



AON3806

Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

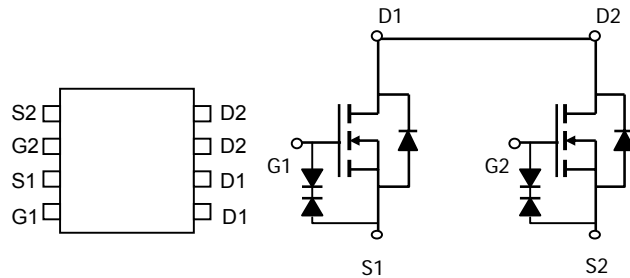
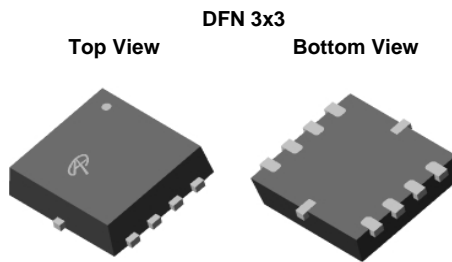


General Description

The AON3806 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration. *Standard Product AON3806 is Pb-free (meets ROHS & Sony 259 specifications).*

Features

- V_{DS} (V) = 20V
- I_D = 6.8 A ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 26m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 27m\Omega$ ($V_{GS} = 4V$)
- $R_{DS(ON)} < 35m\Omega$ ($V_{GS} = 2.5V$)
- ESD Protected**



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^A	I_D	$T_A=25^\circ C$	A
		$T_A=70^\circ C$	
Pulsed Drain Current ^B	I_{DM}	40	
Power Dissipation ^A	P_D	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	55	65	$^\circ C/W$
Maximum Junction-to-Ambient ^A				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	30	50	$^\circ C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±10V			10	μA
BV _{GSO}	Gate-Source Breakdown Voltage	V _{DS} =0V, I _G =±250μA	±12			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.7	1	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	40			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =6.8A T _J =125°C		21 29	26 35	mΩ
		V _{GS} =4V, I _D =6A		22	27	mΩ
		V _{GS} =2.5V, I _D =5A		28	35	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =6.8A		25		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.75	1	V
I _S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		615		pF
C _{oss}	Output Capacitance			150		pF
C _{rss}	Reverse Transfer Capacitance			120		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		0.9		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =6.8A		8.5		nC
Q _{gs}	Gate Source Charge			1.2		nC
Q _{gd}	Gate Drain Charge			3		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =5V, V _{DS} =10V, R _L =1.4Ω, R _{GEN} =3Ω		7		ns
t _r	Turn-On Rise Time			13		ns
t _{D(off)}	Turn-Off Delay Time			29		ns
t _f	Turn-Off Fall Time			11		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =6.8A, dI/dt=100A/μs		15		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =6.8A, dI/dt=100A/μs		5		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

