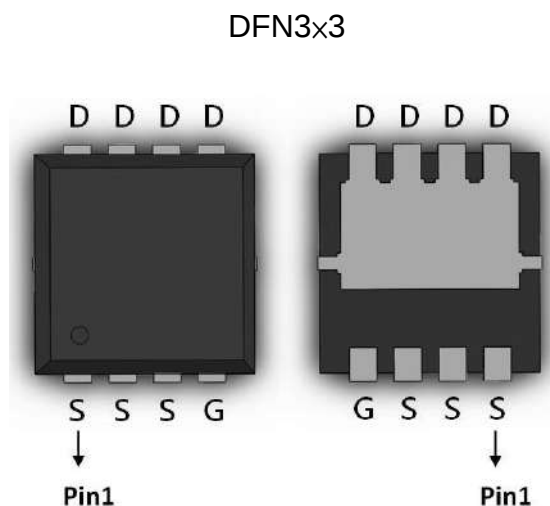


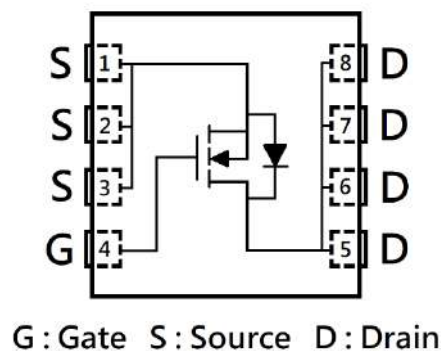
N-Channel Enhancement Mode Power MOSFET

Features:

- Low Gate Charge
- Fast Switching Characteristic



BV _{DSS}	40V
I _D @V _{GS} =10V, T _C =25°C	17A
I _D @V _{GS} =10V, T _A =25°C	10A
R _{DS(ON)} typ.@ V _{GS} =10V, I _D =10A	6mΩ
R _{DS(ON)} typ.@ V _{GS} =4.5V, I _D =8A	9mΩ



Ordering Information

Device	Package	Shipping
KSPB6D2N04R	DFN3×3 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Limits	Unit	
Drain-Source Voltage		V _{DS}	40	V	
Gate-Source Voltage		V _{GS}	±20		
Continuous Drain Current @ V _{GS} =10V, T _C =25°C (silicon limit) *a		I _D	29	A	
Continuous Drain Current @ V _{GS} =10V, T _C =25°C (package limit) *a			17		
Continuous Drain Current @ V _{GS} =10V, T _C =100°C *a			17		
Continuous Drain Current @ V _{GS} =10V, T _A =25°C *b			10		
Continuous Drain Current @ V _{GS} =10V, T _A =70°C *b			8		
Pulsed Drain Current *c			I _{DM}		68
Continuous Body Diode Forward Current @ T _C =25°C *a		I _S	12.5		mJ
Pulsed Body Diode Forward Current @ T _C =25°C *a		I _{SM}	68		
Avalanche Current @ L=0.1mH		I _{AS}	15		
Avalanche Energy @ L=0.5mH		E _{AS}	16		
Total Power Dissipation	T _C =25°C *a	P _D	15	W	
	T _C =100°C *a		6		
	T _A =25°C *b		1.7		
	T _A =70°C *b		1.1		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55~+150	°C	

Thermal Data

Parameter	Symbol	Steady State	Unit
Thermal Resistance, Junction-to-case	R _{θJC}	8.4	°C/W
Thermal Resistance, Junction-to-ambient *b	R _{θJA}	72	

Note:

- *a. The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- *b. The value of R_{θJA} is measured with the device mounted on 1 in² FR -4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_D is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
- *c. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	40	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	1	-	2.5		V _{DS} =V _{GS} , I _D =250μA
G _{FS}	-	19	-	S	V _{DS} =5V, I _D =10A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	1	μA	V _{DS} =32V, V _{GS} =0V
R _{DS(ON)}	-	6	7.8	mΩ	V _{GS} =10V, I _D =10A
	-	9	12.5		V _{GS} =4.5V, I _D =8A
Dynamic					
C _{iss}	-	750	-	pF	V _{DS} =20V, V _{GS} =0V, f=1MHz
C _{oss}	-	370	-		
C _{rss}	-	37	-		
R _g	-	0.7	-	Ω	f=1MHz
Q _g *1, 2	-	6.6	-	nC	V _{DS} =20V, I _D =10A, V _{GS} =4.5V
Q _g *1, 2	-	14	-		V _{DS} =20V, I _D =10A, V _{GS} =10V
Q _{gs} *1, 2	-	2.8	-		
Q _{gd} *1, 2	-	2.5	-		
t _{d(ON)} *1, 2	-	9	-	ns	V _{DS} =20V, I _D =10A, V _{GS} =10V, R _{GS} =1Ω
t _r *1, 2	-	13	-		
t _{d(OFF)} *1, 2	-	25	-		
t _f *1, 2	-	6.2	-		
Source-Drain Diode					
V _{SD} *1	-	0.83	1.2	V	I _S =10A, V _{GS} =0V
t _{rr}	-	15	-	ns	I _F =10A, dI _F /dt=100A/μs
Q _{rr}	-	5	-	nC	

