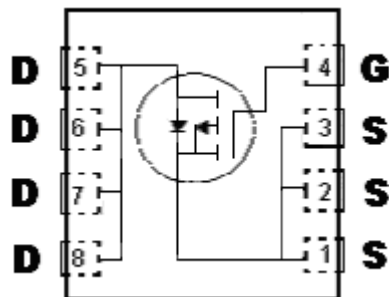


P-Channel Enhancement Mode Power MOSFET

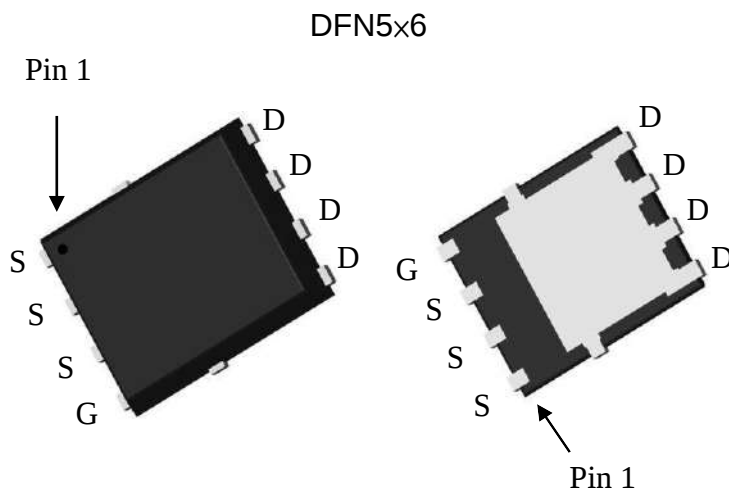
Features:

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Pb-free lead plating and Halogen-free package



G : Gate D : Drain S : Source

BV _{DSS}		-40V
I _D @V _{GS} =-12V, T _C =25°C		-49A
I _D @V _{GS} =-12V, T _A =25°C		-11A
R _{DS(on)} (TYP)	V _{GS} =-12V, I _D =-15A	8.3mΩ
	V _{GS} =-4.5V, I _D =-10A	12.6mΩ



Ordering Information

Device	Package	Shipping
KPRB010P04	DFN5x6 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	10s	Steady State	Unit
Drain-Source Voltage	V _{DS}	-40		V
Gate-Source Voltage	V _{GS}	±20		
Continuous Drain Current @ T _C =25°C, V _{GS} =-12V (Note1)	I _D	-49		A
Continuous Drain Current @ T _C =100°C, V _{GS} =-12V (Note1)		-31		
Continuous Drain Current @ T _A =25°C, V _{GS} =-12V (Note2)	I _{DSM}	-15.5	-11	
Continuous Drain Current @ T _A =70°C, V _{GS} =-12V (Note2)		-12.4	-8.8	
Pulsed Drain Current (Note3)	I _{DM}	-160		
Avalanche Current @ L=0.1mH	I _{AS}	-56		mJ
Avalanche Energy @ L=1mH, I _D =-26A, V _{DD} =-10V (Note4)	E _{AS}	338		
Total Power Dissipation	P _D	T _C =25°C (Note1)	50	W
		T _C =100°C (Note1)	20	
	P _{DSM}	T _A =25°C (Note2)	5.0	
		T _A =70°C (Note2)	3.2	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+150		°C

Thermal Data

Parameter	Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-case	R _{th,j-c}	2	2.5	°C/W
Thermal Resistance, Junction-to-ambient (Note2)	R _{th,j-a}	t≤10s	18	
		Steady State	45	

Note : 1. 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.

2. 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_{DSM} 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.

3. 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.

4. 100% tested by conditions of L=100μH, I_{AS}=-10A, V_{GS}=-10V, V_{DD}=-15V

Characteristics (T_C=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} *1	-	24	-	S	V _{DS} =-10V, I _D =-20A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	-1	μA	V _{DS} =-32V, V _{GS} =0V
	-	-	-25		V _{DS} =-32V, V _{GS} =0V, T _J =85°C
R _{DS(ON)} *1	-	8.3	12.5	mΩ	V _{GS} =-12V, I _D =-15A
	-	12.6	18.0		V _{GS} =-4.5V, I _D =-10A

Dynamic *4					
Ciss	-	3254	-	pF	V _{DS} =-20V, V _{GS} =0V, f=1MHz
Coss	-	269	-		
Crss	-	198	-		
Qg *1, 2	-	66	99	nC	V _{DS} =-20V, V _{GS} =-10V, I _D =-15A
Qgs *1, 2	-	10	-		
Qgd *1, 2	-	14	-		
t _{d(ON)} *1, 2	-	17.6	26.4	ns	V _{DS} =-20V, I _D =-15A, V _{GS} =-10V, R _G =1Ω
t _r *1, 2	-	20.2	30.3		
t _{d(OFF)} *1, 2	-	88.4	132.6		
t _f *1, 2	-	18.8	28.2		
R _g	-	4.7	-	Ω	f=1MHz
Source-Drain Diode					
V _{SD} *1	-	-0.82	-1.2	V	I _S =-10A, V _{GS} =0V
t _{rr}	-	16.6	-	ns	I _F =-10A, dI _F /dt=100A/μs
Q _{rr}	-	11.7	-	nC	

