25V N-CHANNEL Enhancement Mode MOSFET

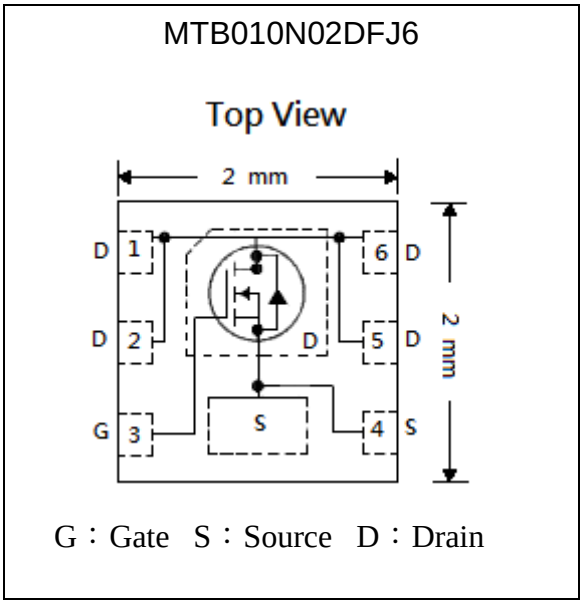
MTB010N02DFJ6

BV_{DSS}	25V
I_D@V_{GS}=10V, T_C=25°C	18.2A
I_D@V_{GS}=10V, T_A=25°C	8.8A
R_{DSON}@V_{GS}=10V, I_D=8.5A	10.9mΩ(typ.)
R_{DSON}@V_{GS}=4.5V, I_D=6.8A	15.3mΩ(typ.)

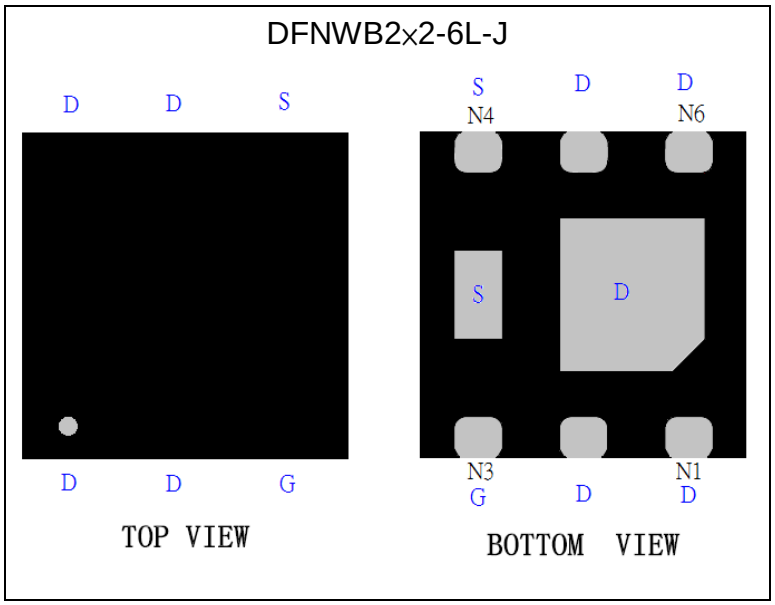
Features

- Low on-resistance
- Excellent thermal and electrical capabilities
- Pb-free lead plating and halogen-free package

Equivalent Circuit



Outline



Ordering Information

Device	Package	Shipping
MTB010N02DFJ6-0-T1-G	DFNWB2x2-6L-J (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T1 : 3000 pcs / tape & reel,7” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	25	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V (Note 3)	I_{DSM}	8.8	A
Continuous Drain Current @ T_A=70°C, V_{GS}=10V (Note 3)		7.0	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V	I_D	18.2	
Continuous Drain Current @ T_C=70°C, V_{GS}=10V		14.6	
Pulsed Drain Current (Note 1, 2)	I_{DM}	72	
Power Dissipation @ T_A=25℃ (Note 3)	P_{DSM}	2.1	W
Power Dissipation @ T_A=70℃ (Note 3)		1.3	
Power Dissipation @ T_C=25℃	P_D	8.9	
Power Dissipation @ T_C=70℃		5.7	
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	14	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	60 (Note 3)	

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.

