

N- AND P-Channel Enhancement Mode MOSFET

Description:

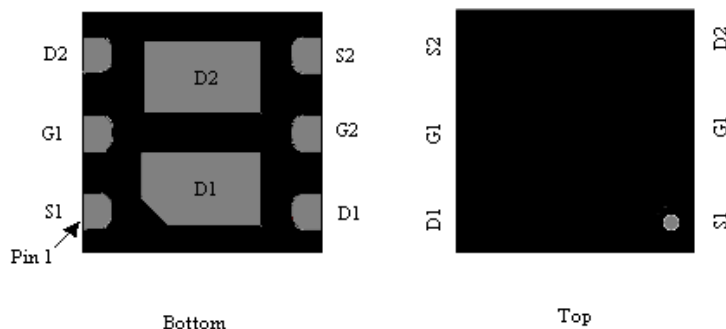
The KW3586B consists of a N-channel and a P-channel enhancement-mode MOSFET in a single DFN2*2-6L package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The DFN2*2-6L package is universally preferred for all commercial-industrial surface mount applications.

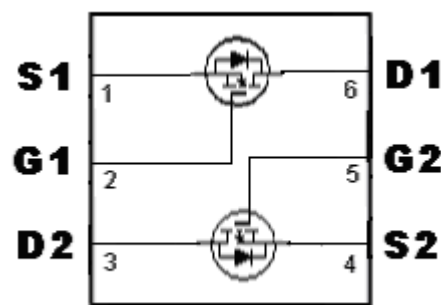
Features:

- Simple drive requirement
- Low gate charge
- Low on-resistance
- Fast switching speed
- Pb-free lead plating and halogen-free package

DFN2x2-6L



	N-CH	P-CH
BV _{DSS}	20V	-20V
I _D	5A (V _{GS} =4.5V)	-3.3A (V _{GS} =-4.5 V)
R _{DS(on)} (TYP.)	27mΩ (V _{GS} =4.5V)	78mΩ (V _{GS} =-4.5V)
	37mΩ (V _{GS} =2.5V)	115mΩ (V _{GS} =-2.5V)
	82mΩ (V _{GS} =1.5V)	280mΩ (V _{GS} =-1.5V)



G : Gate S : Source D : Drain

Ordering Information

Device	Package	Shipping
KW3586B	DFN2x2-6L (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		N-channel	P-channel	
Drain-Source Breakdown Voltage	BV _{DSS}	20	-20	V
Gate-Source Voltage	V _{GS}	±12	±12	
Continuous Drain Current @T _A =25 °C (Note 1)	I _D	5	-3.3	A
Continuous Drain Current @T _A =70 °C (Note 1)	I _D	4	-2.6	
Pulsed Drain Current (Note 2)	I _{DM}	20	-20	
Total Power Dissipation (Note 1)	P _d	1.38		W
Linear Derating Factor		0.01		W / °C
Operating Junction and Storage Temperature	T _j , T _{stg}	-55~+150		°C

Note : 1.Surface mounted on 1 in² copper pad of FR-4 board, t≤5 sec
2.Pulse width limited by maximum junction temperature

N-Channel Electrical Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	20	-	-	V	V _{GS} =0, I _D =250μA
ΔBV _{DSS} /ΔT _j	-	0.02	-	V/°C	Reference to 25°C, I _D =1mA
V _{GS(th)}	0.5	0.7	1.2	V	V _{DS} =V _{GS} , I _D =250μA
I _{GSS}	-	-	±100	nA	V _{GS} =±12V, V _{DS} =0
I _{DSS}	-	-	1	μA	V _{DS} =20V, V _{GS} =0
	-	-	10		V _{DS} =16V, V _{GS} =0, T _j =70°C
*R _{DS(ON)}	-	27	40	mΩ	I _D =3.5A, V _{GS} =4.5V
	-	37	50		I _D =1.2A, V _{GS} =2.5V
	-	82	105		I _D =0.5A, V _{GS} =1.5V
*G _{FS}	-	7	-	S	V _{DS} =5V, I _D =3A
Dynamic					
C _{iss}	-	423	-	pF	V _{DS} =20V, V _{GS} =0, f=1MHz
C _{oss}	-	50	-		
C _{rss}	-	48	-		
*t _{d(ON)}	-	6	-	ns	V _{DS} =15V, I _D =1A, V _{GS} =5V, R _G =3.3Ω , R _D =15Ω
*t _r	-	8	-		
*t _{d(OFF)}	-	11	-		
*t _f	-	10	-		
*Q _g	-	6	-	nC	V _{DS} =16V, I _D =3A, V _{GS} =4.5V
*Q _{gs}	-	0.8	-		
*Q _{gd}	-	2.5	-		
Source-Drain Diode					
*V _{SD}	-	0.77	1.2	V	V _{GS} =0V, I _S =1.2A
*t _{rr}	-	16	-	ns	I _S =3A, V _{GS} =0V, dI/dt=100A/μs
*Q _{rr}	-	8	-	nC	

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

P-Channel Electrical Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	-20	-	-	V	V _{GS} =0, I _D =-250μA
ΔBV _{DSS} /ΔT _j	-	-0.01	-	V/°C	Reference to 25°C, I _D =-1mA
V _{GS(th)}	-	-0.8	-1.2	V	V _{DS} =V _{GS} , I _D =-250μA
I _{GSS}	-	-	±100	nA	V _{GS} =±12V, V _{DS} =0
I _{DSS}	-	-	-1	μA	V _{DS} =-20V, V _{GS} =0
	-	-	-25		V _{DS} =-16V, V _{GS} =0, T _j =70°C
*R _{DS(ON)}	-	78	105	mΩ	I _D =-2.5A, V _{GS} =-4.5V
	-	115	150		I _D =-2A, V _{GS} =-2.5V
	-	280	350		I _D =-0.5A, V _{GS} =-1.5V
*G _{FS}	-	5	-	S	V _{DS} =-5V, I _D =-2A
Dynamic					
C _{iss}	-	429	-	pF	V _{DS} =-20V, V _{GS} =0, f=1MHz
C _{oss}	-	45	-		
C _{rss}	-	41	-		
*t _{d(ON)}	-	6	-	ns	V _{DS} =-10V, I _D =-1A, V _{GS} =-10V, R _G =3.3Ω , R _D =10Ω
*t _r	-	17	-		
*t _{d(OFF)}	-	16	-		
*t _f	-	5	-		
*Q _g	-	6	-	nC	V _{DS} =-16V, I _D =-2A, V _{GS} =-4.5V
*Q _{gs}	-	0.8	-		
*Q _{gd}	-	2.4	-		
Source-Drain Diode					
*V _{SD}	-	-0.82	-1.2	V	V _{GS} =0V, I _S =-1.2A
*t _{rr}	-	20	-	ns	I _S =-2A, V _{GS} =0V, dI/dt=100A/μs
*Q _{rr}	-	15	-	nC	