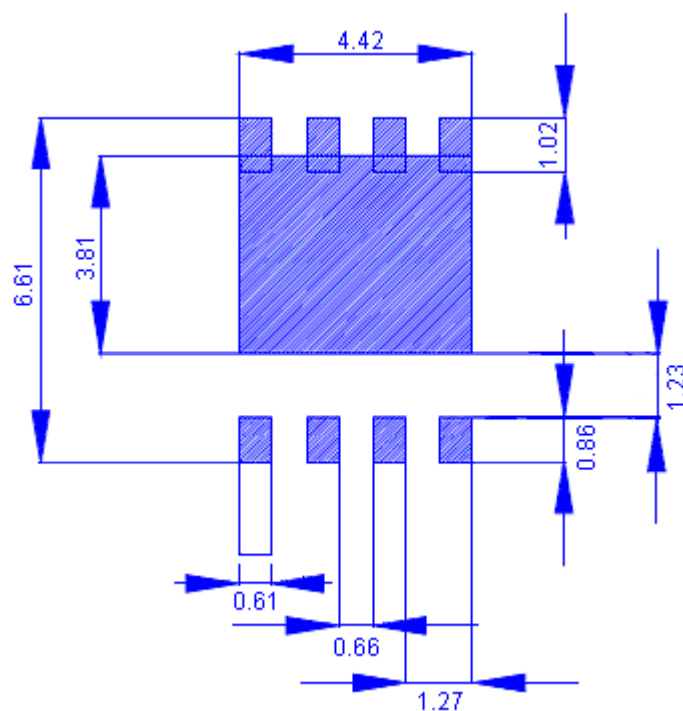
Note : *1.Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

*2.Independent of operating temperature

*3.Pulse width limited by maximum junction temperature.

*4.Guaranteed by design, not subject to production testing.

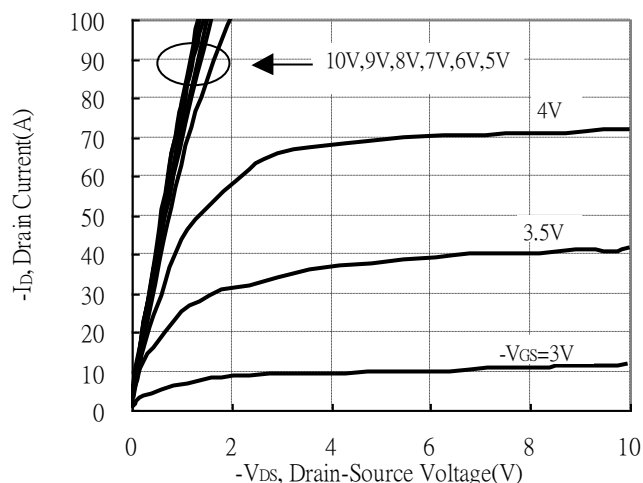
Recommended Soldering Footprint



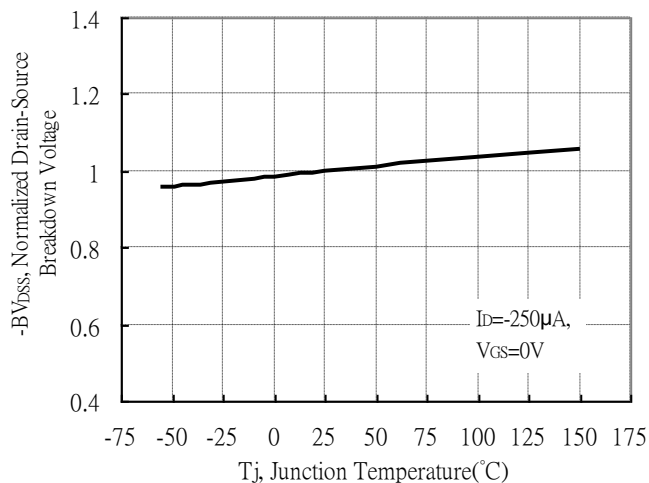
unit : mm

Typical Characteristics

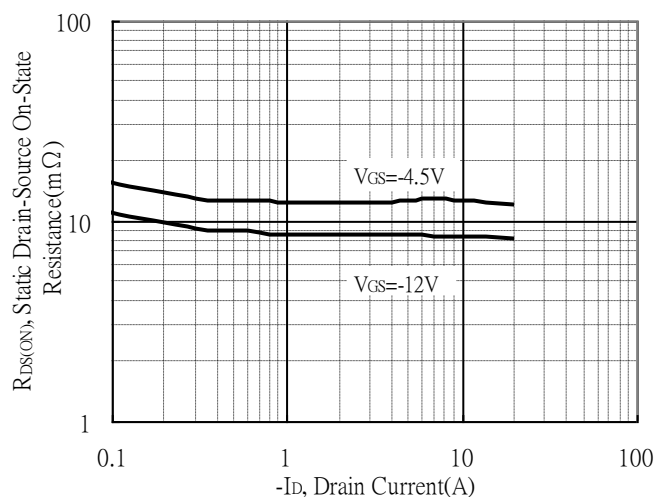
Typical Output Characteristics



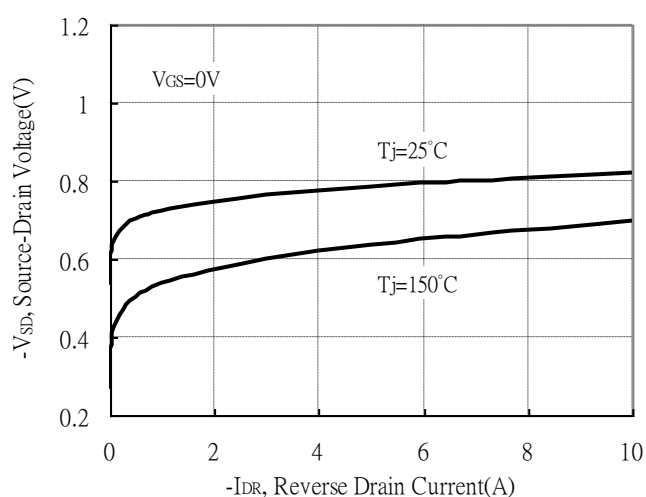
Breakdown Voltage vs Ambient Temperature



