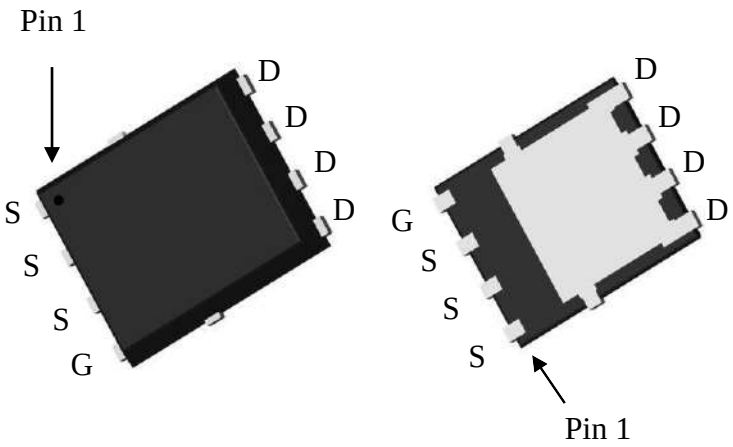
N-Channel Enhancement Mode Power MOSFET

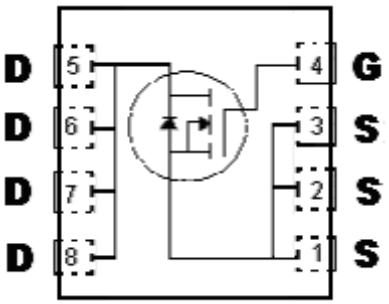
Features:

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

DFN5×6



BV_{DSS}		120V
I_D@V_{GS}=10V, T_C=25°C		40A
I_D@V_{GS}=10V, T_A=25°C		13.4A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=11.5A	10 mΩ



G：Gate D：Drain S：Source

Ordering Information

Device	Package	Shipping
KPRE013N12R	DFN 5 ×6 (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}	120		V
Gate-Source Voltage			V_{GS}	±20		
Continuous Drain Current @ T_C=25°C, V_{GS}=10V		(Note 1)	I_D	40		A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V		(Note 1)		28.2		
Continuous Drain Current @ T_A=25°C, V_{GS}=10V		(Note 2)	I_{DSM}	13.4	8.9	
Continuous Drain Current @ T_A=70°C, V_{GS}=10V		(Note 2)		10.7	7.1	
Continuous Drain Current @ T_A=85°C, V_{GS}=10V		(Note 2)		9.7	6.4	
Pulsed Drain Current		(Note 3)	I_{DM}	160 *1		
Avalanche Current @ L=0.1mH(Typical)		(Note 3)	I_{AS}	35		
Avalanche Energy @ L=0.5mH		(Note 2)	E_{AS}	81		mJ
Total Power Dissipation	T_C=25℃	(Note 1)	P_D	50		W
	T_C=100℃	(Note 1)		20		
	T_A=25°C	(Note 2)	P_{DSM}	5.7	2.5	
	T_A=70°C	(Note 2)		4.0	1.8	
	T_A=85°C	(Note 2)		3.6	1.6	
Operating Junction and Storage Temperature Range			Tj, Tstg	-55~+150		°C

Thermal Data

Parameter		Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-ambient (Note 2)	t≤10s	$R_{\theta JA}$	18	22	°C/W
	Steady State		42	50	
Thermal Resistance, Junction-to-case		$R_{\theta JC}$	2.2	2.5	

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 $R_{\theta JA}$ 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 $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3.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.