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

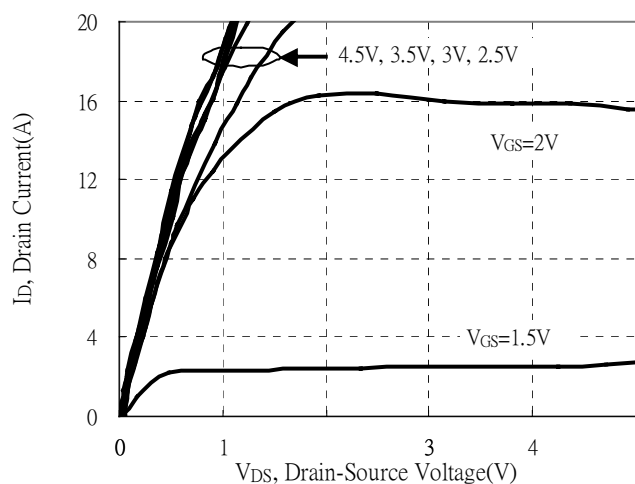
Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{θJC}	80	°C/W
Thermal Resistance, Junction-to-ambient, max	R _{θJA}	90 (Note)	

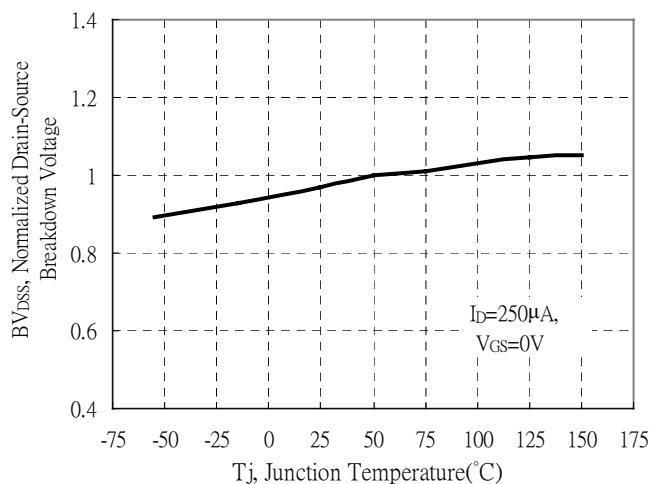
Note : Surface mounted on 1 in² copper pad of FR-4 board, t≤5 sec; 195°C/W when mounted on minimum copper pad

N-channel Typical Characteristics

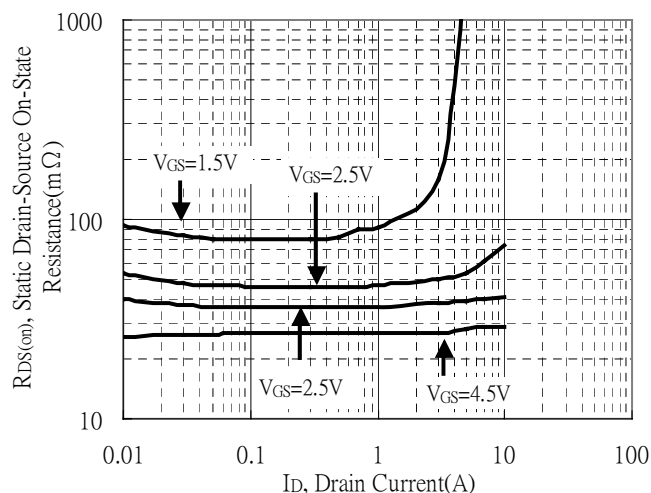
Typical Output Characteristics



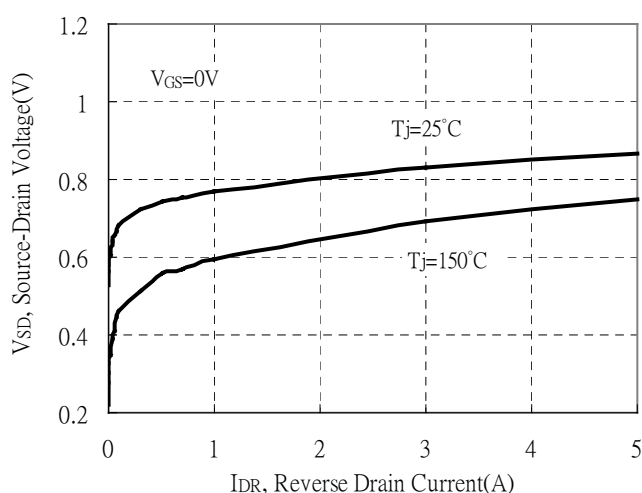
Breakdown Voltage vs Ambient Temperature



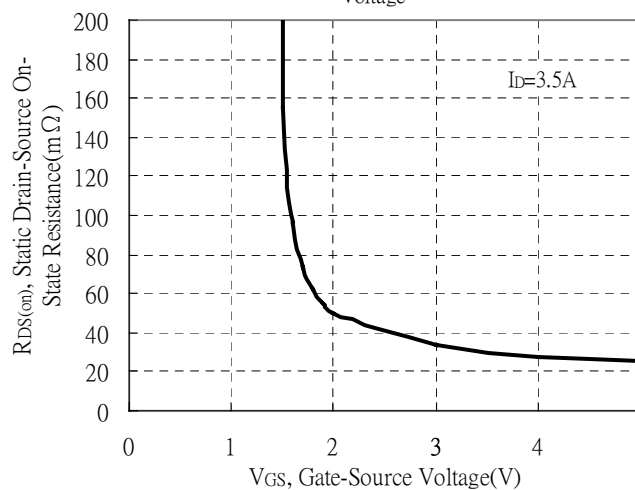
Static Drain-Source On-State resistance vs Drain Current