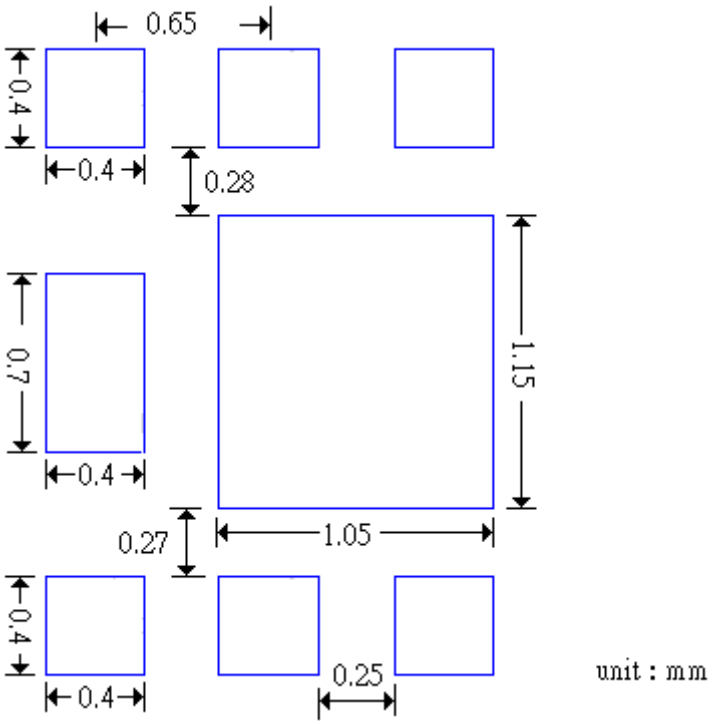
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.35	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=20V, V_{GS}=0V
	-	-	10	μA	V_{DS}=20V, V_{GS}=0V, Tj=55°C
*$R_{DS(ON)}$	-	10.9	14.2	mΩ	V_{GS}=10V, I_D=8.5A
	-	15.3	20		V_{GS}=4.5V, I_D=6.8A
*G_{FS}	-	7	-	S	V_{DS}=5V, I_D=8.5A
Dynamic					
Ciss	-	539	-	pF	V_{DS}=10V, V_{GS}=0, f=1MHz
Coss	-	104	-		
Crss	-	85	-		
$t_{d(ON)}$	-	10.2	-	ns	V_{DD}=13V, I_D=8.5A, V_{GS}=4.5V, R_G=1.8Ω
t_r	-	21	-		
$t_{d(OFF)}$	-	21.6	-		
t_f	-	11.2	-		

Qg(V_{GS}=10V)	-	13	-	nC	V_{DS}=13V, I_D=8.5A, V_{GS}=10V
Qg(V_{GS}=4.5V)	-	6.7	-		
Qgs	-	1.8	-		
Qgd	-	3.0	-		
Rg	-	4.7	-	Ω	f=1MHz
Source-Drain Diode					
*V_{SD}	-	0.87	1.0	V	V_{GS}=0V, I_S=8.5A
*trr	-	5.9	-	ns	I_F=8.5A, dI_F/dt=280A/μs
*Qrr	-	3.9	-	nC	

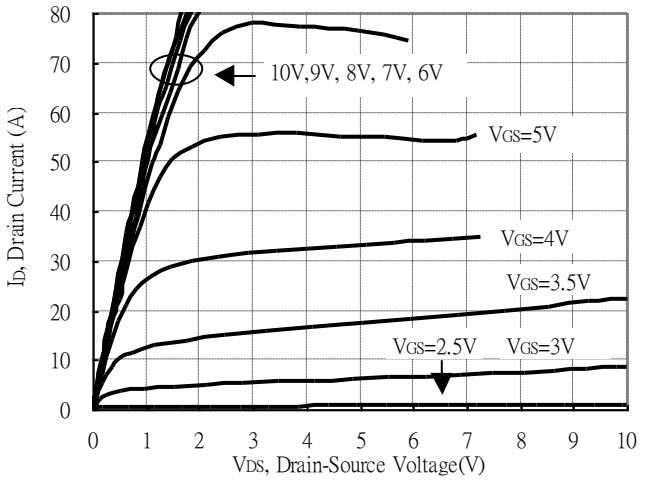
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint

