

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±12	
I _D	Continue Drain Current	T _A =25°C	12**	A
I _{DM}	300μs Pulsed Drain Current	T _A =25°C	48	
	10μs Pulsed Drain Current		80***	
I _S	Diode continuous forward current		1.5	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
P _D	Maximum Power Dissipation	T _A =25°C	3.5	W
		T _A =70°C	2.2	
R _{θJA} *	Thermal Resistance-Junction to Ambient		36	°C/W
R _{θJC} *	Thermal Resistance-Junction to Case		5.6	

Note : *Surface Mounted on 1in² pad area, t ≤ 10sec.

** Current limited by bond wire.

*** Duty Cycle ≤ 1%

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±10	μA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =6A	5	6.2	8.1	mΩ
		V _{GS} =4V, I _{DS} =6A	5.2	6.4	8.5	
		V _{GS} =3.7V, I _{DS} =6A	5.4	6.7	8.8	
		V _{GS} =3.1V, I _{DS} =6A	5.8	6.9	9.2	
		V _{GS} =2.5V, I _{DS} =6A	6	8.1	11	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =6A, V _{GS} =0V	-	0.7	1.3	V

Electrical Characteristics (Cont.) ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

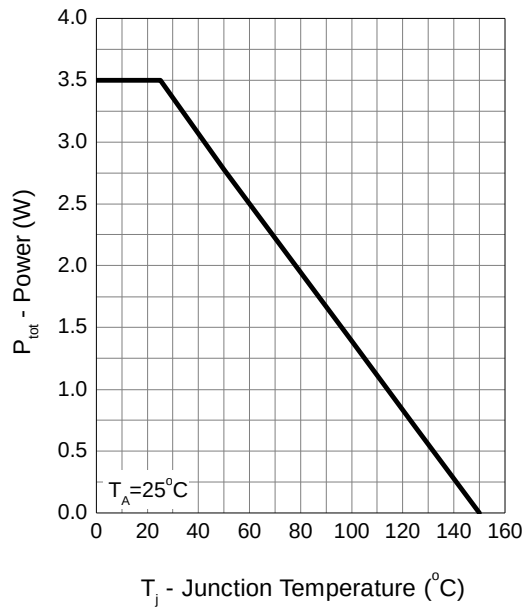
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Frequency=1.0MHz	-	2000	-	pF
C _{oss}	Output Capacitance		-	370	-	
C _{rss}	Reverse Transfer Capacitance		-	350	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	13	-	ns
t _r	Turn-on Rise Time		-	16	-	
t _{d(OFF)}	Turn-off Delay Time		-	40	-	
t _f	Turn-off Fall Time		-	6	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _{DS} =6A	-	24	-	nC
Q _{gs}	Gate-Source Charge		-	1.7	-	
Q _{gd}	Gate-Drain Charge		-	10	-	

Note a : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

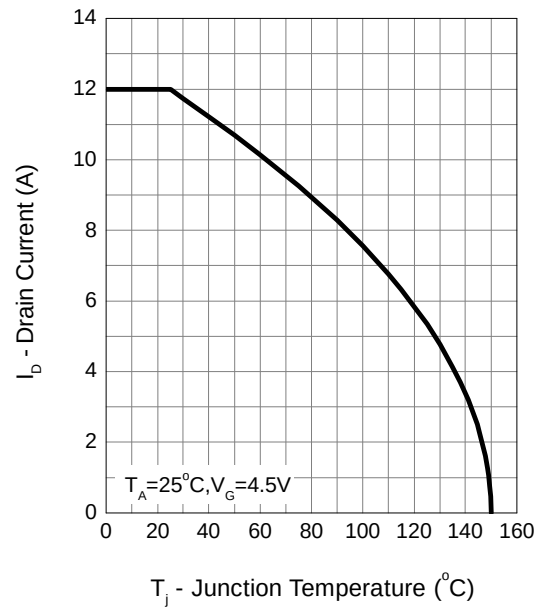
Note b : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