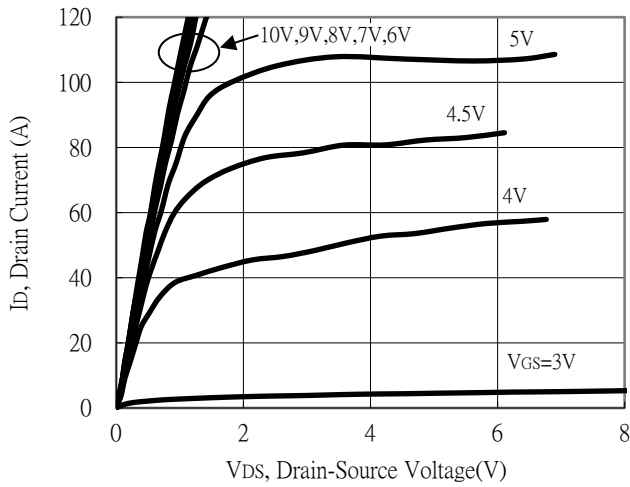
Note:

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

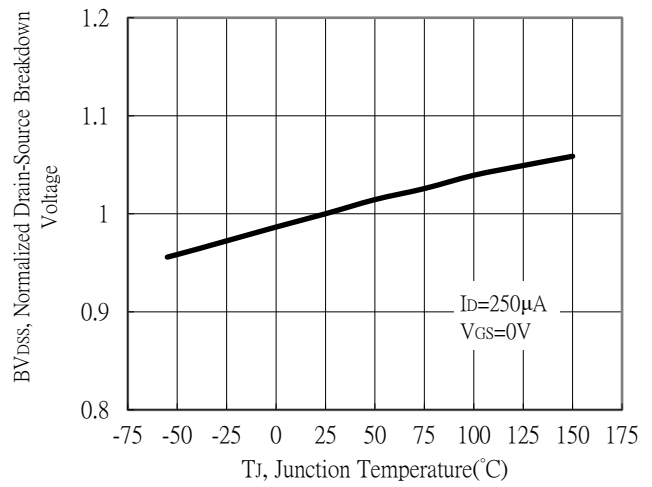
*2. Independent of operating temperature