Rev 3: October 2006

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

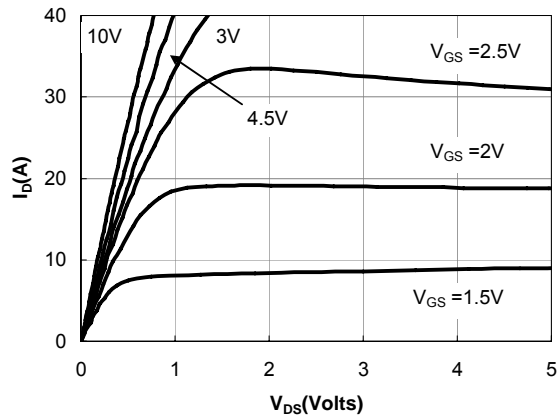


Figure 1: On-Regions Characteristics

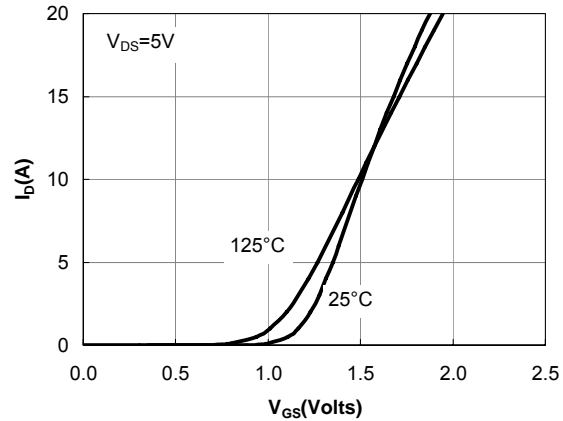


Figure 2: Transfer Characteristics

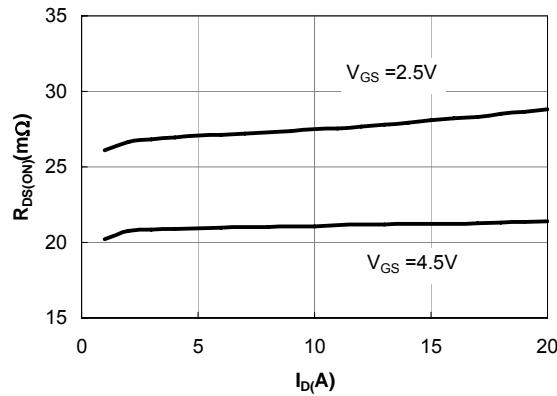


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

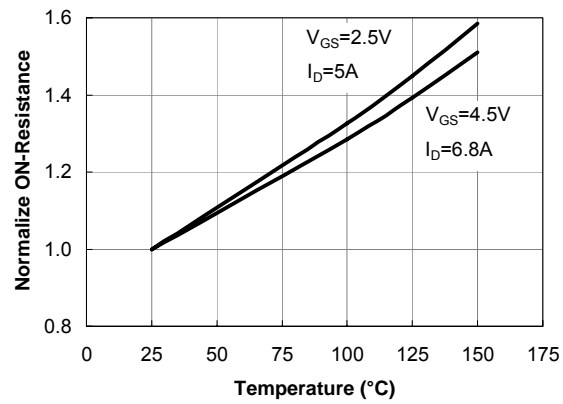


Figure 4: On-Resistance vs. Junction Temperature

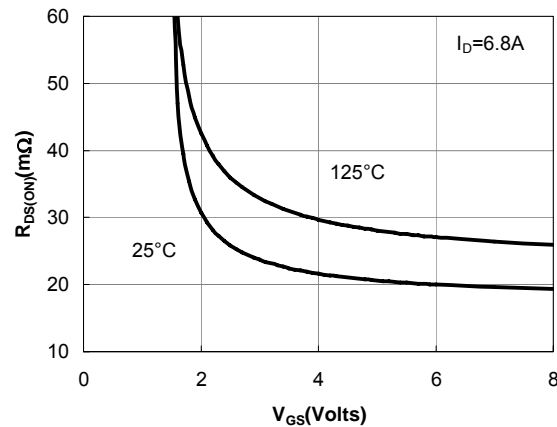


Figure 5: On-Resistance vs. Gate-Source Voltage

