P-Channel 20V(D-S) MOSFET

Product summary		
V_{DS}	-20	V
$R_{DS(ON)}$(at V_{GS}=-4.5V) Typ.	6	mΩ
$R_{DS(ON)}$(at V_{GS}=-2.5V) Typ.	8	mΩ
I_D(Tc=25℃)	-50	A

Features

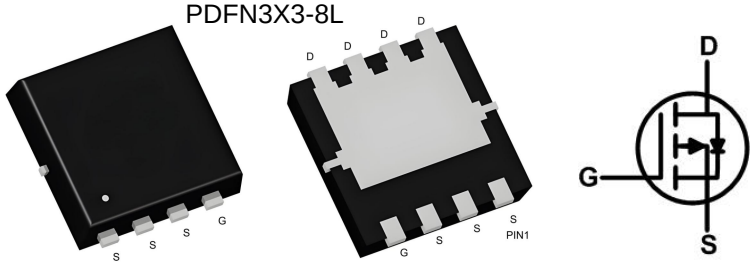
- Advanced Trench technology
- Low Gate Charge

Applications

- Load switching
- PWM Applications
- Power Management

Pin Configuration

PDFN3X3-8L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAL50P02B	PDFN3X3-8L	13″	5000pcs

Absolute Maximum Ratings (at T_A=25℃ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		-20	V
V_{GS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current	T_C=25℃	-50	A
		T_C=100℃	-31.6	A
I_{DM}	Pulse Drain Current Tested [A]		-210	A
E_{AS}	Single Pulse Avalanche Energy [B]		43	mJ
P_D	Power Dissipation	T_C=25℃	42	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case max	3	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=-250uA	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V,V_{GS}=0V	--	--	-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±12V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250uA	-0.4	-0.65	-1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [C]	V_{GS}=-4.5V,I_D=-15A	--	6	8	mΩ
		V_{GS}=-2.5V,I_D=-10A	--	8	10	mΩ
V_{SD}	Diode Forward Voltage	I_S=-10A,V_{GS}=0V	--	--	-1.2	V
Dynamic Parameters [D]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=-10V f=1MHZ	--	2830	--	pF
C_{oss}	Output Capacitance		--	375	--	pF
C_{rss}	Reverse Transfer Capacitance		--	310	--	pF
Q_g	Total Gate Charge	V_{DS}=-10V,I_D=-15A V_{GS}=0 to -4.5V	--	54	--	nC
Q_{gs}	Gate-Source Charge		--	7	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DD}=-10V I_D=-13A,V_{GS}=-10V, R_{GEN}=3Ω	--	13	--	ns
t_r	Turn-on Rise Time		--	105	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	145	--	ns
t_f	Turn-off Fall Time		--	150	--	ns
t_{rr}	Reverse recovery time	I_F=-15A, di/dt=100 A/uS	--	26	--	ns
Q_{rr}	Reverse recovery charge		--	15	--	nC

Note：

A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. The EAS data shows Max. rating . The test condition is V_{DD}=-10V,V_G=-10V,L=0.5mH,I_{AS}=-13A,Rg=25Ω,T_J=25℃.

C. Pulse Test: Pulse Width≤300us,Duty cycle≤2%.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure 1: Output Characteristics

