GS}=10V
Qgs	-	1.8	-		
Qgd	-	2.7	-		
Source Drain Diode					
*I_S	-	-	4	A	
*I_{SM}	-	-	16		
*V_{SD}	-	0.79	1.2	V	I_S=2.3A,V_{GS}=0V
*T_{rr}	-	7.4	-	ns	I_F=4A,V_{GS}=0V, dI_F/dt=100A/μs
Q_{rr}	-	3	-	nC	

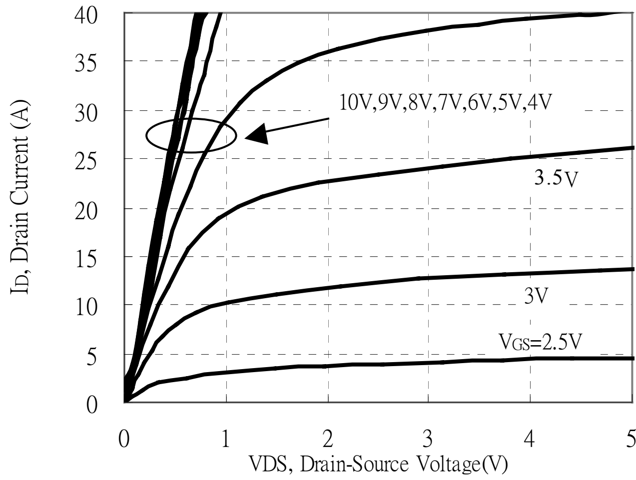
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