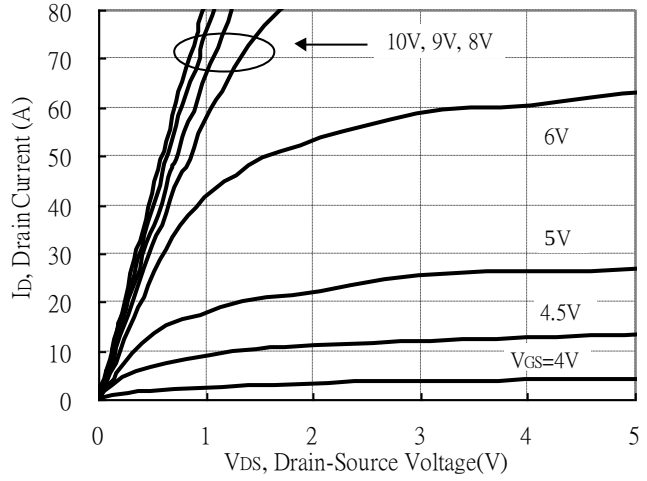
Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	120	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	2	-	4		V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	11	-	S	V_{DS} =5V, I_D=5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =96V, V_{GS} =0V
	-	-	5		V_{DS} =96V, V_{GS} =0V, Tj=55°C
$R_{DS(ON)}$ *1	-	10	14	mΩ	V_{GS} =10V, I_D=11.5A
Dynamic					
Ciss	-	2559	-	pF	V_{GS}=0V, V_{DS}=60V, f=1MHz
Coss	-	218	-		
Crss	-	15	-		
Qg *1, 2	-	36	-	nC	V_{DS}=96V, V_{GS}=10V, I_D=22A
Qgs *1, 2	-	14.5	-		
Qgd *1, 2	-	7.3	-		
$t_{d(ON)}$ *1, 2	-	24.4	-	ns	V_{DD}=60V, I_D=16A, V_{GS}=10V, R_G=4.7Ω
tr *1, 2	-	10.2	-		
$t_{d(OFF)}$ *1, 2	-	40.6	-		
t_f *1, 2	-	10.2	-		
Rg	-	0.7	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	40	A	
I_{SM} *3	-	-	160		
V_{SD} *1	-	0.82	1.2	V	I_S=15A, V_{GS}=0V
trr	-	45.2	-	ns	I_F=32A, dI_F/dt=100A/μs
Qrr	-	82.7	-	nC	

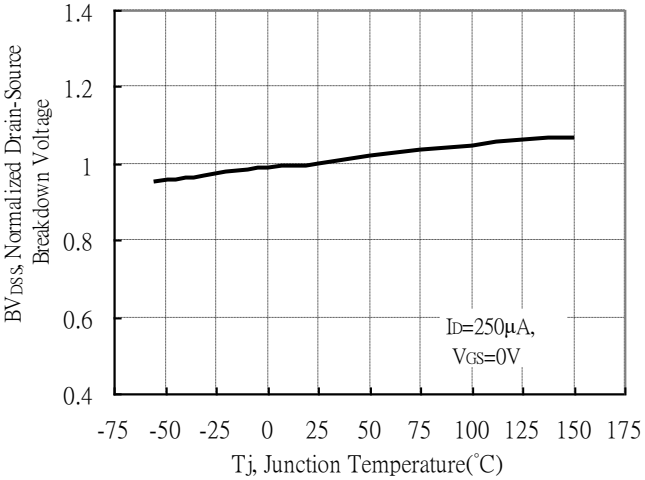
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Typical Characteristics

