

N-Channel Enhancement Mode Power MOSFET

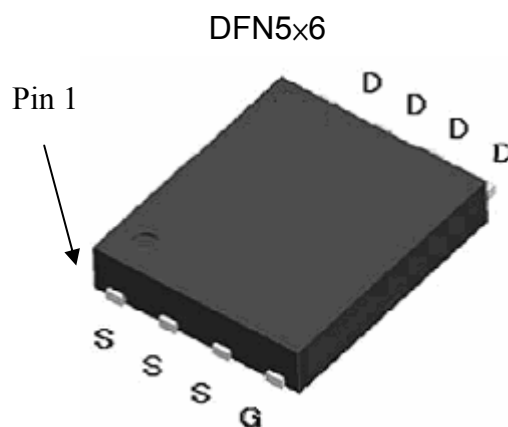
Description

The KPRA65N15 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.

Features

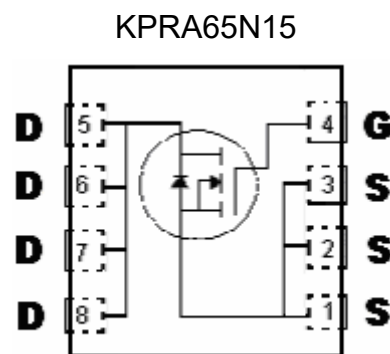
- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Dynamic dv/dt rating
- Repetitive Avalanche Rated
- Pb-free lead plating and Halogen-free package

Outline



Symbol

BV _{DSS}		150V
I _D @ V _{GS} =10V		20A
R _{DS(on)} (TYP)	V _{GS} =10V, I _D =15A	60mΩ
	V _{GS} =5V, I _D =10A	59mΩ
	V _{GS} =3V, I _D =3A	60mΩ



G : Gate
D : Drain
S : Source

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _{GS}	±16	
Continuous Drain Current @ T _C =25°C, V _{GS} =10V (Note 1)	I _D	20	A
Continuous Drain Current @ T _C =100°C, V _{GS} =10V (Note 1)		14	
Continuous Drain Current @ T _A =25°C, V _{GS} =10V (Note 2)	I _{DSM}	4.0 *3	
Continuous Drain Current @ T _A =70°C, V _{GS} =10V (Note 2)		3.2 *3	
Pulsed Drain Current (Note 3)	I _{DM}	60 *1	
Avalanche Current (Note 3)	I _{AS}	20	
Avalanche Energy @ L=0.1mH, I _D =20A, V _{DD} =50V (Note 2)	E _{AS}	20	mJ
Repetitive Avalanche Energy @ L=0.05mH (Note 3)	E _{AR}	6 *2	
Total Power Dissipation	P _D	T _C =25°C (Note 1) 60	W
		T _C =100°C (Note 1) 30	
	P _{DSM}	T _A =25°C (Note 2) 2.5	
		T _A =70°C (Note 2) 1.6	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+175	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{θJC}	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R _{θJA}	50	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 4)	R _{θJA}	125	°C/W

- Note : 1. The power dissipation P_D is based on T_{J(MAX)}=175°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. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.
4. When mounted on the minimum pad size recommended (PCB mount), t≤10s.