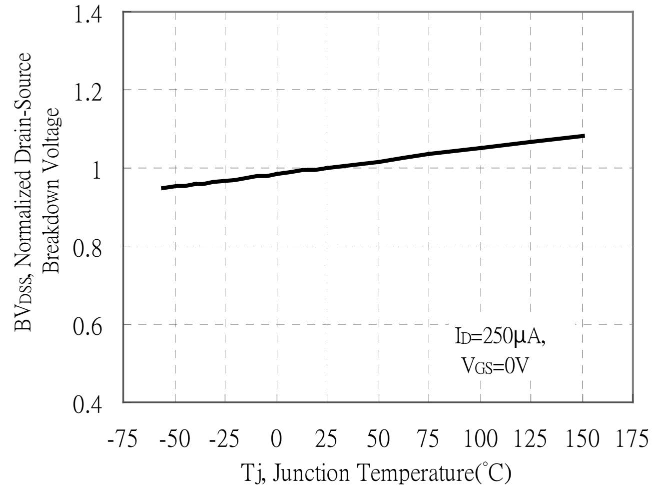
Recommended Soldering Footprint

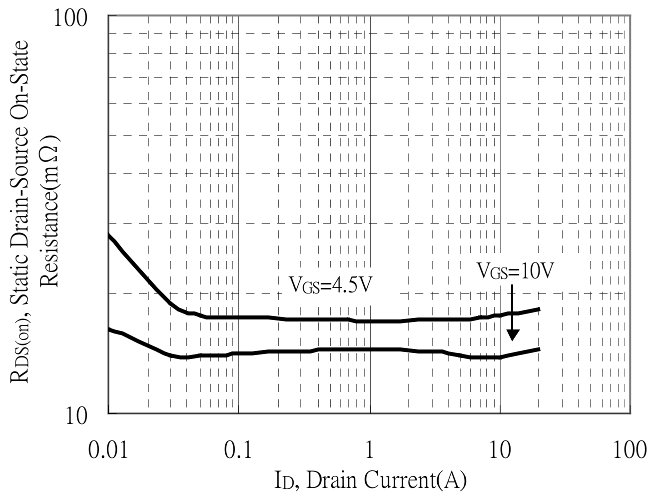


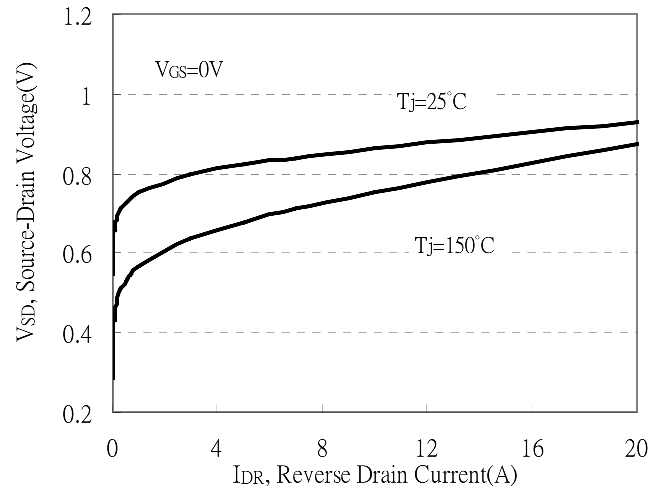
unit : mm

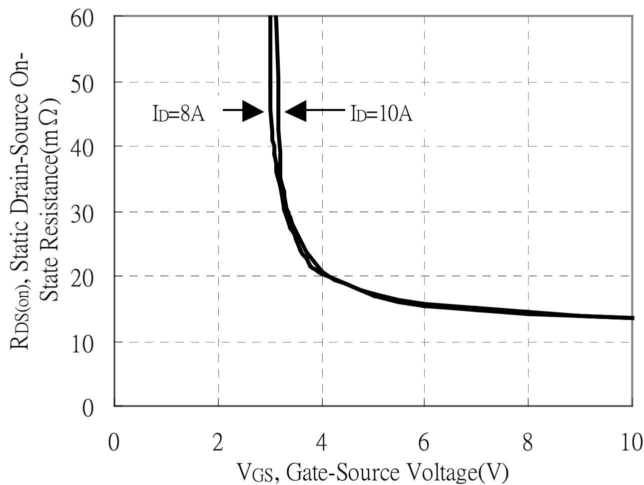
Typical Characteristics

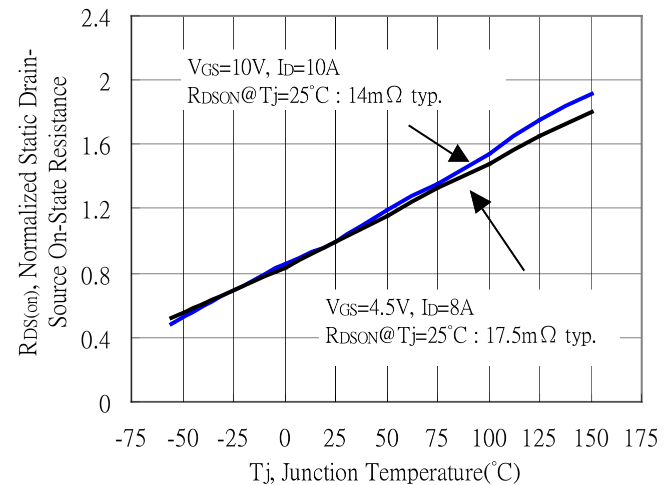