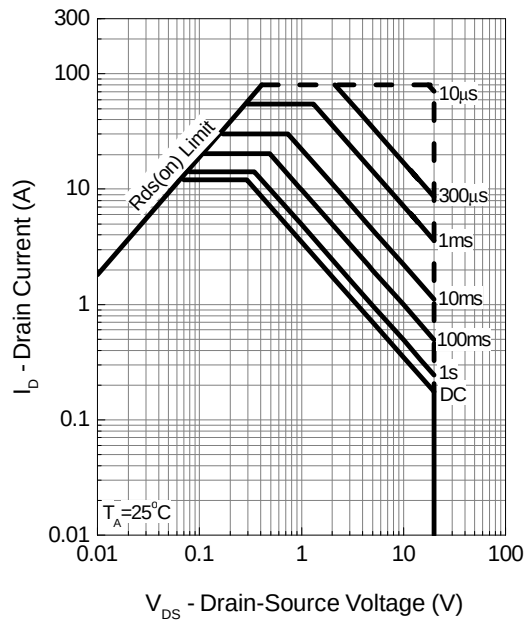
Power Dissipation



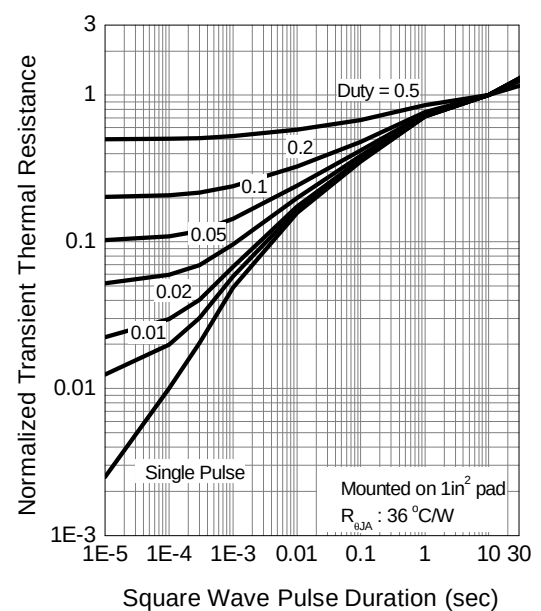
Drain Current



Safe Operation Area

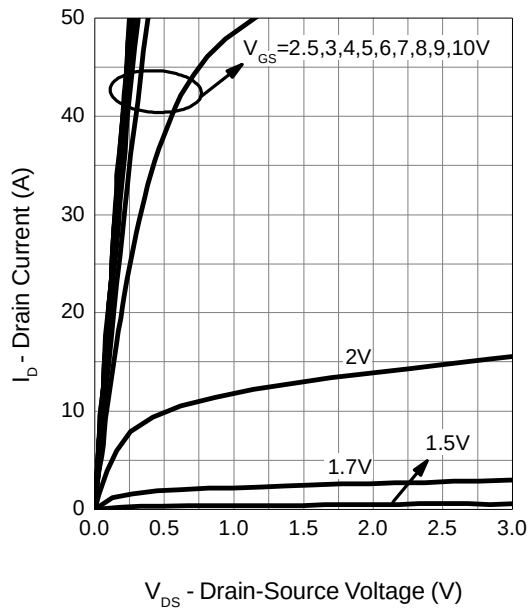


Thermal Transient Impedance

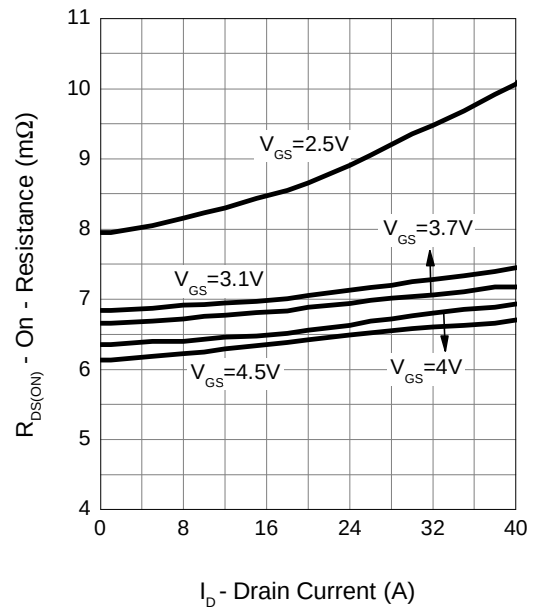


Typical Operating Characteristics (Cont.)