Ordering Information

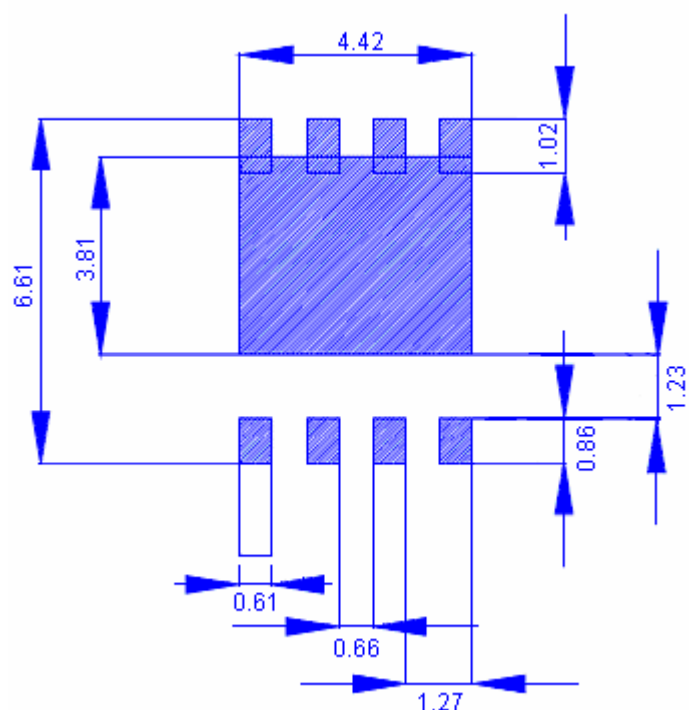
Device	Package	Shipping
KPRA65N15	DFN 5 ×6 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	150	-	-	V	V _{GS} =0V, I _D =250μA
ΔBV _{DSS} /ΔT _j	-	0.12	-	V/°C	Reference to 25°C, I _D =250μA
V _{GS(th)}	0.4	0.8	1.5	V	V _{DS} = V _{GS} , I _D =250μA
G _{FS} *1	-	48	-	S	V _{DS} =5V, I _D =10A
I _{GSS}	-	-	±100	nA	V _{GS} =±16V
I _{DSS}	-	-	1	μA	V _{DS} =120V, V _{GS} =0V
	-	-	25		V _{DS} =100V, V _{GS} =0V, T _j =125°C
R _{DS(ON)} *1	-	60	75	mΩ	V _{GS} =10V, I _D =15A
	-	59	75		V _{GS} =5V, I _D =10A
	-	60	78		V _{GS} =3V, I _D =3A
Dynamic					
C _{iss}	-	2282	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	-	120	-		
C _{rss}	-	66	-		
Q _g *1, 2	-	30	-	nC	I _D =10A, V _{DS} =80V, V _{GS} =5V
Q _{gs} *1, 2	-	4.8	-		
Q _{gd} *1, 2	-	16	-		
t _{d(ON)} *1, 2	-	23	-	ns	V _{DS} =75V, I _D =1A, V _{GS} =4.5V, R _G =6Ω
t _r *1, 2	-	22	-		
t _{d(OFF)} *1, 2	-	91	-		
t _f *1, 2	-	63	-		
Source-Drain Diode					
I _S *1	-	-	20	A	
I _{SM} *3	-	-	60		
V _{SD} *1	-	0.85	1.3	V	I _S =20A, V _{GS} =0V
t _{rr}	-	50	-	ns	I _F =20A, dI _F /dt=100A/μs
Q _{rr}	-	120	-	nC	