Typical Characteristics

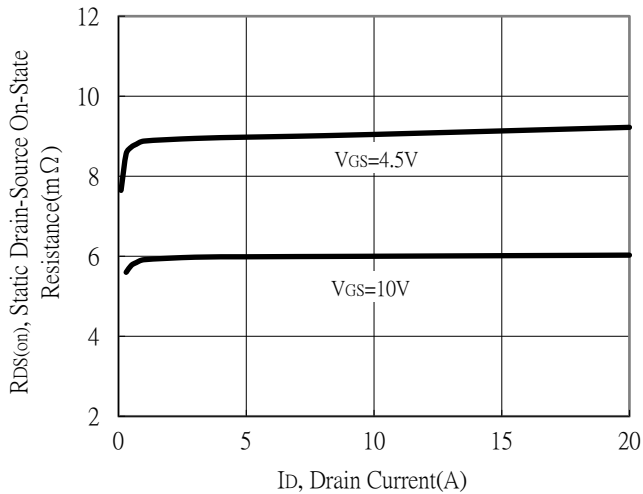
Typical Output Characteristics



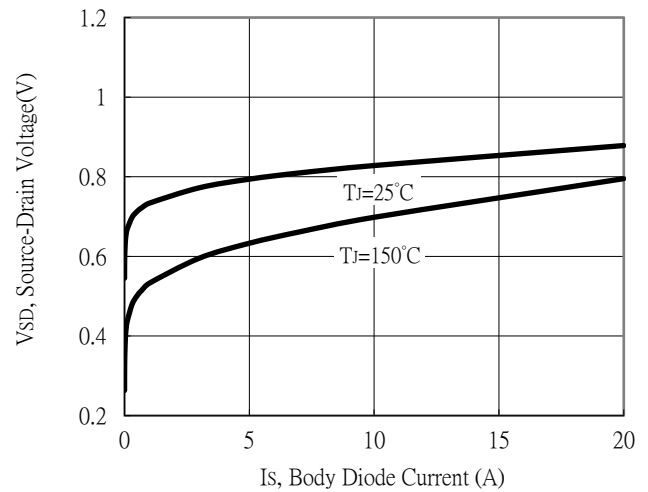
Breakdown Voltage vs Ambient Temperature



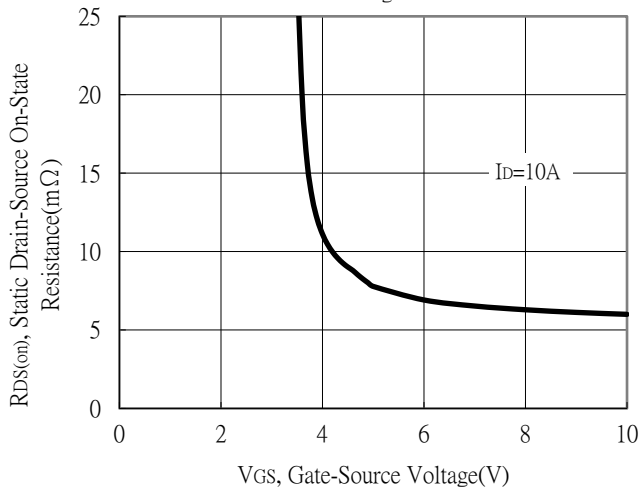
Static Drain-Source On-State resistance vs Drain Current



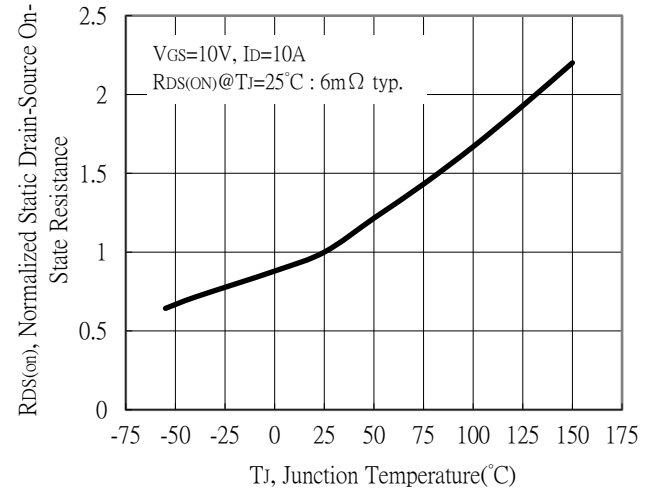
Body Diode Current vs Source-Drain Voltage