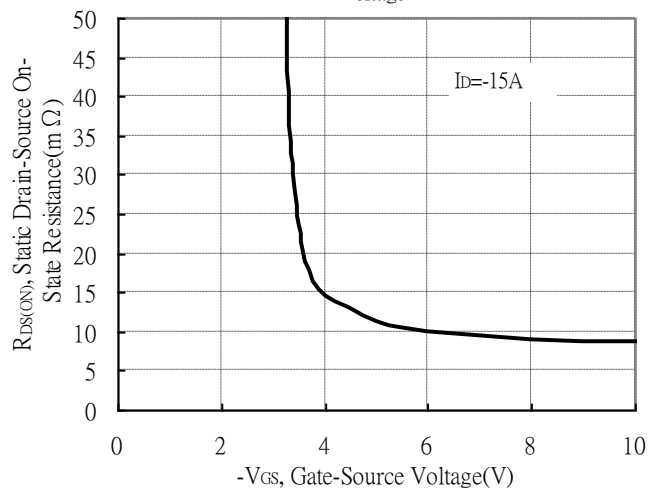
Static Drain-Source On-State resistance vs Drain Current



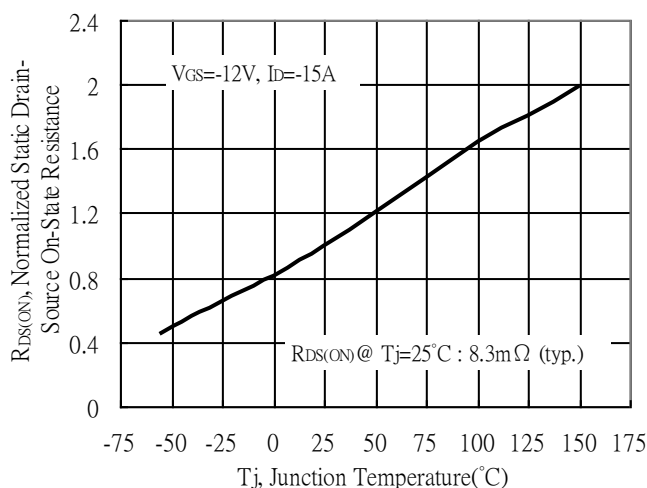
Reverse Drain Current vs Source-Drain Voltage



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

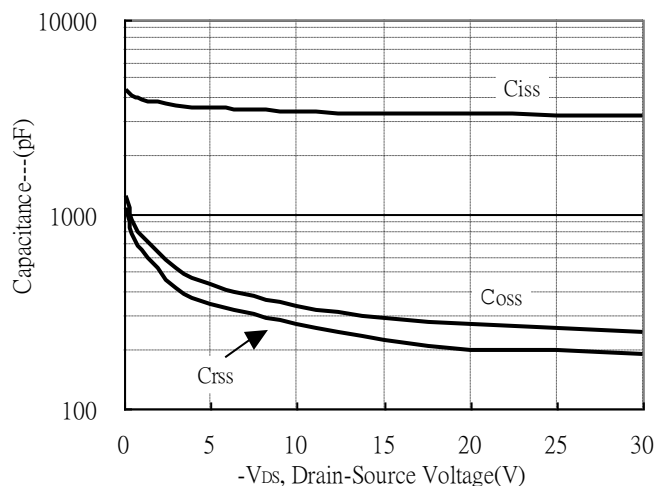


Drain-Source On-State Resistance vs Junction Temperature

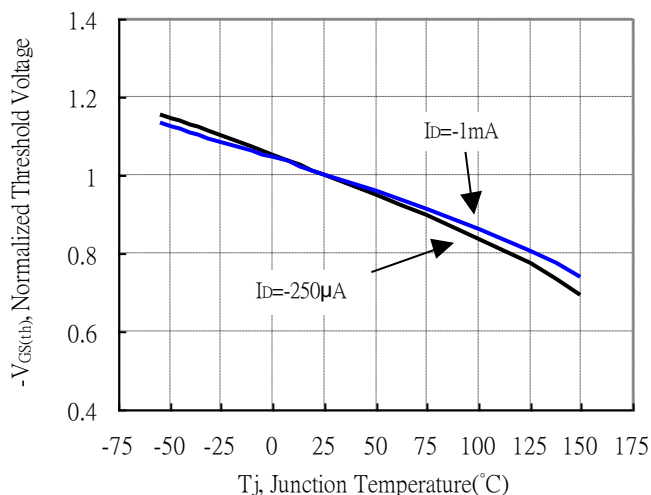


Typical Characteristics(Cont.)