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

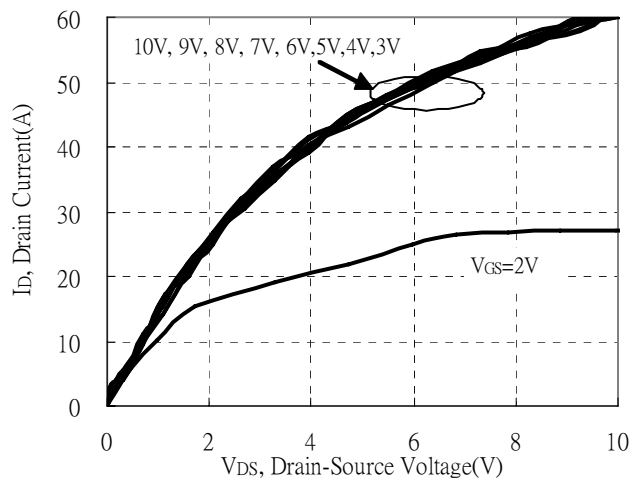
Recommended Soldering Footprint



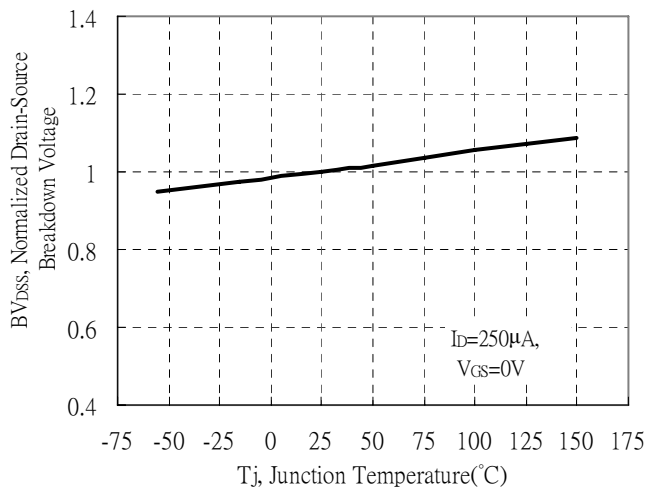
unit : mm

Typical Characteristics

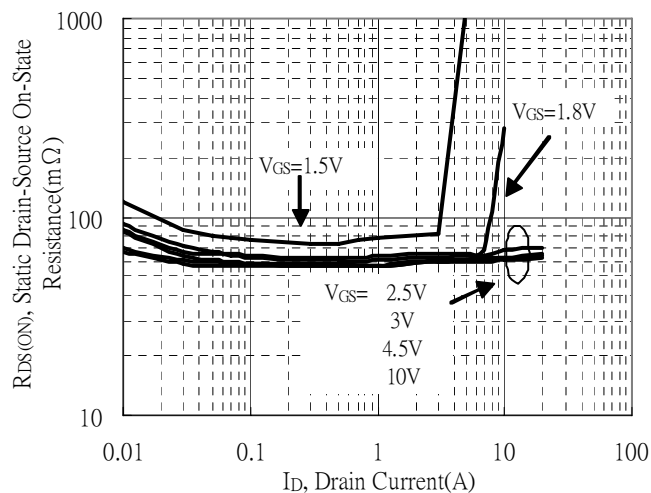
Typical Output Characteristics



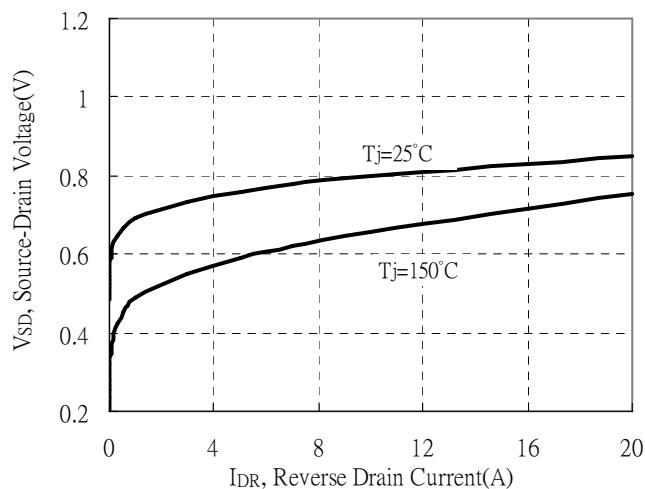
Breakdown Voltage vs Ambient Temperature



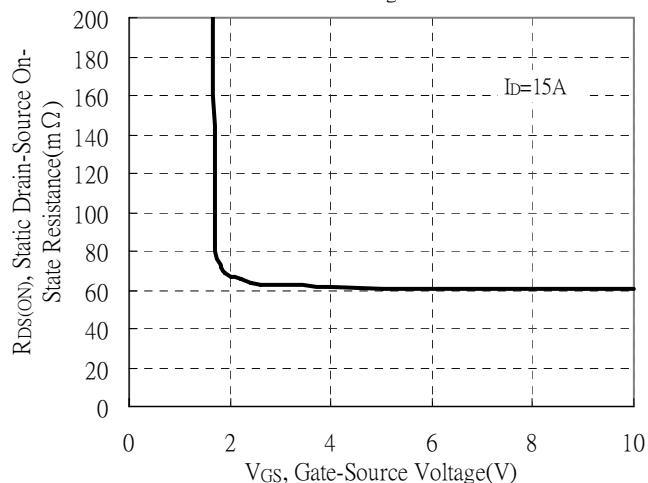
Static Drain-Source On-State resistance vs Drain Current



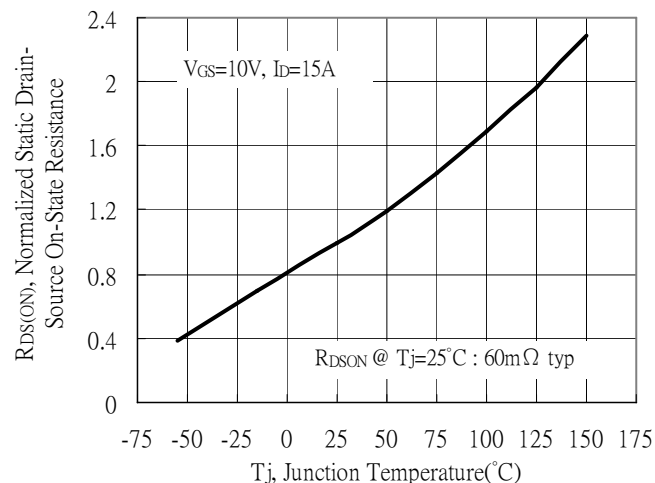
Reverse Drain Current vs Source-Drain Voltage