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

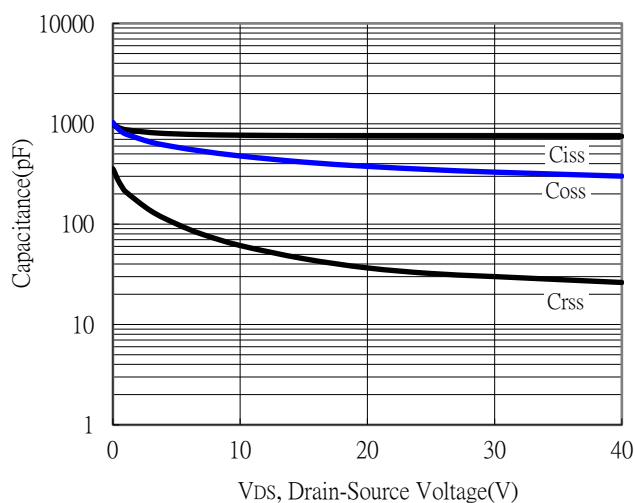


Drain-Source On-State Resistance vs Junction Temperature

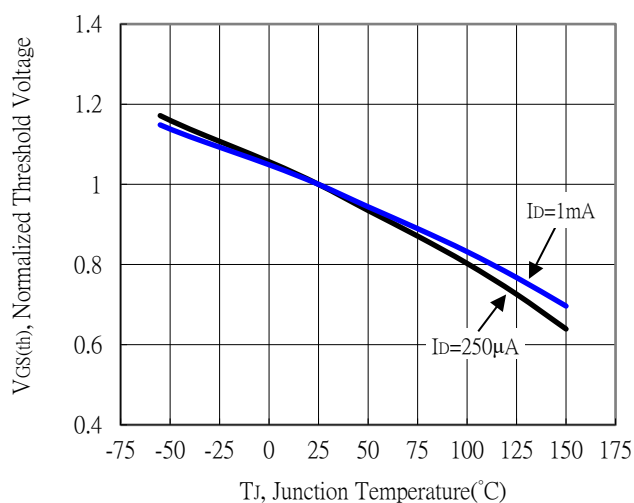


Typical Characteristics (Cont.)

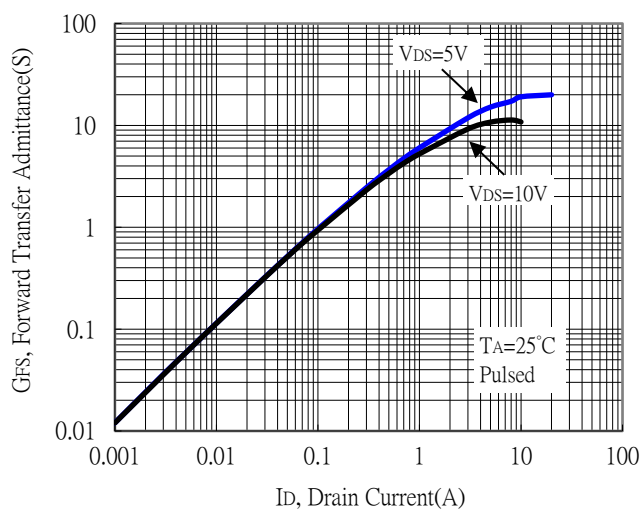
Capacitance vs Drain-to-Source Voltage



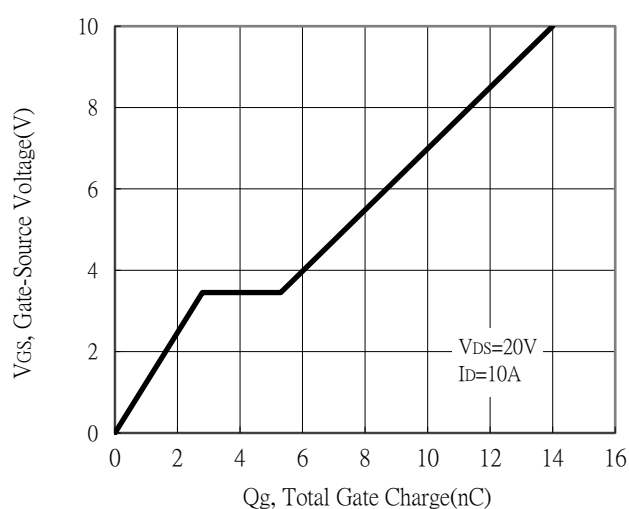
Threshold Voltage vs Junction Temperature



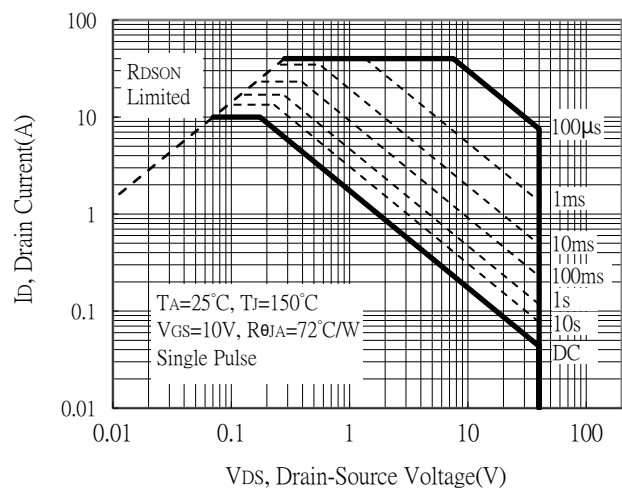
Forward Transfer Admittance vs Drain Current



