N-Channel Enhancement Mode Power MOSFET

MTB2D8N03RV8

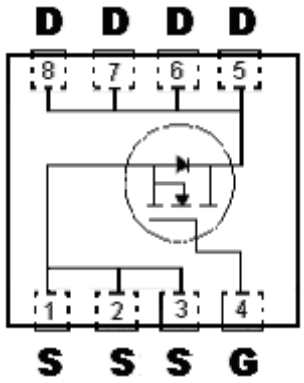
Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free lead plating package

BV_{DSS}	30V
I_D@T_C=25°C,V_{GS}=10V	55A(silicon limit)
I_D@T_C=25°C,V_{GS}=10V	25A(package limit)
I_D@T_A=25°C,V_{GS}=10V	14A
$R_{DS(ON)}$@V_{GS}=10V, I_D=20A	2.8 mΩ(typ.)
$R_{DS(ON)}$@V_{GS}=4.5V,I_D=20A	4.0 mΩ(typ.)

Equivalent Circuit

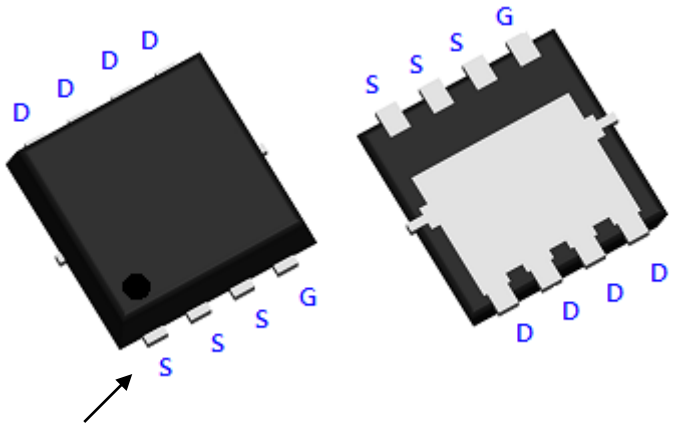
MTB2D8N03RV8



G：Gate S：Source D：Drain

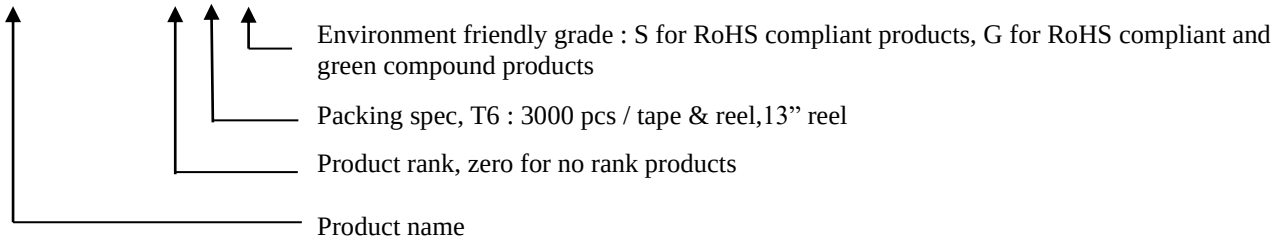
Outline

DFN3x3



Ordering Information

Device	Package	Shipping
MTB2D8N03RV8-0-T6-G	DFN3x3 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V(silicon limit)		I_D	55	A
Continuous Drain Current @ T_C=100°C,V_{GS}=10V(silicon limit)			35	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V(package limit)			25	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V			14	
Continuous Drain Current @ T_A=70°C, V_{GS}=10V			11	
Pulsed Drain Current		I_{DM}	220*1	
Avalanche Current @ L=0.5mH		I_{AS}	12	
Avalanche Energy @ L=0.5mH, I_D=12A		E_{AS}	36*4	mJ
Total Power Dissipation	T_C=25°C	P_D	25	W
	T_C=100°C		10	
	T_A=25°C		1.8*3	
	T_A=70°C		1.1*3	
Operating Junction and Storage Temperature Range		T_J, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	5.2	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	71 *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, t≤10s ; 125°C/W when mounted on minimum copper pad.
4. 100% tested by conditions of L=0.5mH, I_{AS}=6A, V_{GS}=10V, V_{DD}=15V

Electrical Characteristics (T_J=25°C, unless otherwise specified)

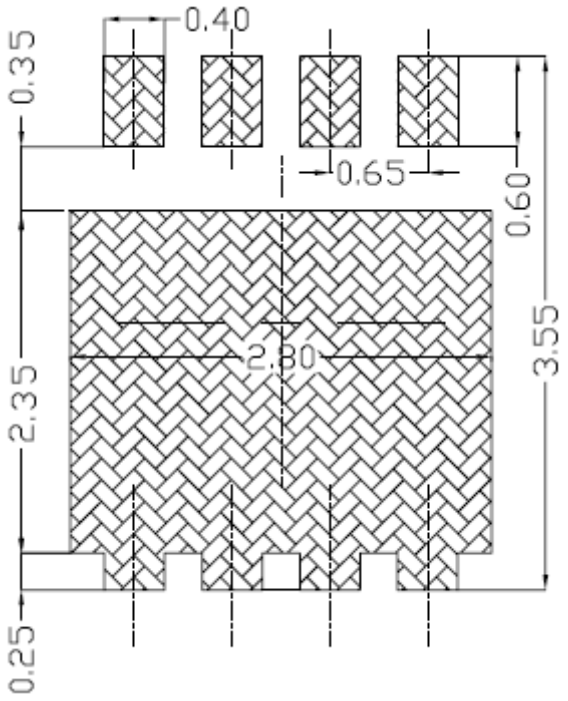
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.5		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
	-	-	5		V_{DS}=24V, V_{GS}=0V, Tj=55°C
$R_{DS(ON)}$*1	-	2.8	3.7	mΩ	V_{GS}=10V, I_D=20A
	-	4	5.7		V_{GS}=4.5V, I_D=20A
G_{FS} *1	-	28	-	S	V_{DS}=5V, I_D=10A

