-30V -39A P-Channel Enhancement Mode MOSFET

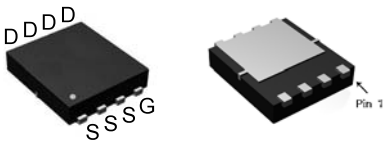
Features

- -30V/-39A,
  $R_{DS(ON)}$ = 14mΩ(max.) @ V_{GS} =-10V
  $R_{DS(ON)}$ = 24mΩ(max.) @ V_{GS} =-4.5V
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)
- ESD protection pass 3KV

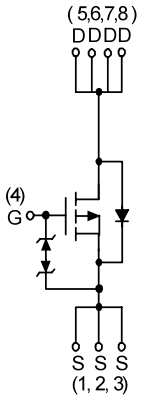
Applications

- Load Switch.
- Battery Pack Power Management.

Pin Description



DFN3x3-8



P-Channel MOSFET

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±25	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	T_C=25°C	-20	A
I_D	Continuous Drain Current	T_C=25°C	-39	
		T_C=100°C	-25	
I_{DM}	Pulsed Drain Current	T_C=25°C	-70 *	
P_D	Maximum Power Dissipation	T_C=25°C	32.9	W
		T_C=100°C	13.2	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	3.8	°C/W
I_D	Continuous Drain Current	T_A=25°C	-12 [b]	A
		T_A=70°C	-9.8 [b]	
P_D	Maximum Power Dissipation	T_A=25°C	3.1	W
		T_A=70°C	2	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	t ≤ 10s	40	°C/W
		Steady State	75	
I_{AS} [a]	Avalanche Current, Single pulse	L=0.5mH	18	A
E_{AS} [a]	Avalanche Energy, Single pulse	L=0.5mH	81	mJ

Note * : Current limited by bond wire.
Note a : UIS tested and pulse width are limited by maximum junction temperature 150°C (initial temperature T_J = 25°C).
Note b : t < 10s.

Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

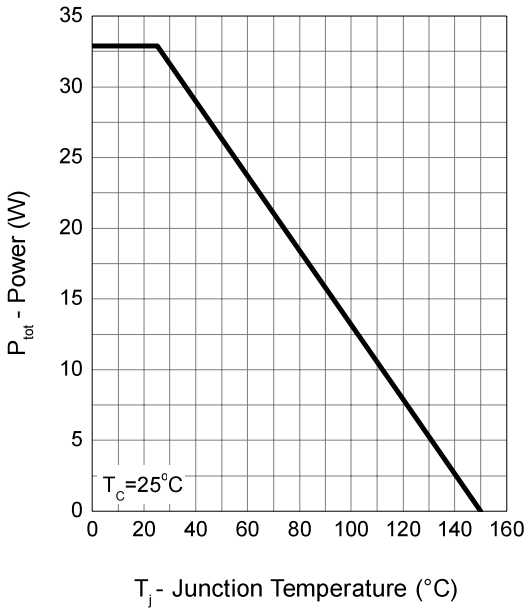
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
		T_J=85°C	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.3	-1.8	-2.3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±25V, V_{DS}=0V	-	-	±10	μA
$R_{DS(ON)}$ [c]	Drain-Source On-state Resistance	V_{GS}=-10V, I_{DS}=-20A	-	11	14	mΩ
		V_{GS}=-4.5V, I_{DS}=-10A	-	18	24	
Diode Characteristics						
V_{SD} [c]	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V	-	-0.7	-1	V
t_{rr} [d]	Reverse Recovery Time	I_{SD}=-20A, dI_{SD}/dt=100A/μs	-	20	-	ns
Q_{rr} [d]	Reverse Recovery Charge		-	8	-	nC
Dynamic Characteristics [d]						
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V,F=1MHz	-	9	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz	-	1380	-	pF
C_{oss}	Output Capacitance		-	280	-	
C_{rss}	Reverse Transfer Capacitance		-	217	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15Ω, I_{DS}=-1A, V_{GEN}=-10V, R_G=6Ω	-	11	-	ns
t_r	Turn-on Rise Time		-	11	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	101	-	
t_f	Turn-off Fall Time		-	60	-	
Gate Charge Characteristics [d]						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V, I_{DS}=-20A	-	30	-	nC
Q_{gs}	Gate-Source Charge		-	1.2	-	
Q_{gd}	Gate-Drain Charge		-	11	-	

Note c：Pulse test ; pulse width≤300μs, duty cycle≤2%.

