

Absolute Maximum Ratings ($T_A = 25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		30	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current		30	A
I _{DP}	Pulse Drain Current Tested	T _C =25°C	120	A
		T _C =100°C	80	
I _D ^a	Continuous Drain Current	T _C =25°C	60*	A
		T _C =100°C	38	
P _D	Maximum Power Dissipation	T _C =25°C	50	W
		T _C =100°C	20	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2.5	°C/W
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤ 10s	22	°C/W
		Steady State	66	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	48	A
		L=0.3mH	34	
		L=0.5mH	30	
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	115	mJ
		L=0.3mH	173	
		L=0.5mH	225	

Note a : * Current limited by bond wire.

Note b : Surface Mounted on 1in^2 pad area, $t=999\text{sec}$.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

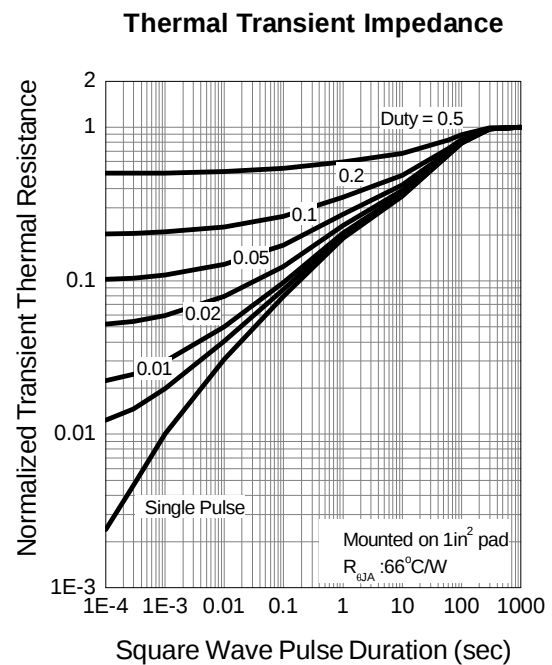
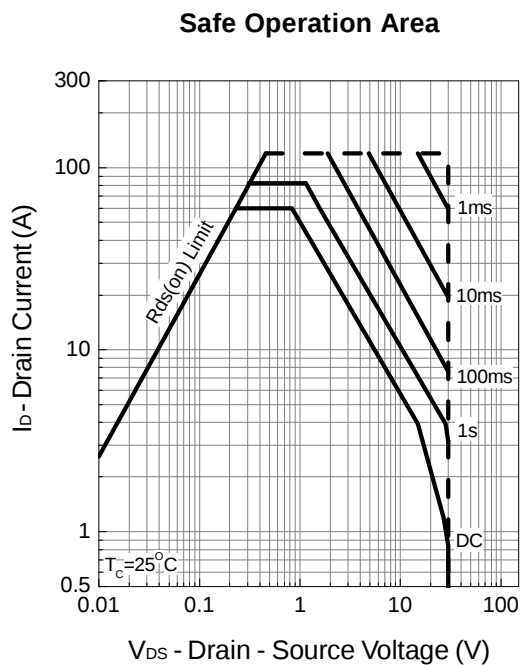
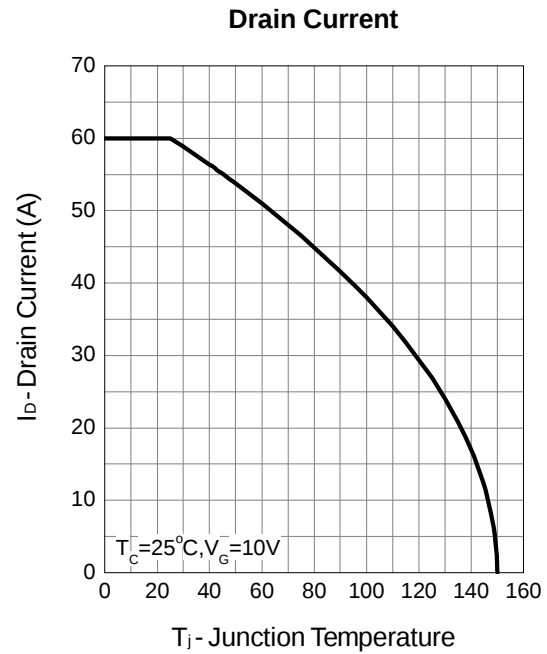
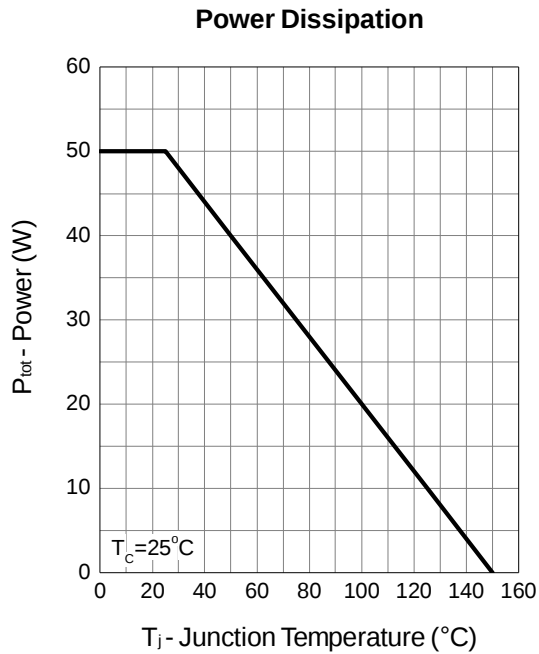
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
BV _{DSS(t)}	Drain-Source Breakdown Voltage (transient)	V _{GS} =0V, I _{D(aval)} =30A T _{case} =25°C, t _{transient} =100ns	34	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.5	1.9	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =30A T _J =125°C V _{GS} =4.5V, I _{DS} =15A	- - -	2.5 3.75 3.8	3 - 4.6	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	50	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =30A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{DS} =30A, dI _{SD} /dt=100A/μs	-	27.5	-	ns
t _a	Charge Time		-	21.6	-	
t _b	Discharge Time		-	5.9	-	
Q _{rr}	Reverse Recovery Charge		-	17	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	1	1.5	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	1872	2340	2808	pF
C _{oss}	Output Capacitance		406	580	754	
C _{rss}	Reverse Transfer Capacitance		132	220	308	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	16	32	ns
t _r	Turn-on Rise Time		-	10	19	
t _{d(OFF)}	Turn-off Delay Time		-	46	83	
t _f	Turn-off Fall Time		-	18	34	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =30A	-	21	30	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =30A	-	45	63	
Q _{gth}	Threshold Gate Charge		-	4	5.2	
Q _{gs}	Gate-Source Charge		-	5.7	7.4	
Q _{gd}	Gate-Drain Charge		-	7	10.5	