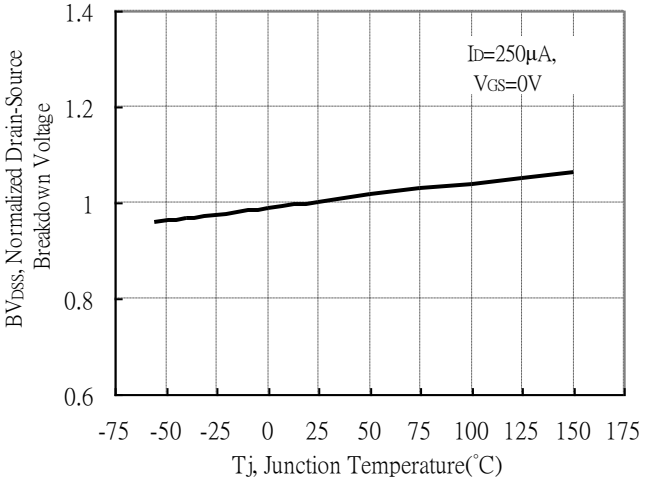


Typical Characteristics

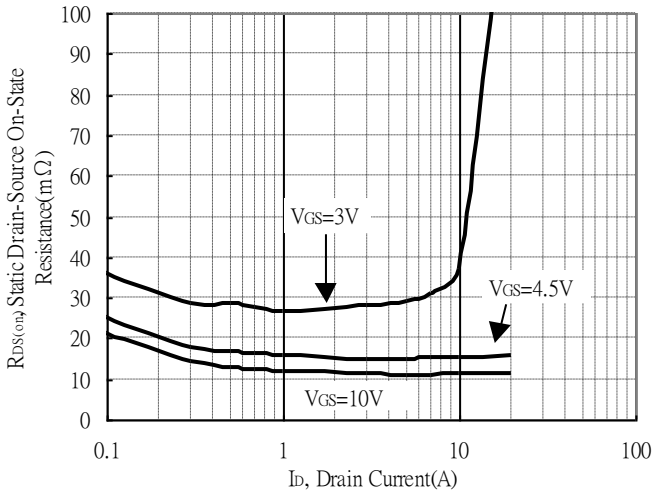
Typical Output Characteristics



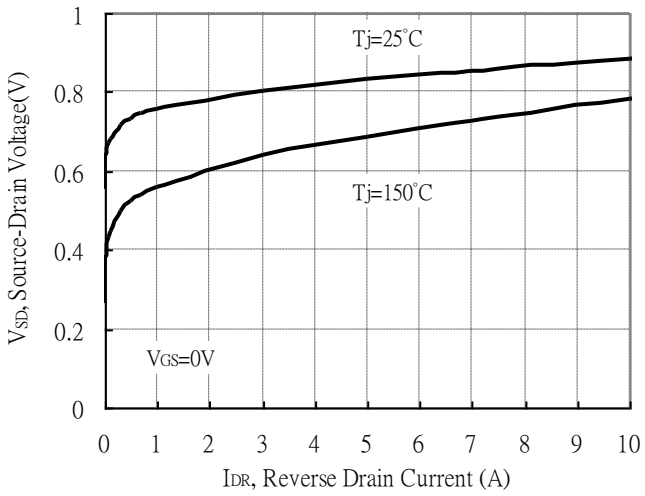
Brekdown Voltage vs Ambient Temperature



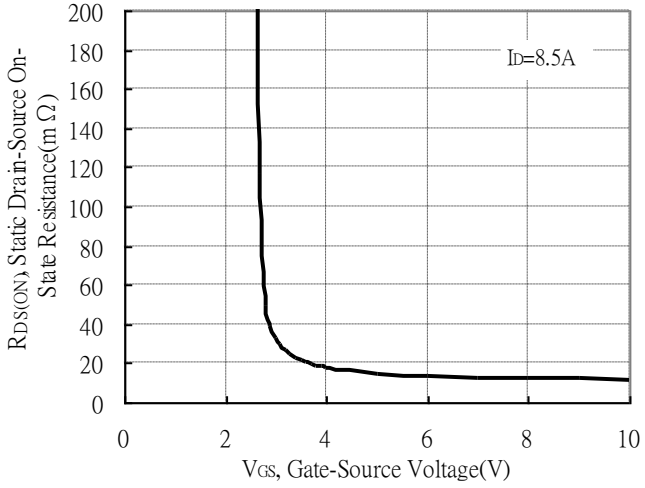
Static Drain-Source On-State resistance vs Drain Current



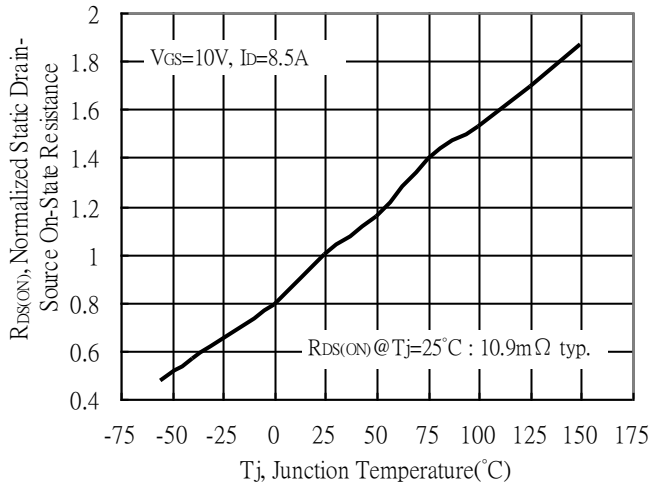
Reverse Drain Current vs Source-Drain Voltage