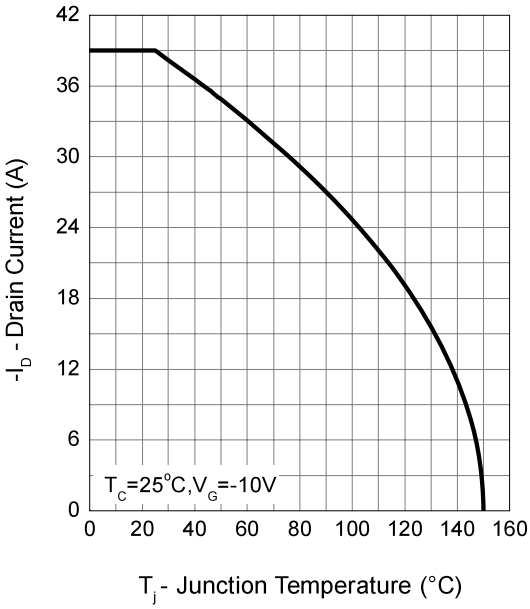
Note d：Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

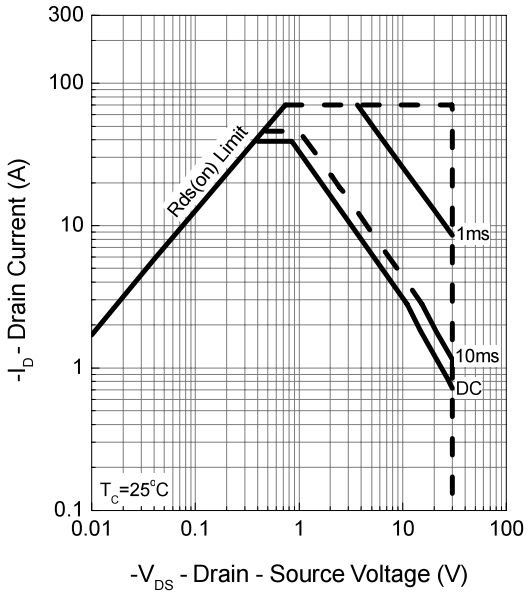
Power Dissipation



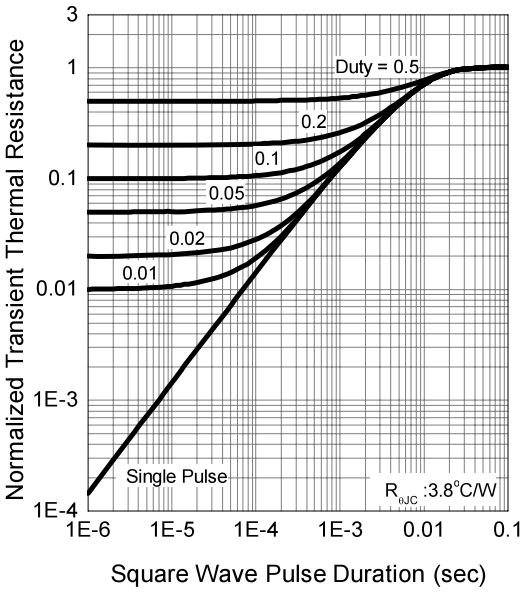
Drain Current



Safe Operation Area

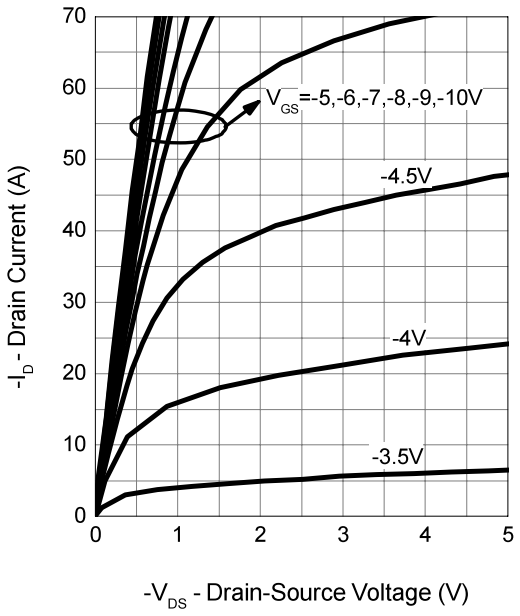


Thermal Transient Impedance

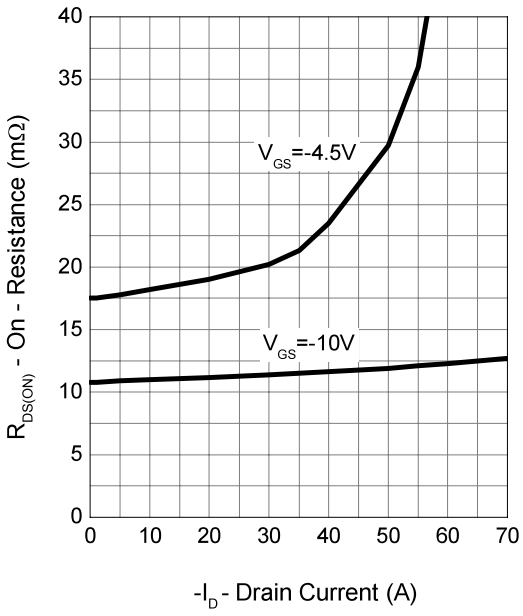


Typical Operating Characteristics (Cont.)