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

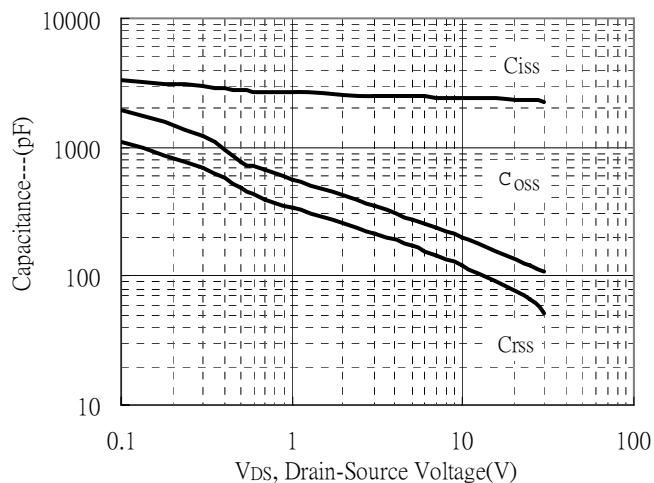


Drain-Source On-State Resistance vs Junction Temperature

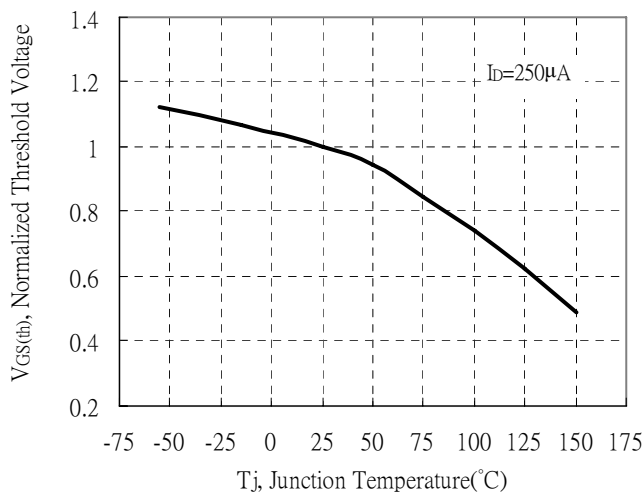


Typical Characteristics(Cont.)

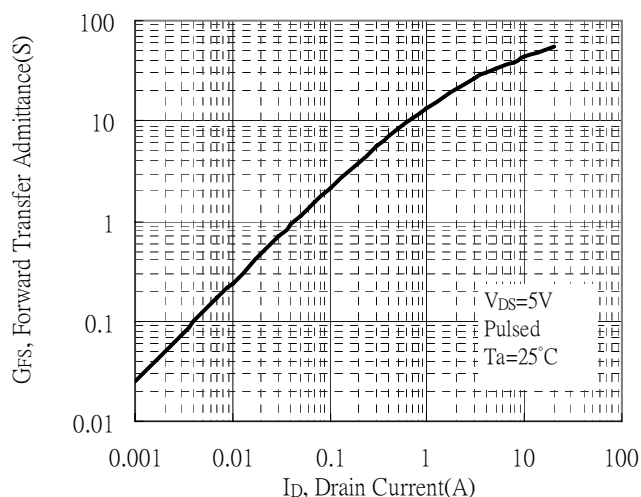
Capacitance vs Drain-to-Source Voltage



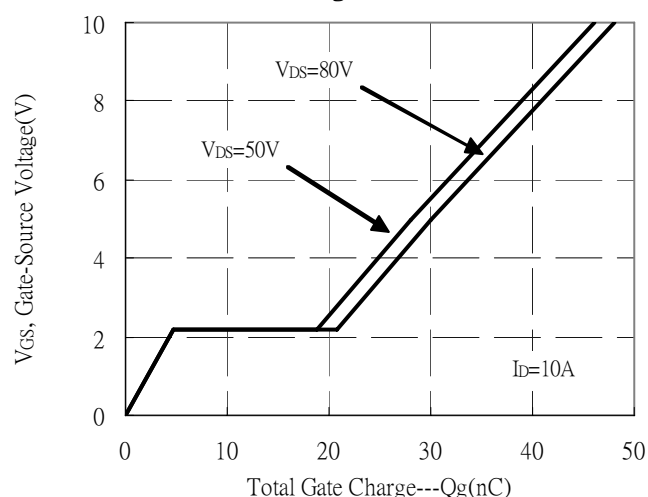
Normalized Threshold Voltage vs Junction Temperature



