

Product Summary

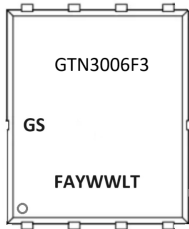
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
30	4.6 @ $V_{GS} = 10V$	32 ^(G)

Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

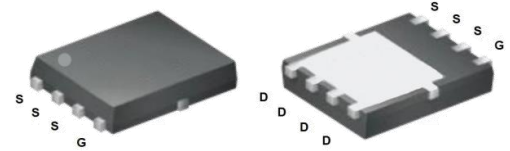
- DC/DC conversion
- Power switch
- Motor drives
- Li- Battery Protection



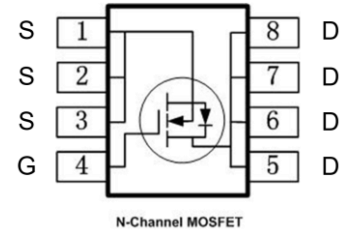
PDFN3333

NOTE:
 LOGO - GS
 GTN3006F3- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

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Equivalent circuit



Absolute maximum rating@25°C

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	±20	
Continuous drain current ^(G)	$T_C=25\text{ C}$	32	A
	$T_C=100\text{ C}^{(G)}$	23	
Pulsed drain current ^(C)	$I_{D,pulse}$	118	
Avalanche energy, single pulse ^(C) L=0.1mH	E_{AS}	45	mJ
Power dissipation ^(B)	$T_C=25\text{ C}$	P_D	28 W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	4.5	°C/W
Thermal resistance, junction-to-ambient ^(A D)	$R_{\theta JA}$	45	

Electrical Characteristics (@T_J = +25°C unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	ID=250μA, VGS=0V	30			V
IDSS	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V			1	μA
		TJ=55°C			5	
IGSS	Gate-Body leakage current	VDS=0V, VGS= ±20V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS ID=250μA	1.3	1.85	2.4	V
RDS(ON)	Static Drain-Source On-Resistance	VGS=10V, ID=20A		3.8	4.6	mΩ
		TJ=125°C		5.6	6.8	
		VGS=4.5V, ID=20A		5.2	7.2	
gFS	Forward Trans conductance	VDS=5V, ID=20A		100		S
VSD	Diode Forward Voltage	IS=1A, VGS=0V		0.7	1	V
IS	Maximum Body-Diode Continuous Current				30	A
DYNAMIC PARAMETERS						
Ciss	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		2300		pF
Coss	Output Capacitance			240		pF
Crss	Reverse Transfer Capacitance			210		pF
Rg	Gate resistance	f=1MHz	1.2	2.5	4.0	Ω
SWITCHING PARAMETERS						
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=20A		38		nC
Qgs	Gate Source Charge			6.0		nC
Qgd	Gate Drain Charge			12		nC
tD(on)	Turn-On Delay Time	VGS=10V, VDS=15V, RL=0.75Ω, RGEN=3Ω		7		ns
tr	Turn-On Rise Time			9		ns
tD(off)	Turn-Off Delay Time			40		ns
tf	Turn-Off Fall Time			11		ns
trr	Body Diode Reverse Recovery Time	IF=20A, dI/dt=100A/μs		11		ns
Qrr	Body Diode Reverse Recovery Charge	IF=20A, dI/dt=100A/μs		15		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 Power dissipation P_{DSM} is based on R_{θJA} ≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature T_{J(MAX)}=150° C.