Electrical Characteristics(Cont.) (T_J=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Dynamic					
Ciss	-	1569	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	1108	-		
Crss	-	125	-		
Qg *1, 2	-	28	-	nC	V_{DS}=15V, I_D=20A, V_{GS}=10V
Qgs*1, 2	-	5	-		
Qgd*1, 2	-	6	-		
$t_{d(ON)}$ *1, 2	-	14	-	ns	V_{DS}=15V, I_D=20A, V_{GS}=10V R_G=6Ω
tr *1, 2	-	15	-		
$t_{d(OFF)}$*1, 2	-	43	-		
t_f *1, 2	-	11	-		
Rg	-	0.9	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	20	A	
I_{SM}*3	-	-	80		
V_{SD}*1	-	0.83	1.2	V	I_S=10A, V_{GS}=0V
trr	-	29.4	-	ns	I_F=20A, dI_F/dt=100A/μs
Qrr	-	15.8	-	nC	

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

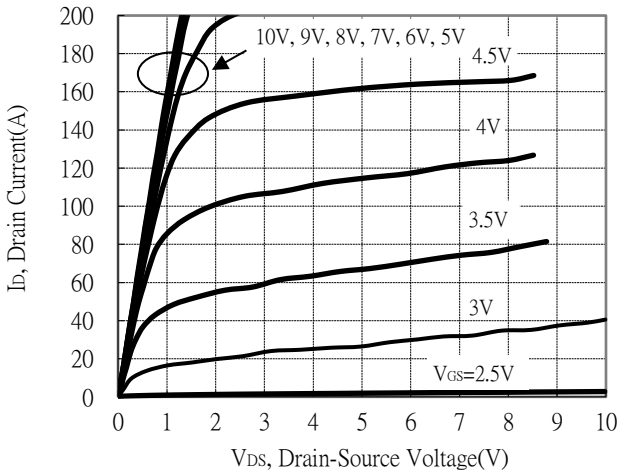