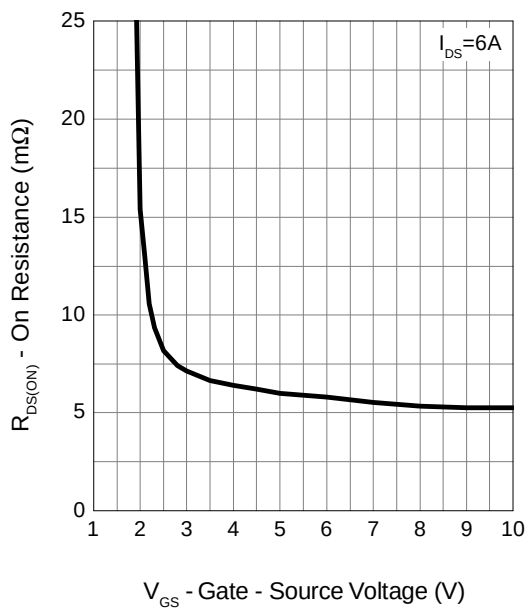
Output Characteristics



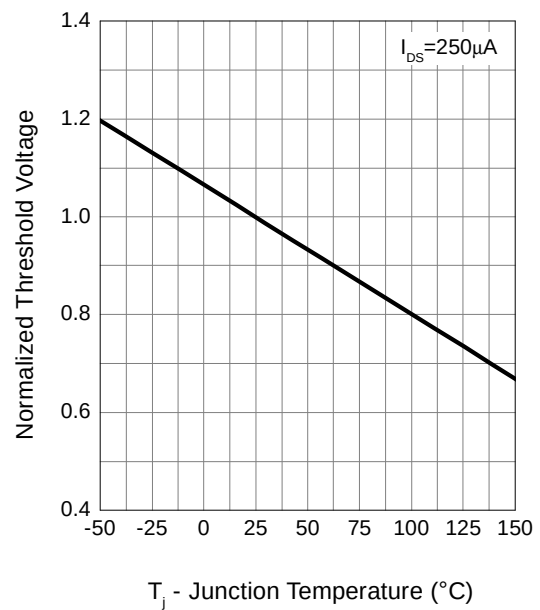
Drain-Source On Resistance



Gate-Source On Resistance

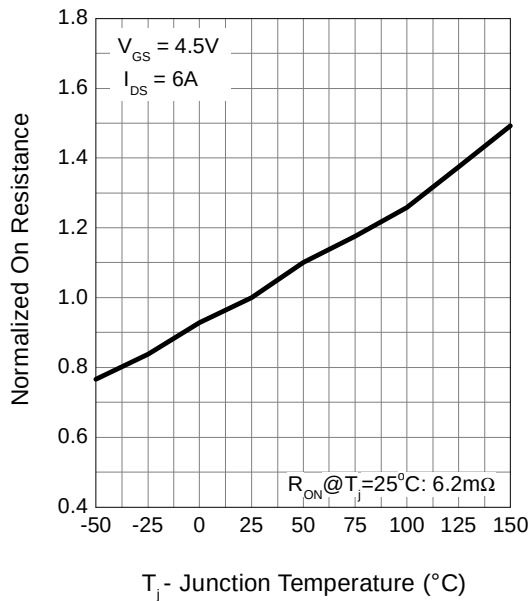


Gate Threshold Voltage

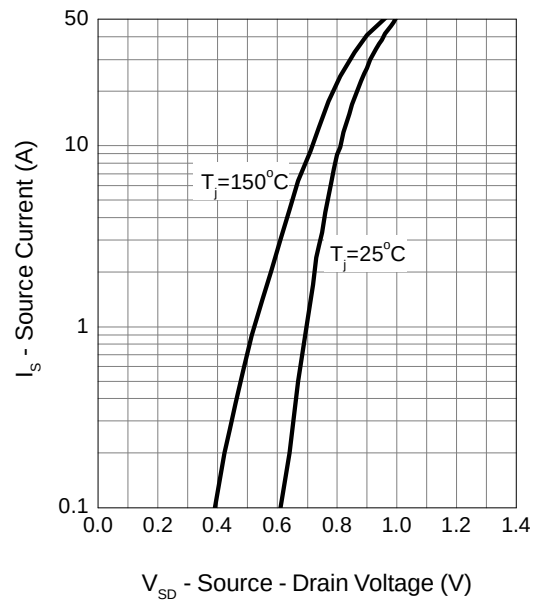