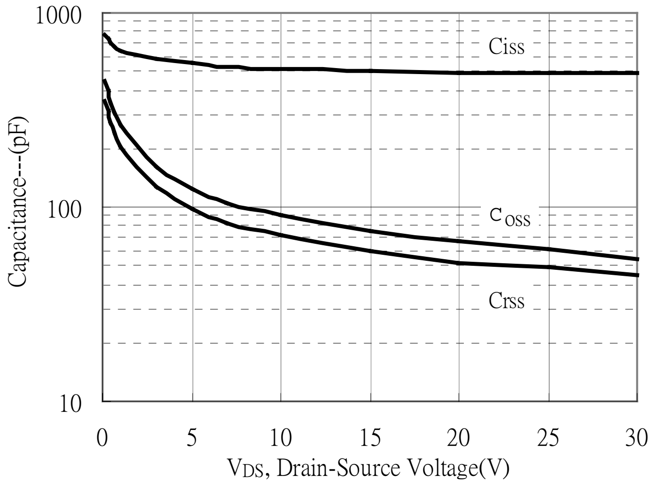


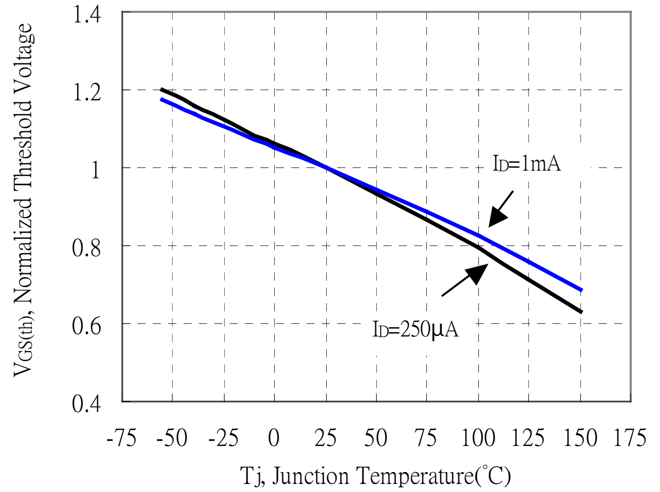


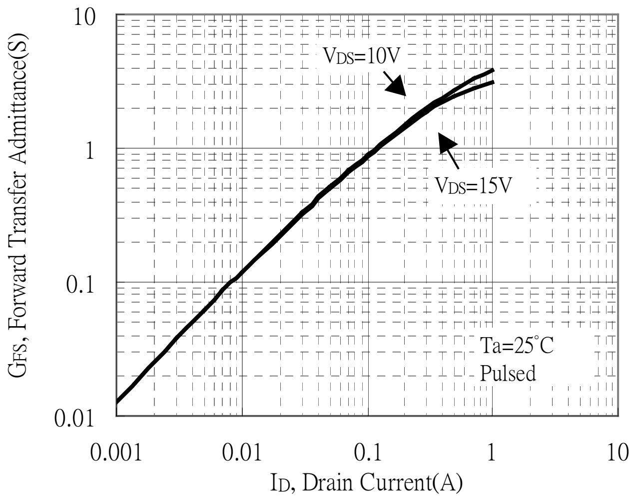


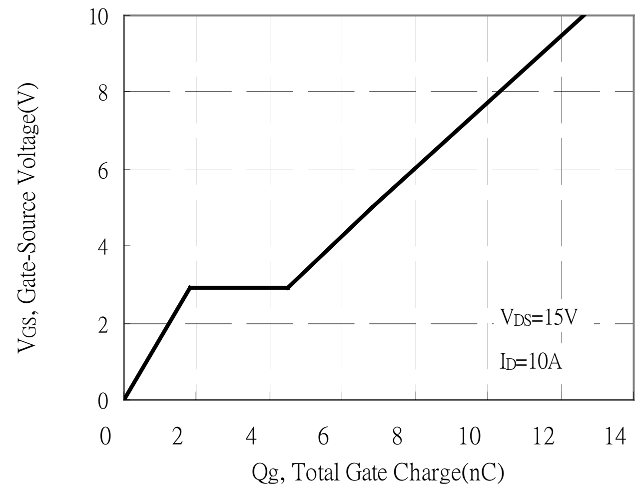


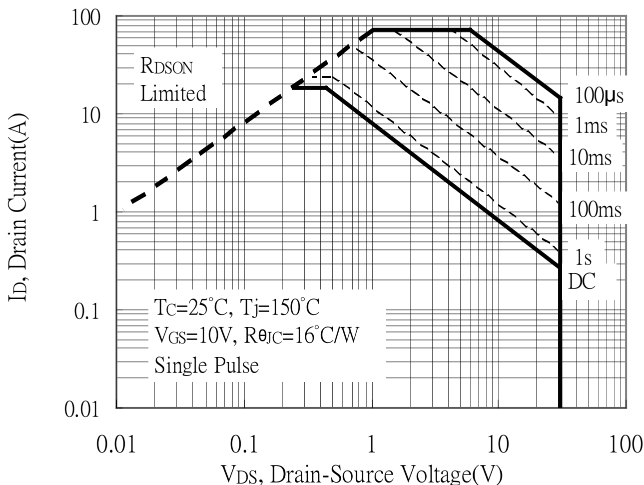
Typical Characteristics(Cont.)