Recommended Soldering Footprint



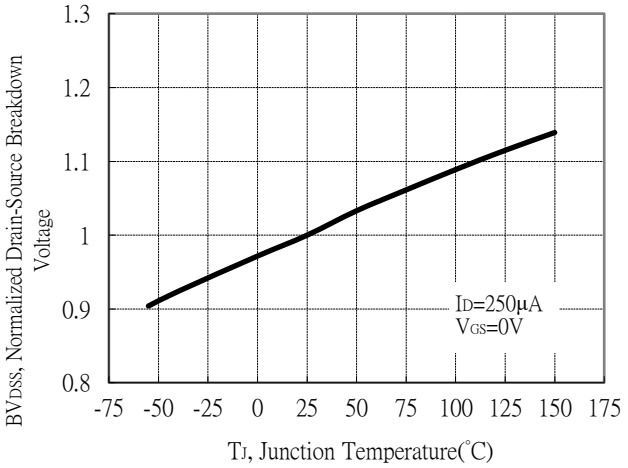
unit : mm

Typical Characteristics

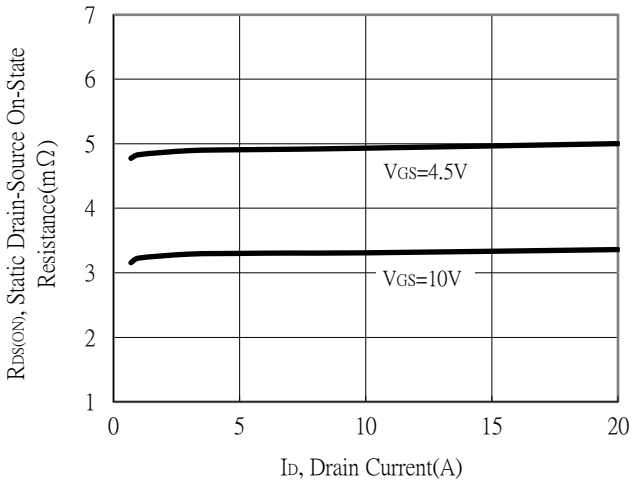
Typical Output Characteristics



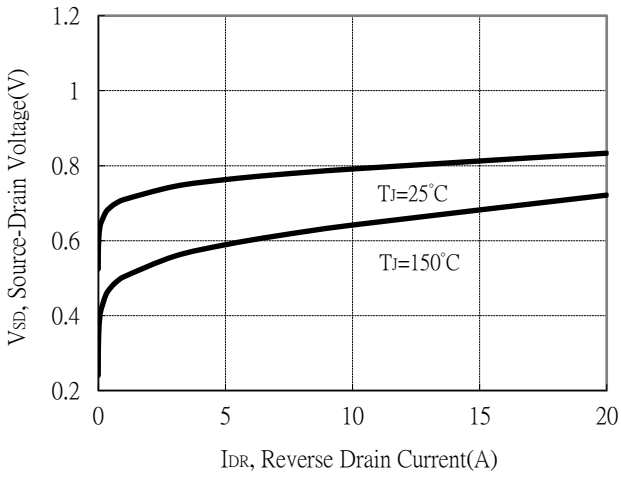
Brekdown Voltage vs Ambient Temperature



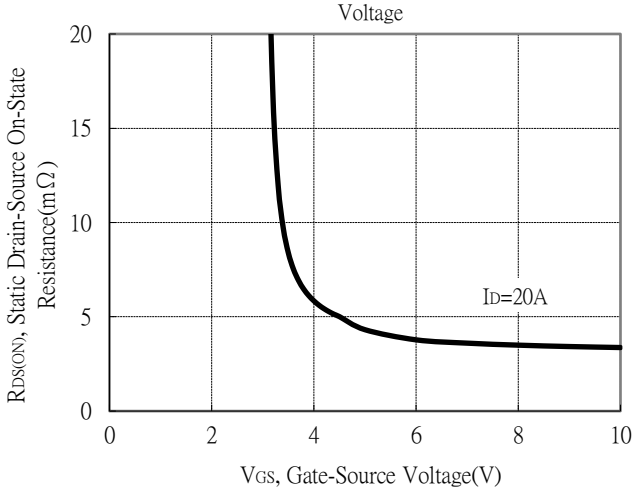
Static Drain-Source On-State resistance vs Drain Current



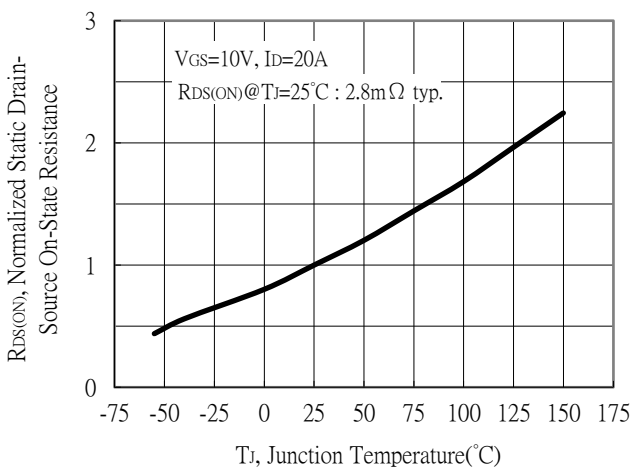
Reverse Drain Current vs Source-Drain Voltage



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

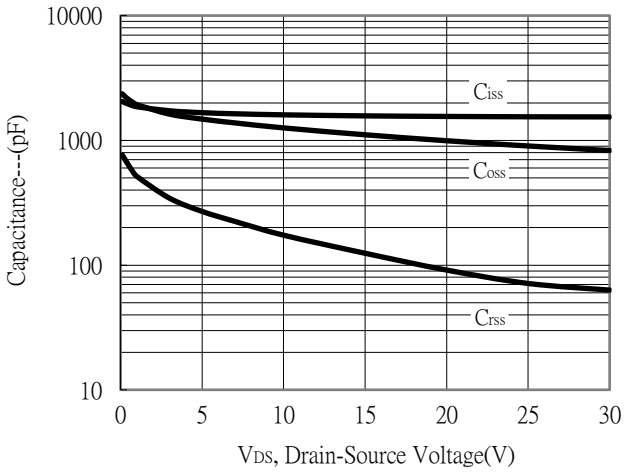


Drain-Source On-State Resistance vs Junction Tempearture

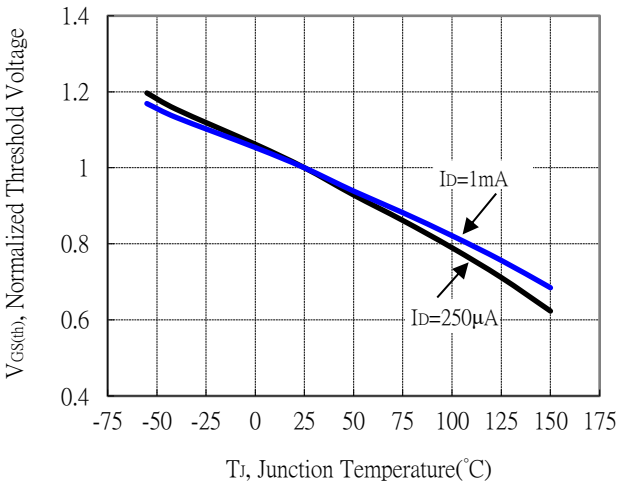


Typical Characteristics(Cont.)