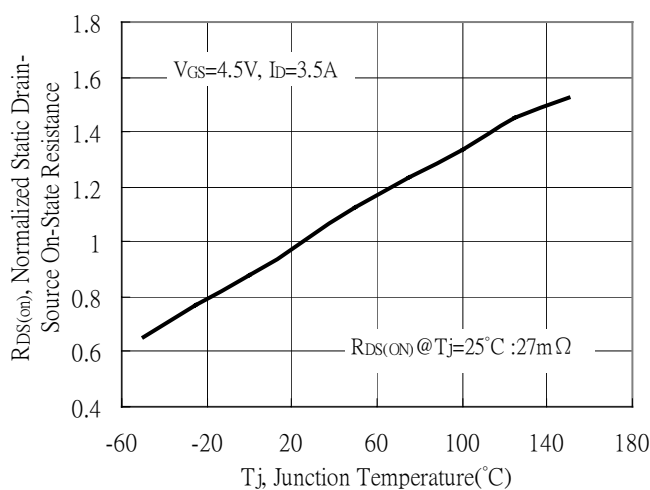
Reverse Drain Current vs Source-Drain Voltage



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

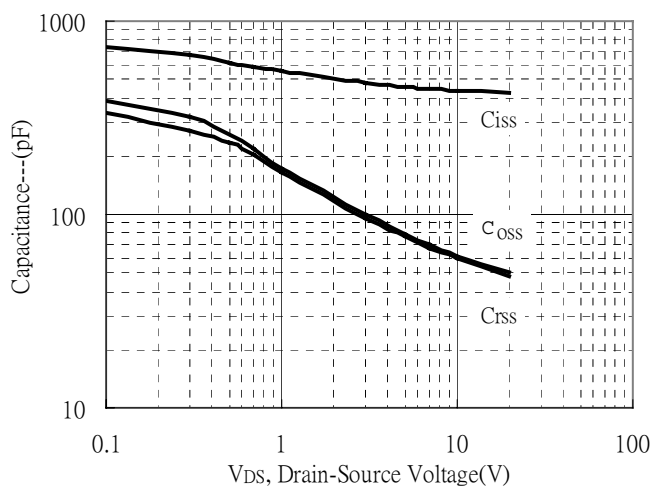


Drain-Source On-State Resistance vs Junction Temperature

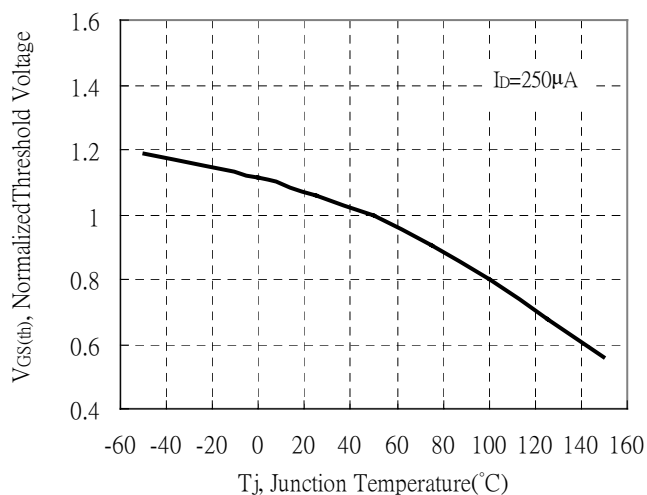


N-channel Typical Characteristics(Cont.)

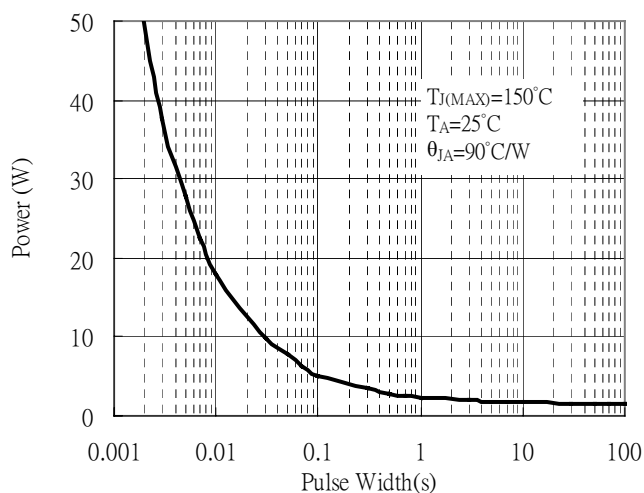
Capacitance vs Drain-to-Source Voltage



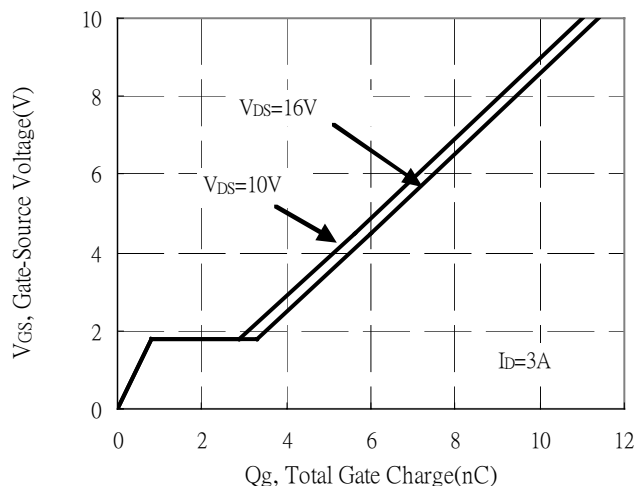
Threshold Voltage vs Junction Temperature



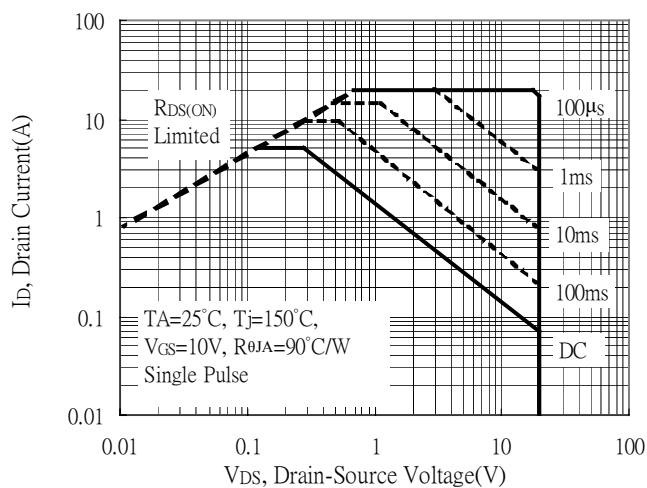
Single Pulse Power Rating, Junction to Ambient