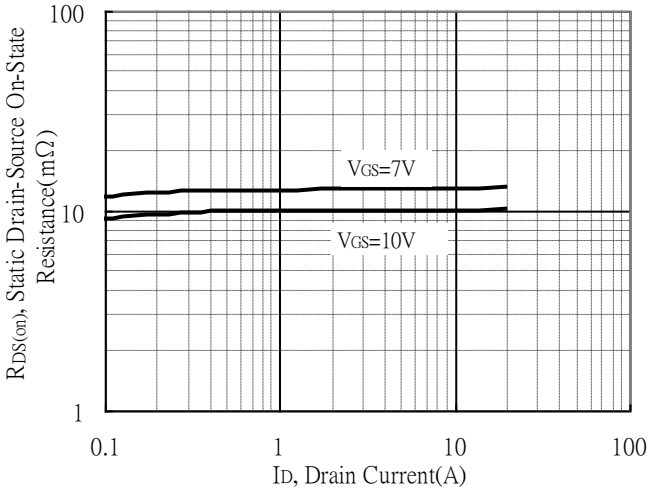
Typical Output Characteristics



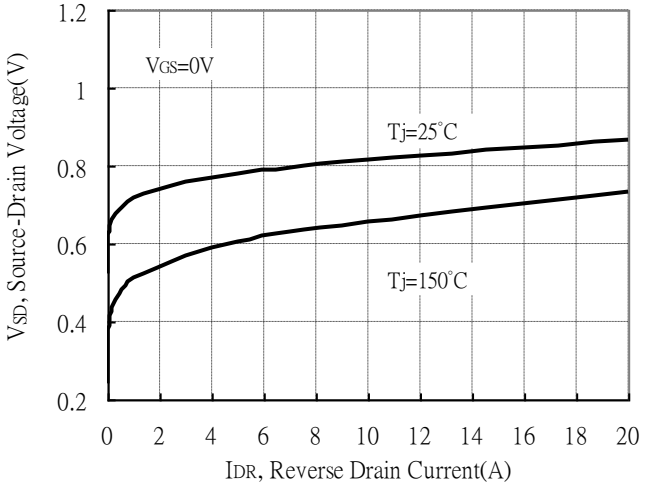
Brekdown Voltage vs Ambient Temperature



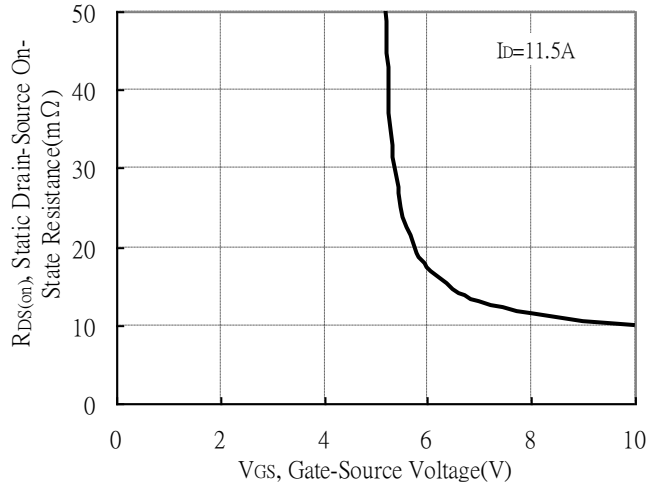
Static Drain-Source On-State resistance vs Drain Current



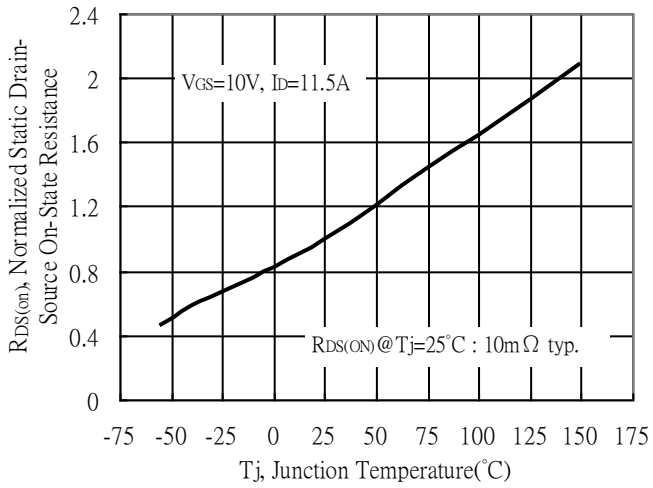
Reverse Drain Current vs Source-Drain Voltage



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

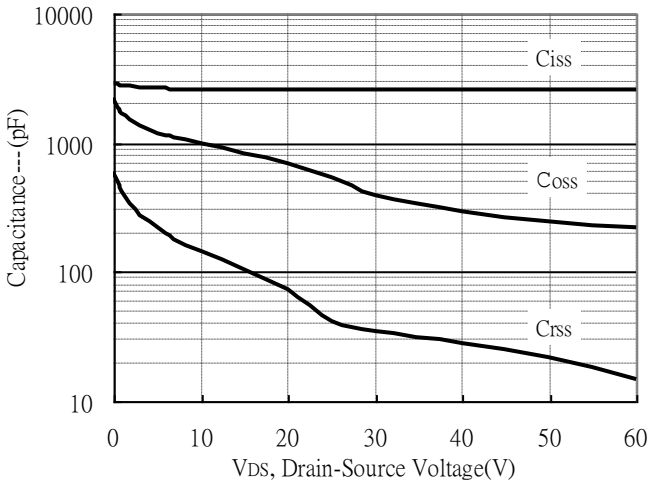


Drain-Source On-State Resistance vs Junction Tempearture

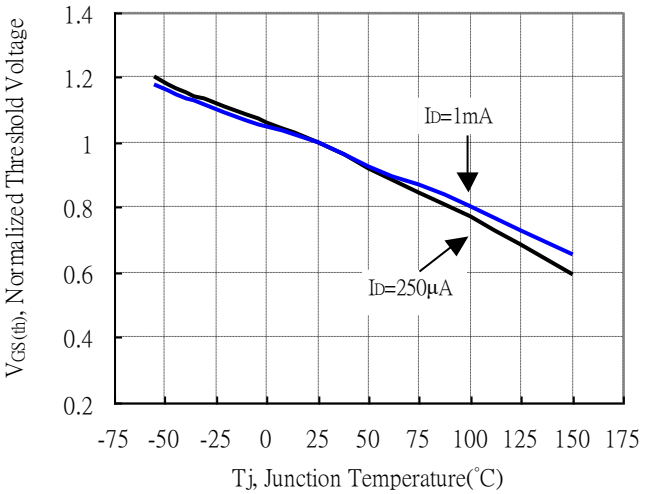


Typical Characteristics(Cont.)