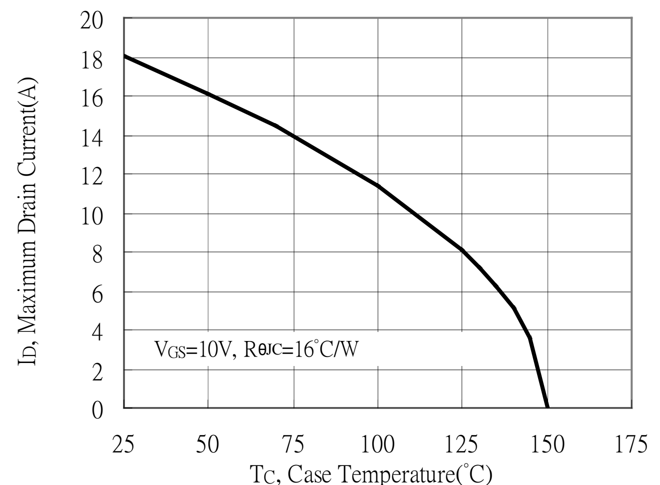




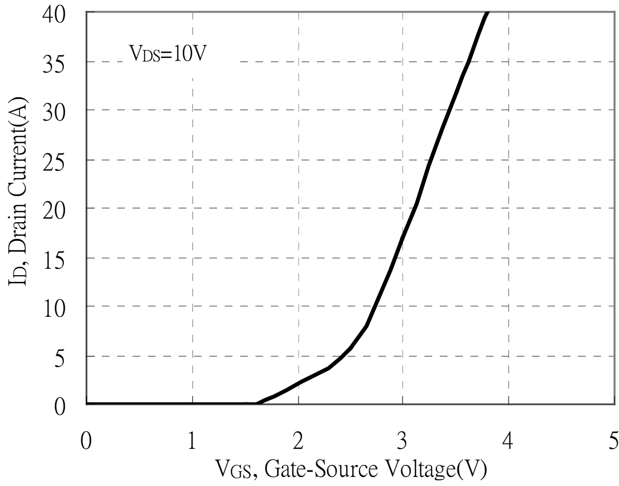


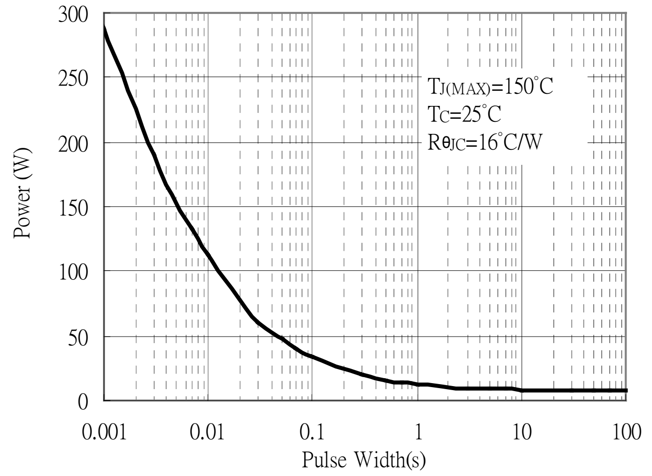