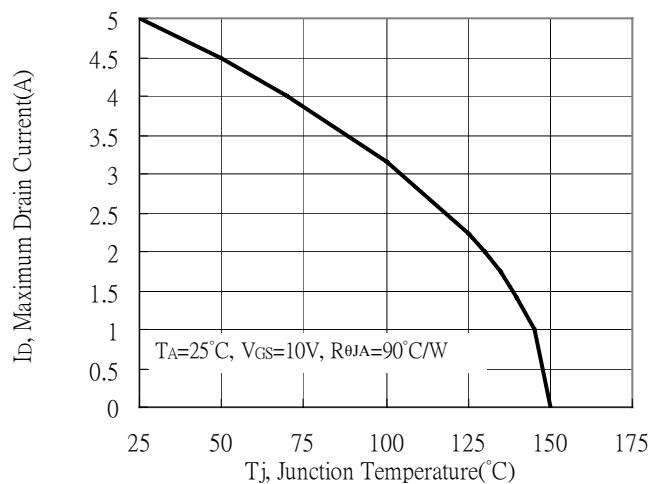
Gate Charge Characteristics



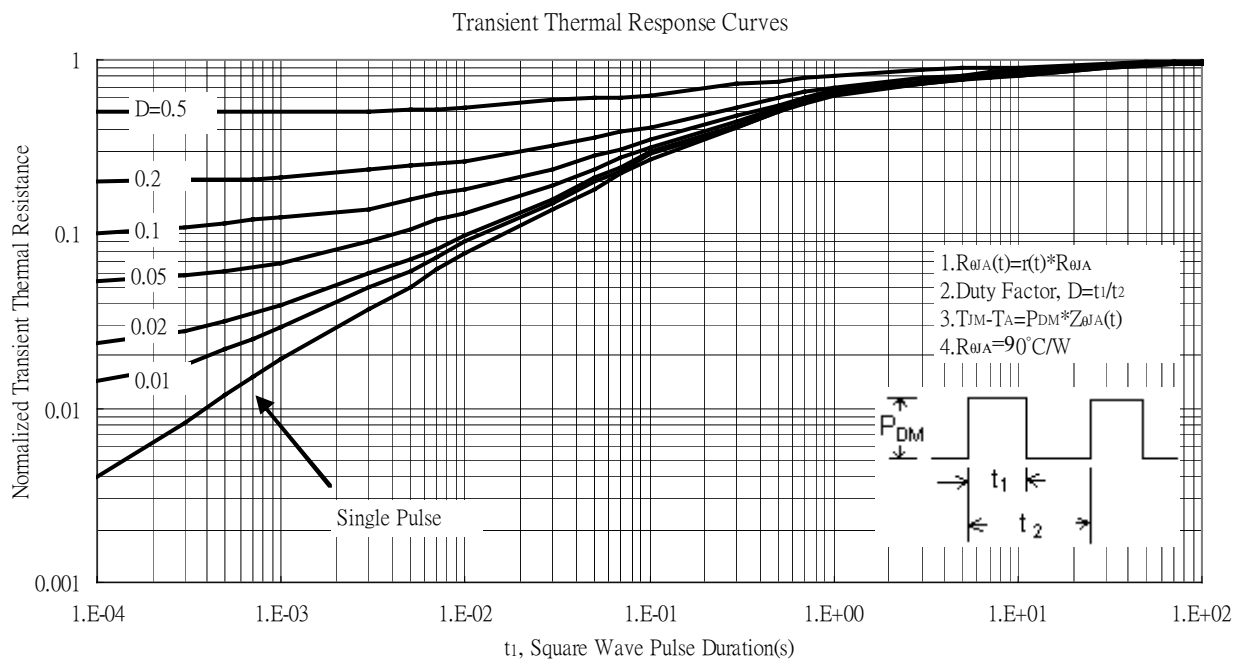
Maximum Safe Operating Area



Maximum Drain Current vs Junction Temperature

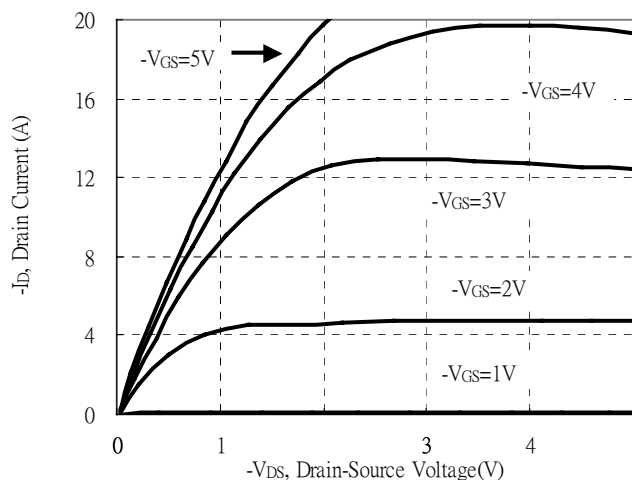


N-channel Typical Characteristics(Cont.)