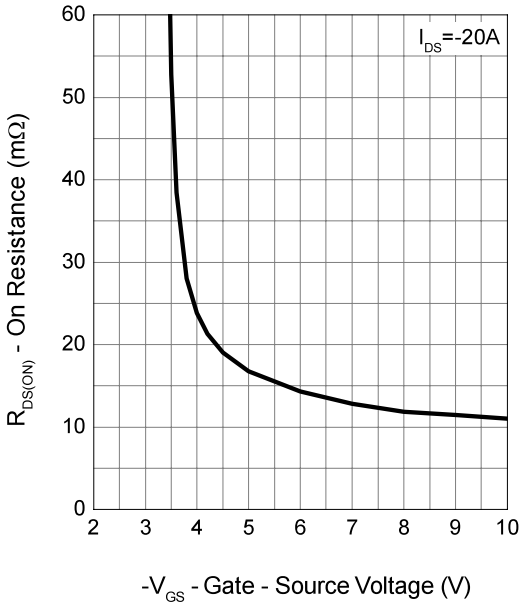
Output Characteristics



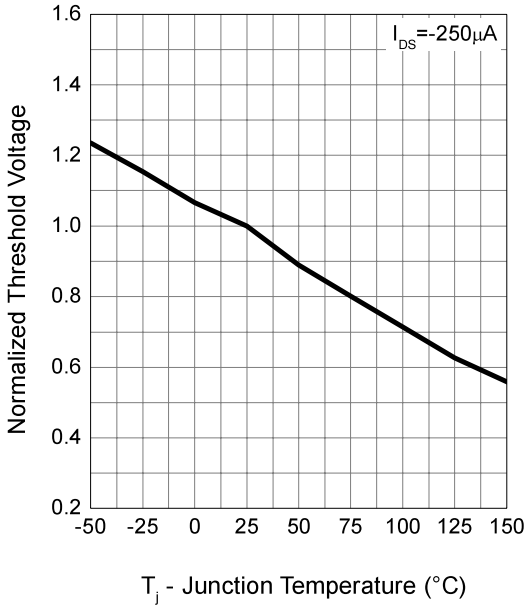
Drain-Source On Resistance



Gate-Source On Resistance

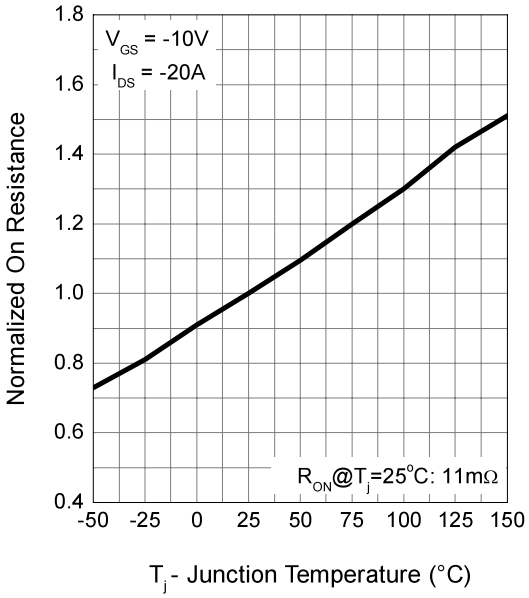


Gate Threshold Voltage

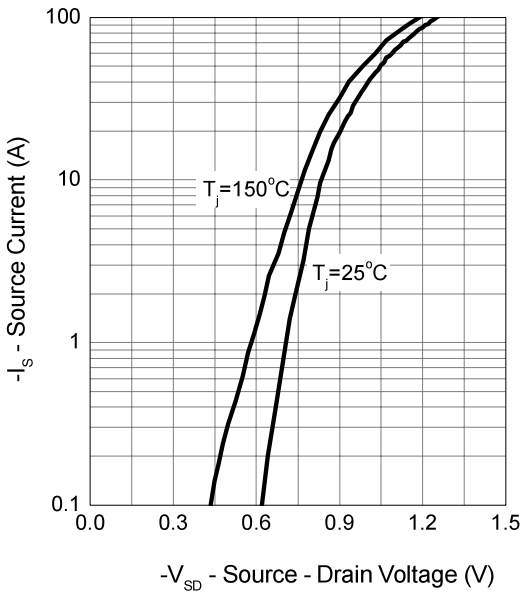


Typical Operating Characteristics (Cont.)