Typical Operating Characteristics (Cont.)

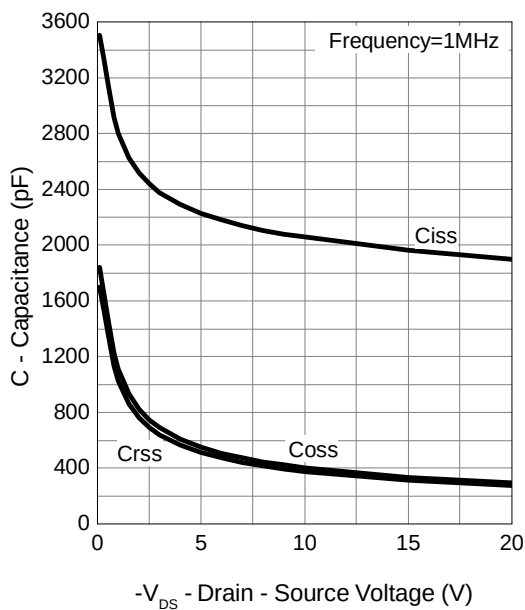
Drain-Source On Resistance



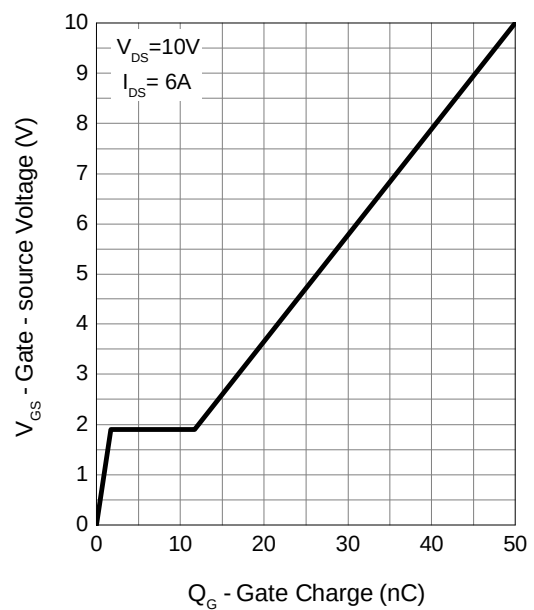
Source-Drain Diode Forward



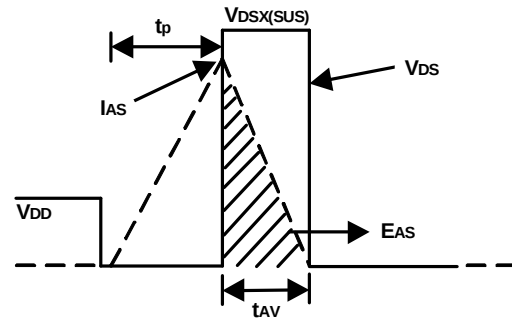
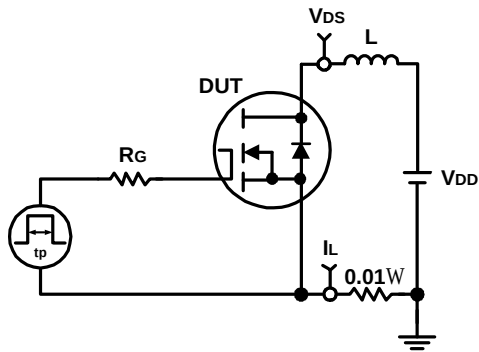
Capacitance