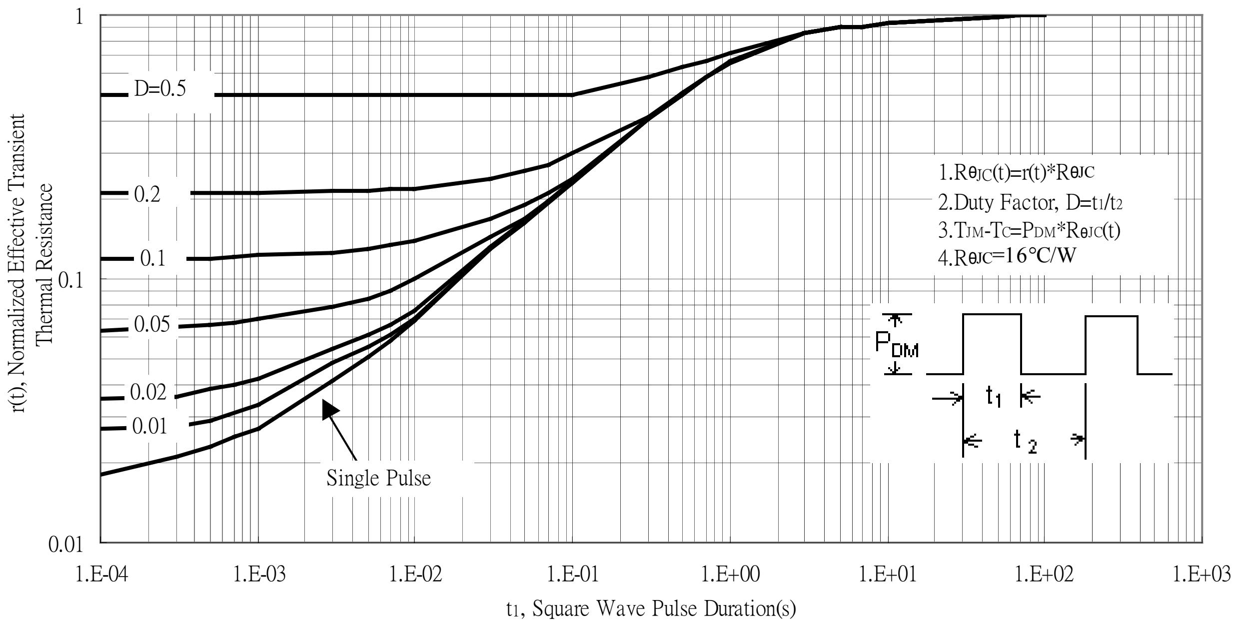




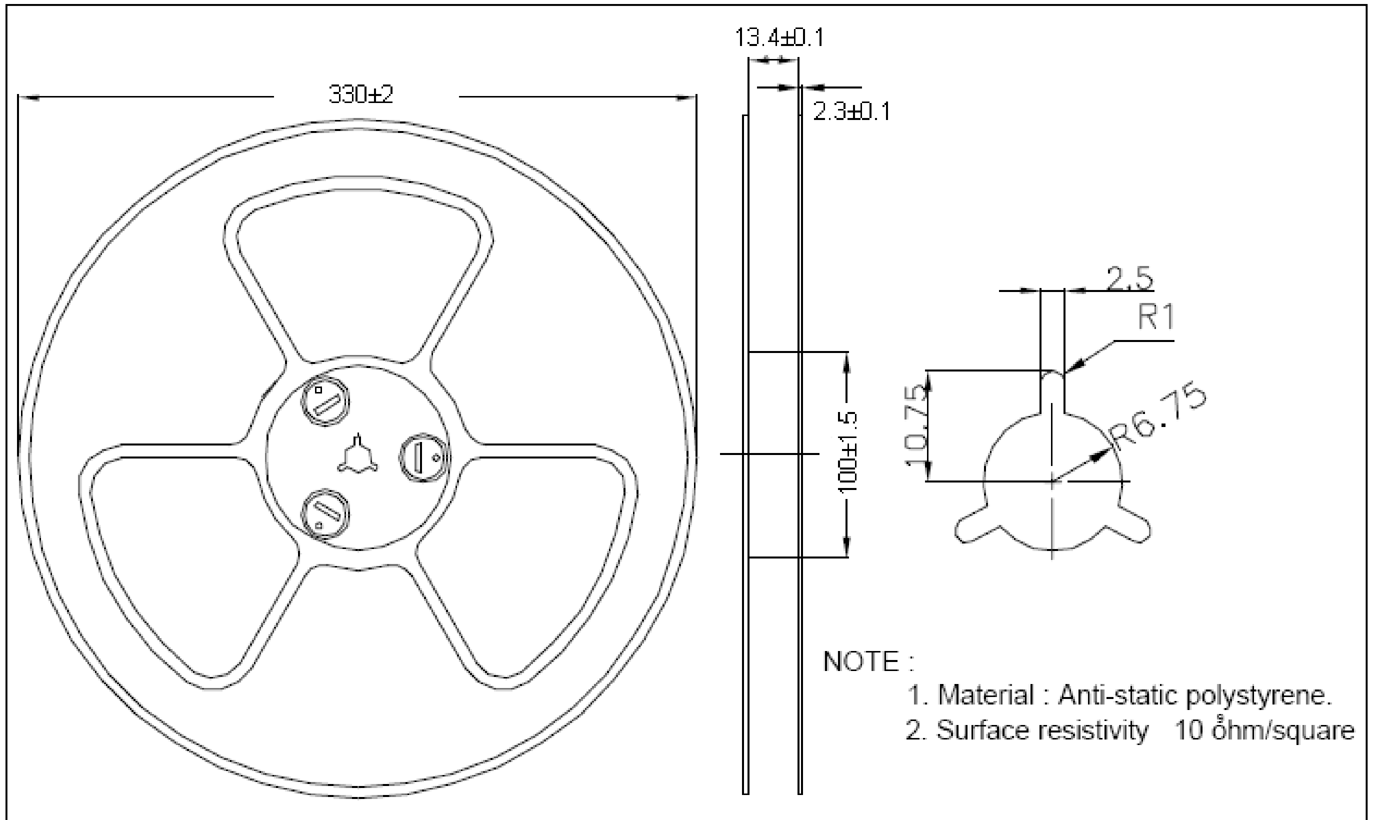
Typical Characteristics(Cont.)