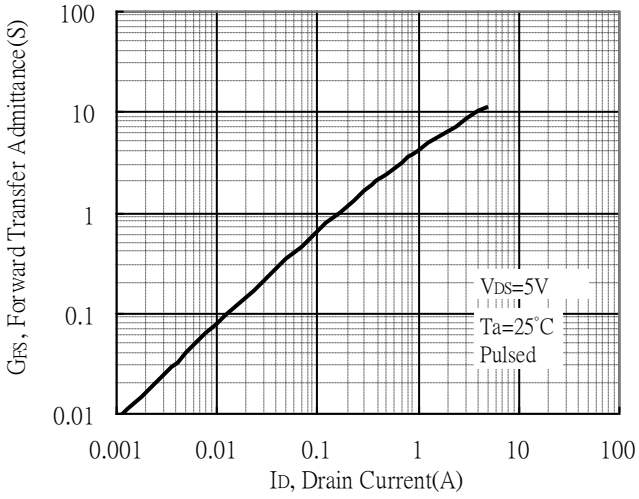
Capacitance vs Drain-to-Source Voltage



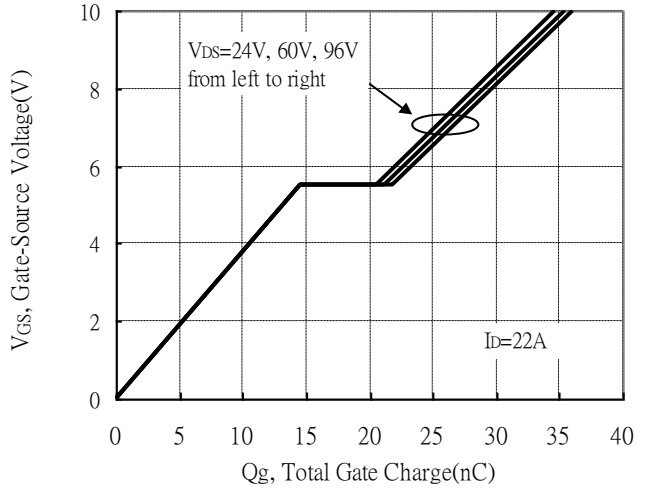
Threshold Voltage vs Junction Tempearture



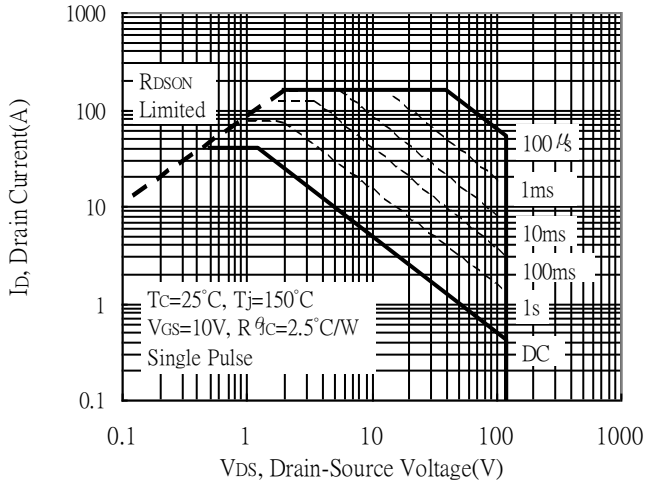
Forward Transfer Admittance vs Drain Current