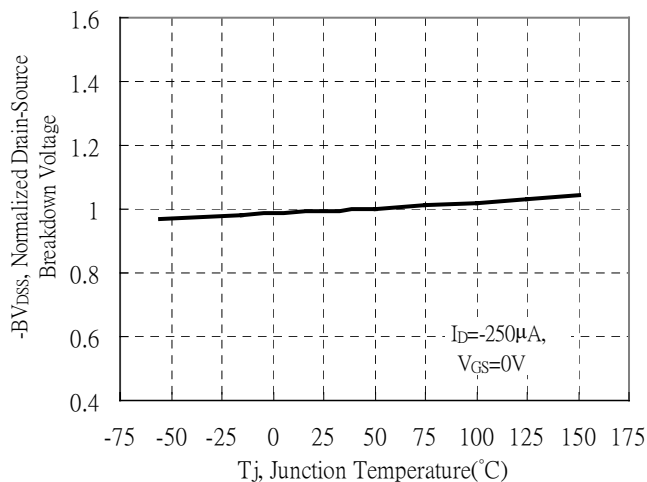


P-channel Typical Characteristics

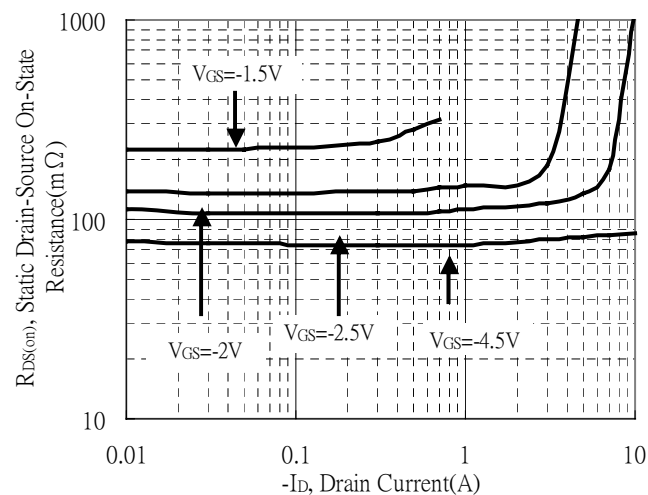
Typical Output Characteristics



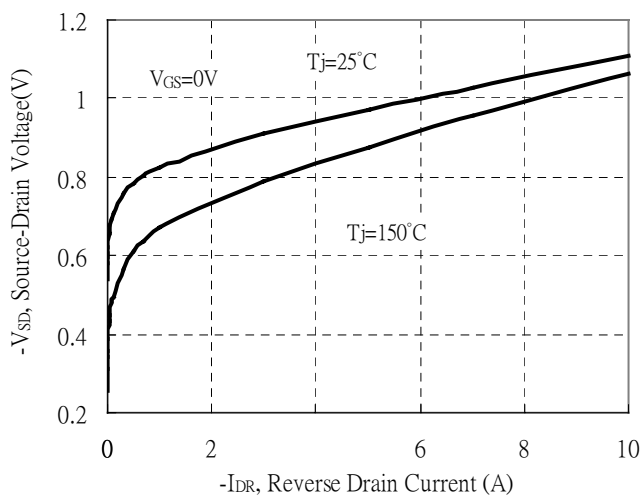
Breakdown Voltage vs Ambient Temperature



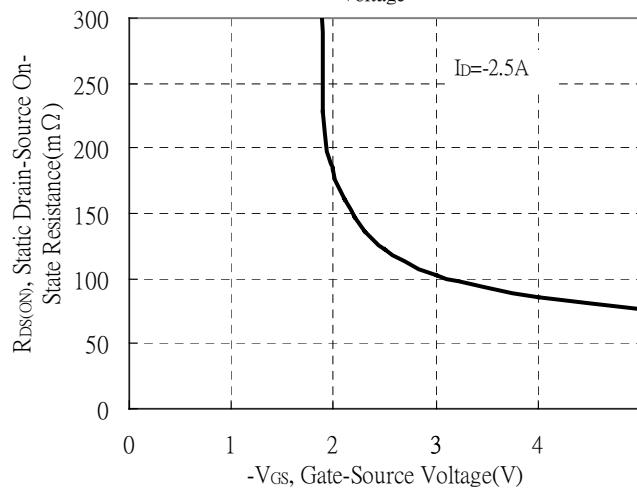
Static Drain-Source On-State resistance vs Drain Current



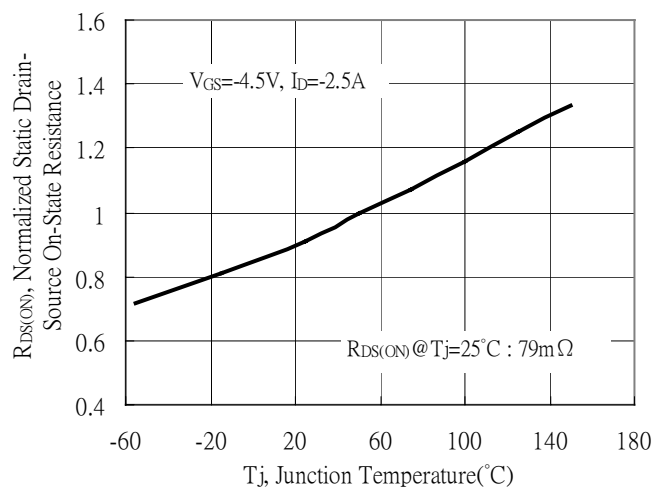
Reverse Drain Current vs Source-Drain Voltage



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

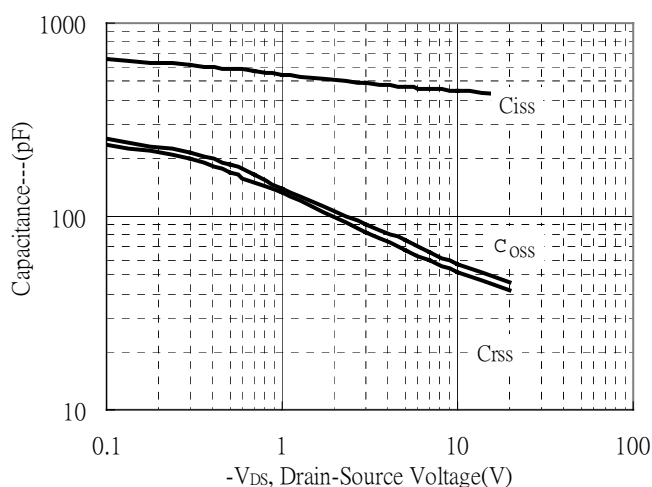


Drain-Source On-State Resistance vs Junction Temperature

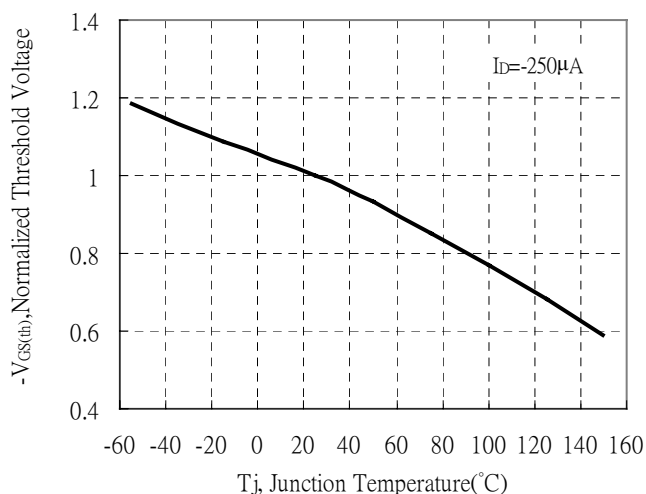


P-channel Typical Characteristics(Cont.)