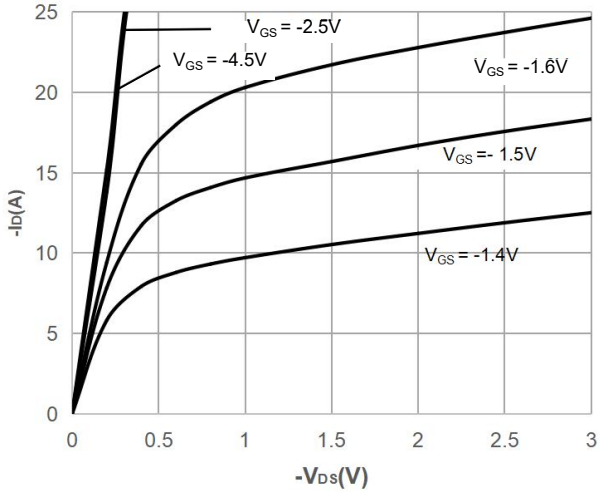


Figure 2: Typical Transfer Characteristics

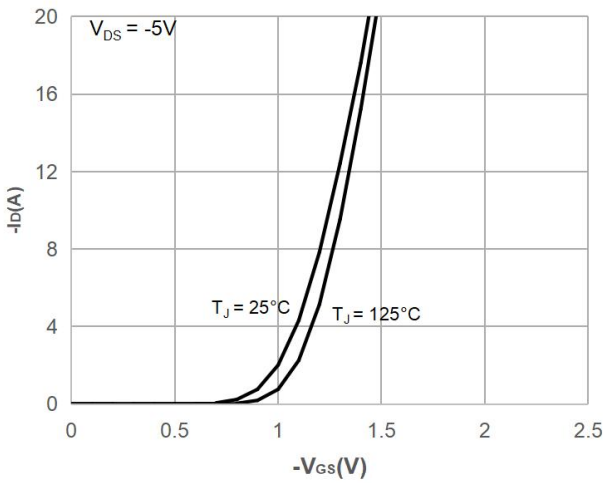


Figure 3: On-resistance vs. Drain Current

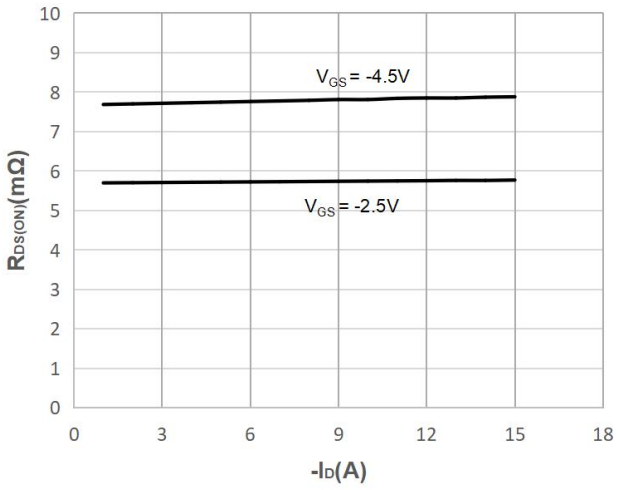