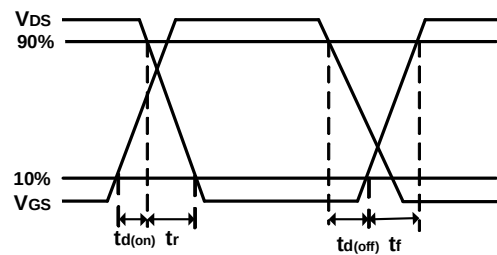
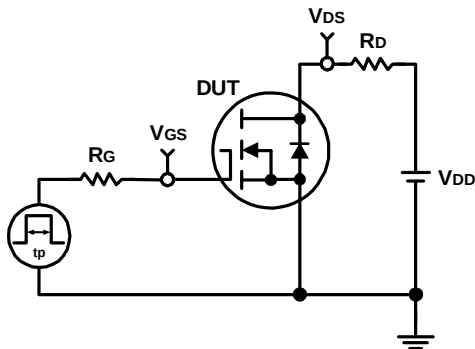
Gate Charge



Avalanche Test Circuit and Waveforms

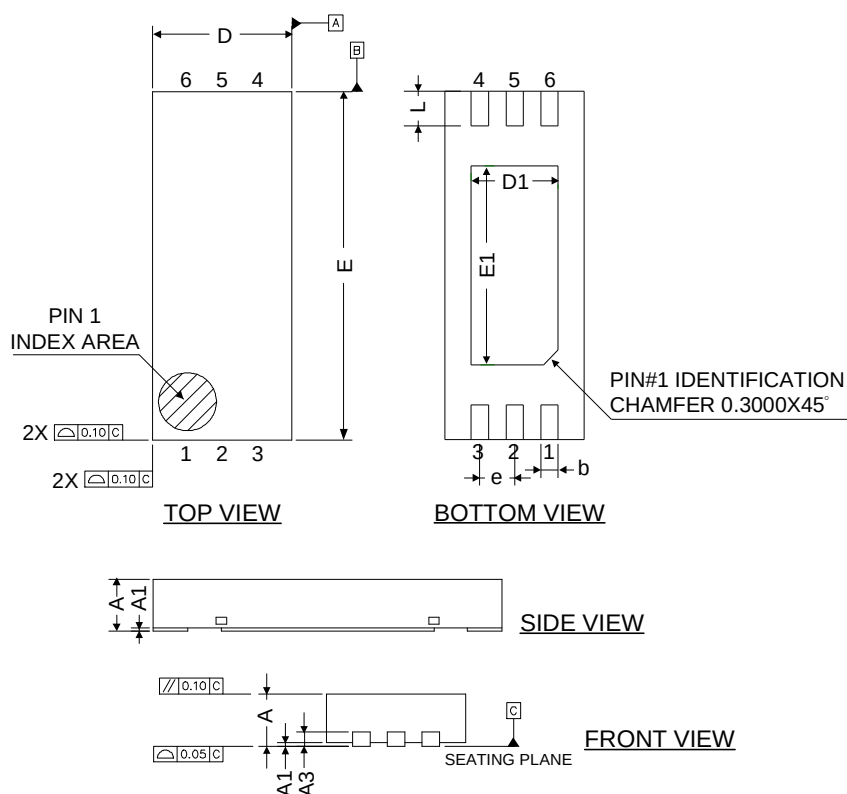


Switching Time Test Circuit and Waveforms



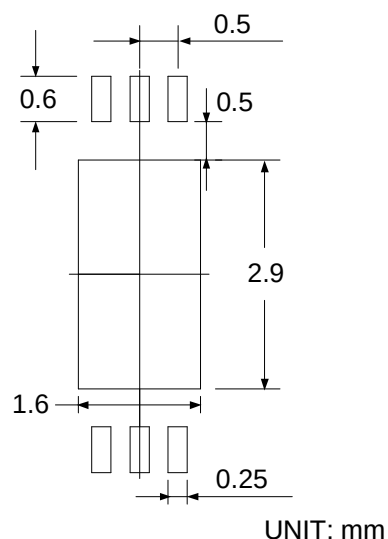
Package Information

DFN2x5-6 (saw type)