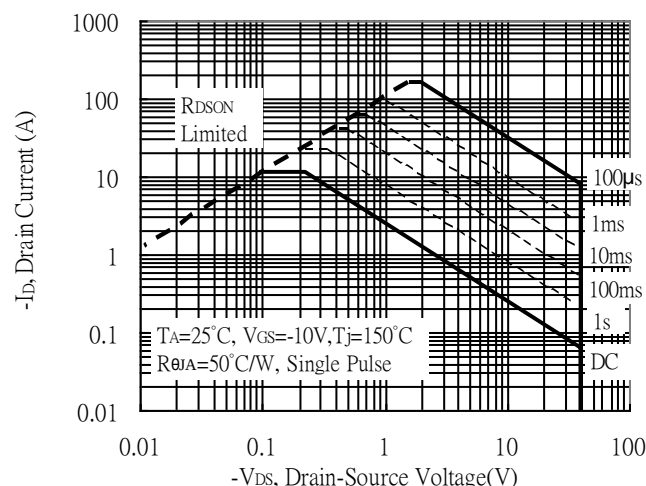
Capacitance vs Drain-to-Source Voltage



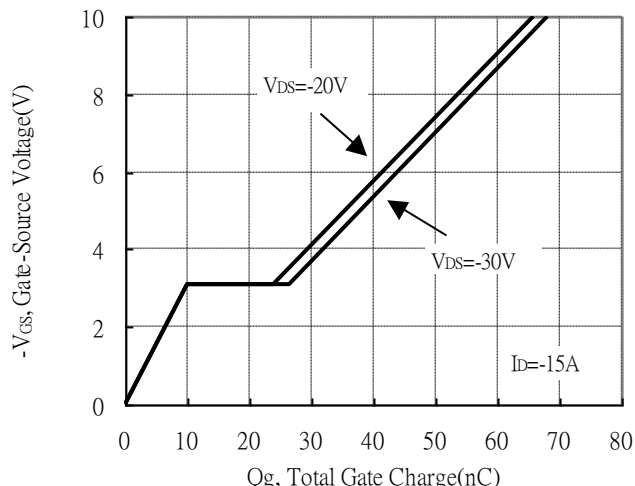
Threshold Voltage vs Junction Temperature



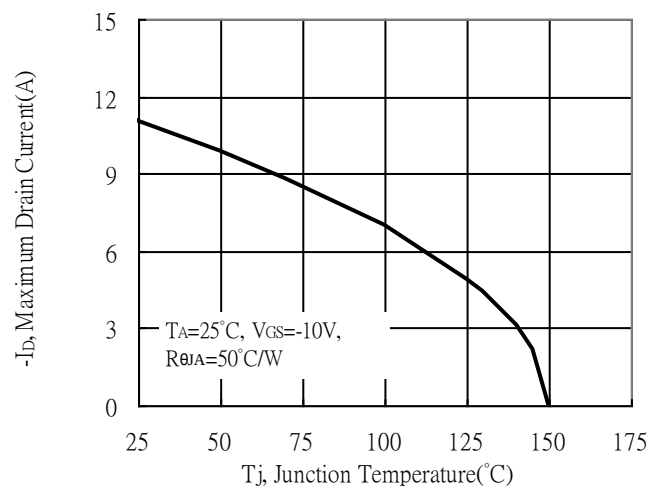
Maximum Safe Operating Area



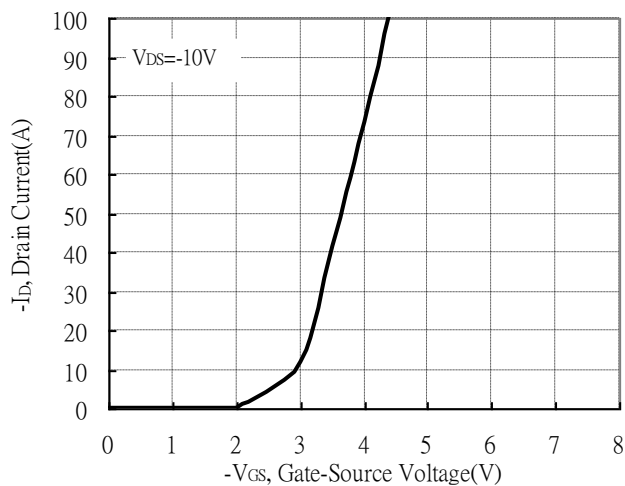
Gate Charge Characteristics



Maximum Drain Current vs Junction Temperature

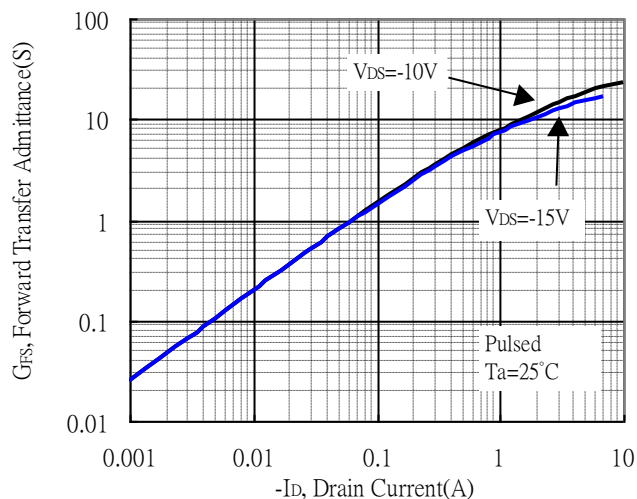


Typical Transfer Characteristics

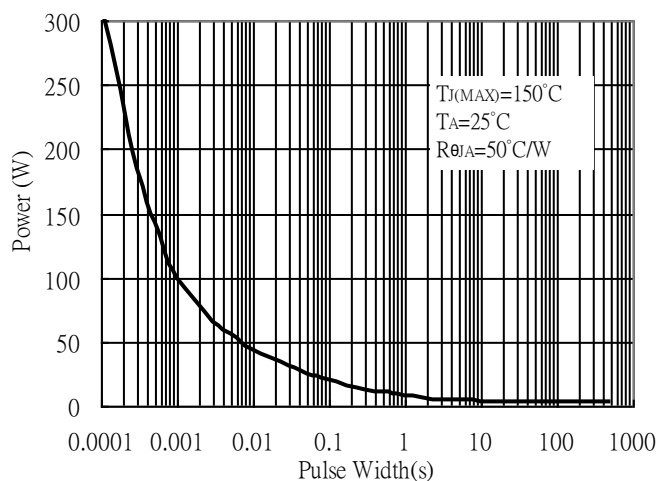


Typical Characteristics(Cont.)