Figure 4: Body Diode Characteristics

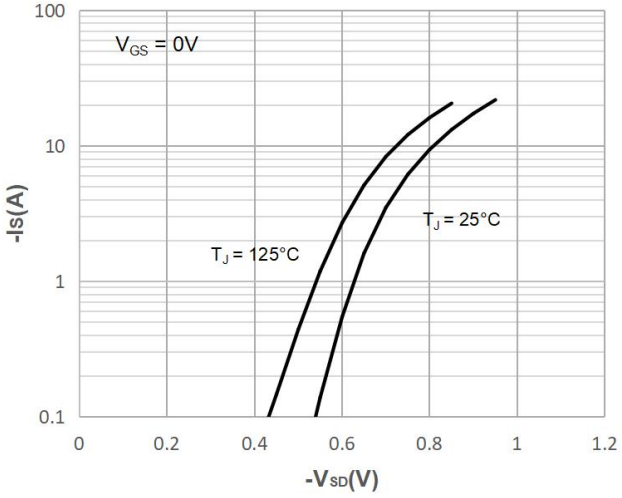


Figure 5: Gate Charge Characteristics

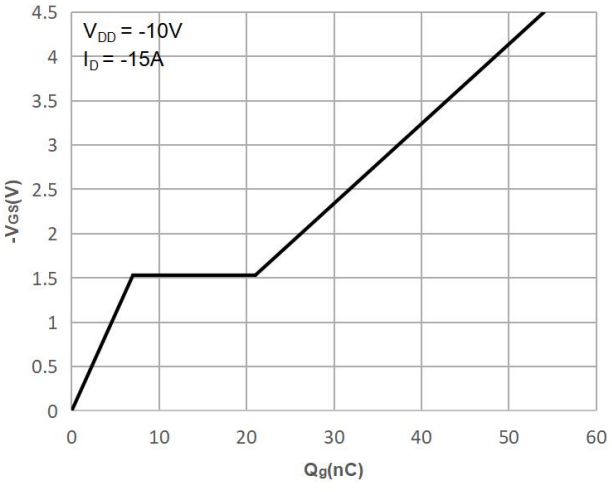
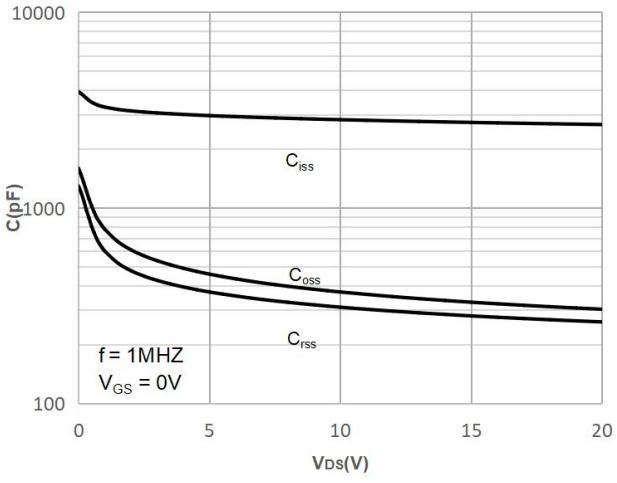