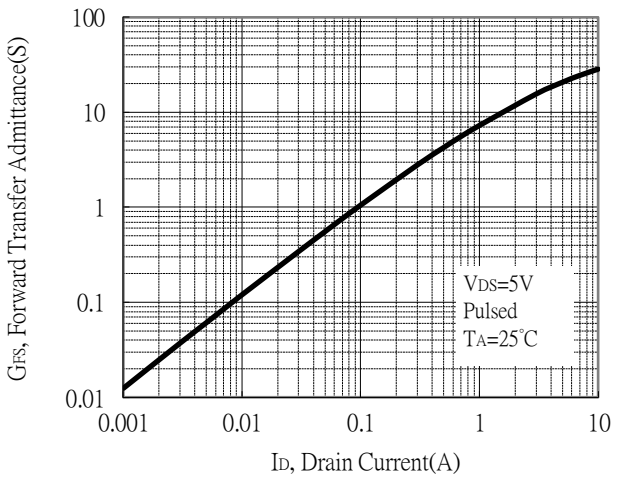
Capacitance vs Drain-to-Source Voltage



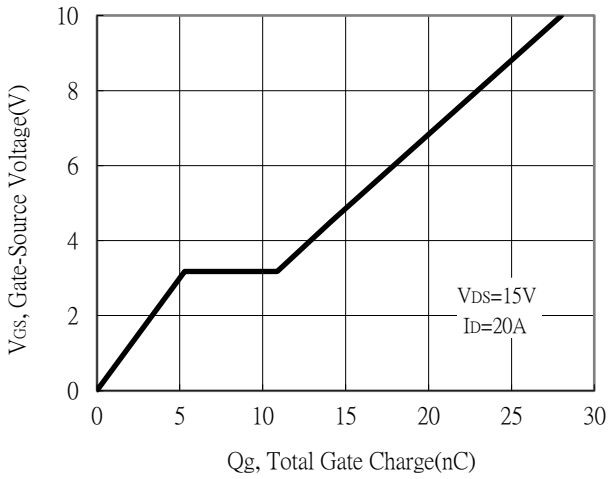
Threshold Voltage vs Junction Tempearture



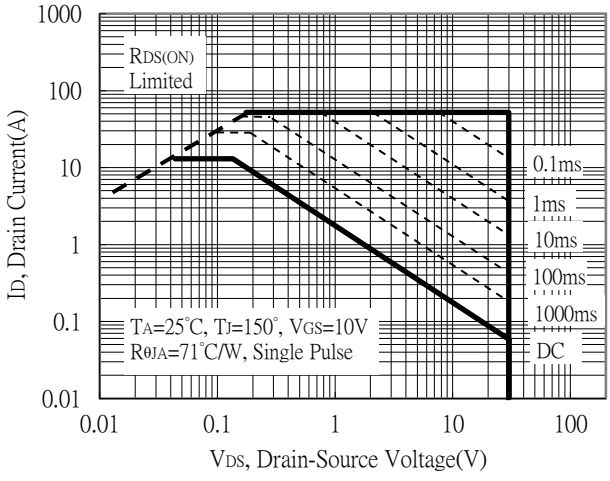
Forward Transfer Admittance vs Drain Current



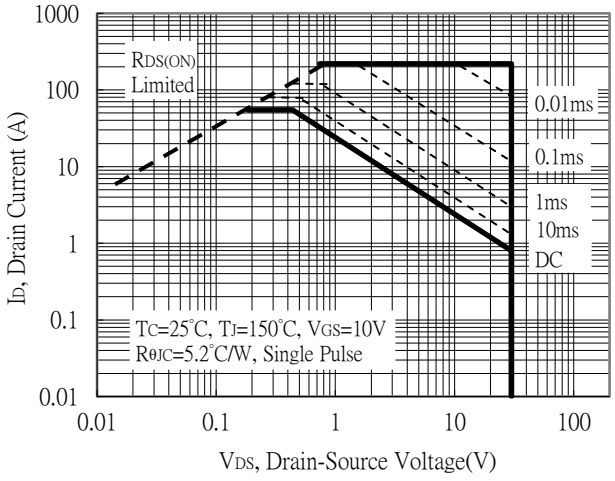
Gate Charge Characteristics



Maximum Safe Operating Area

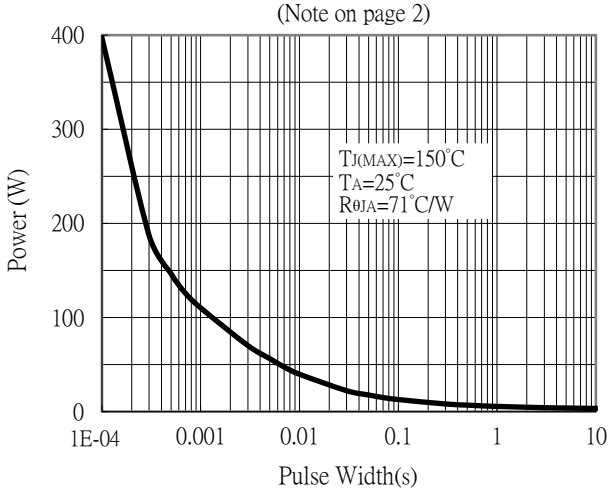


Maximum Safe Operating Area

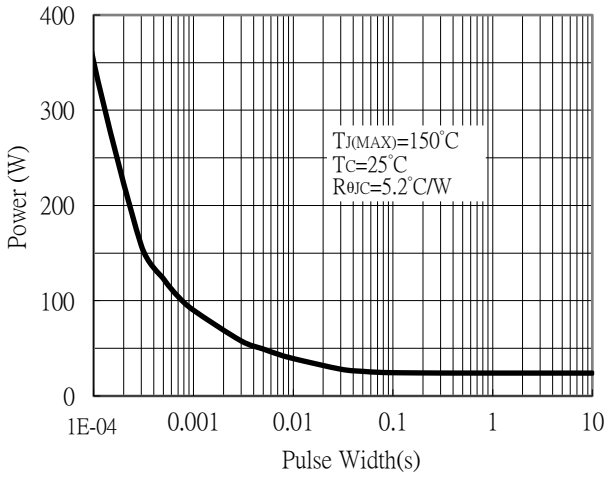


Typical Characteristics(Cont.)