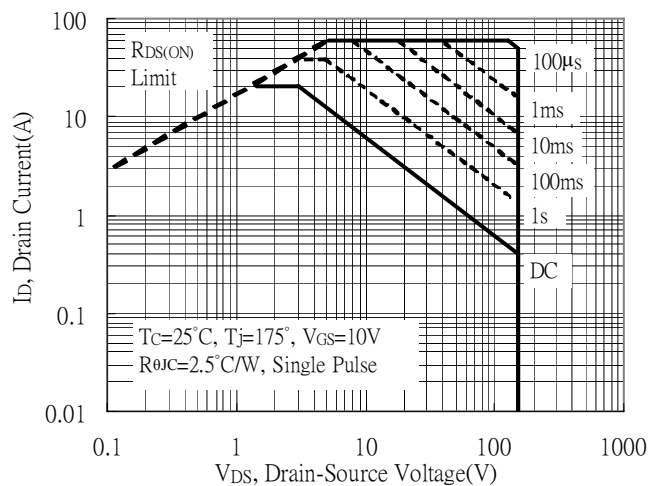
Forward Transfer Admittance vs Drain Current



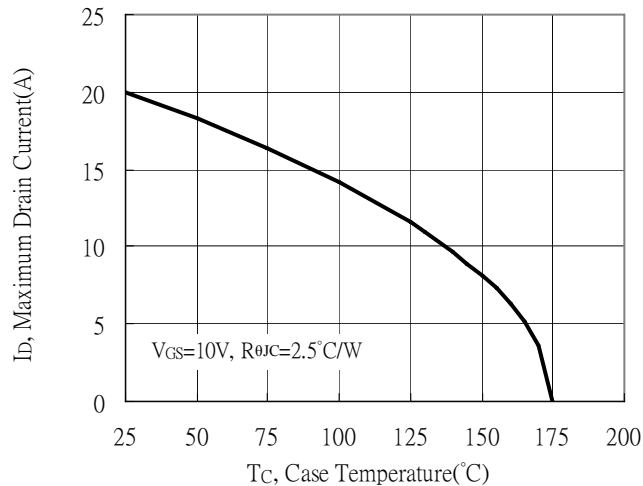
Gate Charge Characteristics



Maximum Safe Operating Area

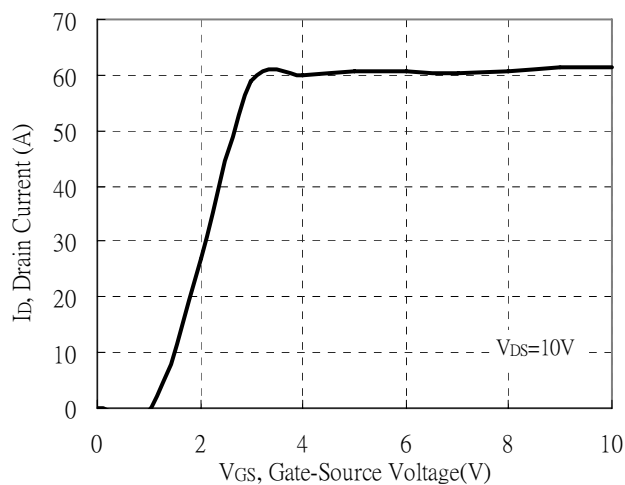


Maximum Drain Current vs Case Temperature

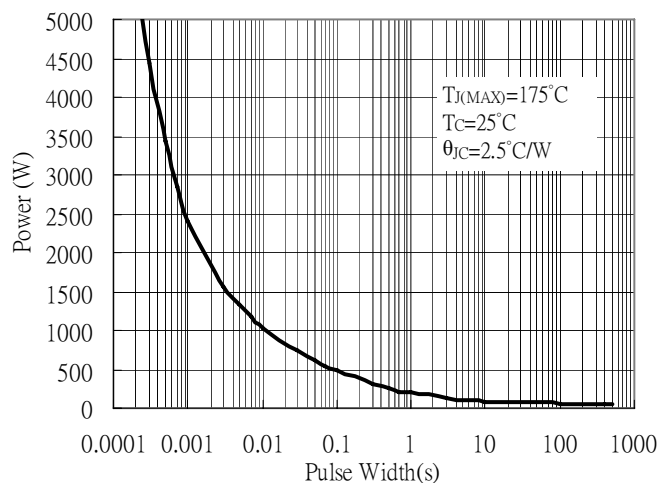


Typical Characteristics(Cont.)