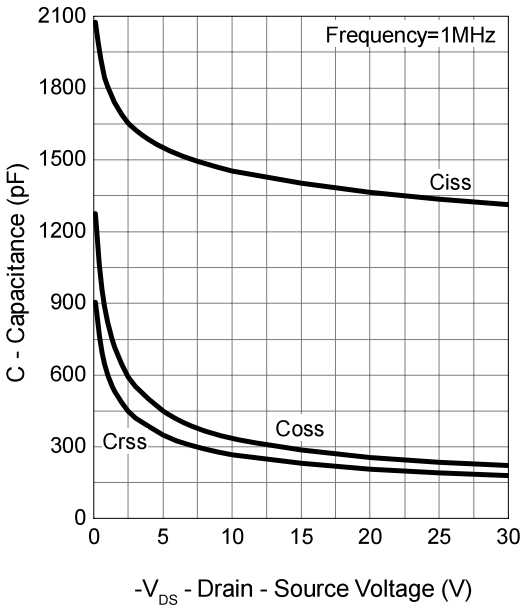
Drain-Source On Resistance



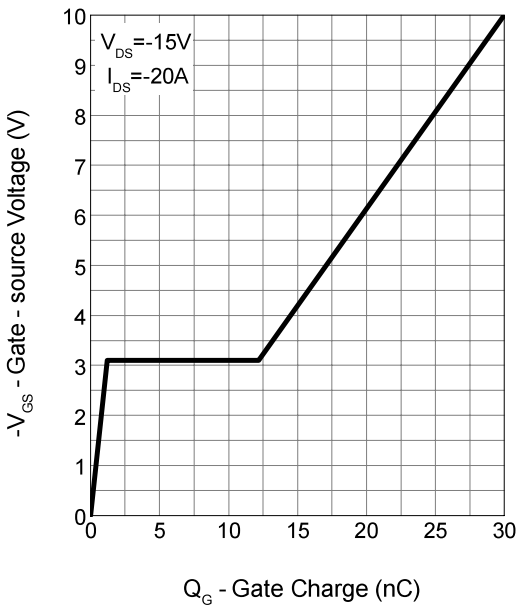
Source-Drain Diode Forward



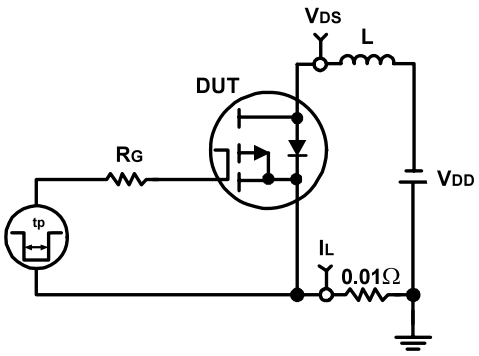
Capacitance

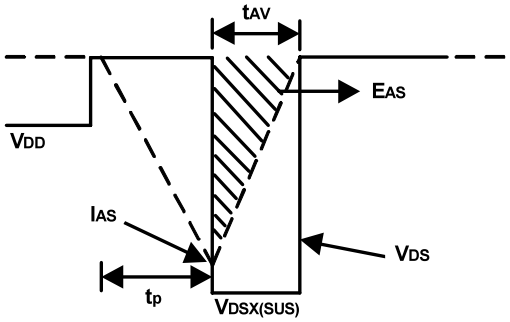