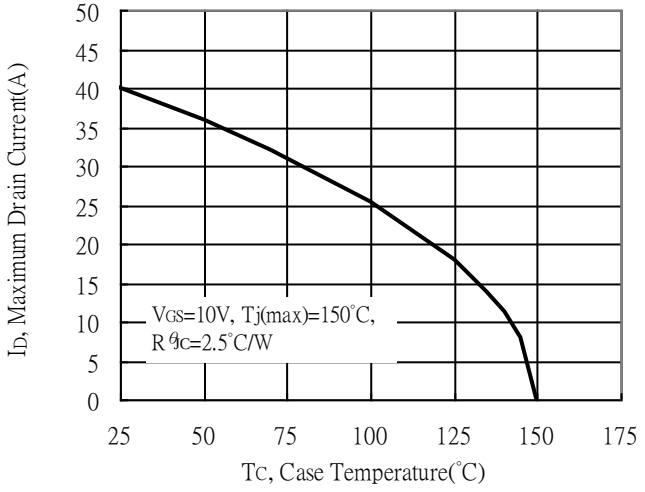
Gate Charge Characteristics



Maximum Safe Operating Area

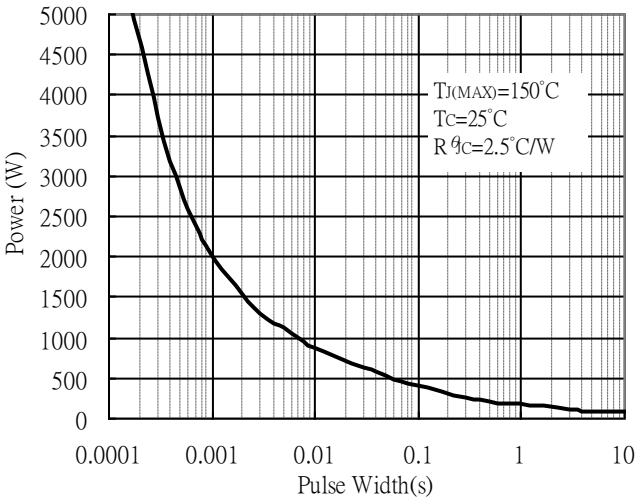


Maximum Drain Current vs Case Temperature

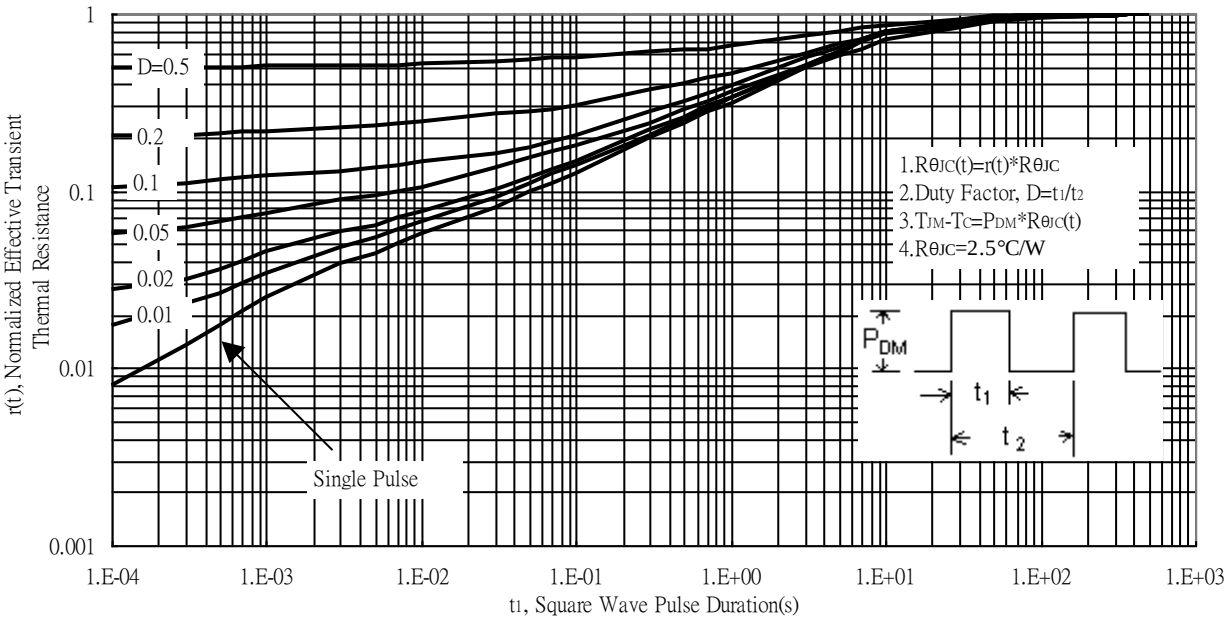


Typical Characteristics(Cont.)

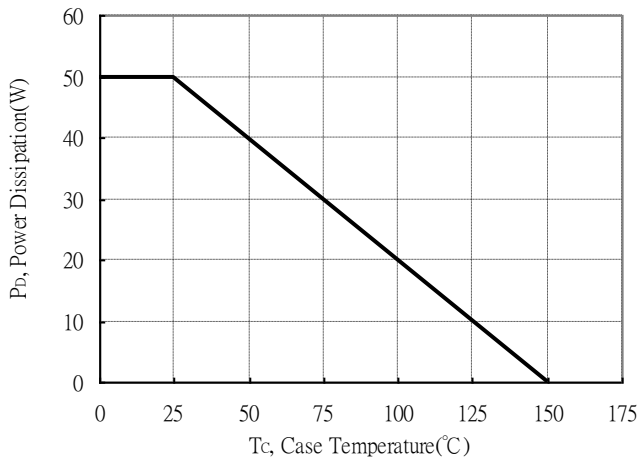
Single Pulse Power Rating, Junction to Case