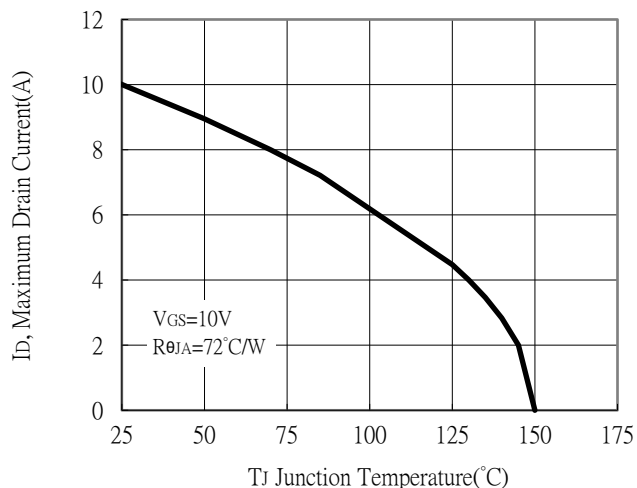
Gate Charge Characteristics



Maximum Safe Operating Area

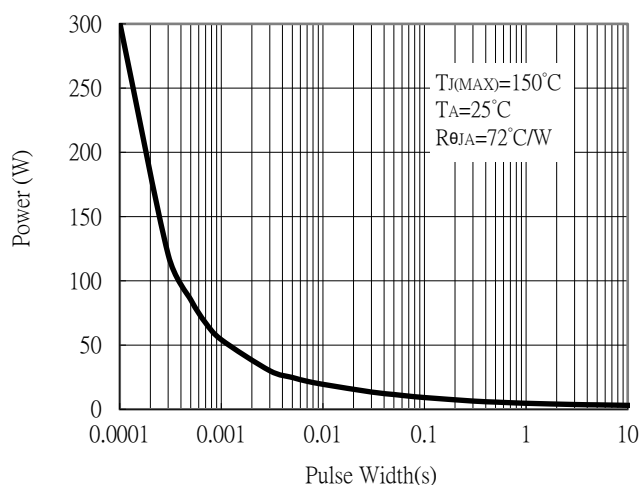


Maximum Drain Current vs Junction Temperature

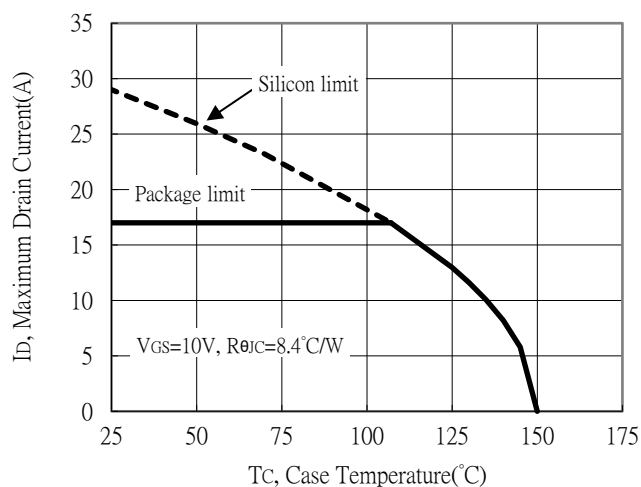


Typical Characteristics (Cont.)

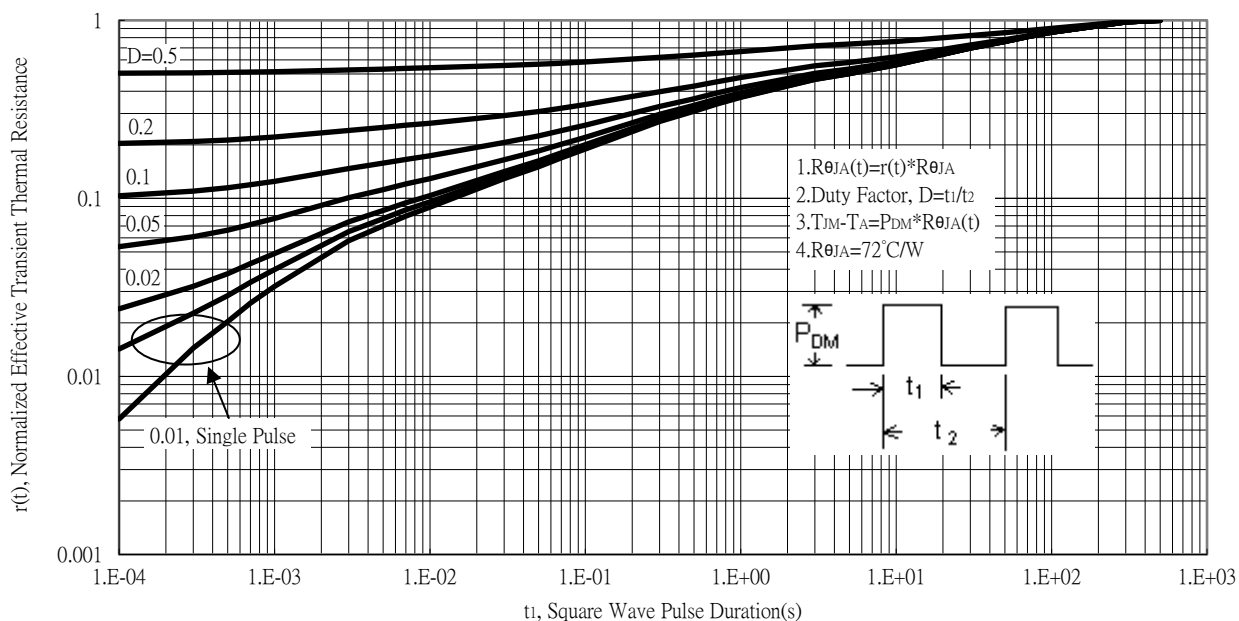
Single Pulse Power Rating, Junction to Ambient