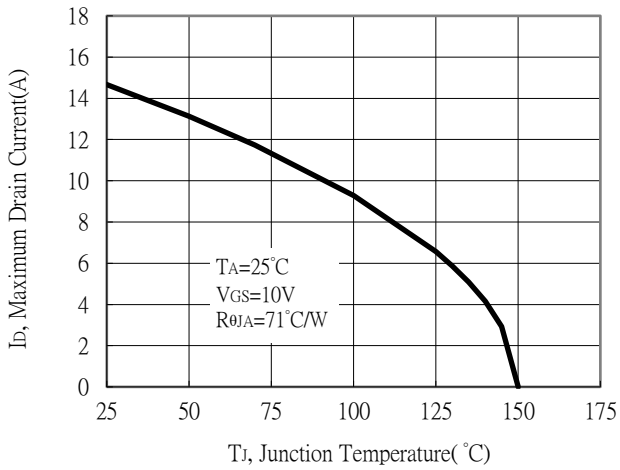
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



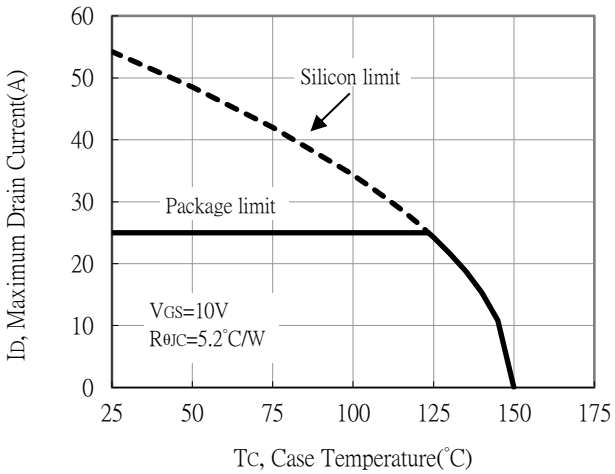
Single Pulse Maximum Power Dissipation



Maximum Drain Current vs Junction Temperature

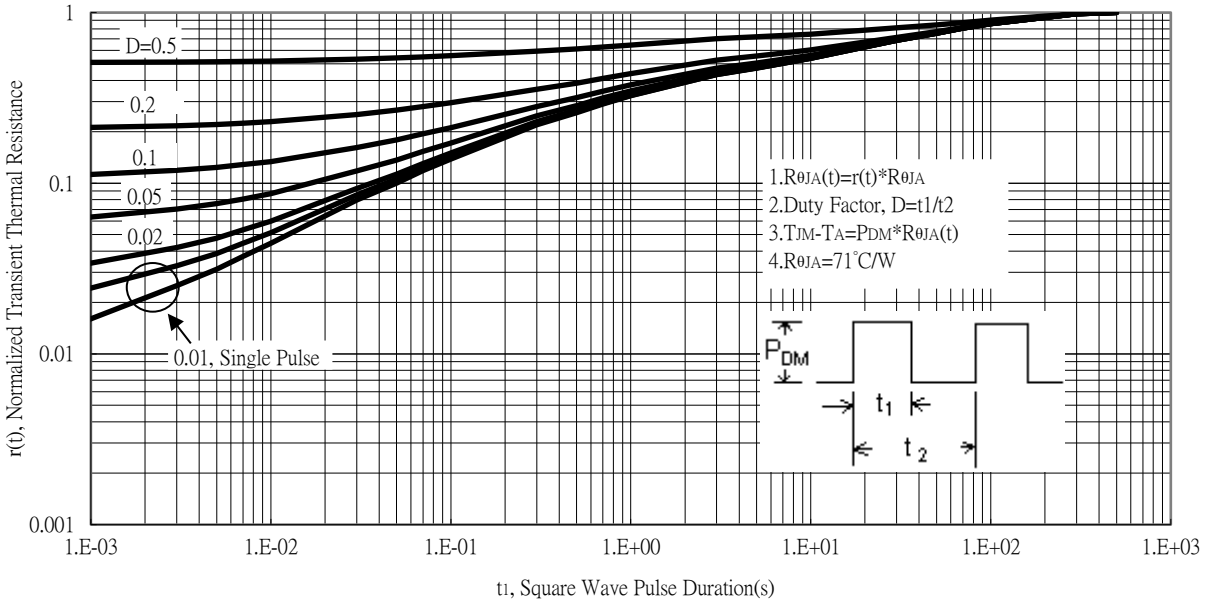


Maximum Drain Current vs Case Temperature

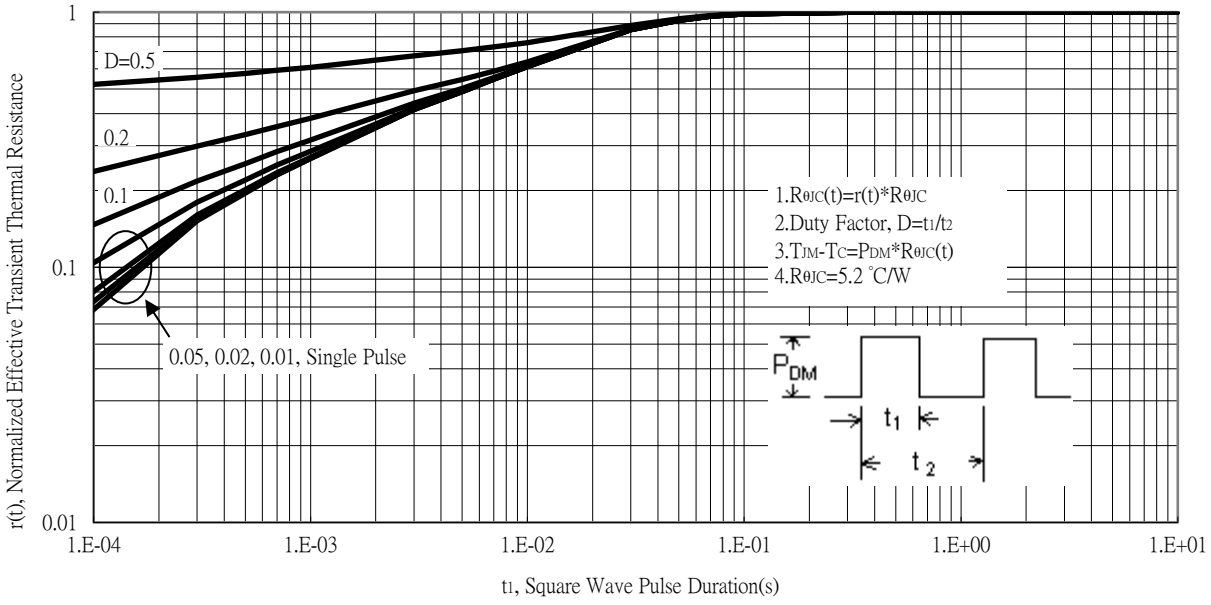


Typical Characteristics(Cont.)