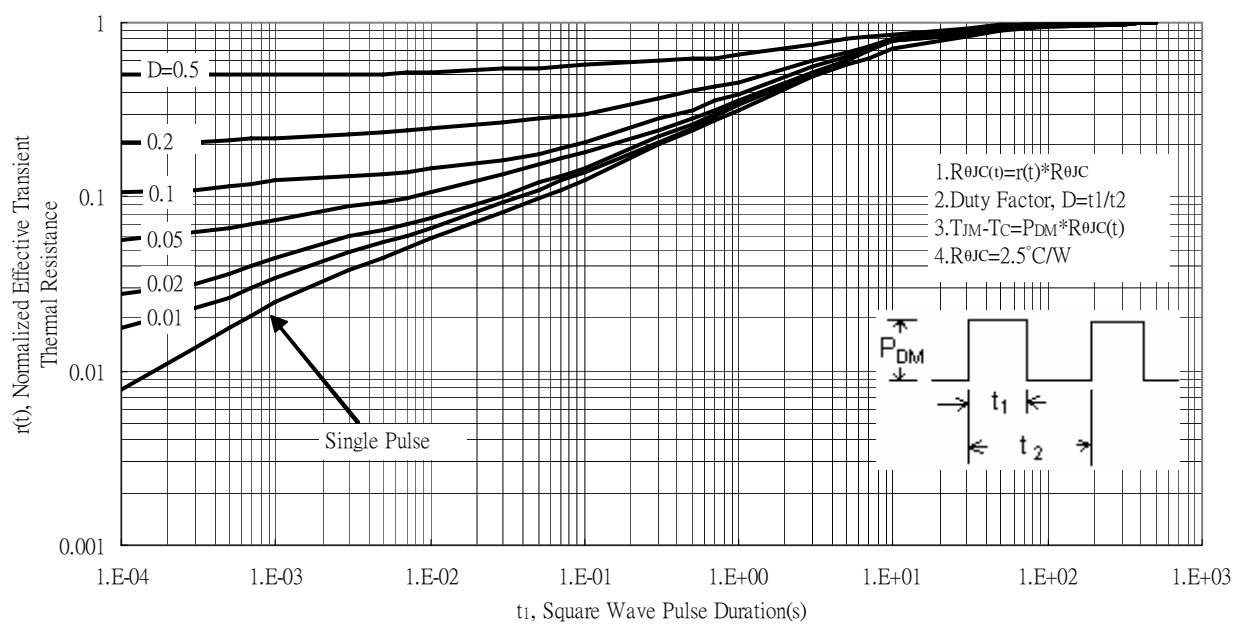
Typical Transfer Characteristics



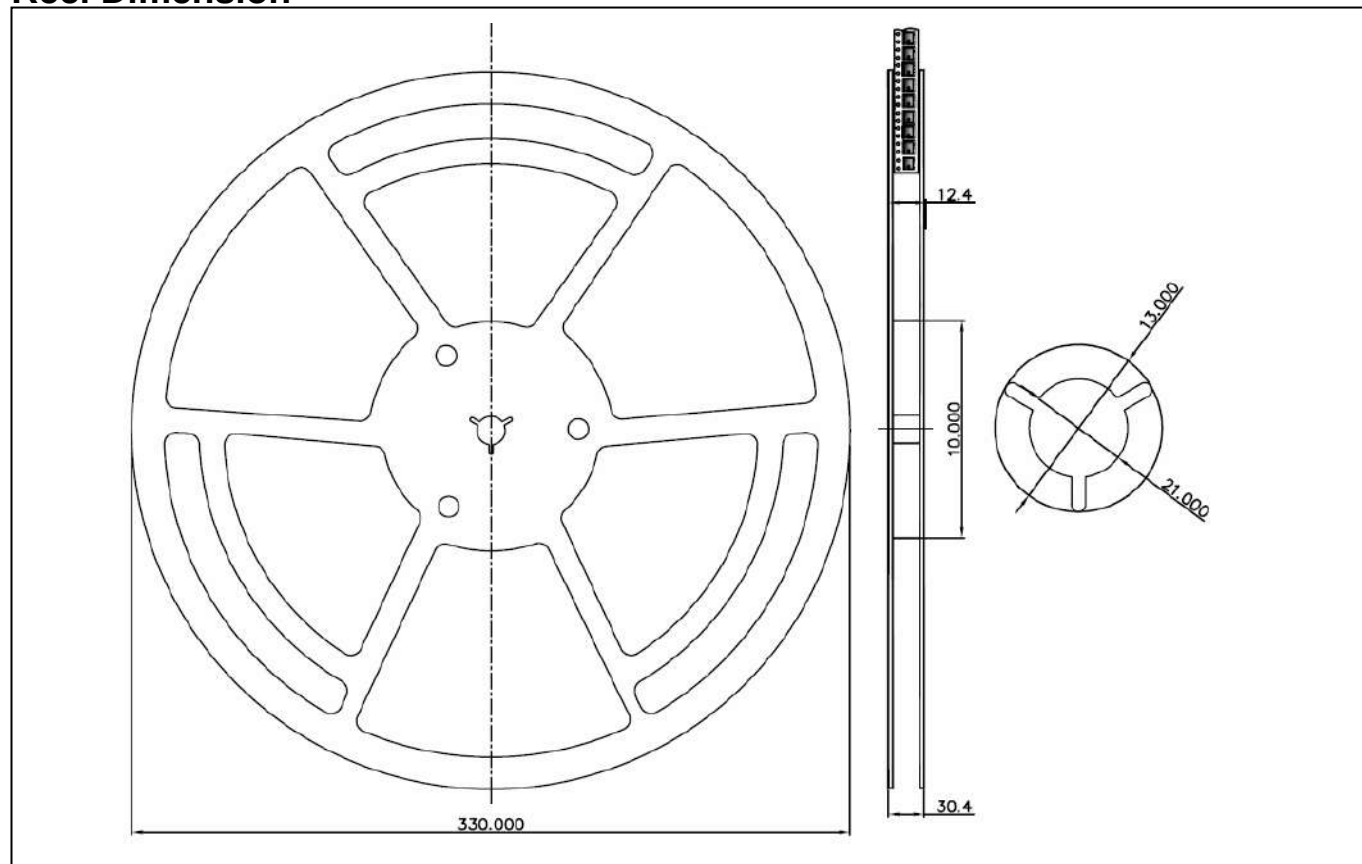