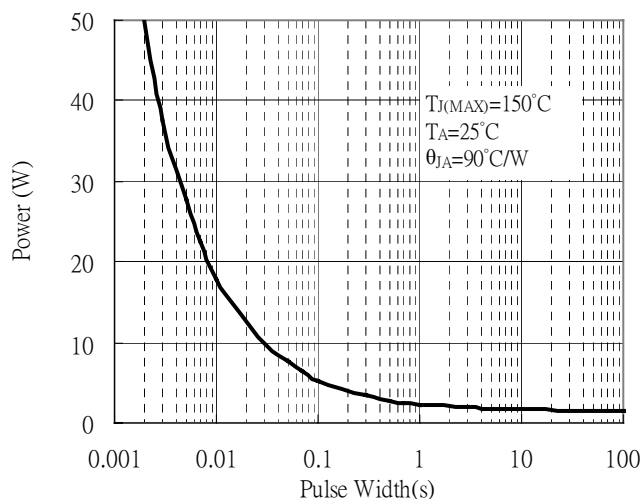
Capacitance vs Drain-to-Source Voltage



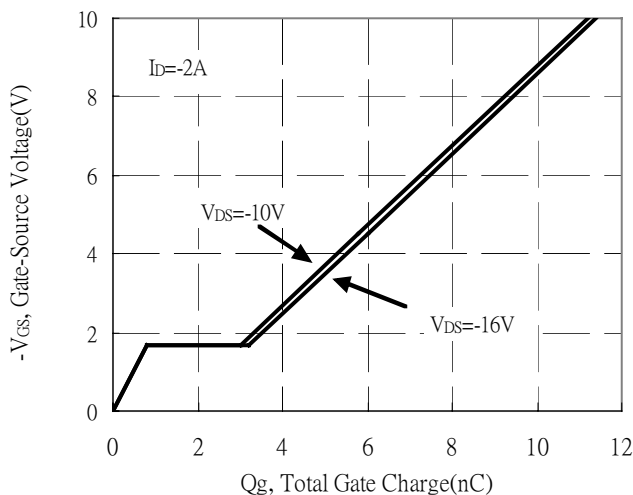
Threshold Voltage vs Junction Temperature



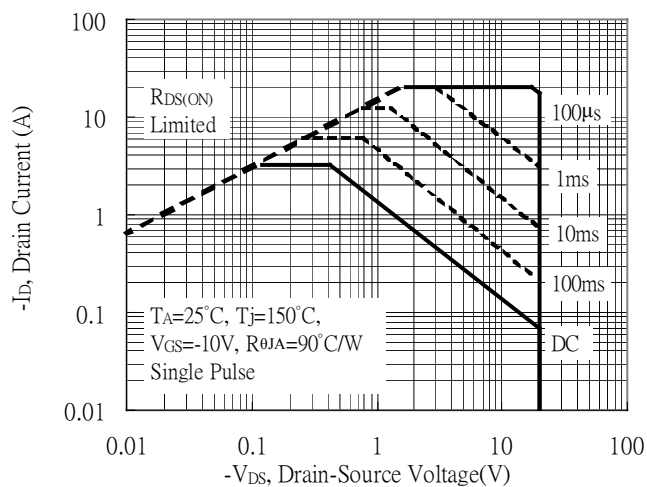
Single Pulse Power Rating, Junction to Ambient