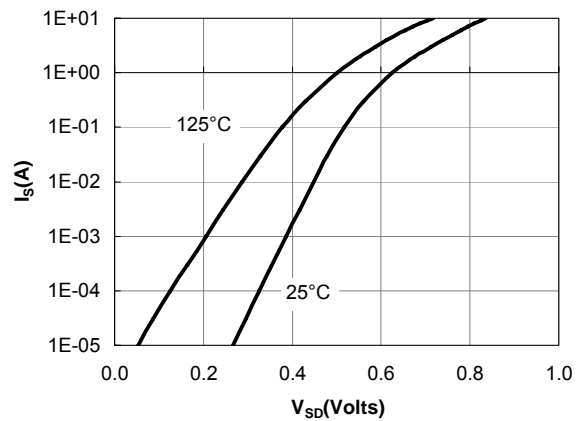


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

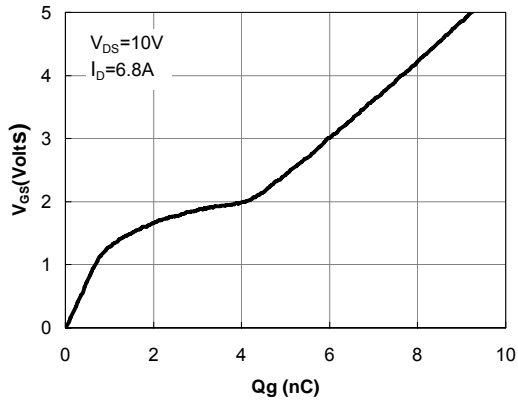


Figure 7: Gate-Charge Characteristics

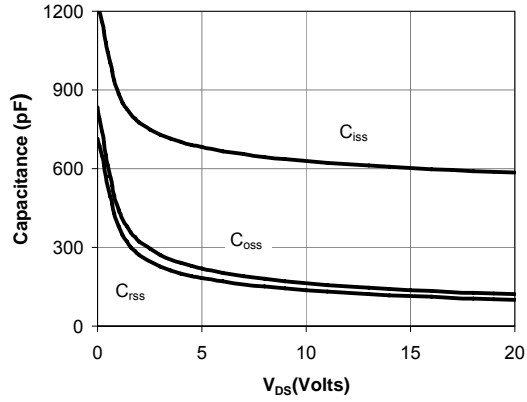


Figure 8: Capacitance Characteristics

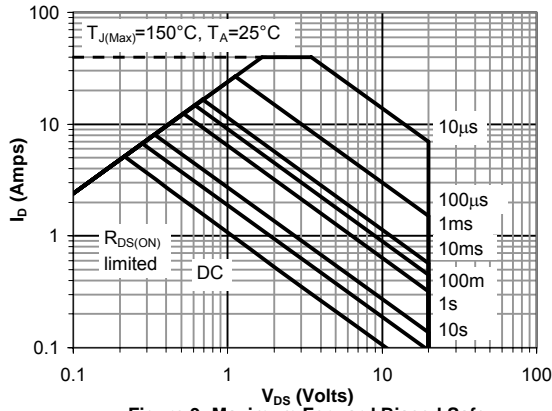


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

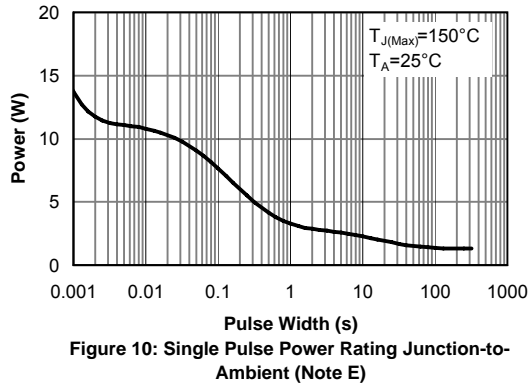


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

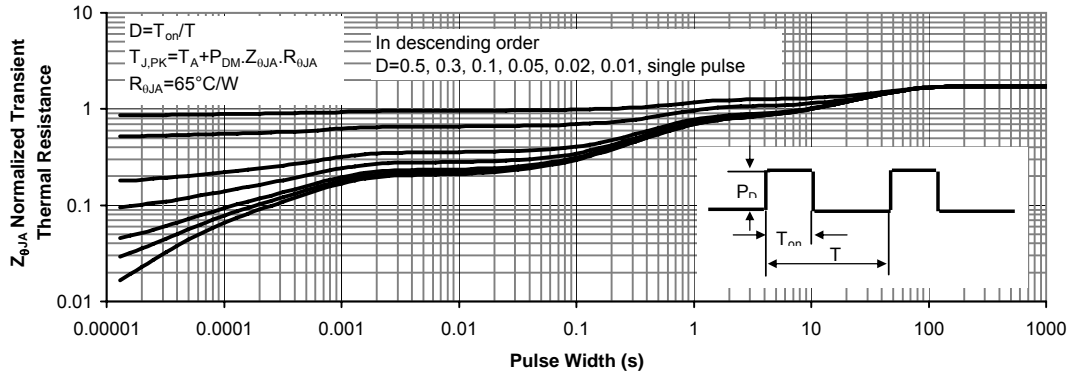
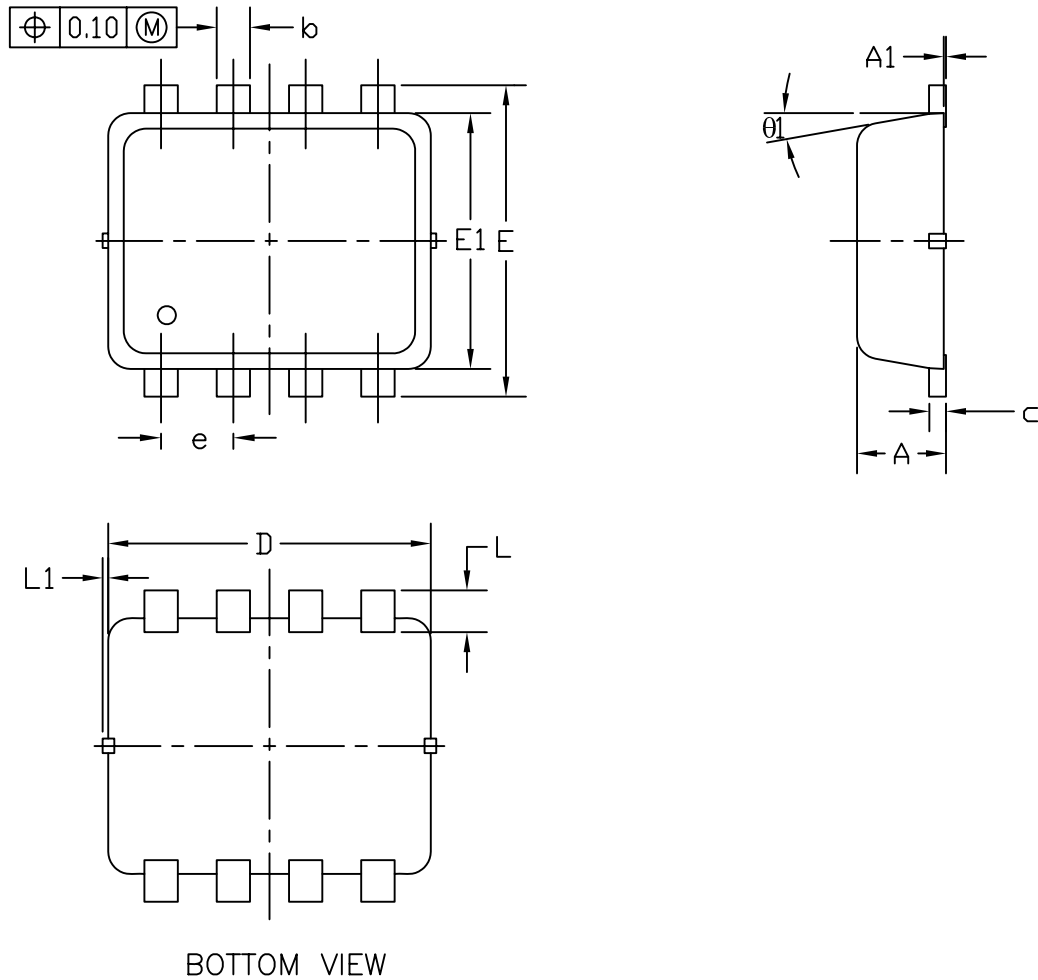