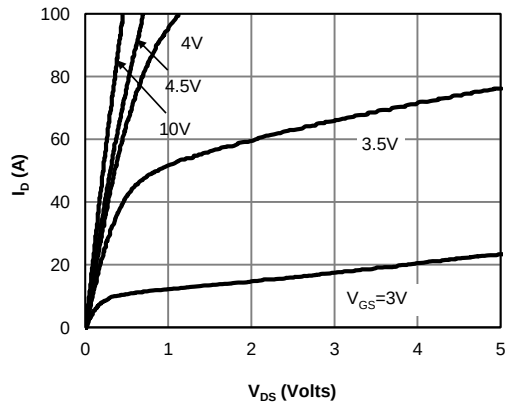
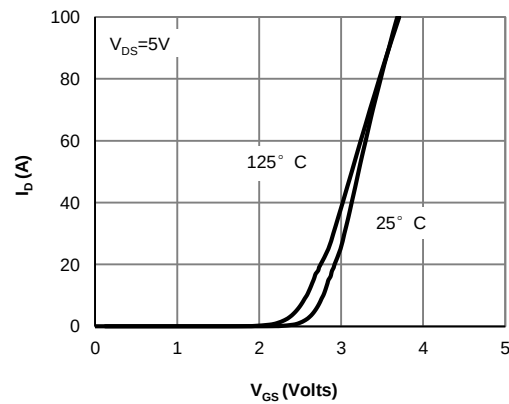
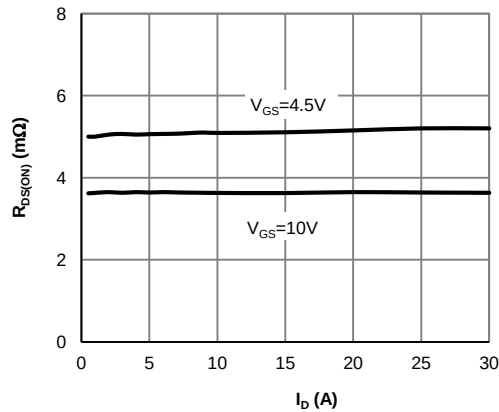
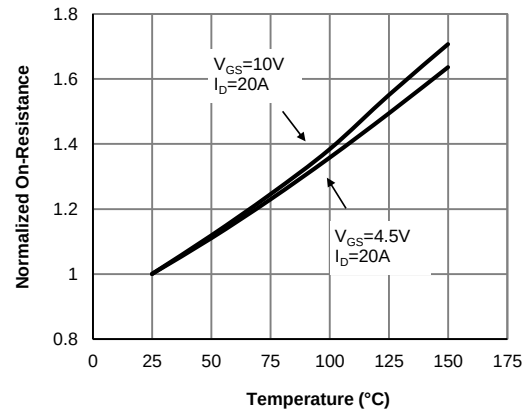
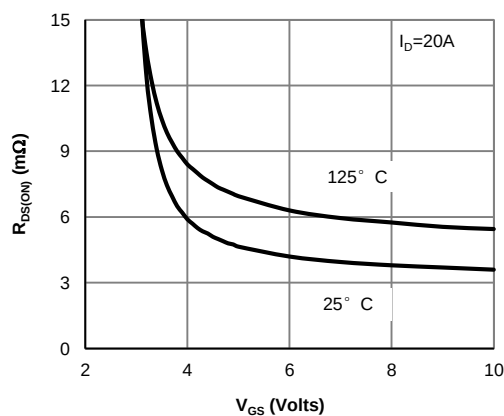
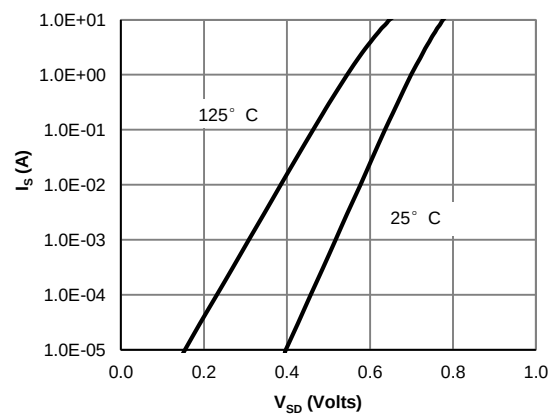
D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. 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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