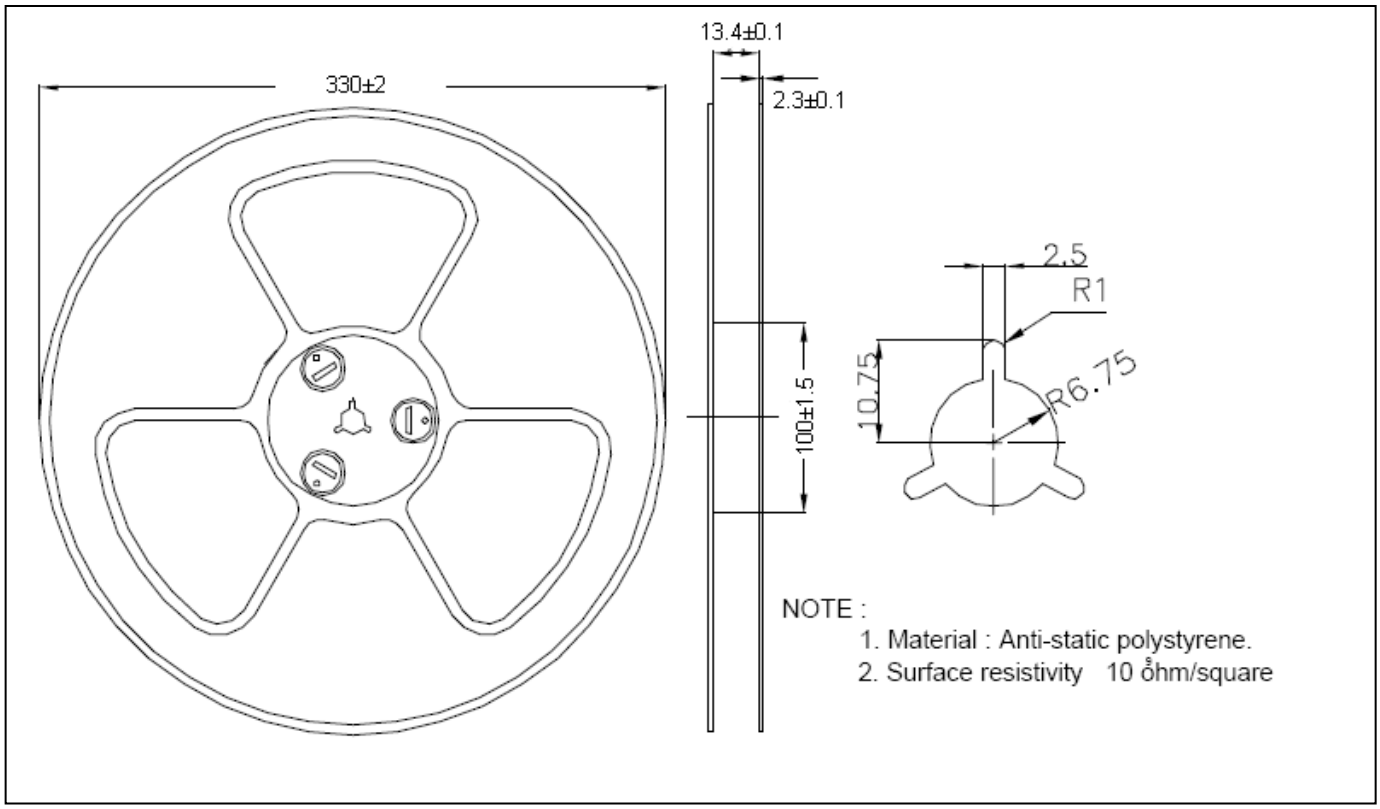
Transient Thermal Response Curves



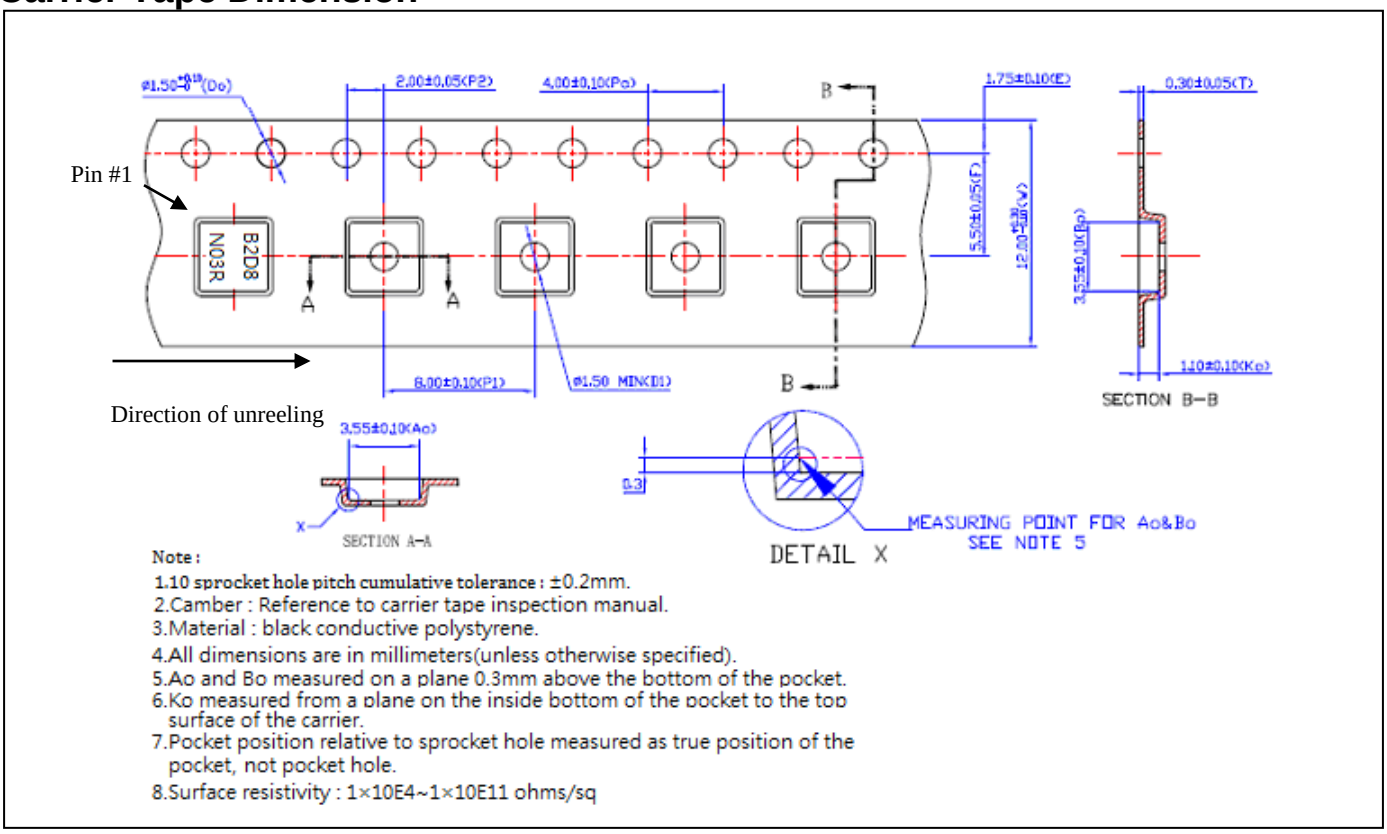
Transient Thermal Response Curves



Reel Dimension



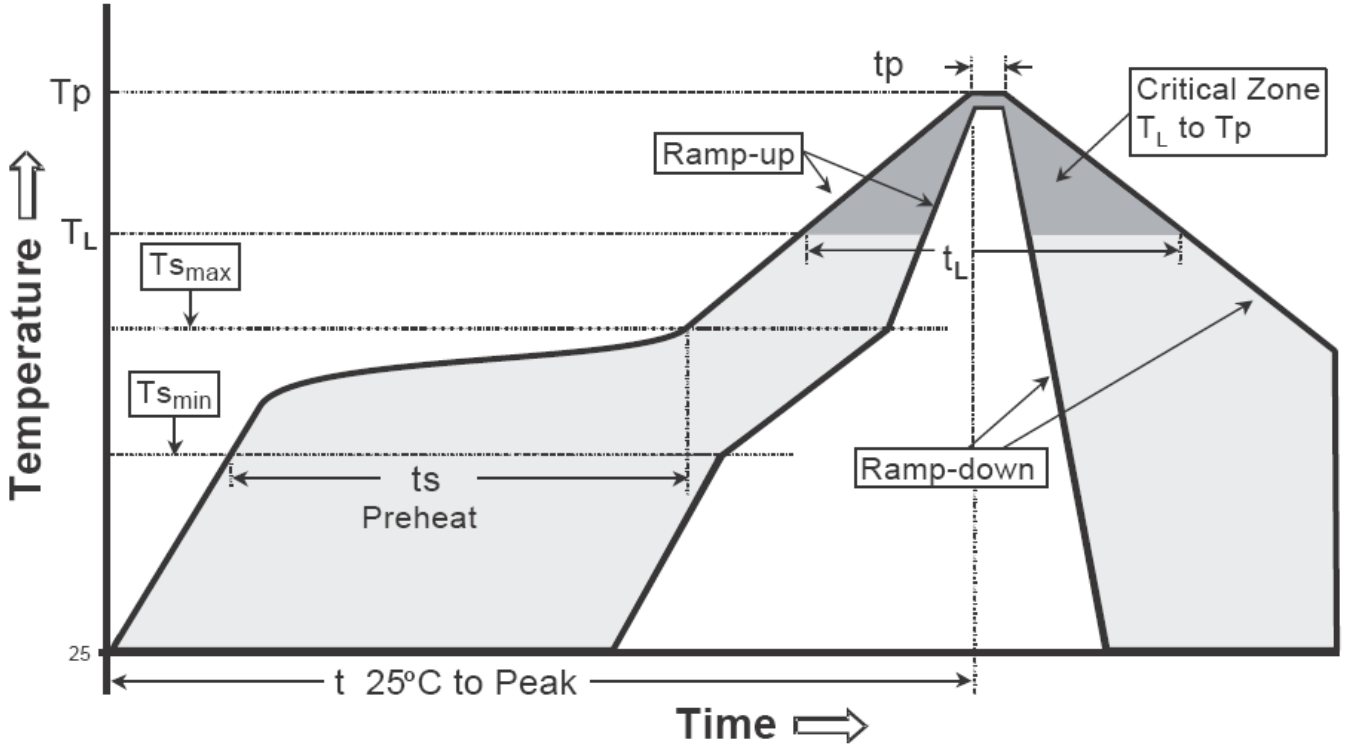
Carrier Tape Dimension



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

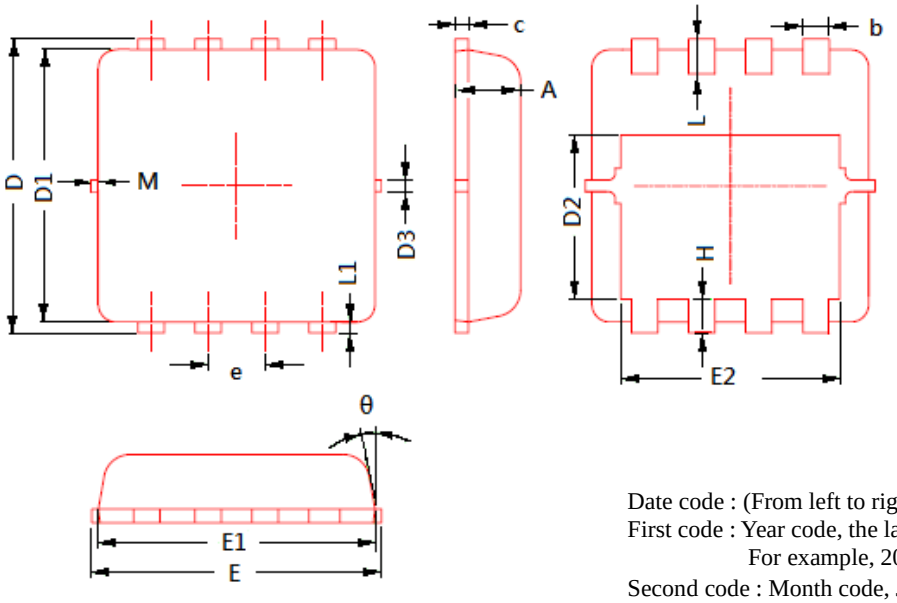


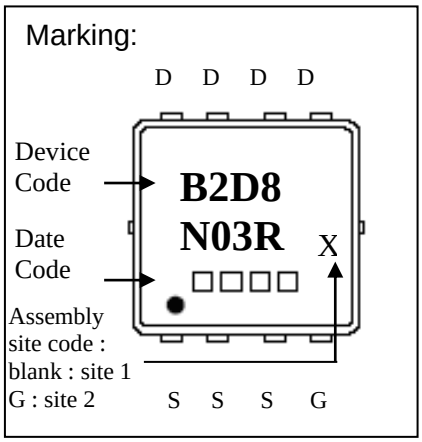
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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 :1. All