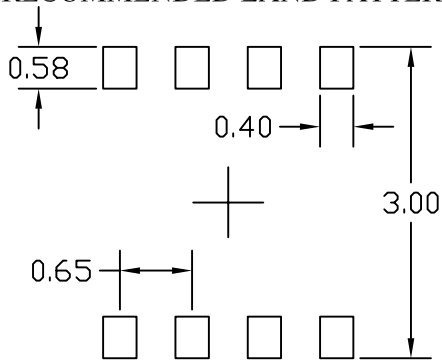
Figure 11: Normalized Maximum Transient Thermal Impedance



DFN 3x3-A PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035
A1	0.00	—	0.05	0.000	—	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.08	0.15	0.25	0.003	0.006	0.010
D	2.90 BSC			0.114 BSC		
E	2.80 BSC			0.110 BSC		
E1	2.30 BSC			0.091 BSC		
e	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.45	0.008	0.015	0.018
L1	0	—	0.10	0	—	0.004
theta1	0°	10°	12°	0°	10°	12°

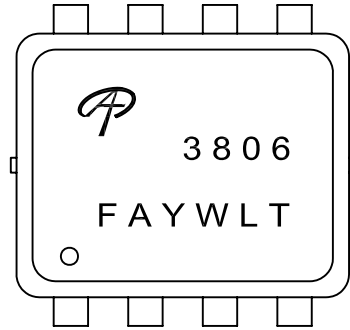
NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