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

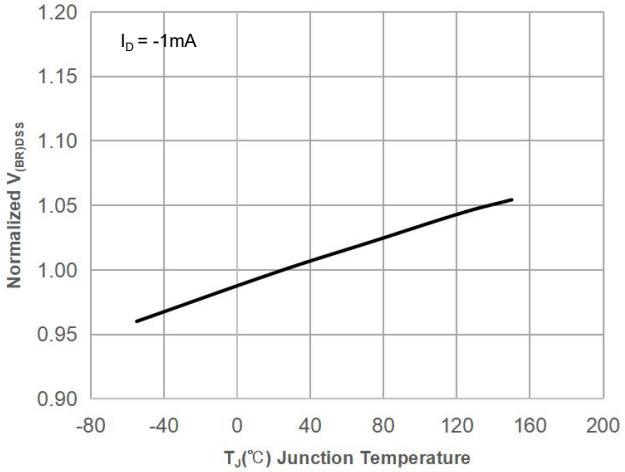


Figure 8: Normalized on Resistance vs. Junction Temperature

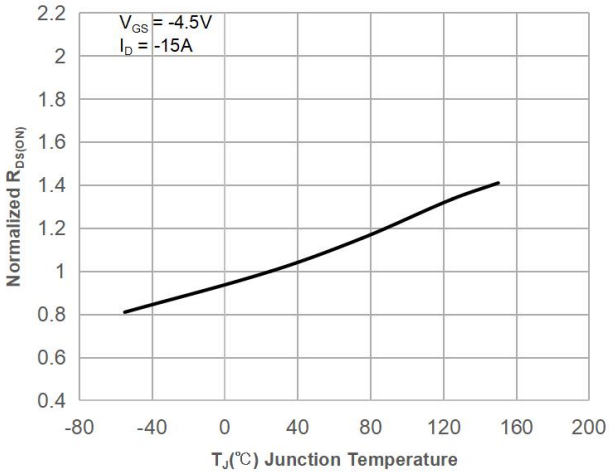


Figure 9: Maximum Safe Operating Area

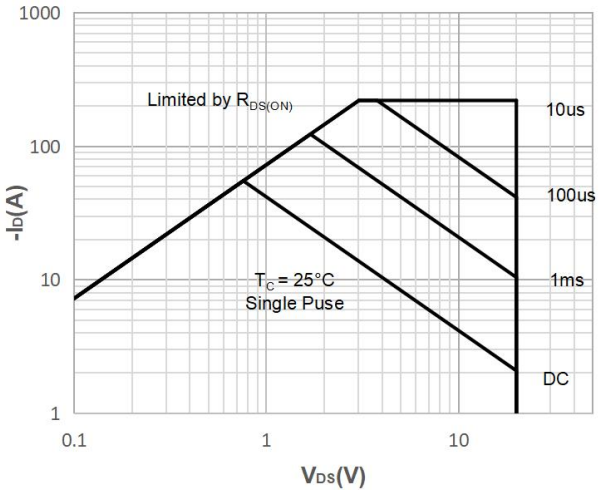


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

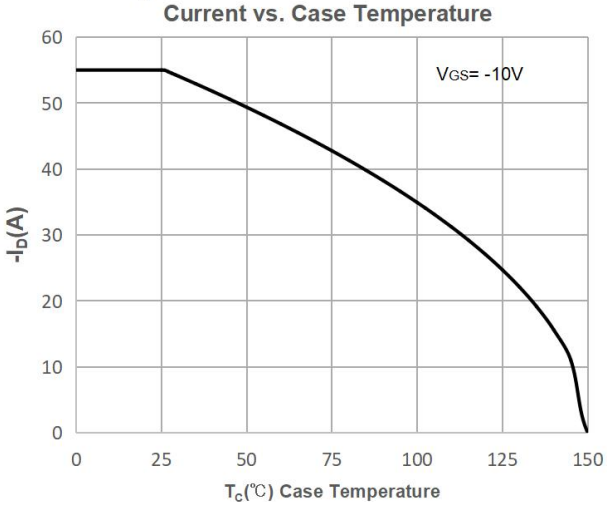


Figure 11: Normalized Maximum Transient Thermal Impedance

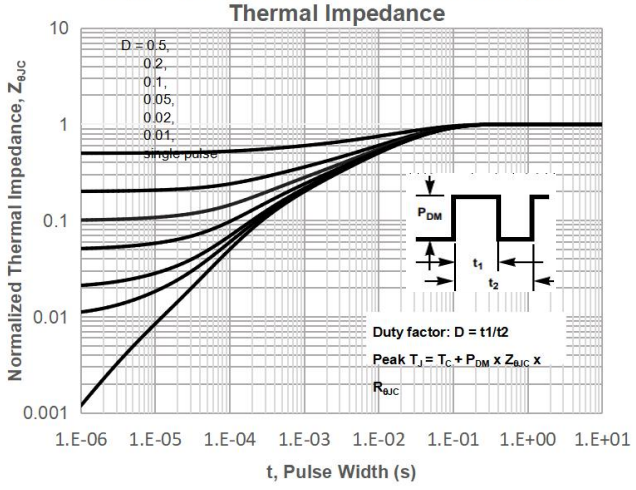
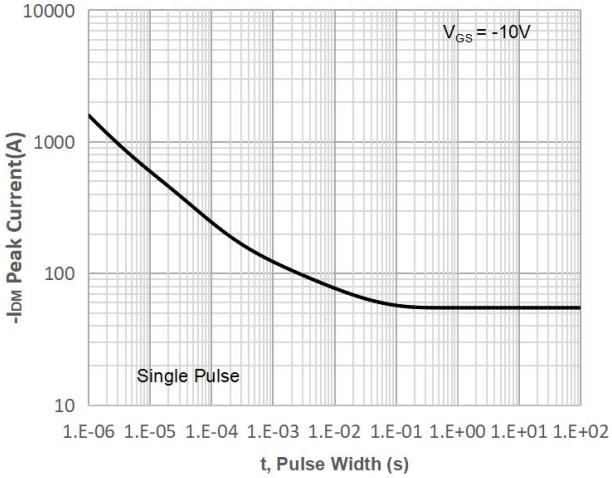