temperatures refer to topside of the package, measured on the package body surface.

2. For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

DFN3x3 Dimension





8-Lead DFN3x3 Plastic Package
CYStek Package Code: V8

Date code : (From left to right)
First code : Year code, the last digit of Christine year.
For example, 2017→7, 2018→8, 2019→9, …, etc.
Second code : Month code, Jan→A, Feb→B, Mar→C, Apr→D,
May→E, Jun→F, Jul→G, Aug→H, Sep→J, Oct→K,
Nov→L, Dec→M
Third and fourth codes : production serial number, 01~99

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.70	0.80	0.028	0.031	E1	3.00	3.20	0.118	0.126
b	0.25	0.35	0.010	0.014	E2	2.39	2.59	0.094	0.102
c	0.10	0.25	0.004	0.010	e	0.65 BSC		0.026 BSC	
D	3.25	3.45	0.128	0.136	H	0.30	0.50	0.012	0.020
D1	3.00	3.20	0.118	0.126	L	0.30	0.50	0.012	0.020
D2	1.78	1.98	0.070	0.078	L1	0.13 TYP		0.005 TYP	
D3	0.13 TYP		0.005 TYP		θ	-	12°	-	12°
E	3.20	3.40	0.126	0.134	M	-	0.15	-	0.006

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.