Single Pulse Maximum Power Dissipation



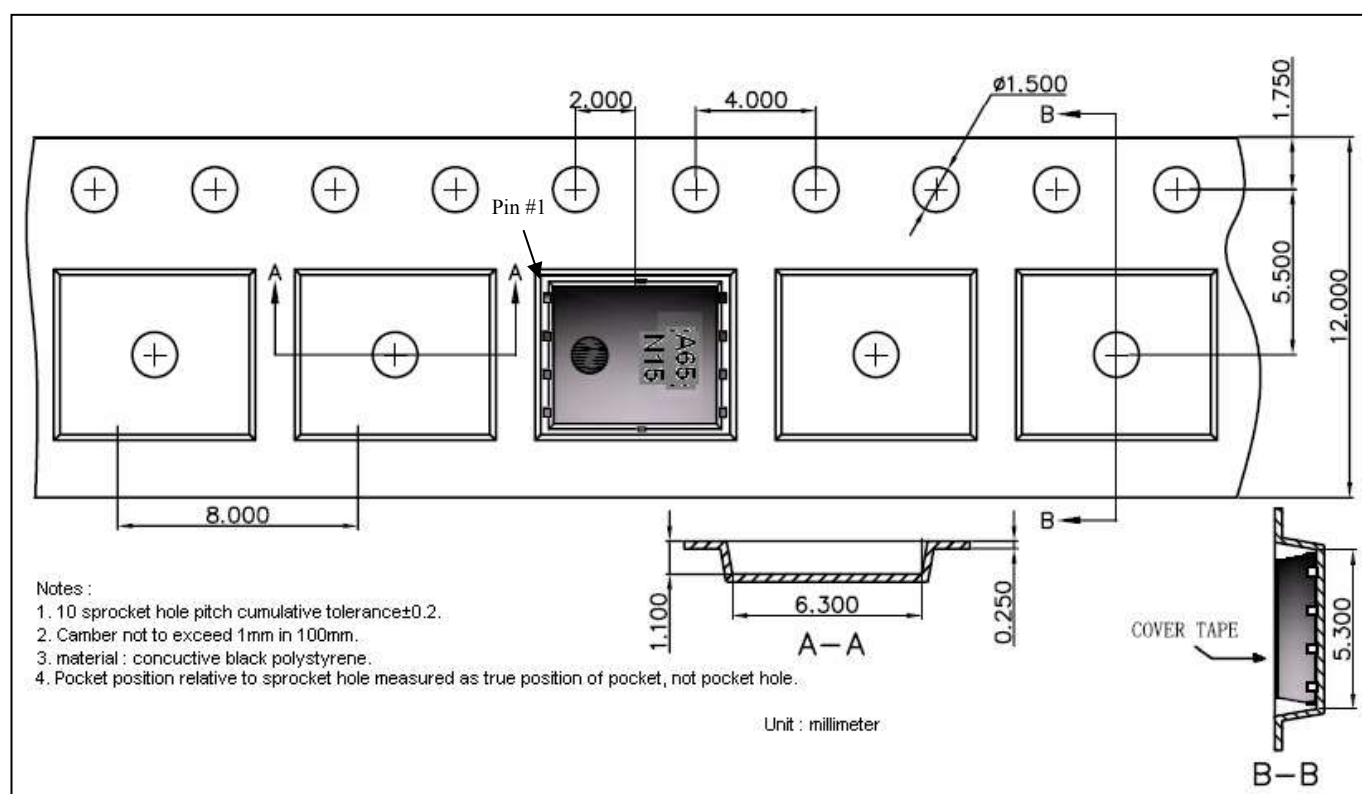
Transient Thermal Response Curves



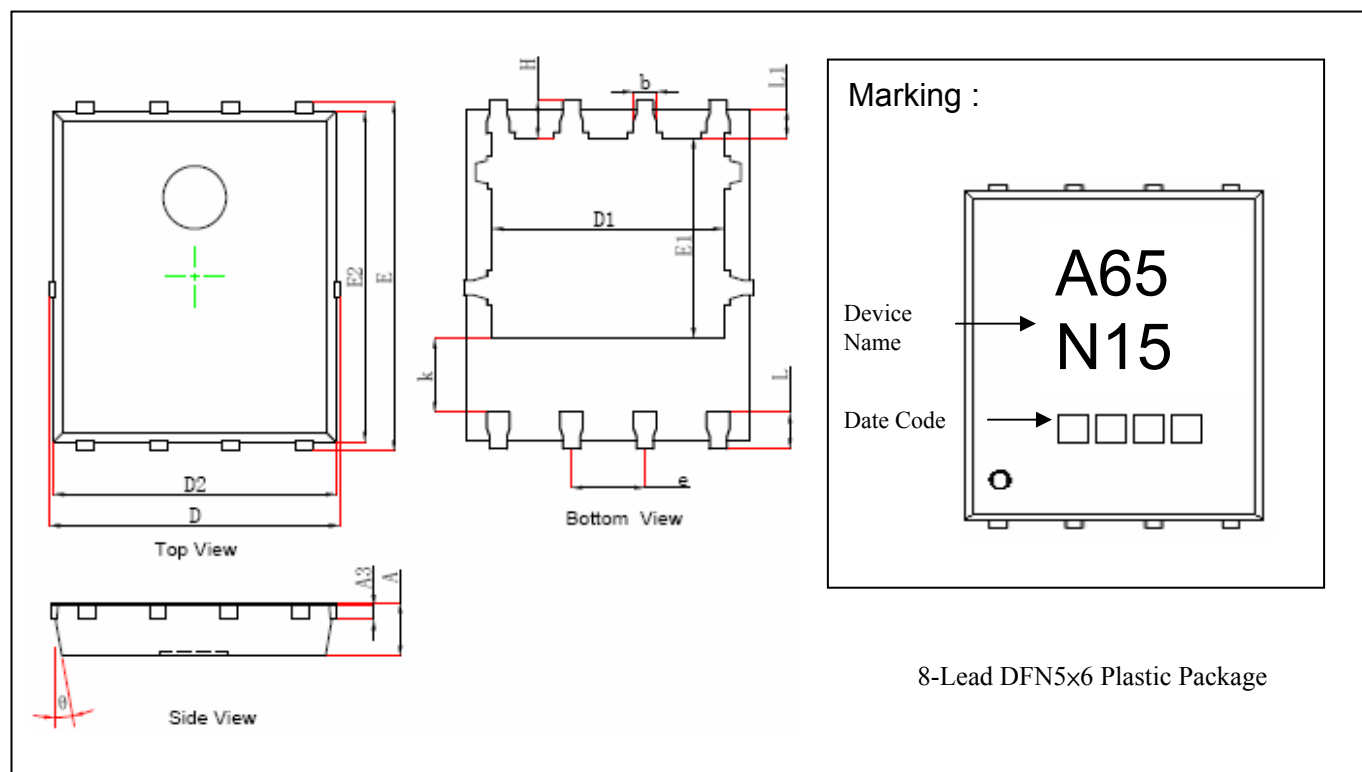
Reel Dimension



Carrier Tape Dimension



DFN5x6 Dimension



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					