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

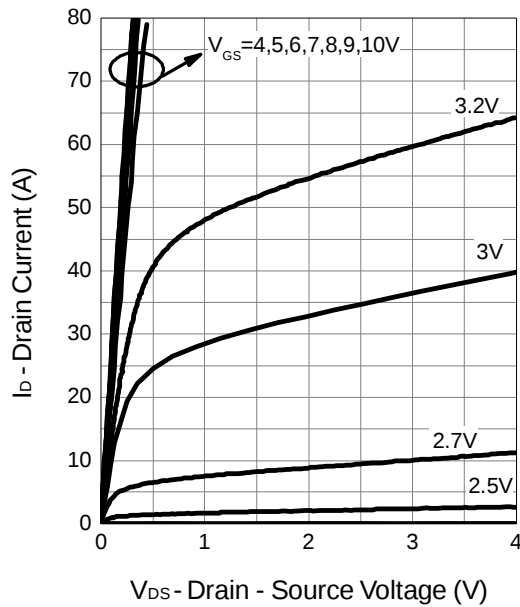
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

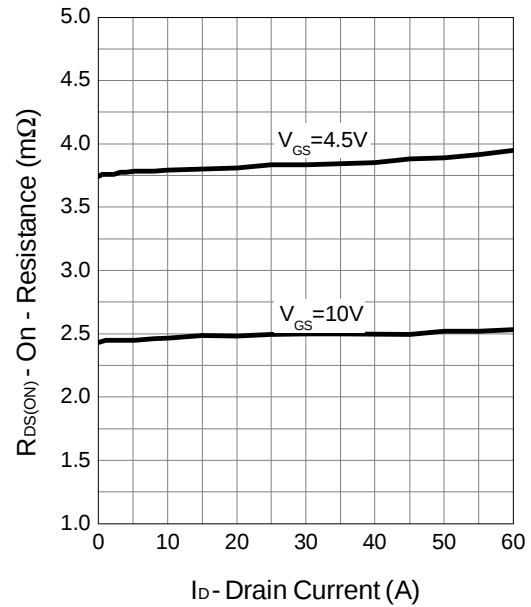


Typical Operating Characteristics (Cont.)