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

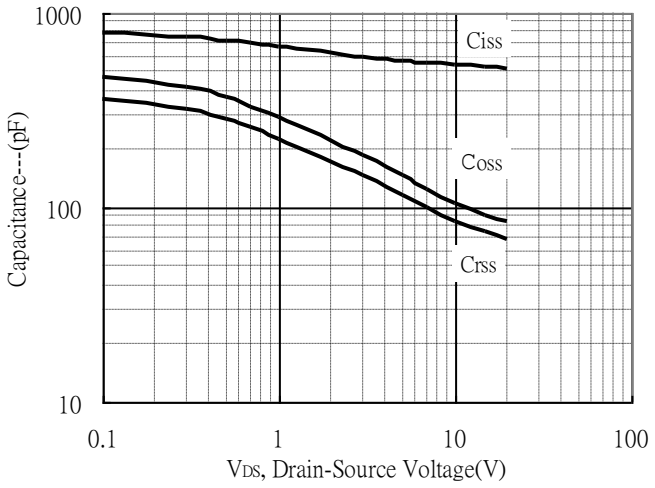


Drain-Source On-State Resistance vs Junction Tempearture

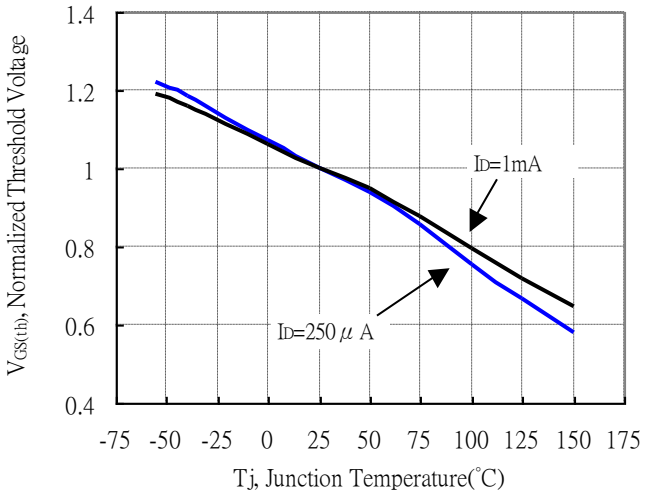


Typical Characteristics(Cont.)

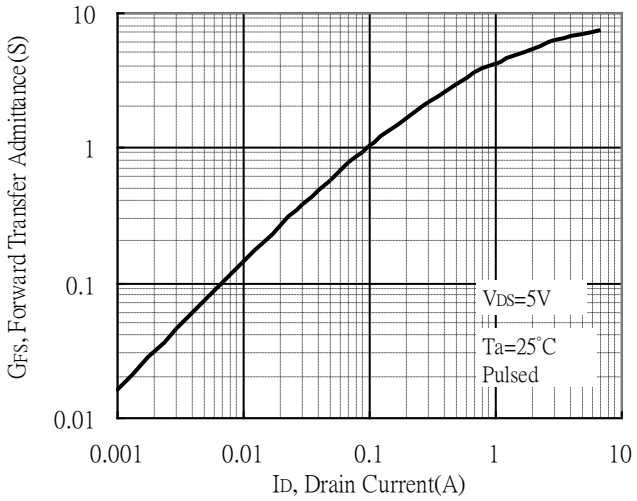
Capacitance vs Drain-to-Source Voltage



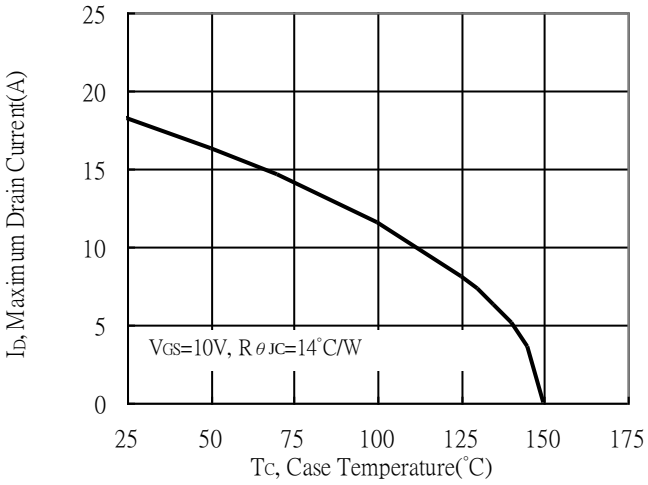
Threshold Voltage vs Junction Tempearture



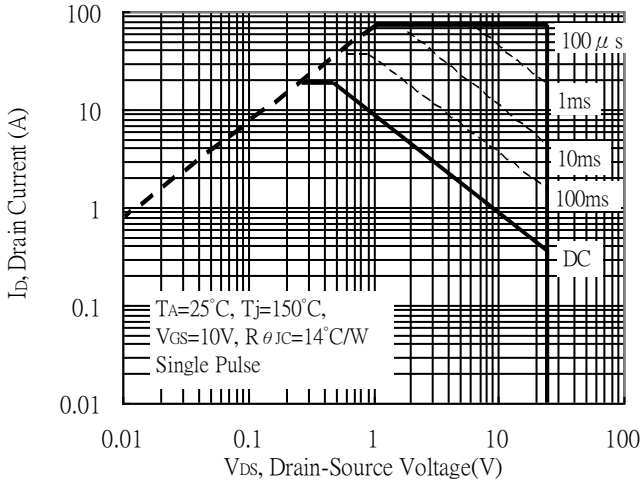
Forward Transfer Admittance vs Drain Current



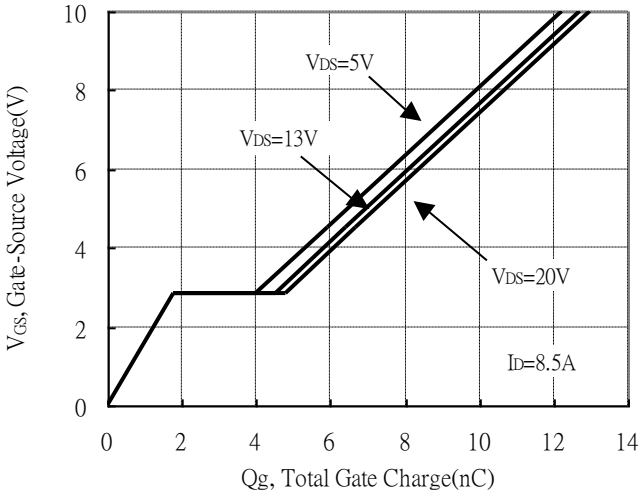
Maximum Drain Current vs Case Temperature