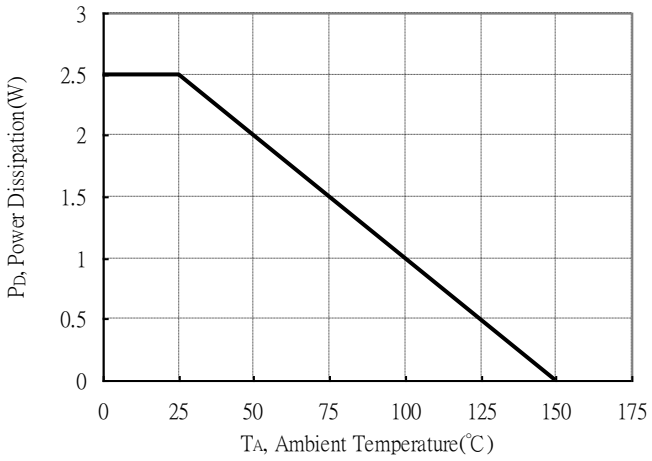
Transient Thermal Response Curves



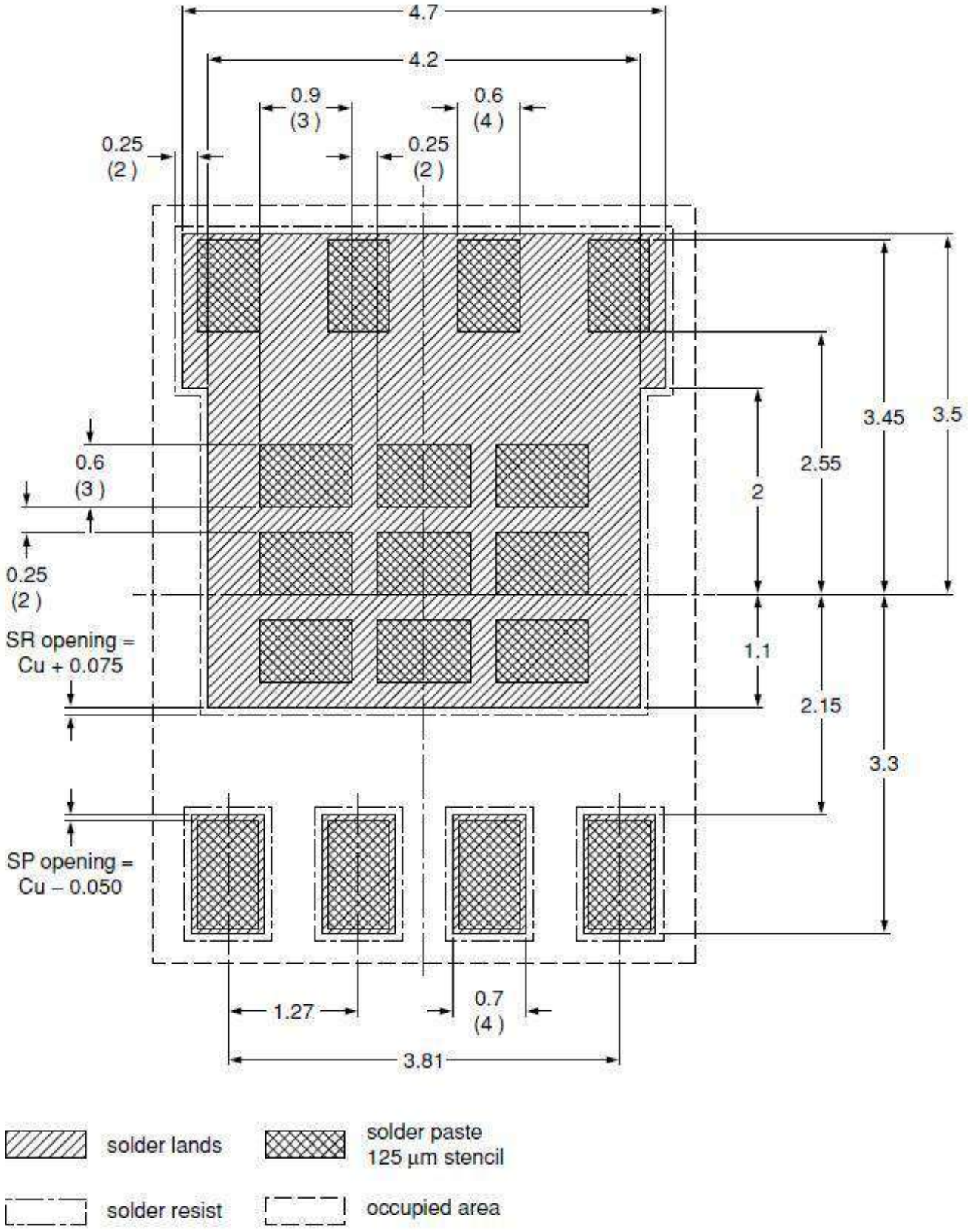
Power Derating Curve



Power Derating Curve

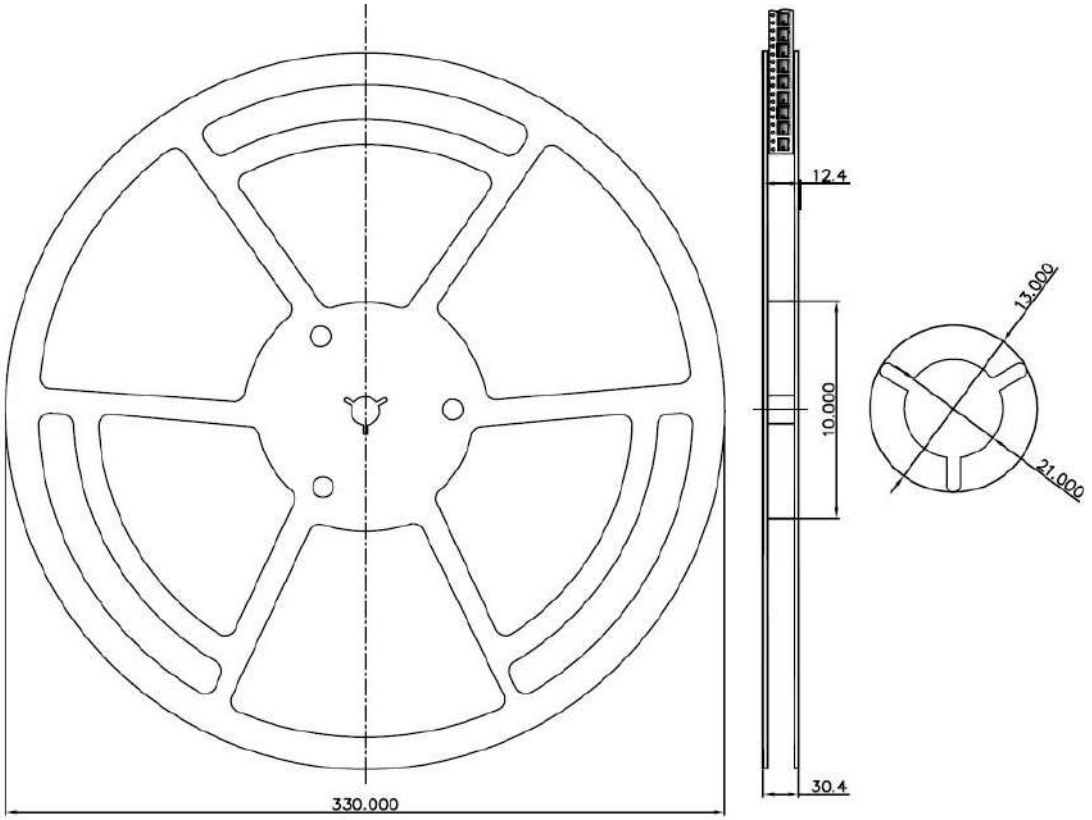


Recommended Soldering Footprint & Stencil Design

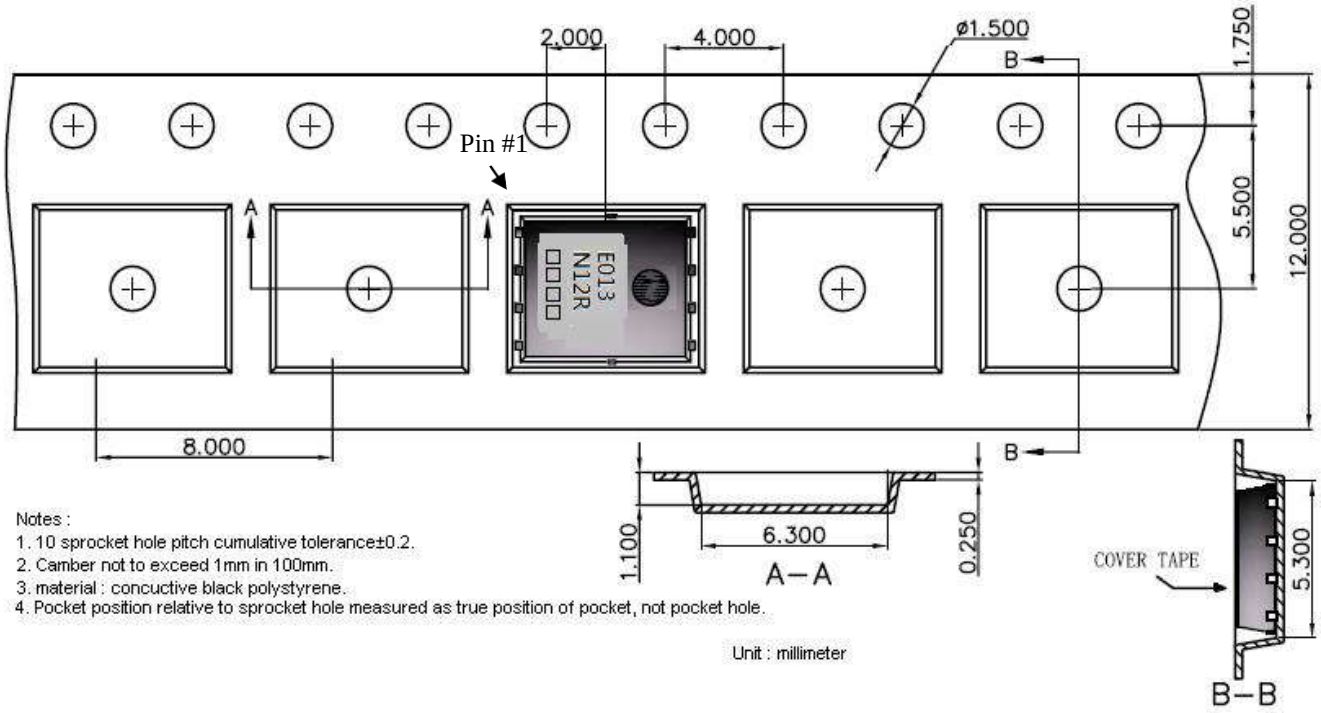


unit : mm

Reel Dimension



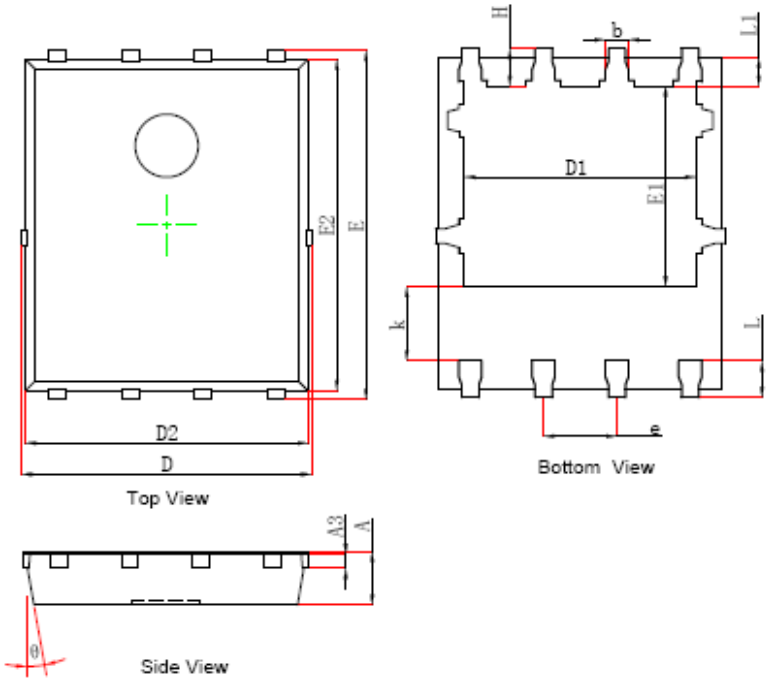