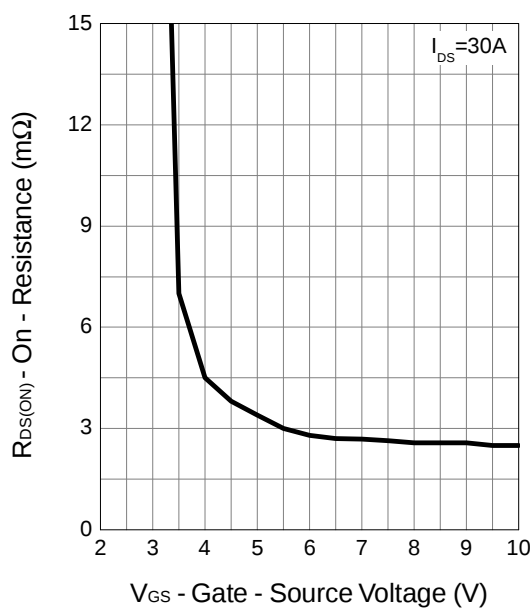
Output Characteristics



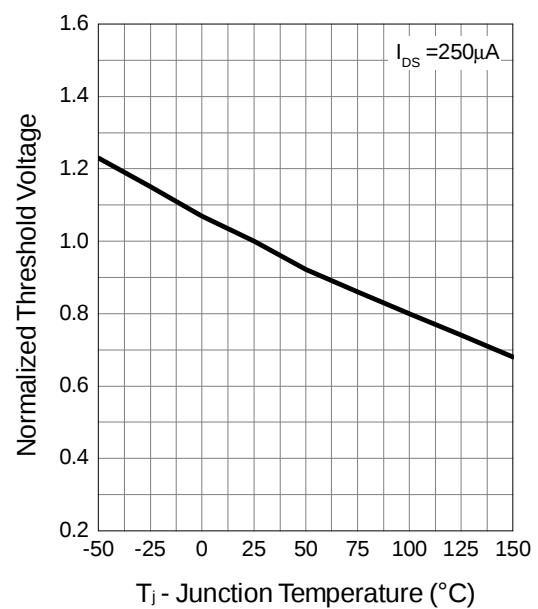
Drain-Source On Resistance



Gate-Source On Resistance

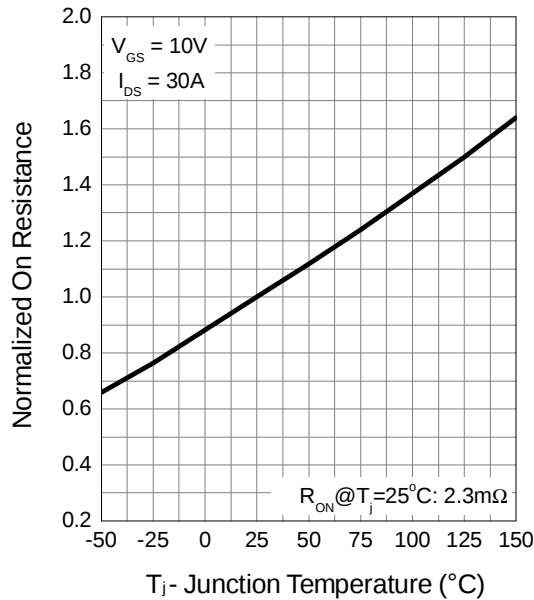


Gate Threshold Voltage

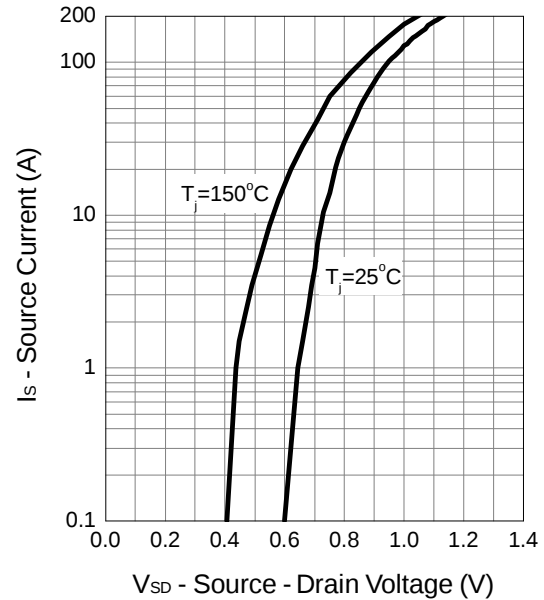


Typical Operating Characteristics (Cont.)