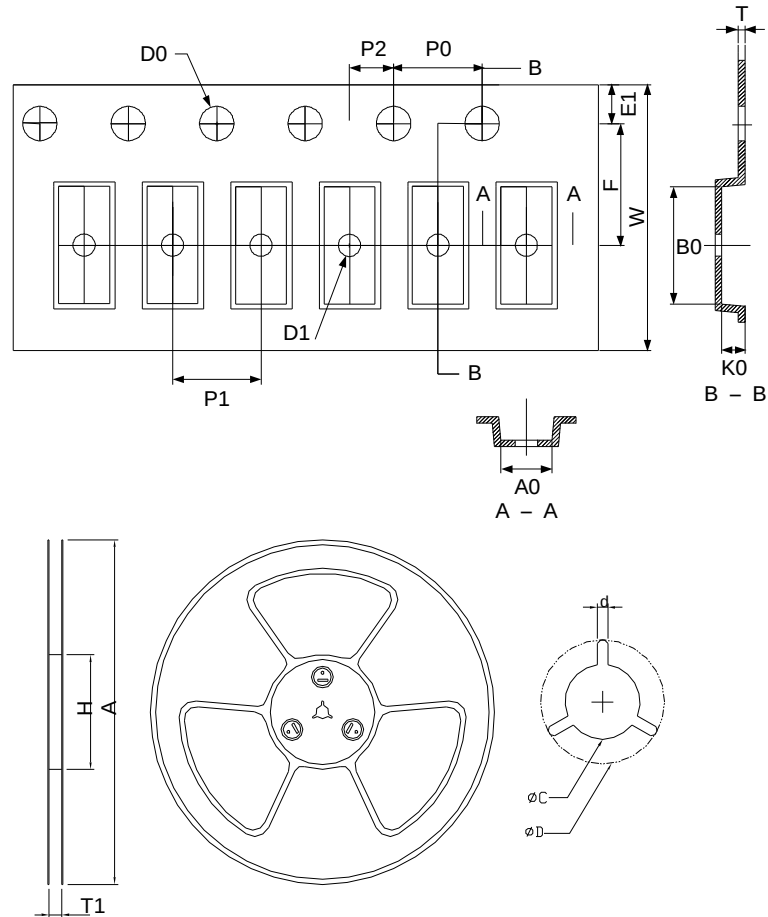


SYMBOL	DFN2x5-6			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.203	0.004	0.008
b	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
D1	1.20	1.60	0.047	0.063
E	4.80	5.20	0.189	0.205
E1	2.60	3.20	0.102	0.126
e	0.50 BSC		0.020 BSC	
L	0.40	0.60	0.016	0.024