Maximum Safe Operating Area

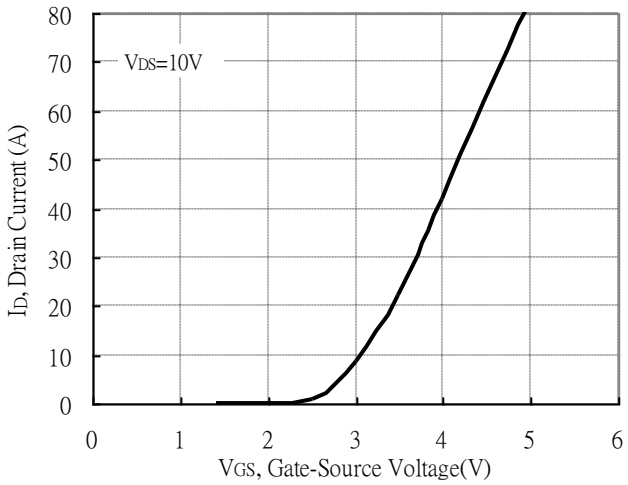


Gate Charge Characteristics

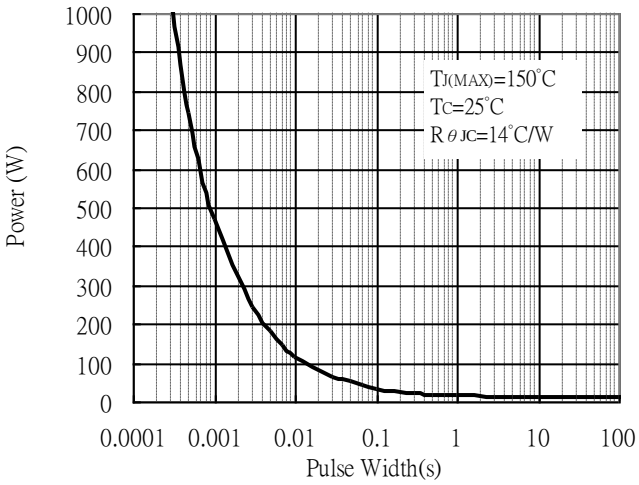


Typical Characteristics(Cont.)