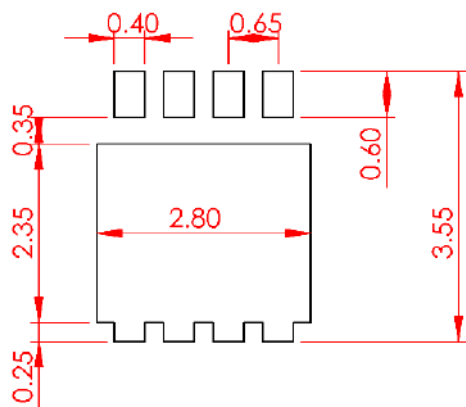
Maximum Drain Current vs Case Temperature



Transient Thermal Response Curves

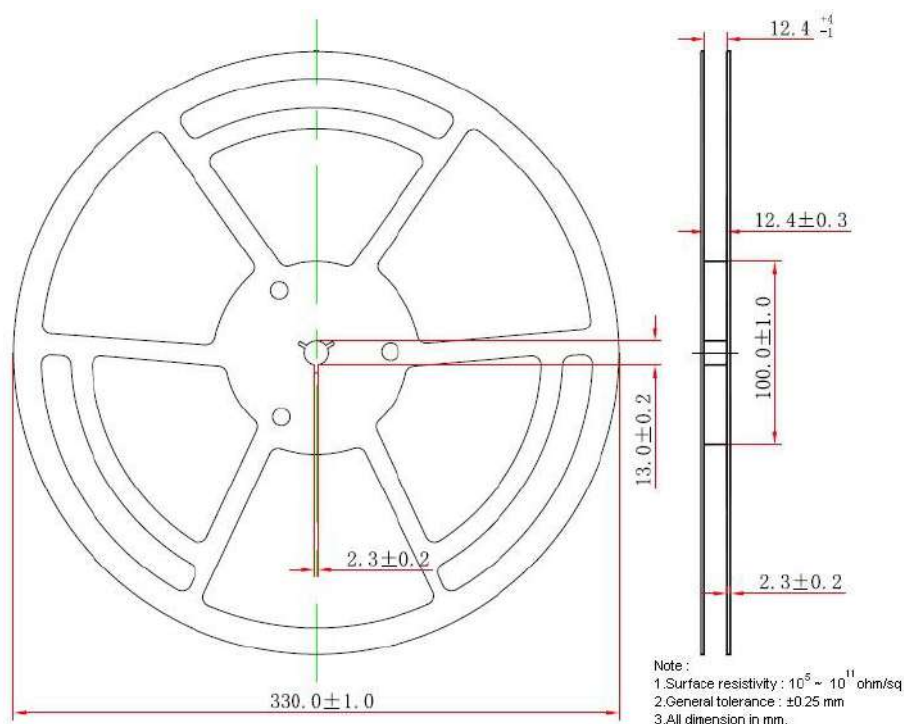


Recommended Soldering Footprint

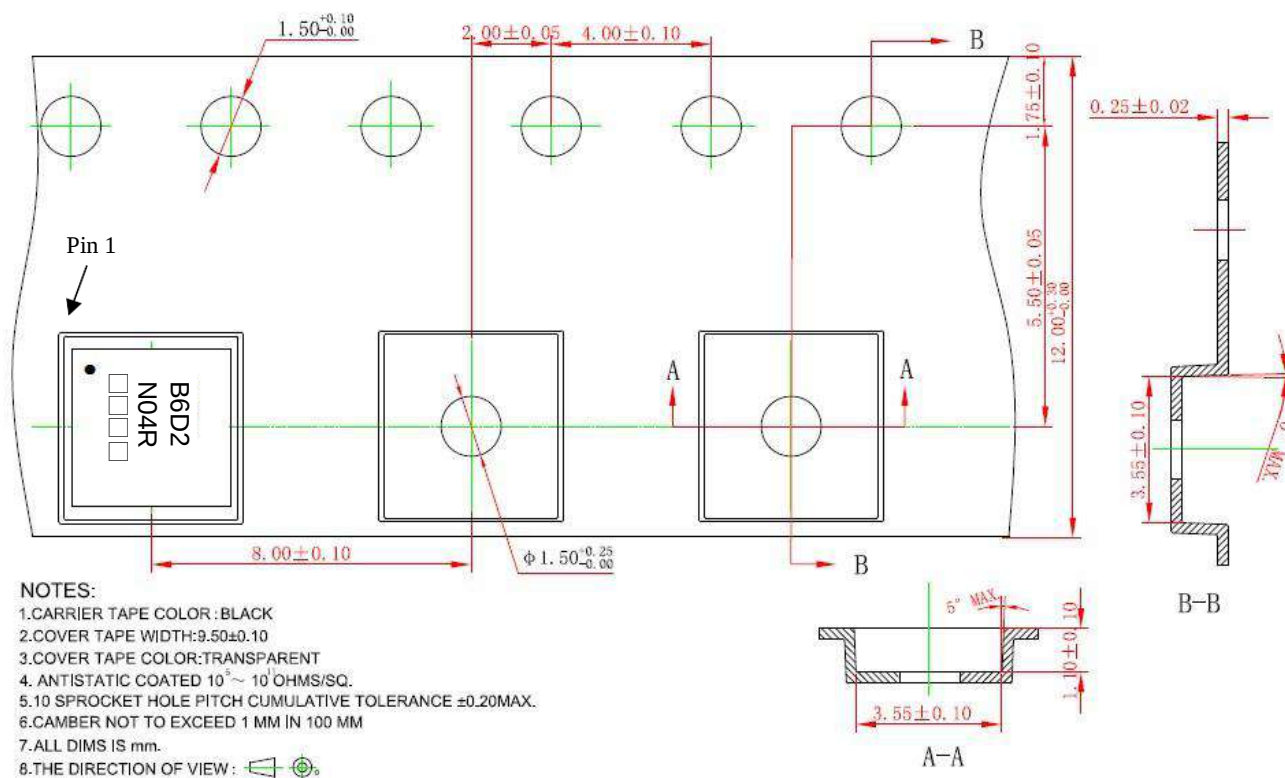