RECOMMENDED LAND PATTERN



Carrier Tape & Reel Dimensions

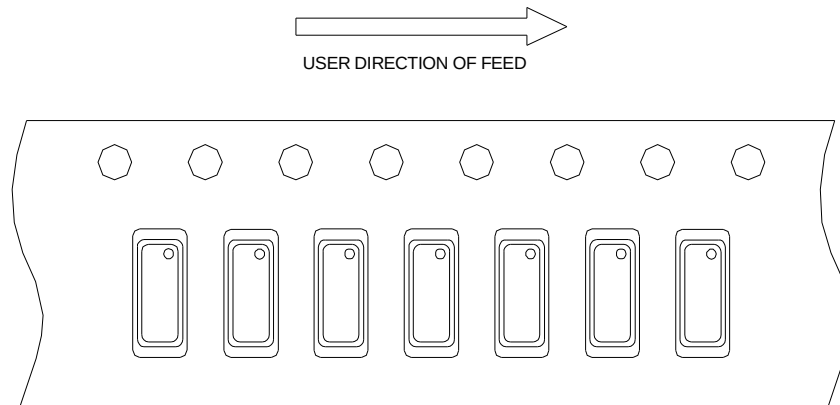


Application	A	H	T1	C	d	D	W	E1	F
DFN2x5-6	178.0±2.00	50 MIN.	13.2±0.20	13.0±0.20	1.5 MIN.	21.0±0.40	12.0 ^{+0.30} _{-0.10}	1.75±0.10	5.5±0.10
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0±0.10	4.0±0.10	2.0±0.05	1.55 ^{+0.10} _{-0.00}	1.0 ^{+0.10} _{-0.00}	0.3±0.05	2.30±0.20	5.30±0.20	1.05±0.20

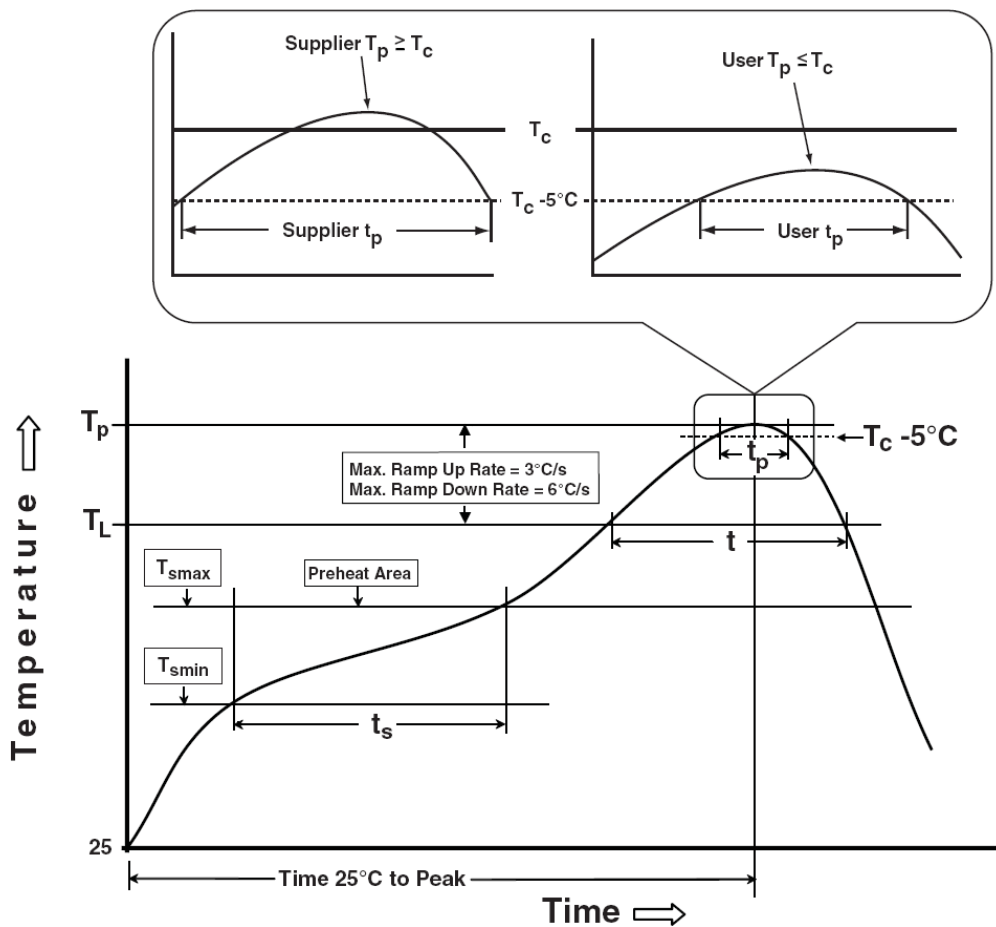
(mm)

Taping Direction Information

DFN2x5-6



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

Table 1. SnPb Eutectic Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	1000 Hrs, 80% of VDS max @ T_{jmax}
HTGB	JESD-22, A108	1000 Hrs, 100% of VGS max @ T_{jmax}
PCT	JESD-22, A102	168 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -65°C~150°C

Customer Service

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