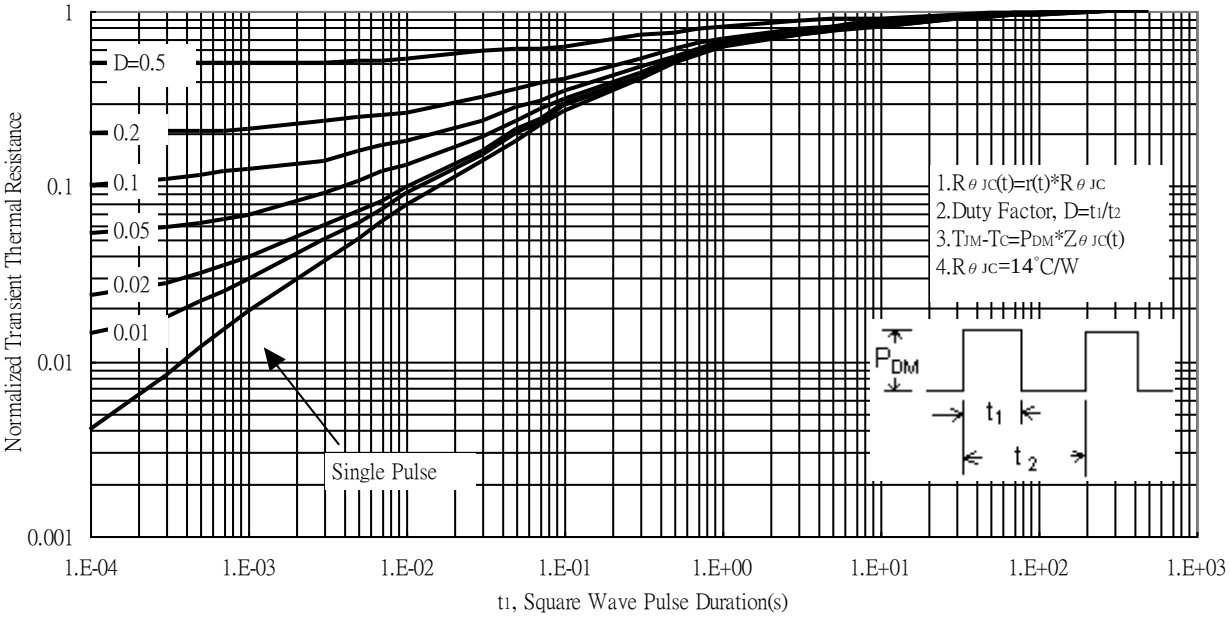
Typical Transfer Characteristics



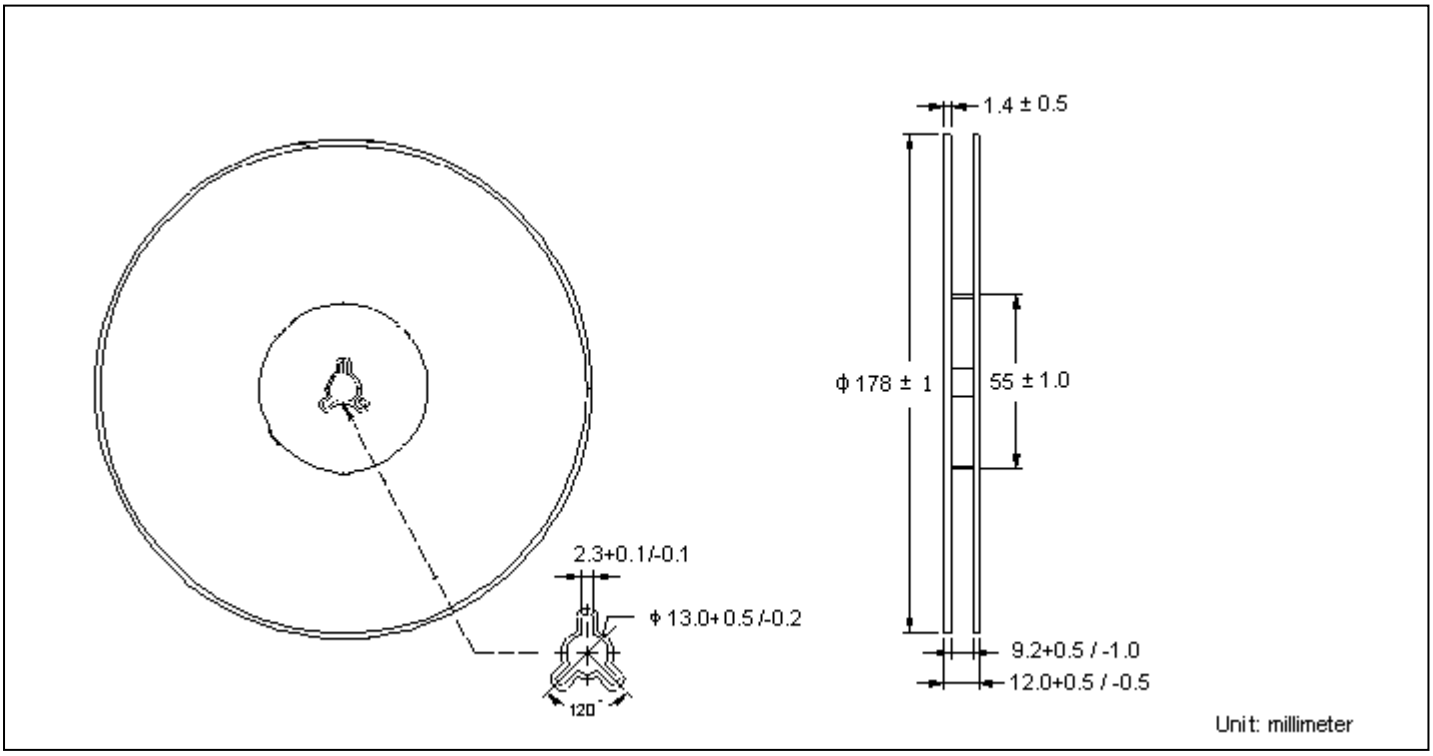
Single Pulse Power Rating, Junction to Case