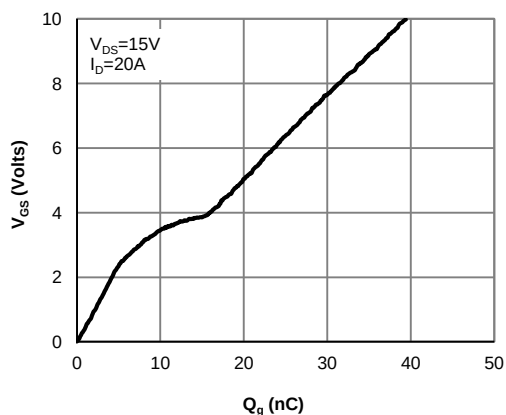


Figure 7: Gate-Charge Characteristics

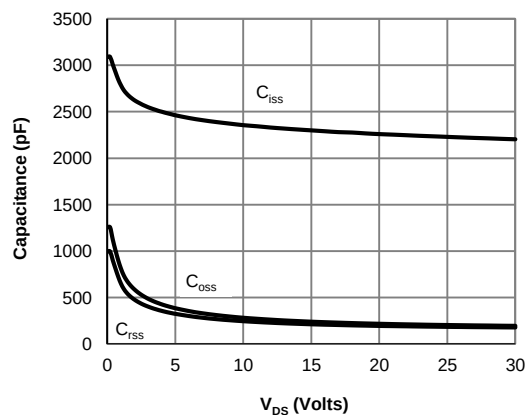


Figure 8: Capacitance Characteristics

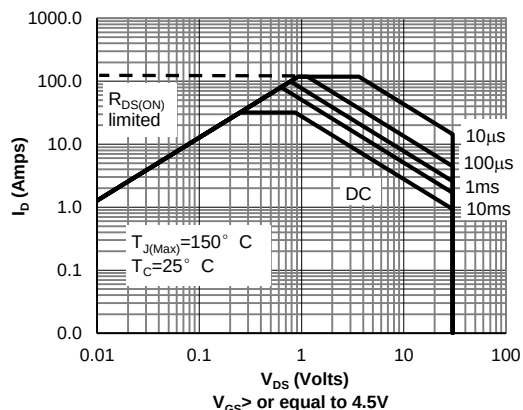


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

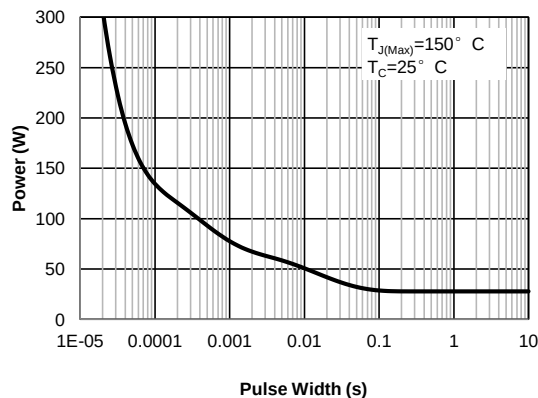


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

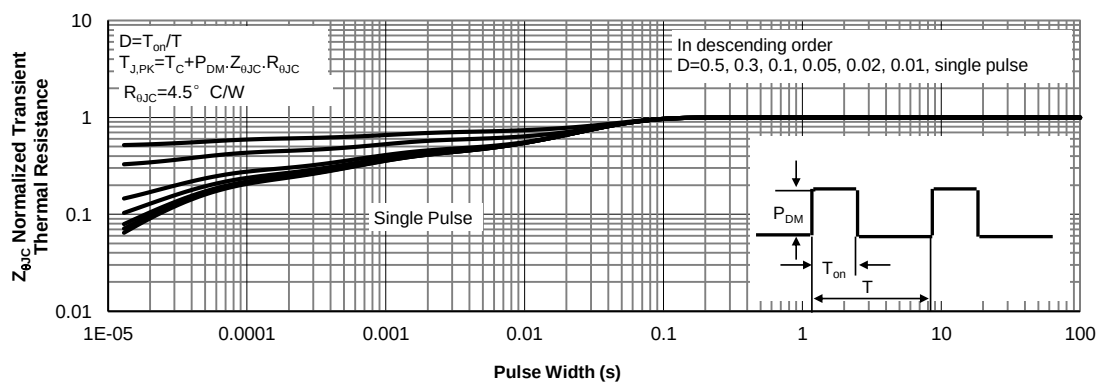


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

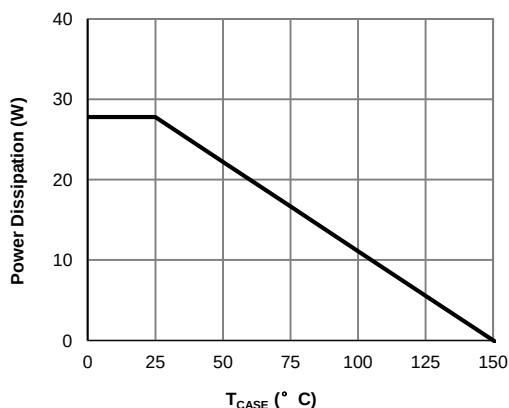


Figure 12: Power De-rating (Note F)

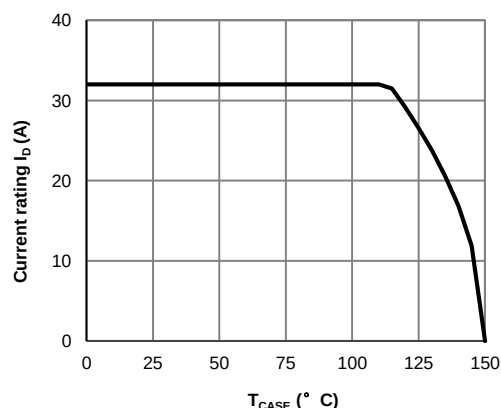


Figure 13: Current De-rating (Note F)