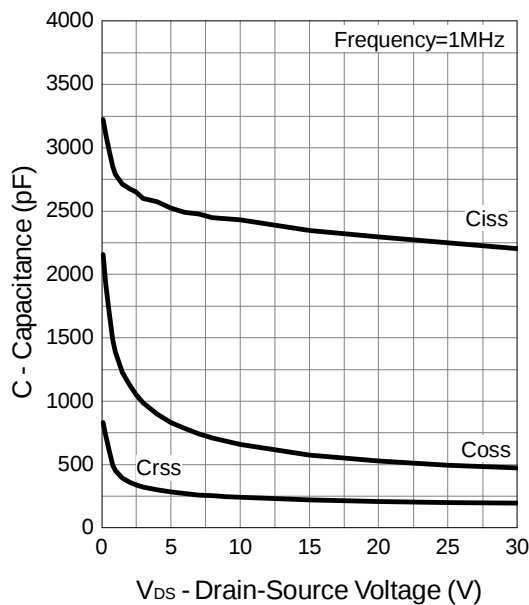
Drain-Source On Resistance



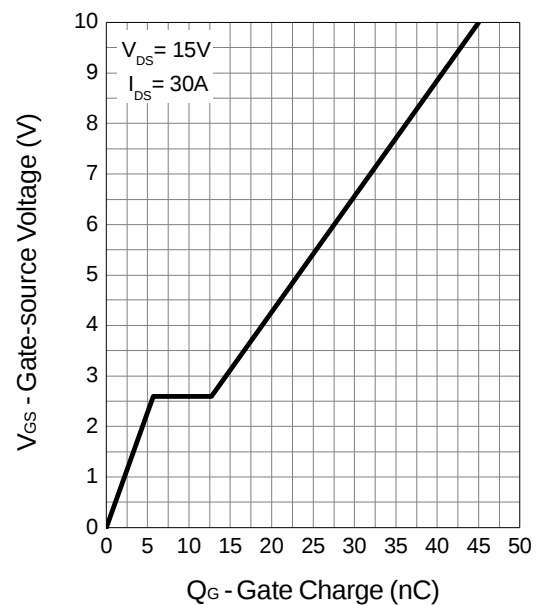
Source-Drain Diode Forward

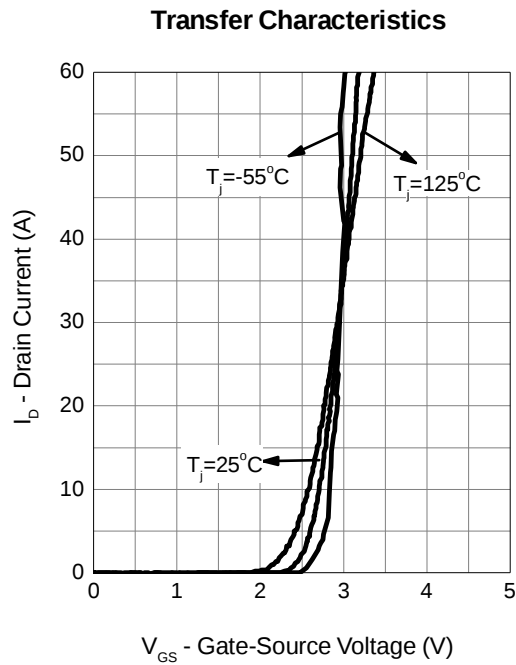


Capacitance

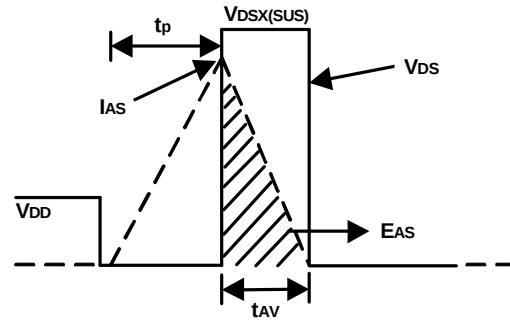
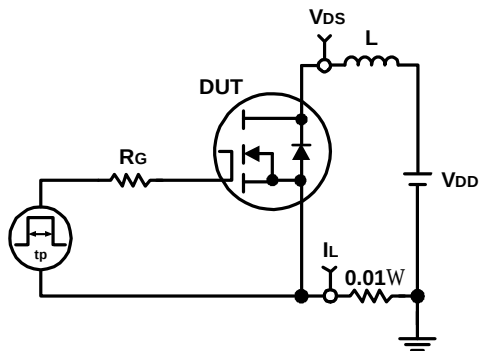


Gate Charge

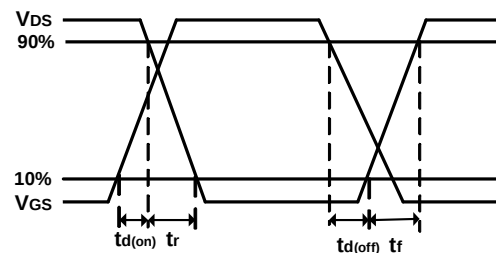