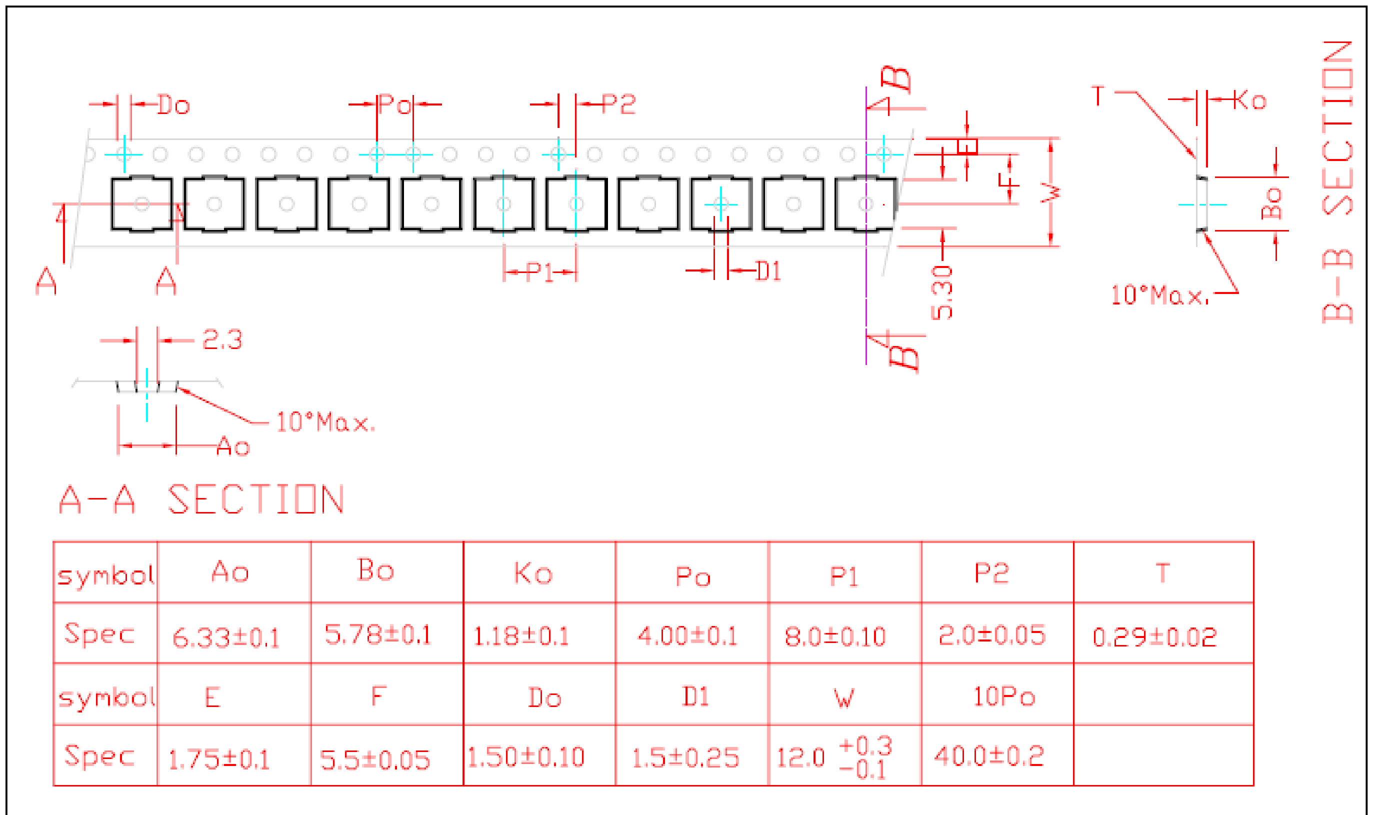




Reel Dimension



Carrier Tape Dimension

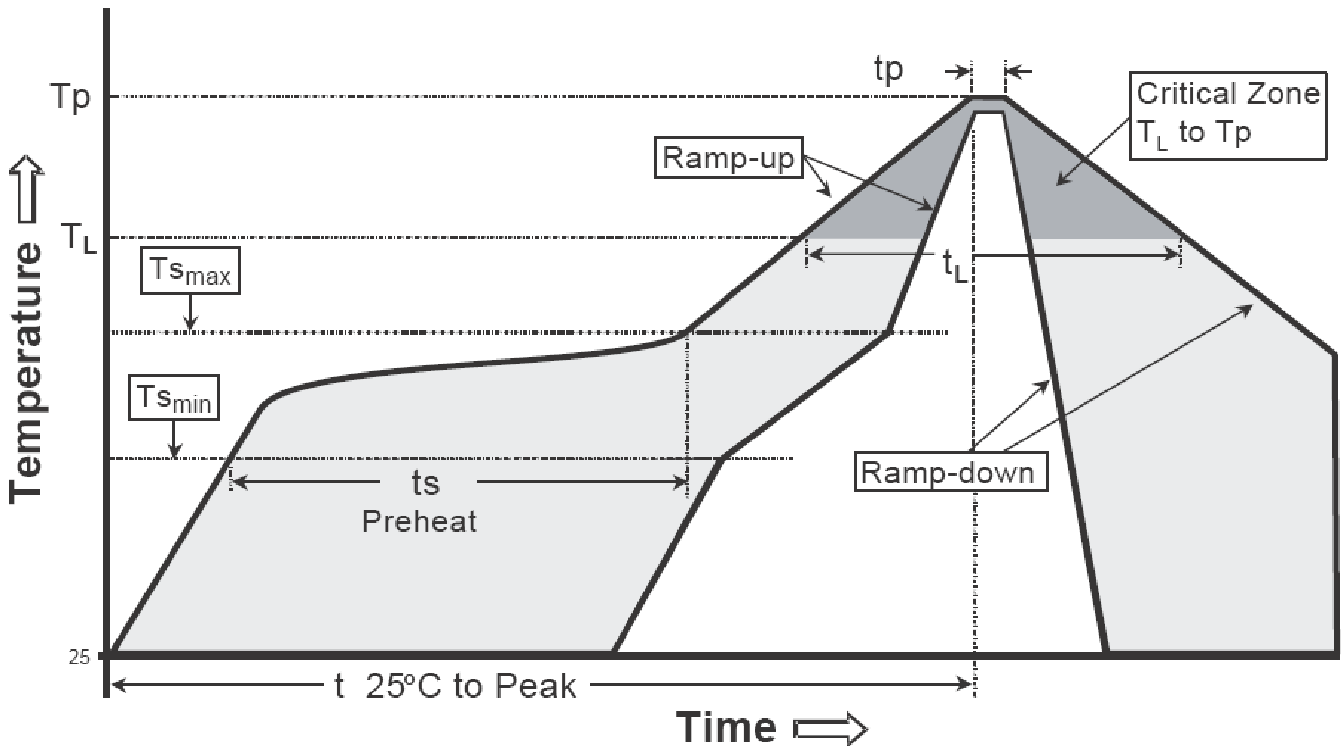


symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.33±0.1	5.78±0.1	1.18±0.1	4.00±0.1	8.0±0.10	2.0±0.05	0.29±0.02
symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.50±0.10	1.5±0.25	12.0 +0.3 −0.1	40.0±0.2	