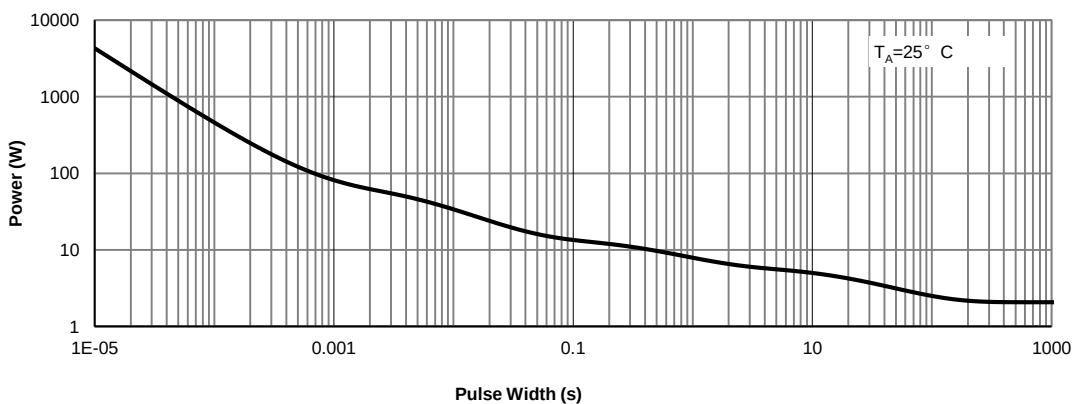


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

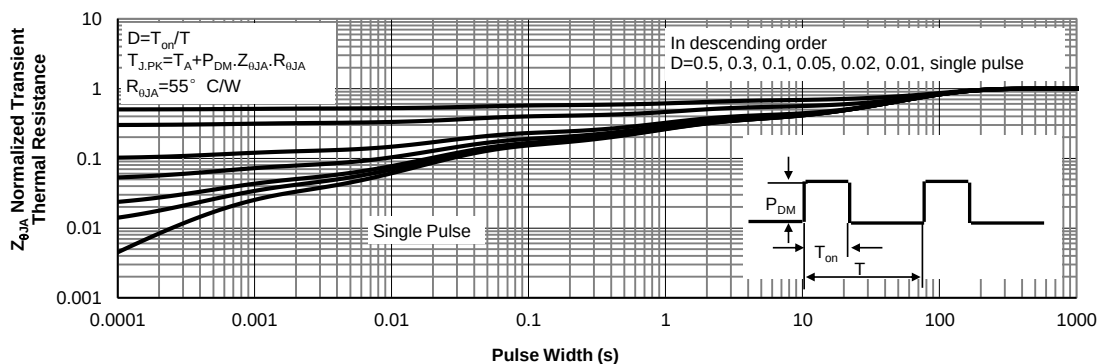


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Test Circuit

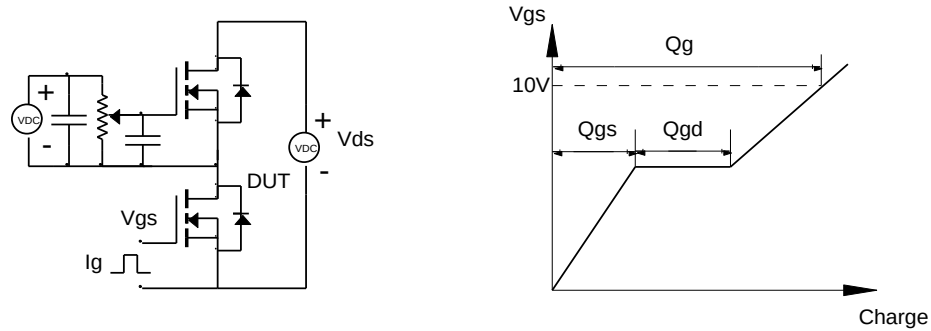


Figure B: Resistive Switching Test Circuit & Waveforms

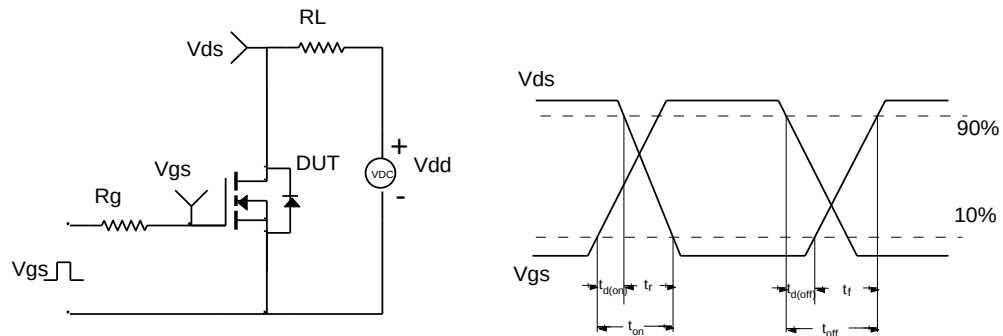


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