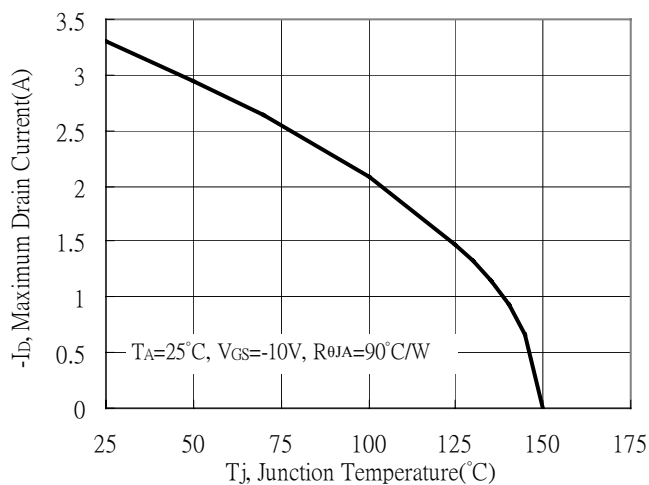
Gate Charge Characteristics



Maximum Safe Operating Area

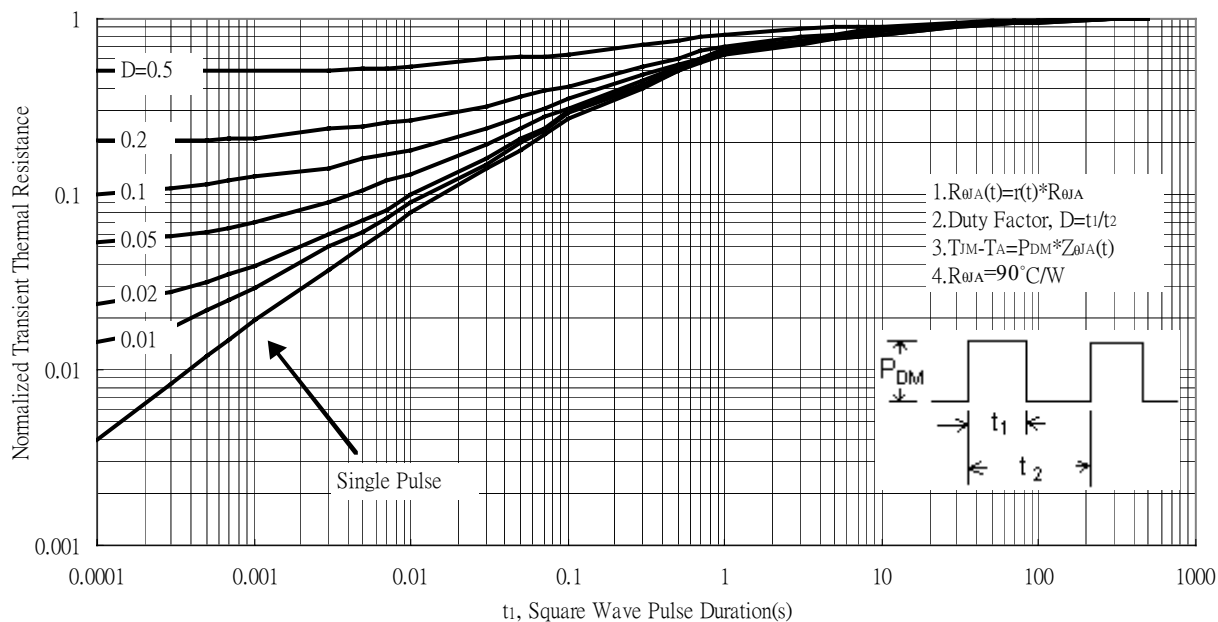


Maximum Drain Current vs Junction Temperature

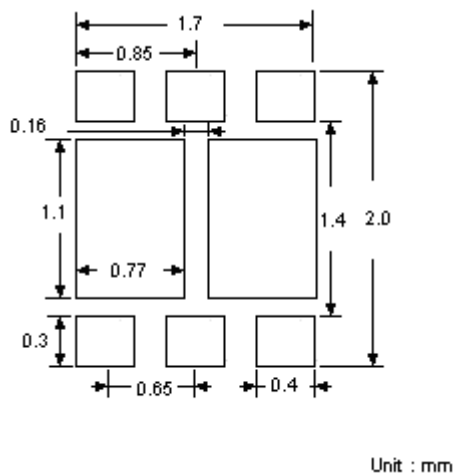


P-channel Typical Characteristics(Cont.)