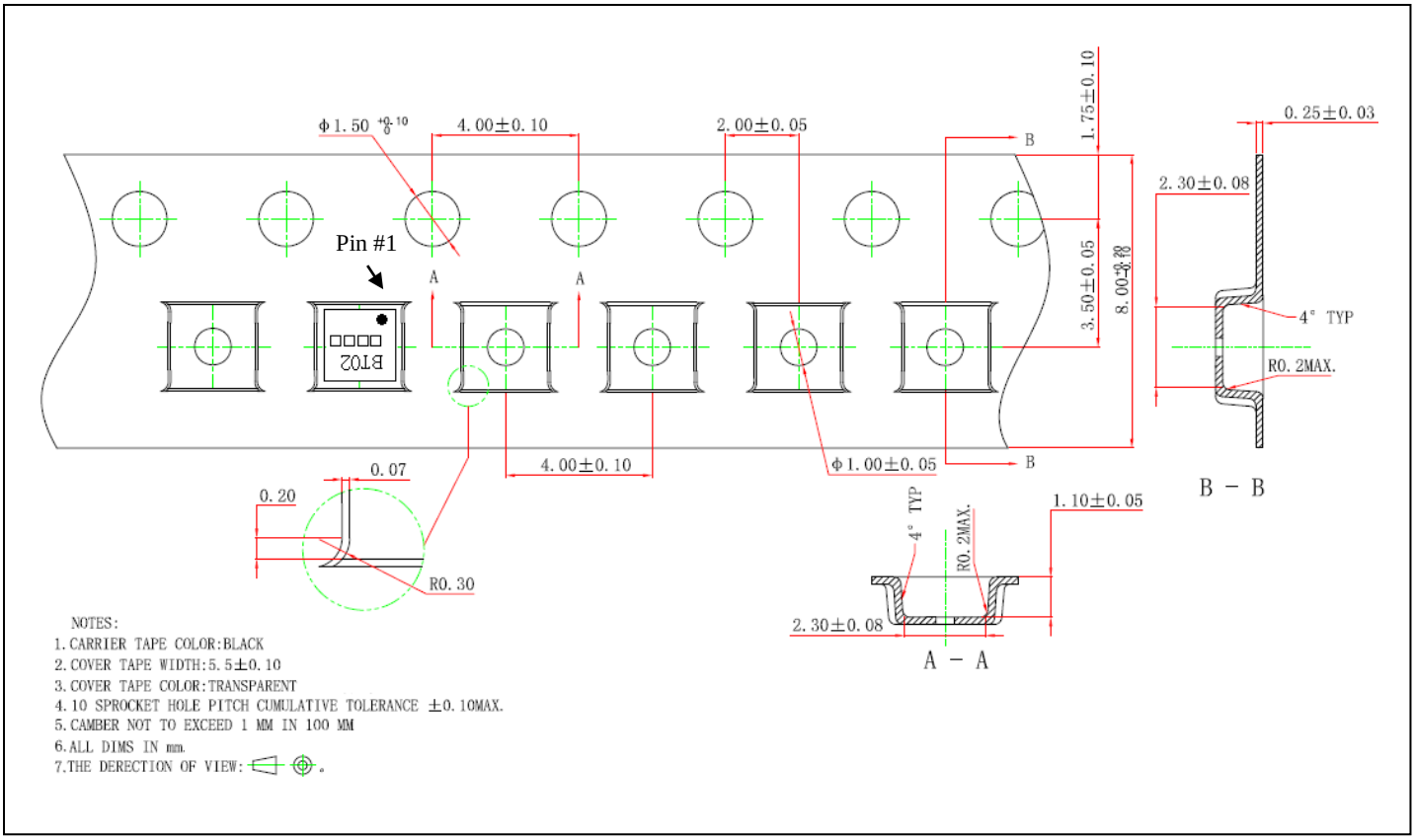
Transient Thermal Response Curves



Reel Dimension



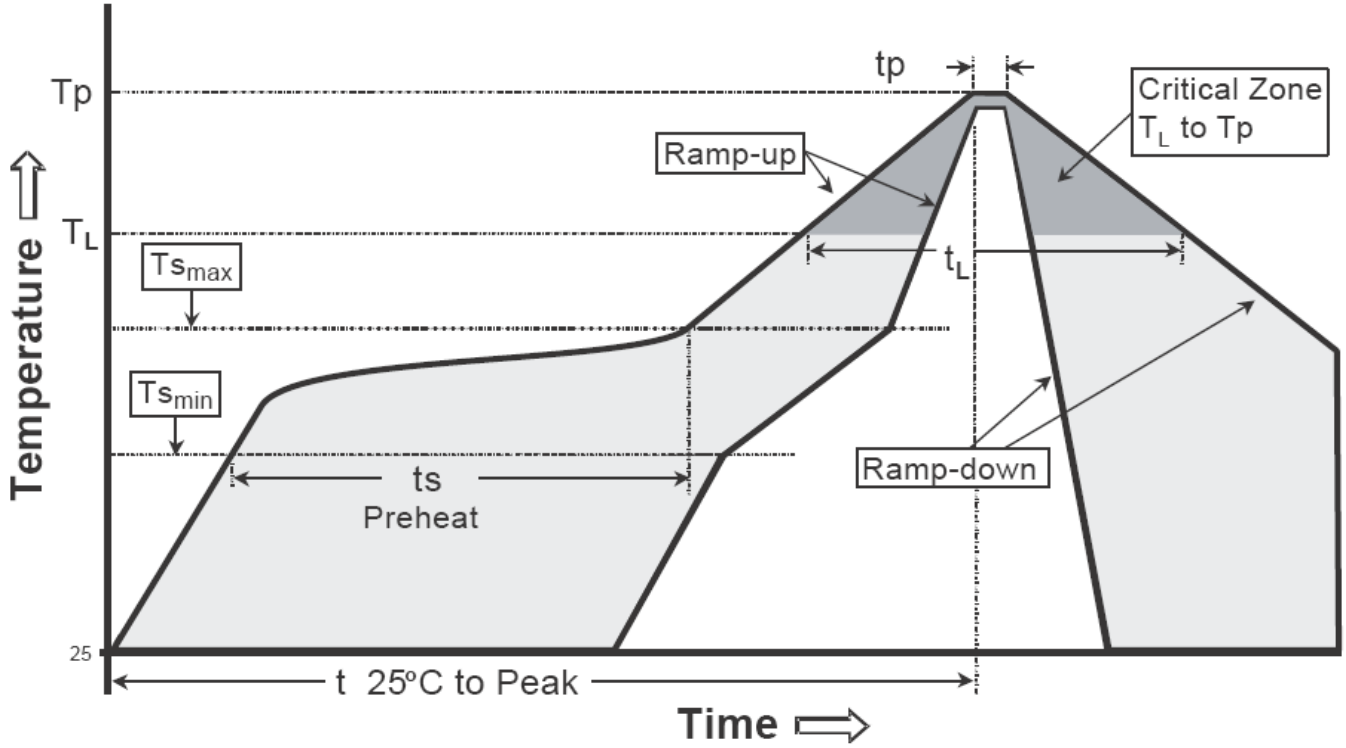
Carrier Tape Dimension



Recommended wave soldering condition

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

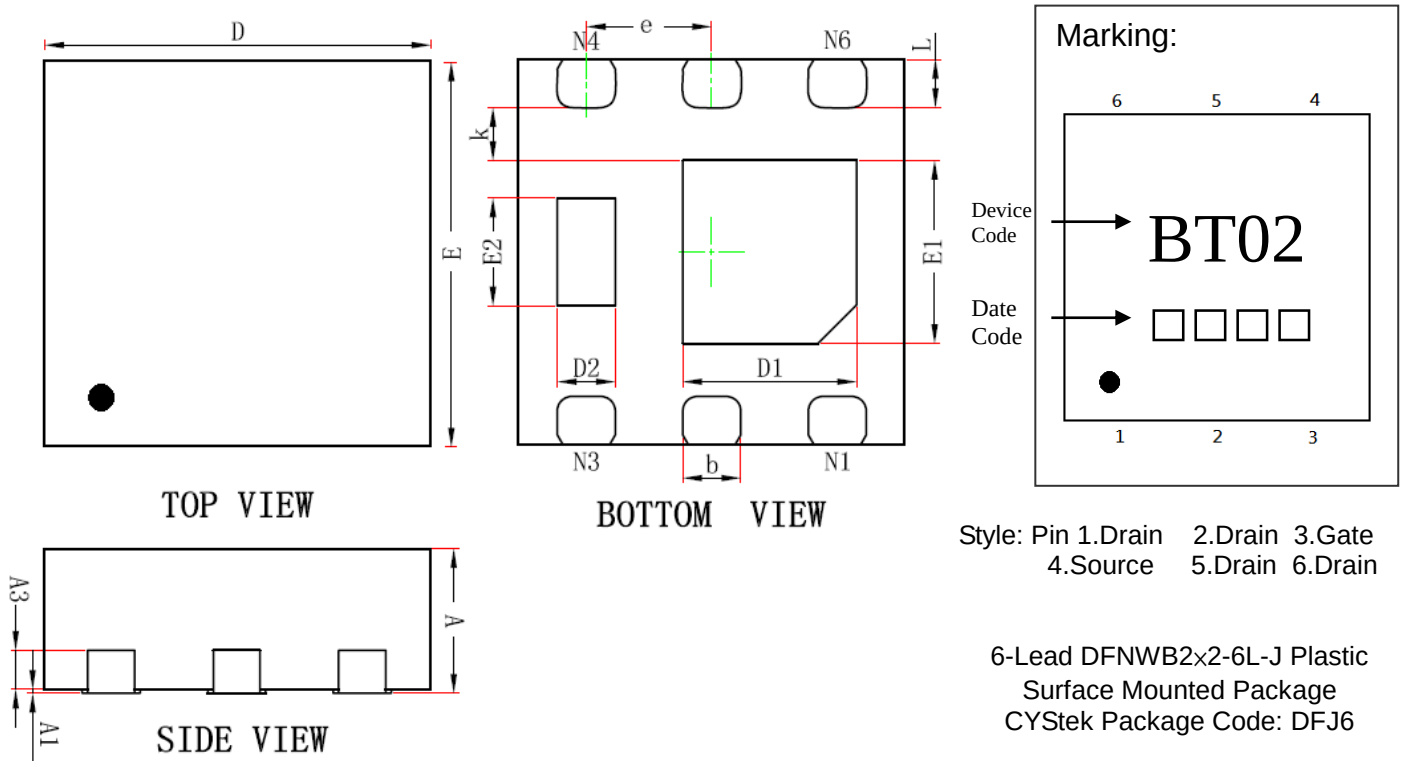
Recommended temperature profile for IR reflow



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($t_{s\ min}$ to $t_{s\ max}$)	 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.

DFNWB2x2-6L-J Dimension



Style: Pin 1.Drain 2.Drain 3.Gate
4.Source 5.Drain 6.Drain

6-Lead DFNWB2x2-6L-J Plastic
Surface Mounted Package
CYStek Package Code: DFJ6

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031	D2	0.200	0.400	0.008	0.016
A1	0.000	0.050	0.000	0.002	E2	0.460	0.660	0.018	0.026
A3	0.203 REF		0.008 REF		k	0.200	-	0.008	-
D	1.924	2.076	0.076	0.082	b	0.250	0.350	0.010	0.014
E	1.924	2.076	0.076	0.082	e	0.650 TYP		0.026 TYP	
D1	0.800	1.000	0.031	0.039	L	0.174	0.326	0.007	0.013
E1	0.850	1.050	0.033	0.041					

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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