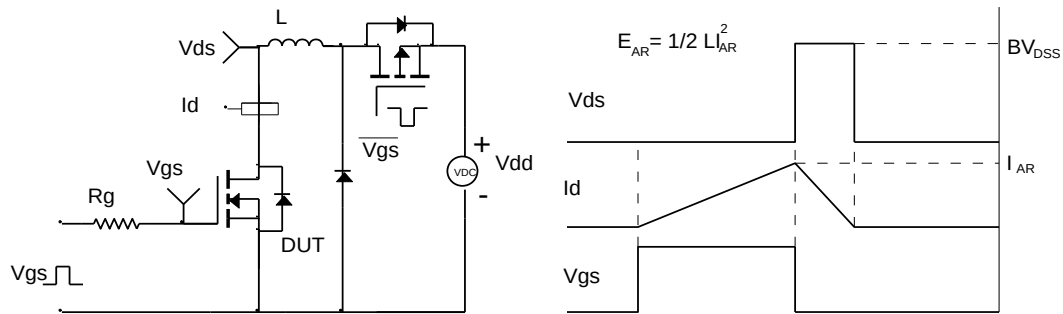
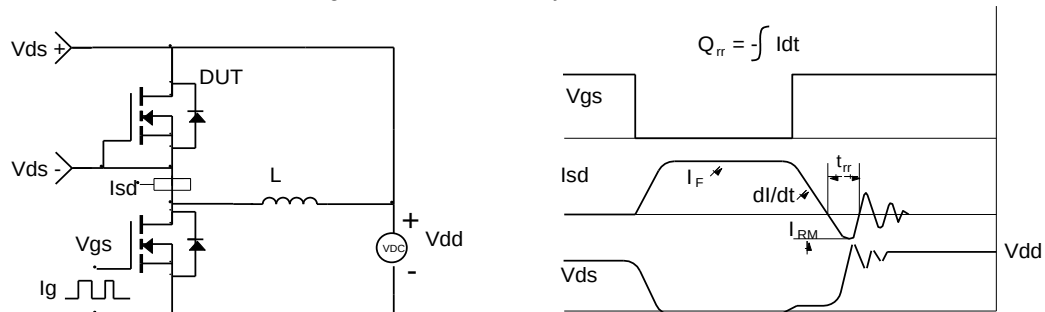
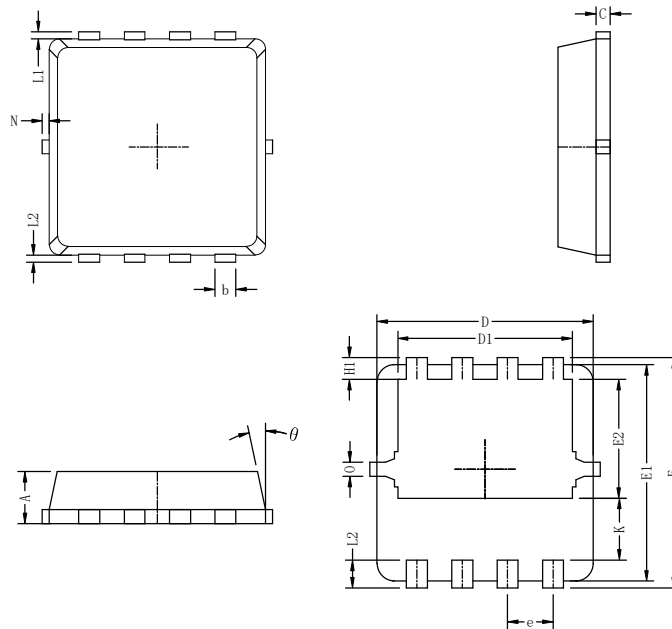


Figure D: Diode Recovery Test Circuit & Waveforms



Package outline:PDFN3333



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.78	0.88	0.98
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
0	0.2 REF.		

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