Recommended wave soldering condition

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

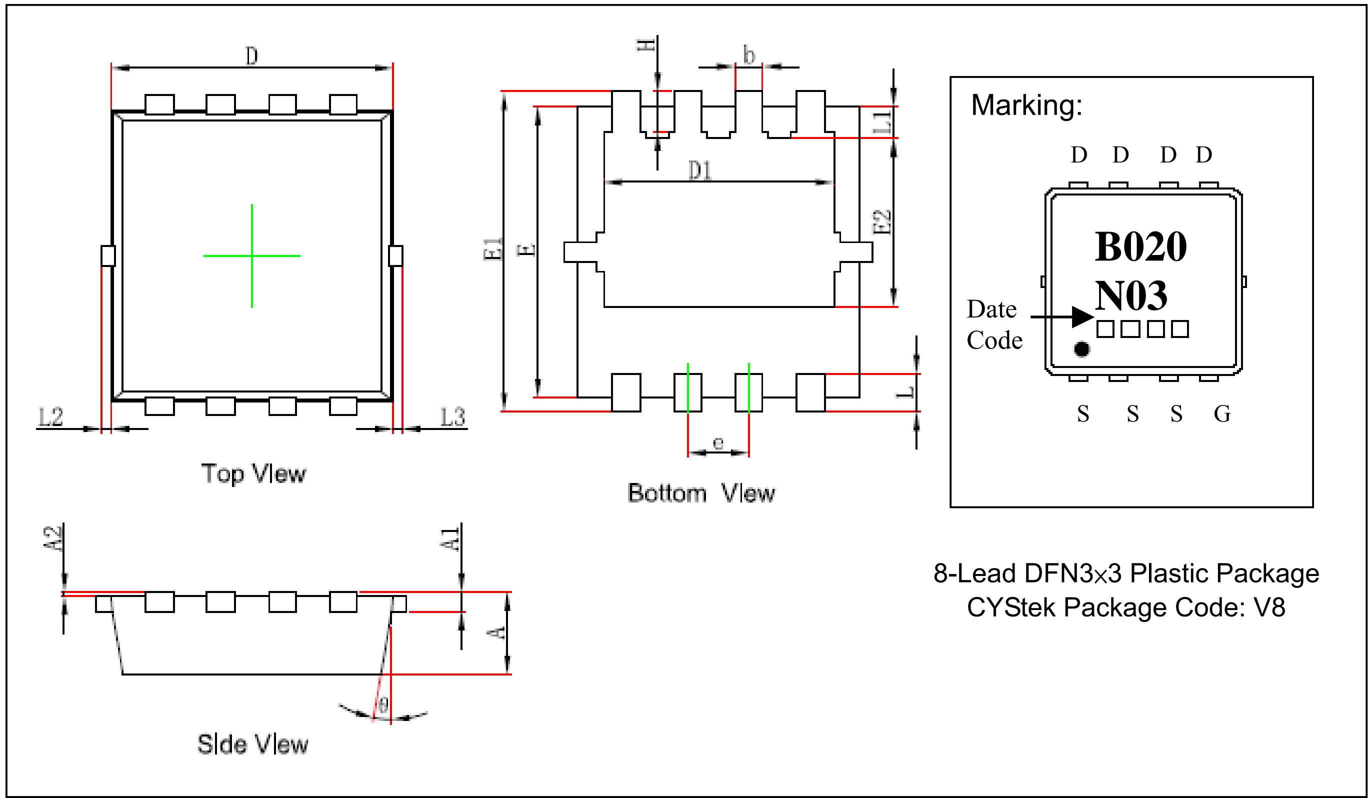
Recommended temperature profile for IR reflow



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.

DFN3x3 Dimension



8-Lead DFN3x3 Plastic Package
CYStek Package Code: V8

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.605	0.850	0.026	0.033	b	0.200	0.400	0.008	0.016
A1	0.152 REF		0.006 REF		e	0.550	0.750	0.022	0.030
A2	0.000	0.050	0.000	0.002	L	0.300	0.500	0.012	0.020
D	2.900	3.100	0.114	0.122	L1	0.180	0.480	0.007	0.019
D1	2.300	2.600	0.091	0.102	L2	0.000	0.100	0.000	0.004
E	2.900	3.100	0.114	0.122	L3	0.000	0.100	0.000	0.004
E1	3.150	3.450	0.124	0.136	H	0.315	0.515	0.012	0.020
E2	1.535	1.935	0.060	0.076	θ	9°	13°	9°	13°

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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