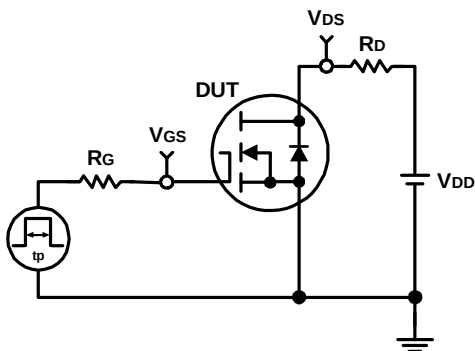


Typical Operating Characteristics (Cont.)

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



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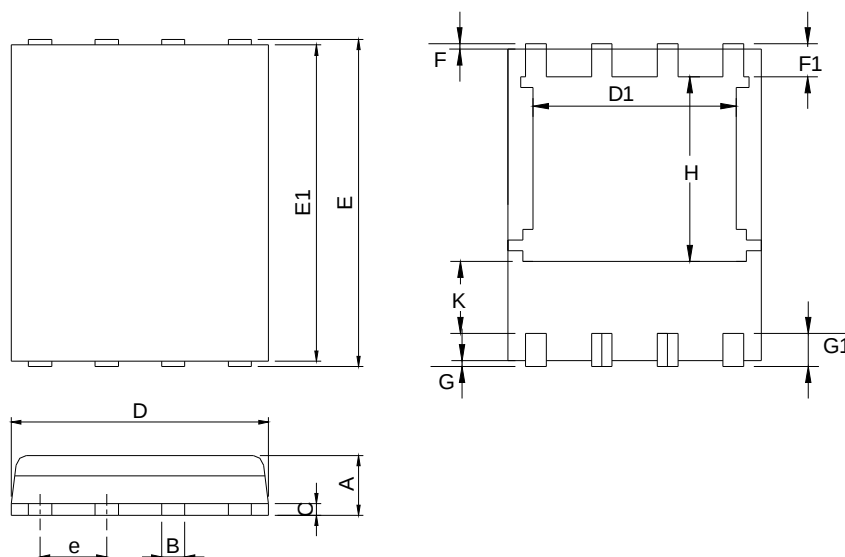
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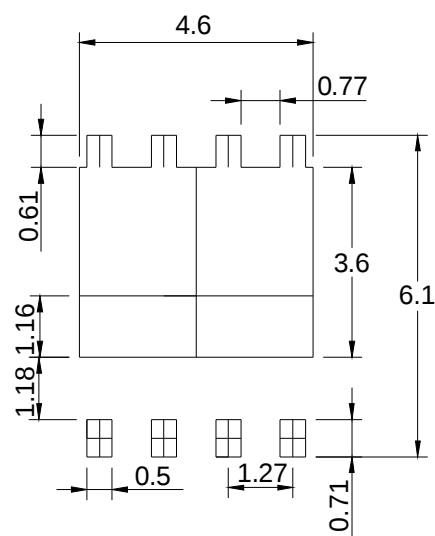
Package Information