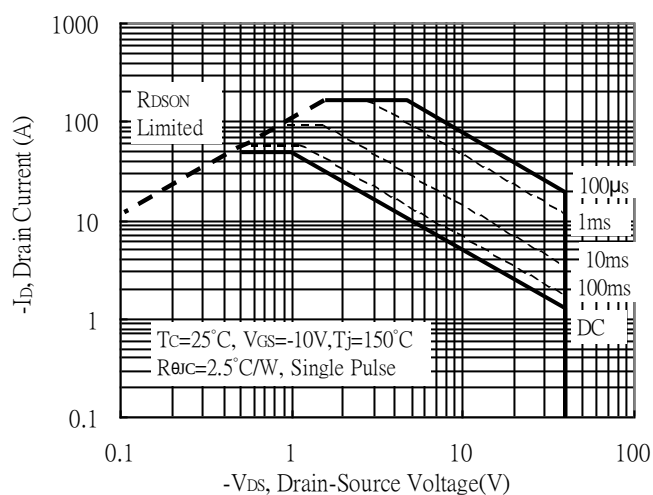
Forward Transfer Admittance vs Drain Current



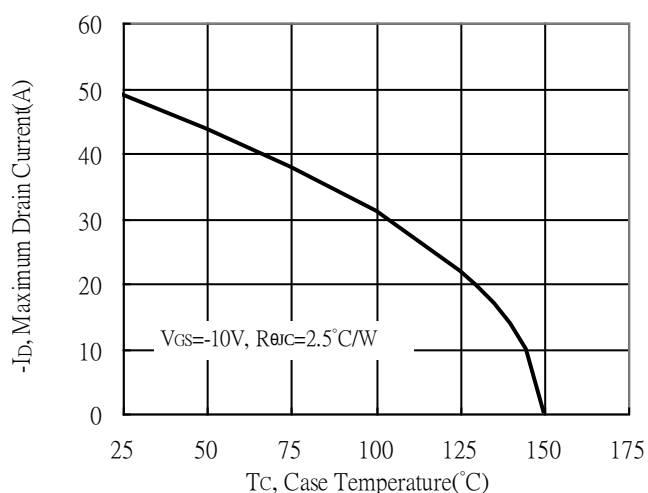
Single Pulse Maximum Power Dissipation



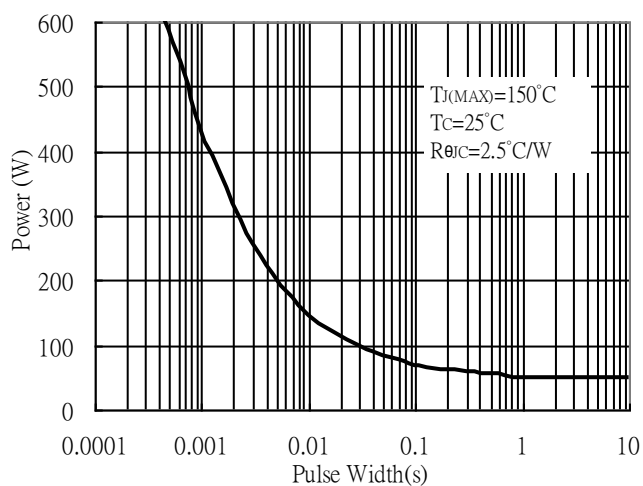
Maximum Safe Operating Area



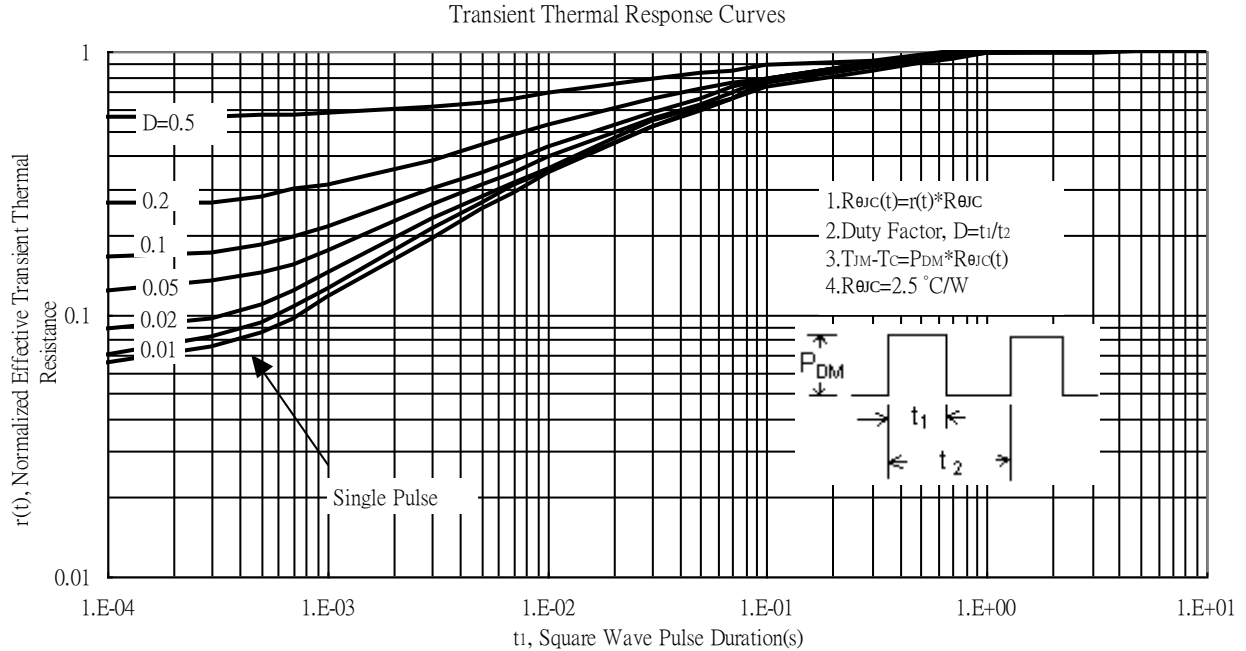
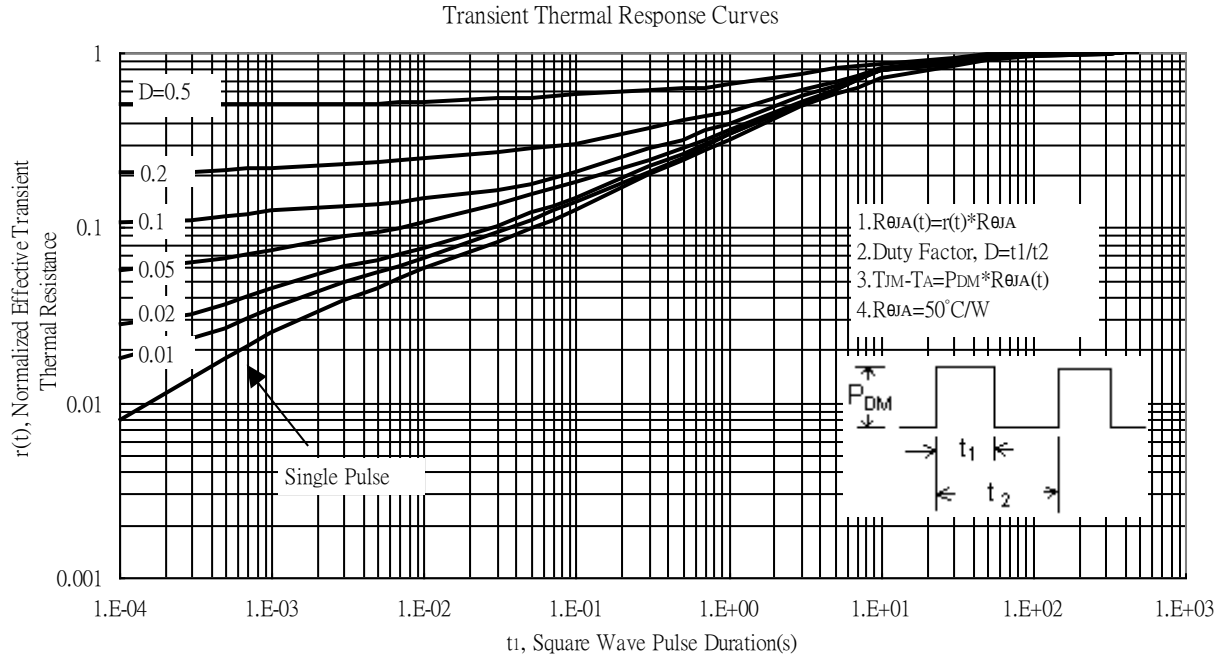
Maximum Drain Current vs Case Temperature