Carrier Tape Dimension



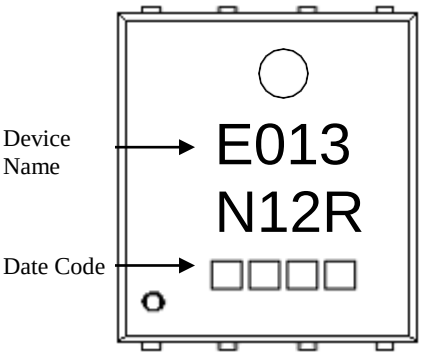
Notes :
1. 10 sprocket hole pitch cumulative tolerance±0.2.
2. Camber not to exceed 1mm in 100mm.
3. material : concuctive black polystyrene.
4. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

DFN5x6 Dimension



Marking :



8-Lead DFN5x6 Plastic Package

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	k	1.190	1.390	0.047	0.055
A3	0.254 REF		0.010 REF		b	0.350	0.450	0.014	0.018
D	4.944	5.096	0.195	0.201	e	1.270 TYP.		0.050 TYP.	
E	5.974	6.126	0.235	0.241	L	0.559	0.711	0.022	0.028
D1	3.910	4.110	0.154	0.162	L1	0.424	0.576	0.017	0.023
E1	3.375	3.575	0.133	0.141	H	0.574	0.726	0.023	0.029
D2	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°
E2	5.674	5.826	0.223	0.229					