SYMBOL	DFN5x6A-8_EP1_P			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

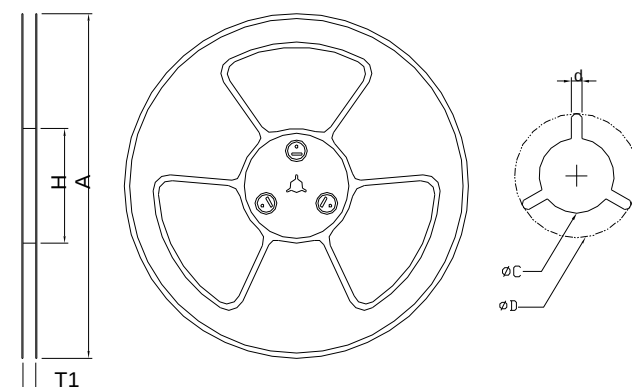
Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm

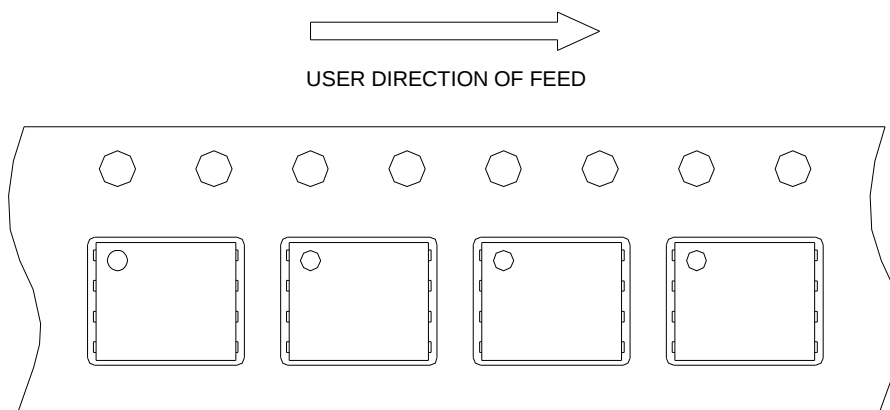
The drawing illustrates a mechanical component with a top view and two cross-sections. The top view shows a rectangular plate with a central row of three rectangular cutouts and a top row of six circular holes. Dimensions include $\varnothing D0$ for the top holes, $\varnothing D1$ for the central cutouts, $P0$, $P2$, and $P1$ for horizontal spacing, $B0$ for the top hole row height, $A0$ for the central cutout width, B for the central cutout height, F for the bottom hole row height, $E1$ for the bottom hole row height, W for the total width, and $K0$ for the bottom hole row width. Section A-A is a vertical cross-section showing the profile of the top and bottom edges. Section B-B is a horizontal cross-section showing the profile of the central cutouts and the bottom edge, with a thickness dimension T .



Application	A	H	T1	C	d	D	W	E1	F
DFN5x6A-8_EP1_P	330.0±2.00	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.10
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0±0.10	8.0±0.10	2.0±0.10	1.5+0.10 -0.00	1.5 MIN.	0.3±0.05	6.5±0.10	5.3±0.10	1.4±0.10

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DFN5x6A-8_EP1-P



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})	100 °C	150 °C
Temperature max (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_L)	60-150 seconds	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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