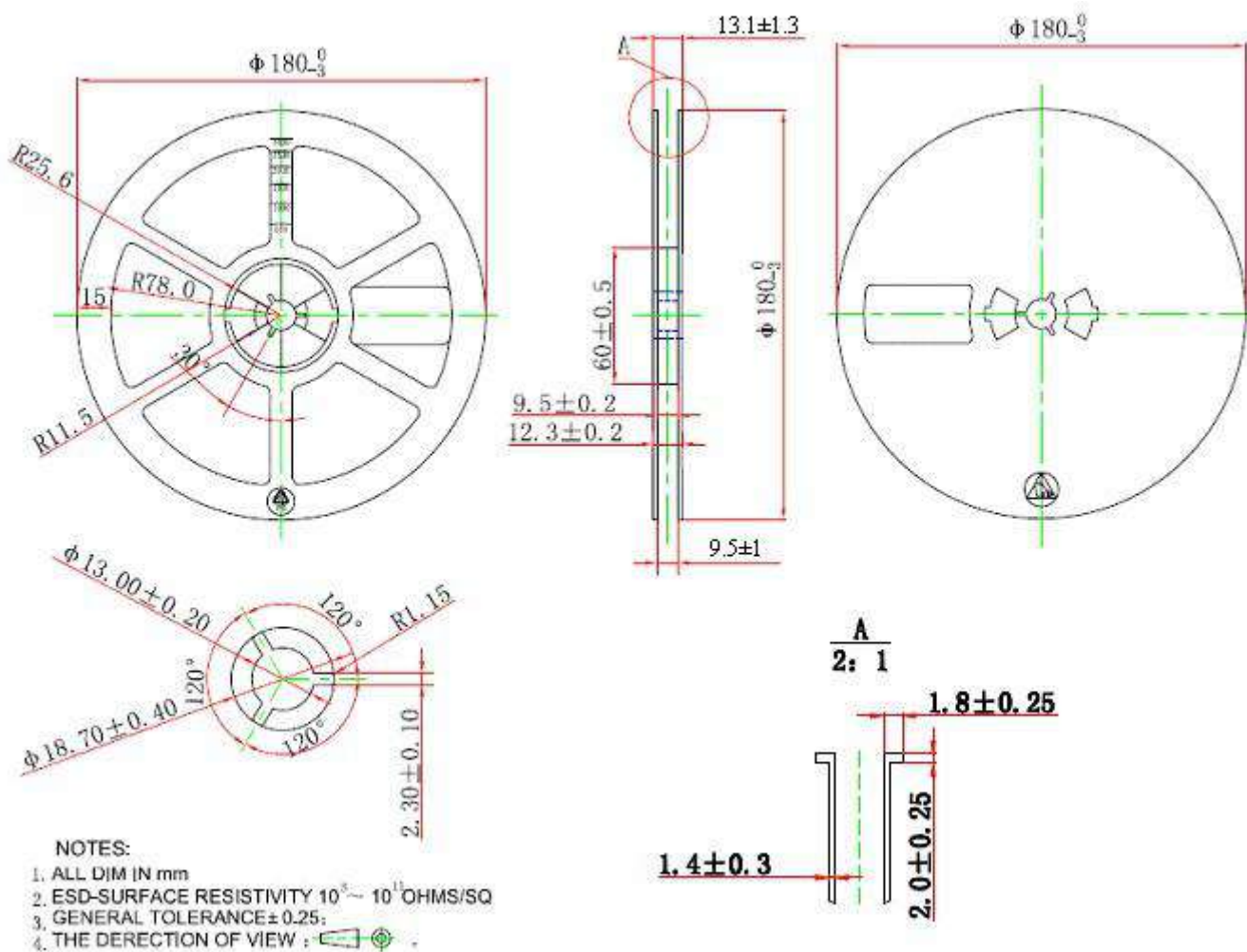
Transient Thermal Response Curves



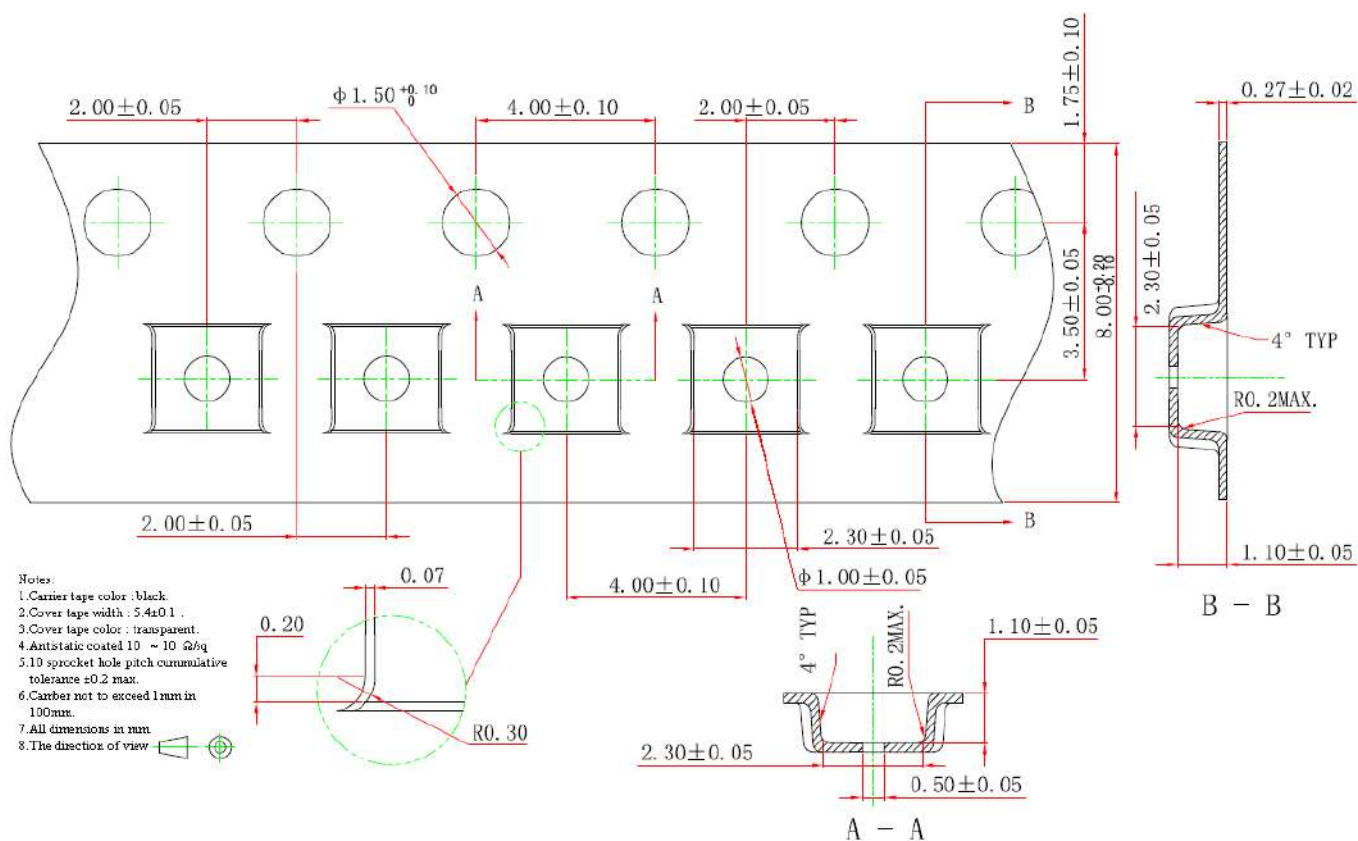
Recommended Soldering Footprint



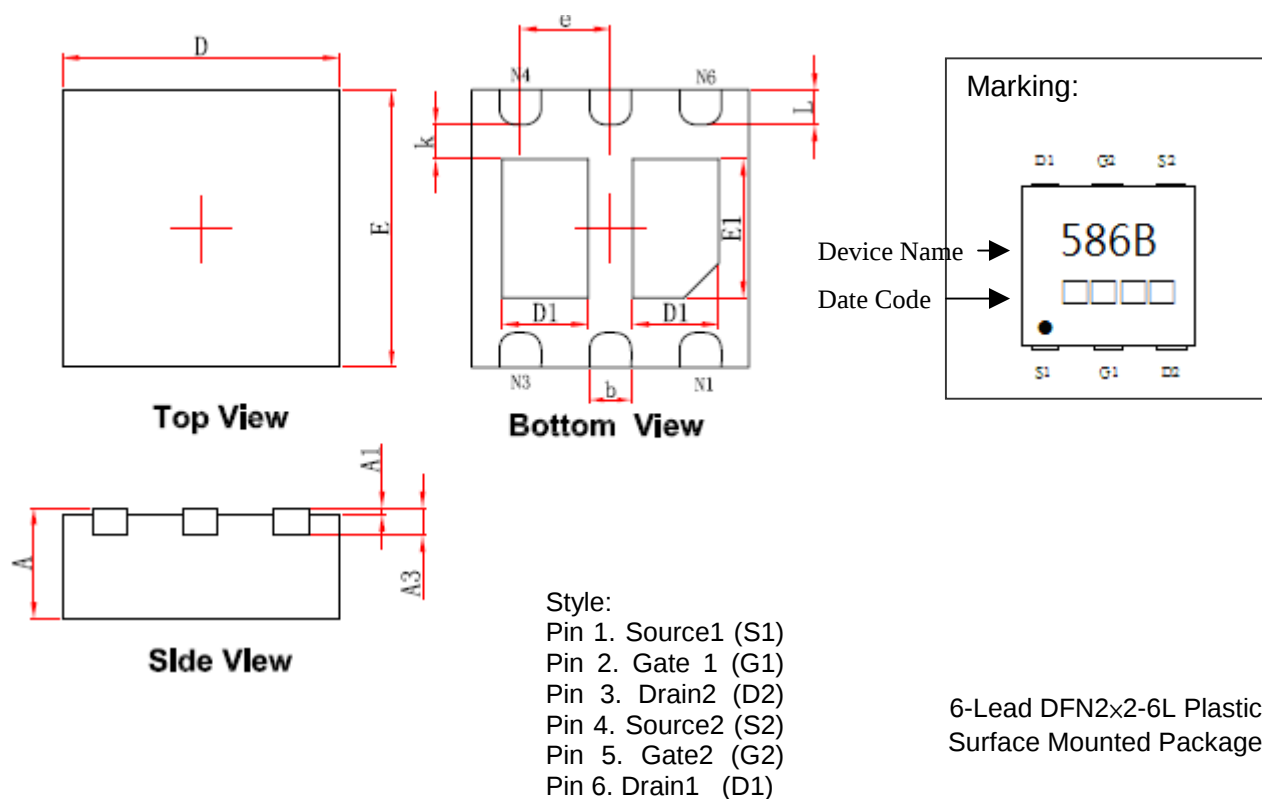
Reel Dimension



Carrier Tape Dimension



DFN2x2-6L Dimension



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035	E1	0.900	1.100	0.035	0.043
A1	0.000	0.050	0.000	0.002	k	0.200	-	0.008	-
A3	0.203	REF	0.008	REF	b	0.250	0.350	0.010	0.014
D	1.950	2.050	0.077	0.081	e	0.650	TYP	0.026	TYP
E	1.950	2.050	0.077	0.081	L	0.200	0.300	0.008	0.012
D1	0.570	0.770	0.022	0.030					