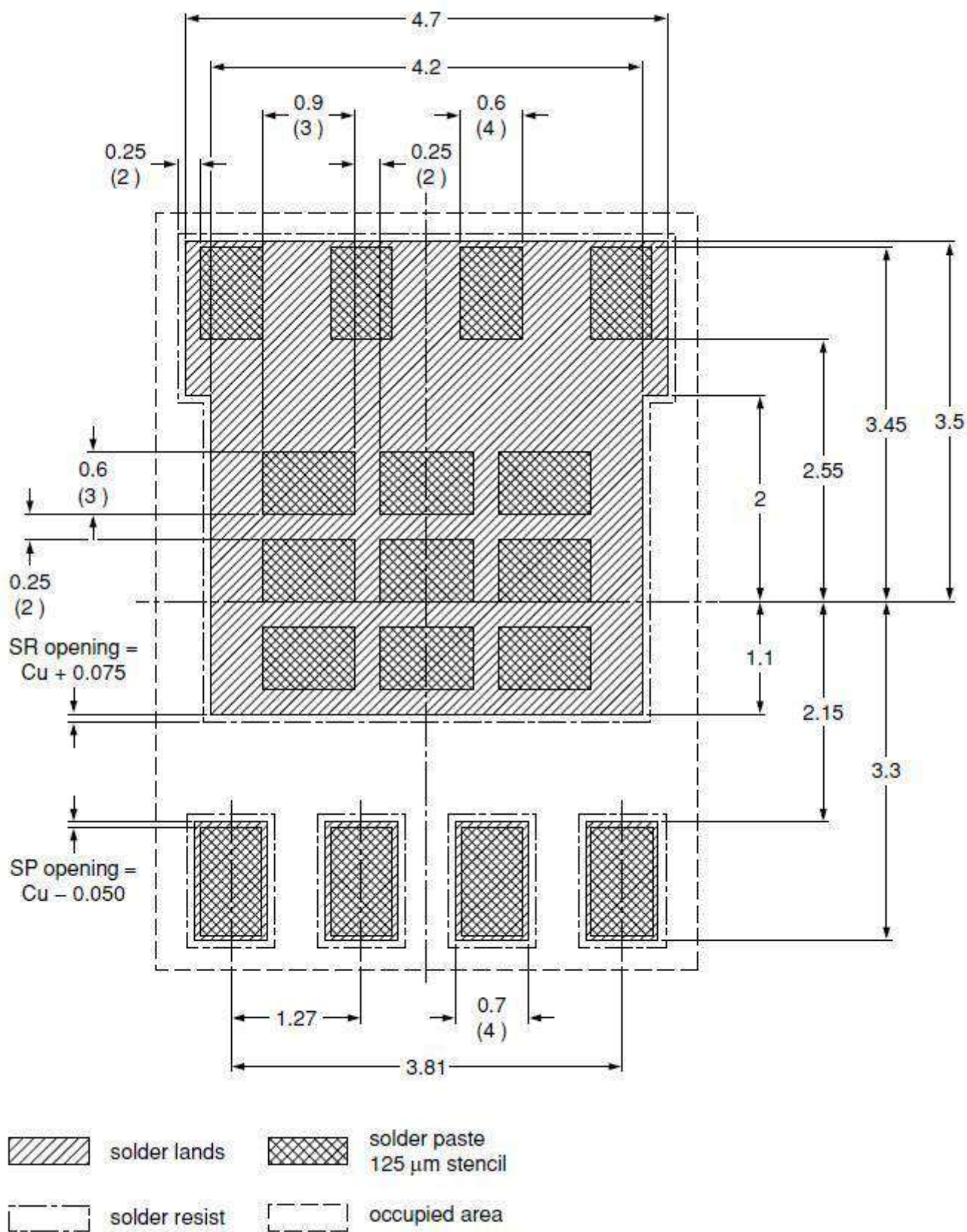
Single Pulse Maximum Power Dissipation



Typical Characteristics(Cont.)