Unit : mm

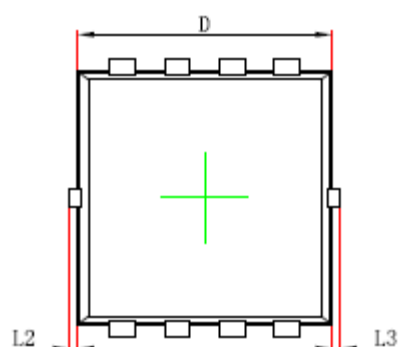
Reel Dimension



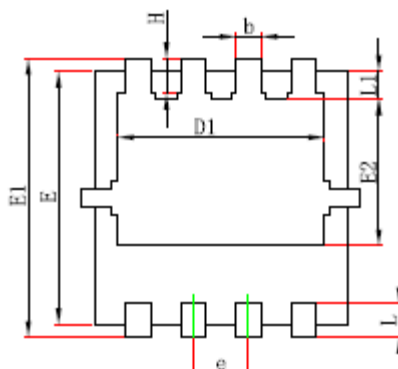
Carrier Tape Dimension



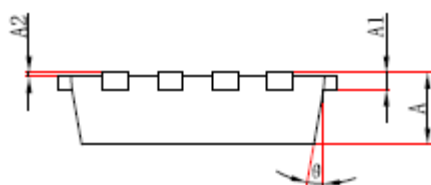
DFN3x3 Dimension (C forming)