Gate Charge

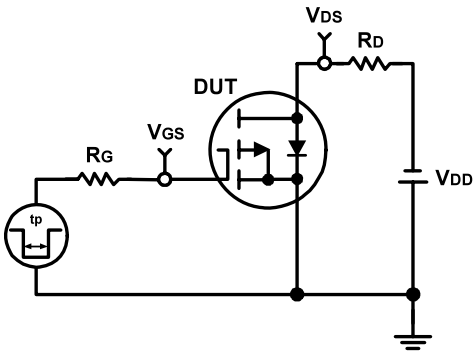


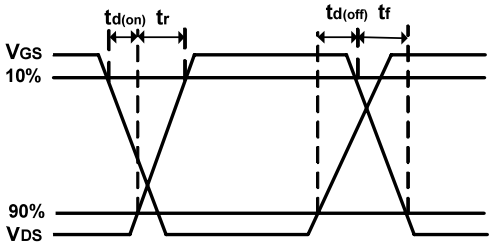
Avalanche Test Circuit and Waveforms





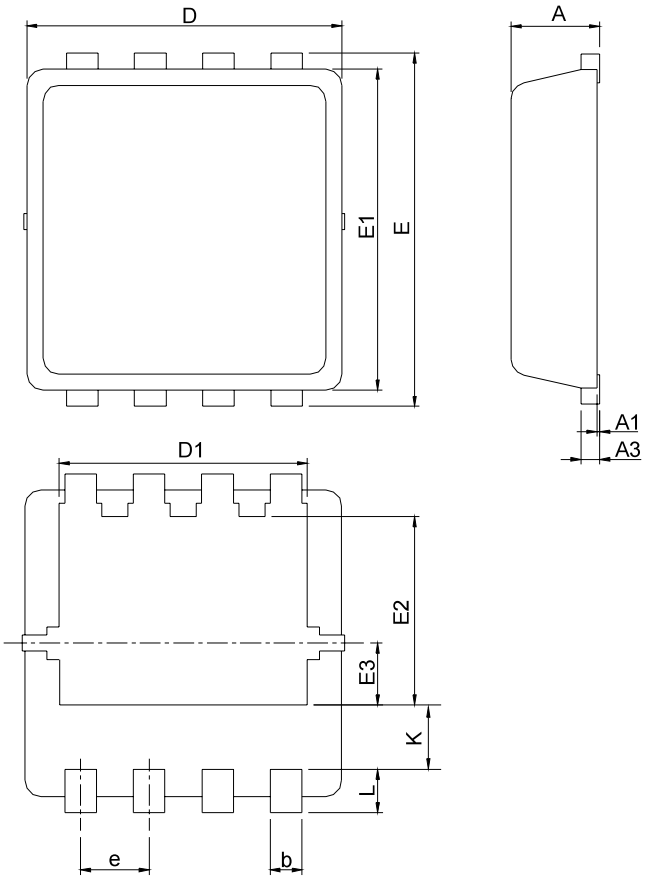
Switching Time Test Circuit and Waveforms