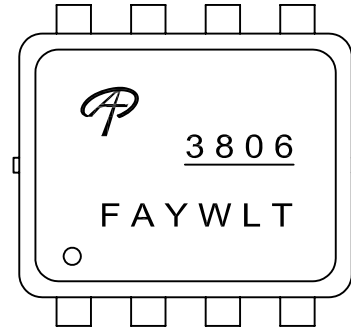


Document No.	PD-00496
Version	A
Title	AON3806 Marking Description

DFN3X3 PACKAGE MARKING DESCRIPTION



Standard product



Green product

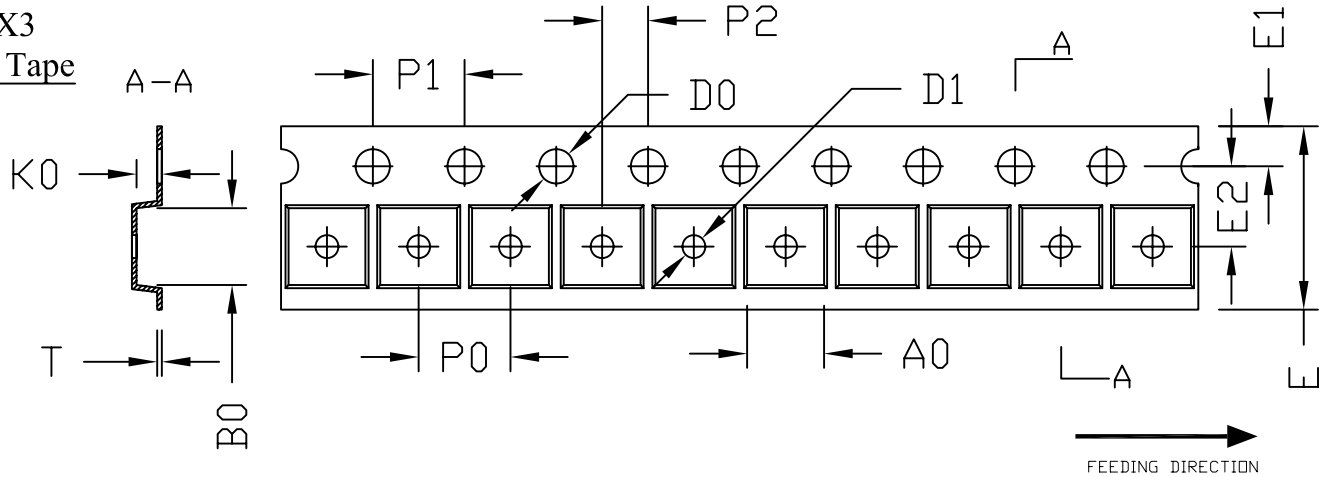
NOTE:

- LOGO - AOS Logo
- 3806 - Part number code
- F - Fab code
- A - Assembly location code
- Y - Year code
- W - Week code
- L&T - Assembly lot code

PART NO.	DESCRIPTION	CODE
AON3806	Standard product	3806
AON3806L	Green product	<u>3806</u>



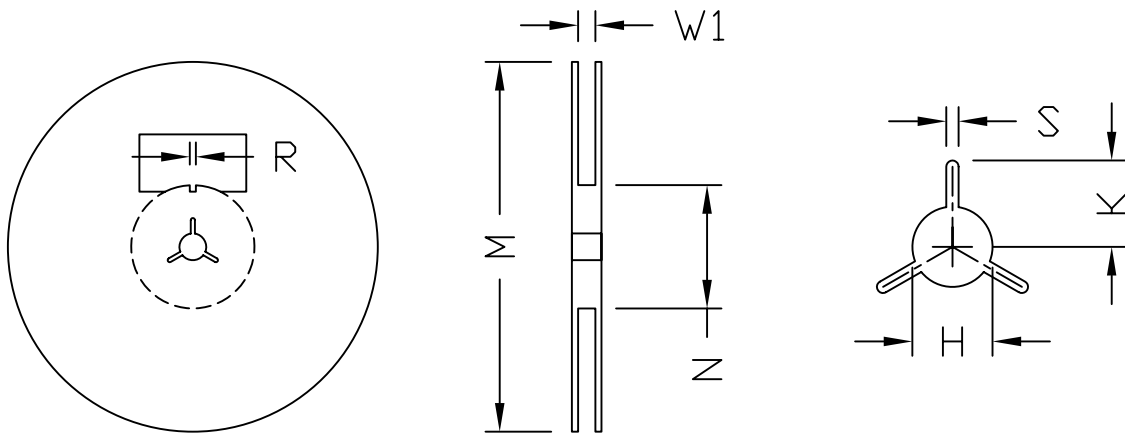
**DFN 3X3
Carrier Tape**



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN 3X3	3.35 ±0.10	3.35 ±0.10	1.25 ±0.10	1.50 +0.1 -0	1.00 +0.25 -0	8.00 +0.30 -0.10	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.200 ±0.02

**DFN 3X3
REEL**



UNIT: MM

TAPE SIZE	REEL SIZE	M	N	W1	H	S	K	R
8	ø180	ø180.0 ±0.50	60.0 ±0.50	8.4 +1.5 -0	13.0 ±0.20	1.5 MIN.	13.5 MIN.	3.0 ±0.50

DFN 3X3 TAPE

Leader / Trailer
& Orientation