Top View



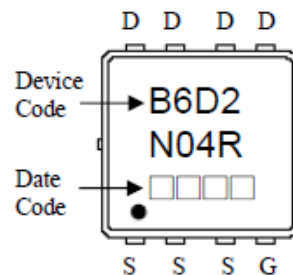
Bottom View



Side View

8-Lead DFN3x3 Plastic Package

Marking:



Date Code(counting from left to right) :

1st code: year code, the last digit of Christian year

2nd code : month code, Jan→A, Feb→B, Mar→C,

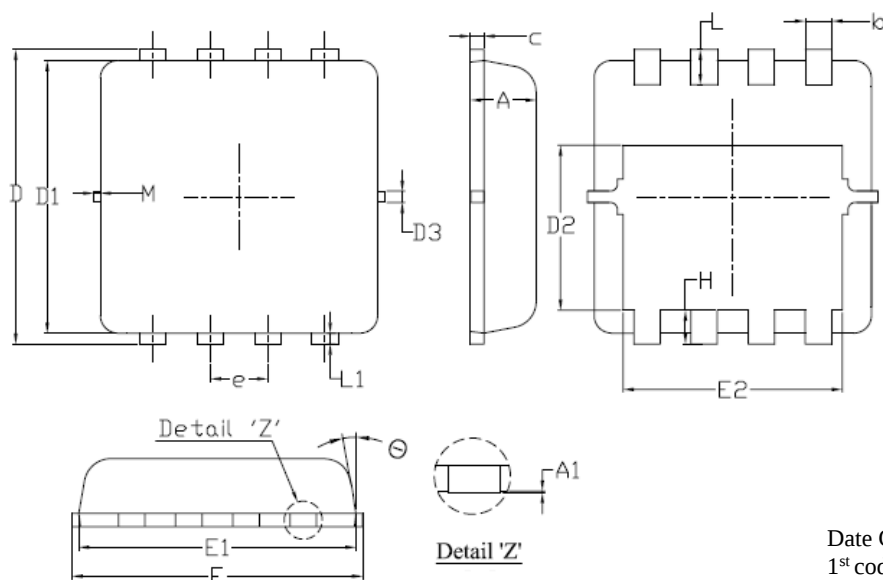
Apr→D, May→E, Jun→F, Jul→G, Aug→H,

Sep→J, Oct→K, Nov→L, Dec→M

3rd and 4th codes : production serial number, 01~99

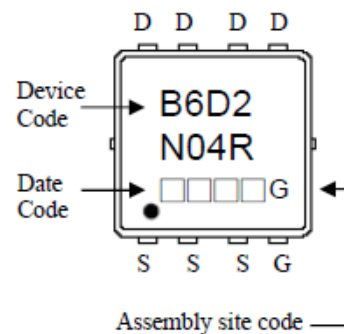
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.026	0.033	0.650	0.850	e	0.022	0.030	0.550	0.750
A1	0.006	REF	0.152	REF	L	0.012	0.020	0.300	0.500
A2	0.000	0.002	0.000	0.050	L1	0.007	0.019	0.180	0.480
D	0.114	0.122	2.900	3.100	L2	0.000	0.004	0.000	0.100
D1	0.091	0.102	2.300	2.600	L3	0.000	0.004	0.000	0.100
E	0.114	0.122	2.900	3.100	H	0.012	0.020	0.315	0.515
E1	0.124	0.136	3.150	3.450	θ	9°	13°	9°	13°
E2	0.060	0.076	1.535	1.935					
b	0.008	0.016	0.200	0.400					

DFN3x3 Dimension (G forming)



8-Lead DFN3x3 Plastic Package

Marking:



Date Code(counting from left to right) :

- 1st code: year code, the last digit of Christian year
 2nd 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
 3rd and 4th 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	E2	2.39	2.59	0.094	0.102
A1	0.00	0.05	0.000	0.002	e	0.65	BSC	0.026	BSC
b	0.25	0.35	0.010	0.014	H	0.30	0.50	0.012	0.020
c	0.10	0.25	0.004	0.010	L	0.30	0.50	0.012	0.020
D	3.25	3.45	0.128	0.136	L1	0.13	TYP	0.005	TYP
D1	3.00	3.20	0.118	0.126	θ	-	12°	-	12°
D2	1.78	1.98	0.070	0.077	M	-	0.15	-	0.006
D3	0.13	TYP	0.005	TYP					
E	3.00	3.40	0.118	0.134					
E1	3.00	3.20	0.118	0.126					