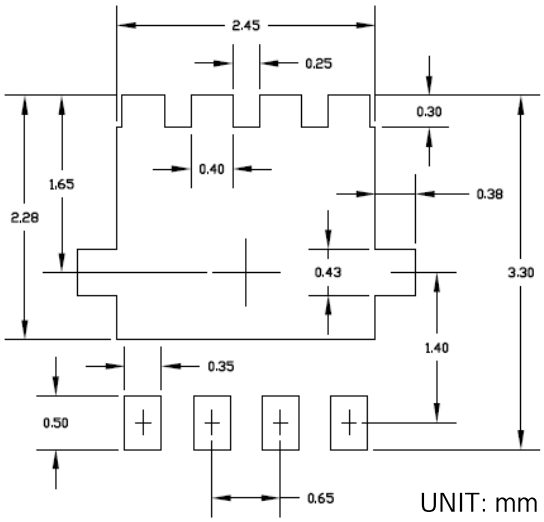
Package Information

DFN3x3-8

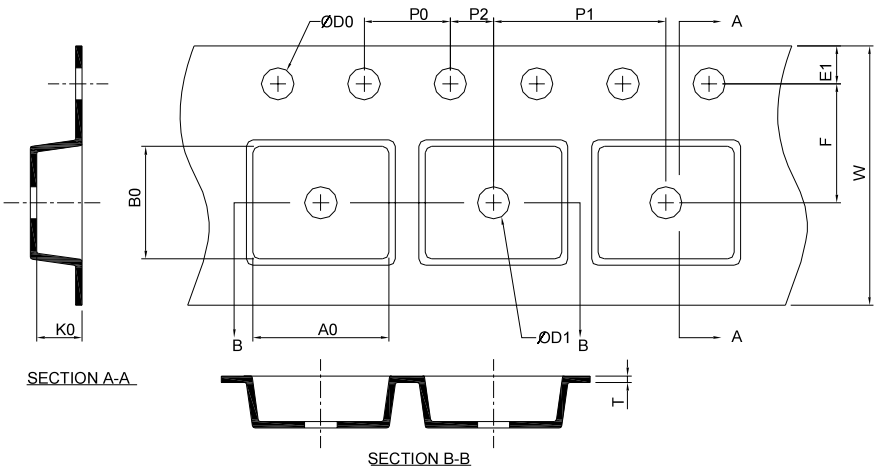


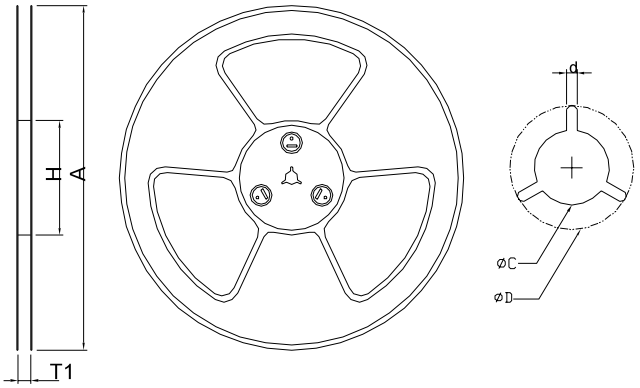
SYMBOL	DFN3x3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.10	0.114	0.122
D1	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN



Carrier Tape & Reel Dimensions



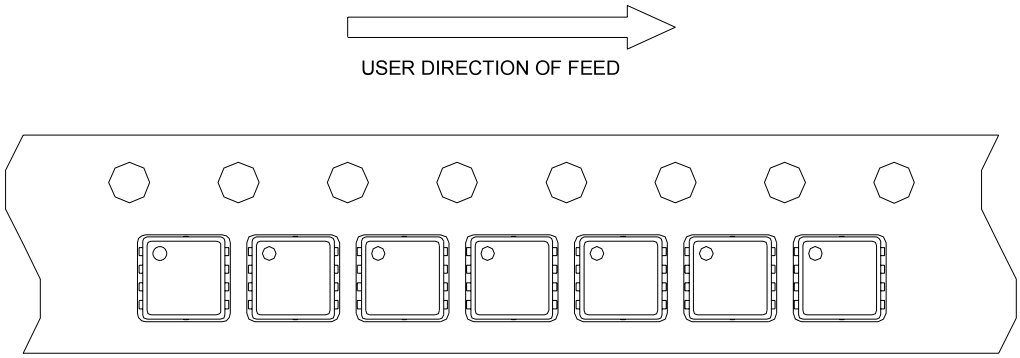


Application	A	H	T1	C	d	D	W	E1	F
DFN3x3-8	178.0± 2.00	50 MIN.	8.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	8.0±0.20	1.75±0.10	3.5±0.05
	P0	**P1**	**P2**	**D0**	**D1**	**T**	**A0**	**B0**	**K0**
	4.0±0.10	4.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	3.35±0.20	3.35±0.20	1.30±0.20

(mm)

Taping Direction Information

DFN3x3-8



Unit Per Reel:
3000pcs

Classification Profile