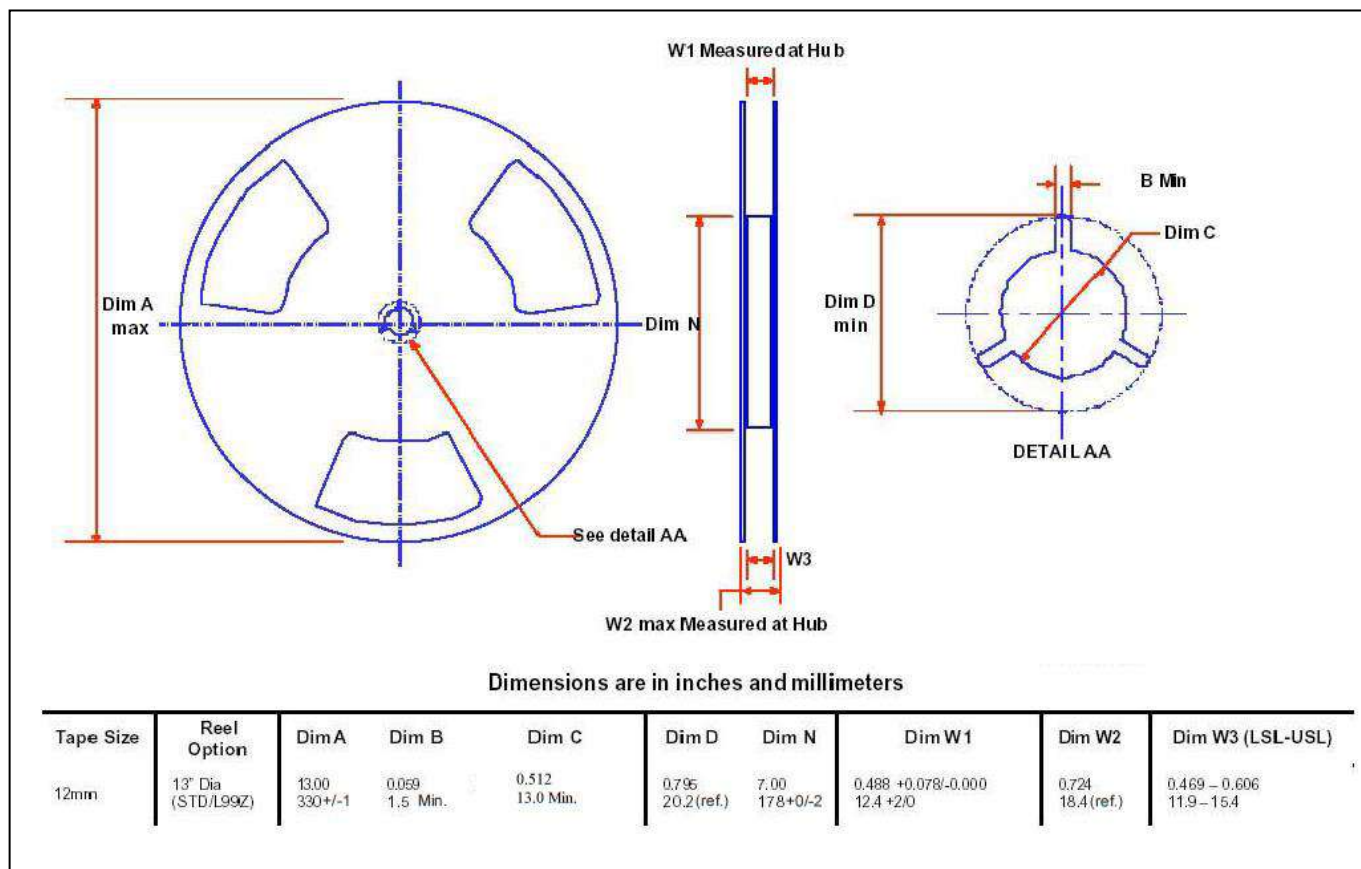


Recommended Soldering Footprint & Stencil Design

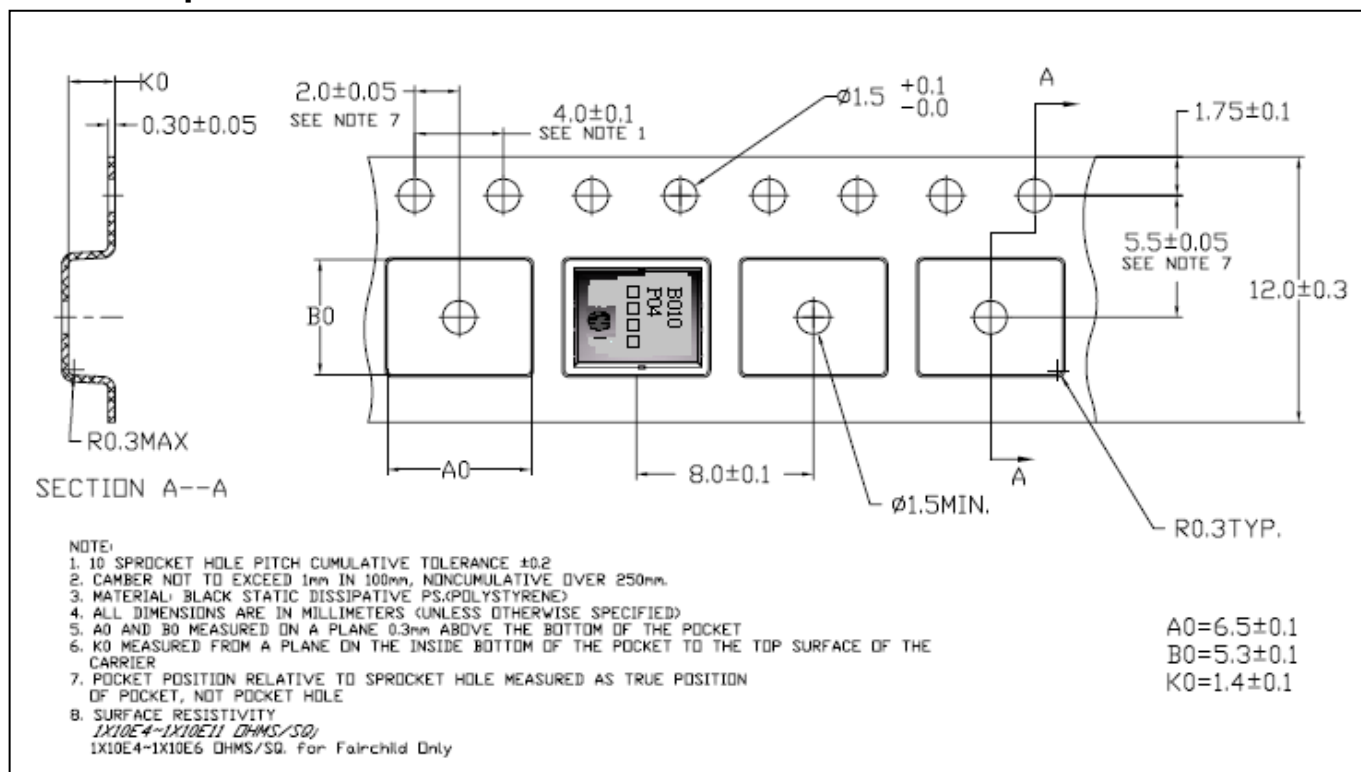


unit : mm

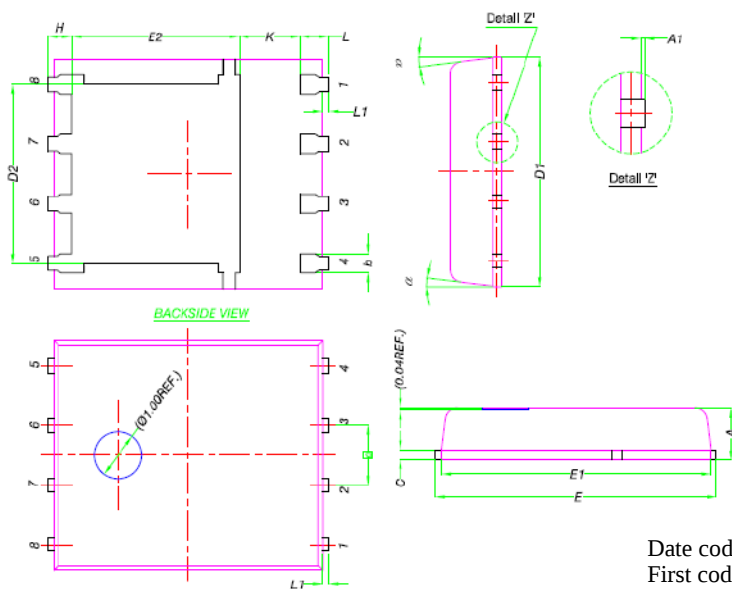
Reel Dimension



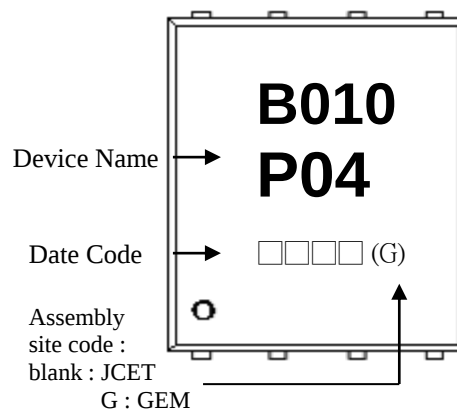
Carrier Tape Dimension



DFN5×6 Dimension



Marking:



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	0.90	1.10	0.035	0.043	E2	3.38	3.78	0.133	0.149
A1	0.00	0.05	0.000	0.002	e	1.27	BSC	0.050	BSC
b	0.33	0.51	0.013	0.020	H	0.41	0.61	0.016	0.024
C	0.20	0.30	0.008	0.012	K	1.10	-	0.043	-
D1	4.80	5.00	0.189	0.197	L	0.51	0.71	0.020	0.028
D2	3.61	3.96	0.142	0.156	L1	0.06	0.20	0.002	0.008
E	5.90	6.10	0.232	0.240	θ	8°	12°	8°	12°
E1	5.70	5.80	0.224	0.228					