Figure 12: Peak Current Capacity



Test Circuit

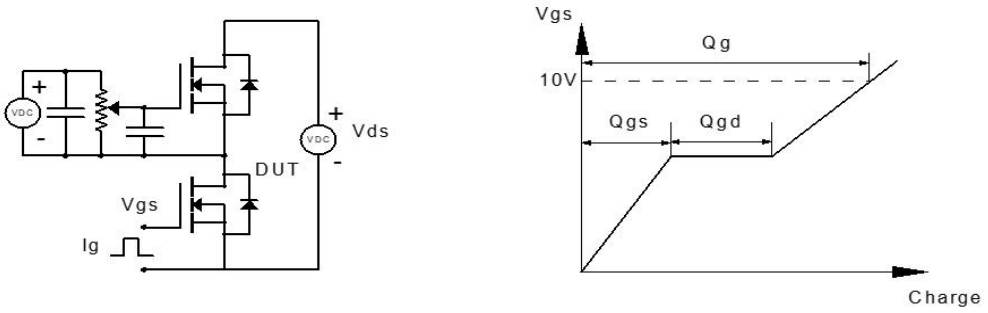


Figure 1: Gate Charge Test Circuit & Waveform

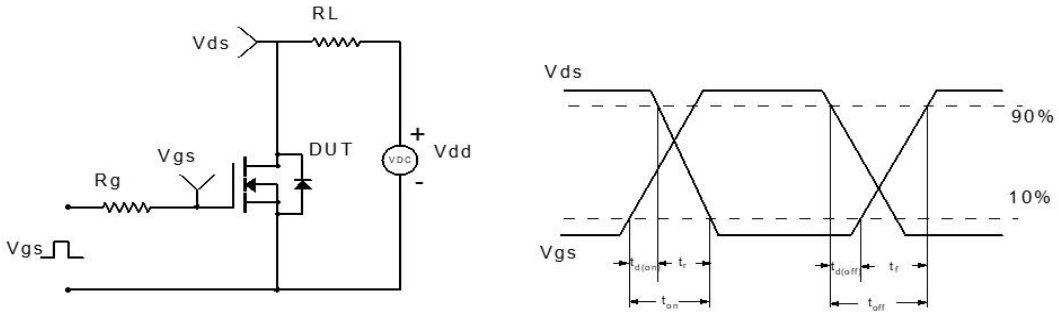


Figure 2: Resistive Switching Test Circuit & Waveform

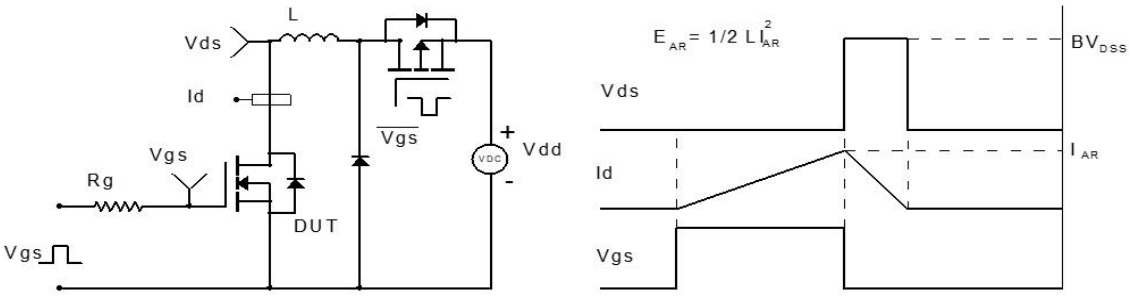


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

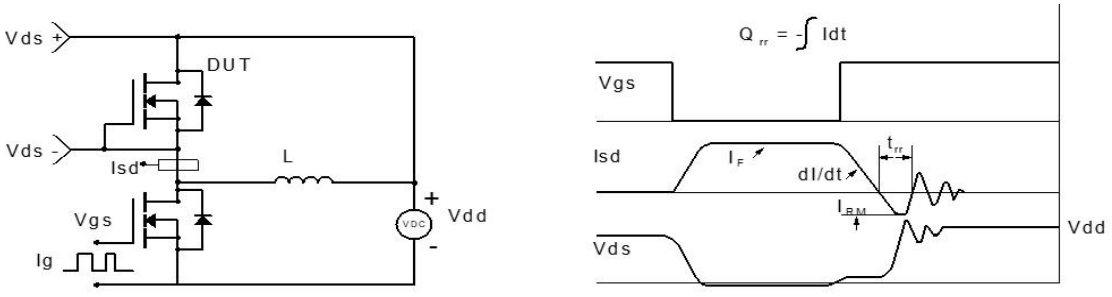
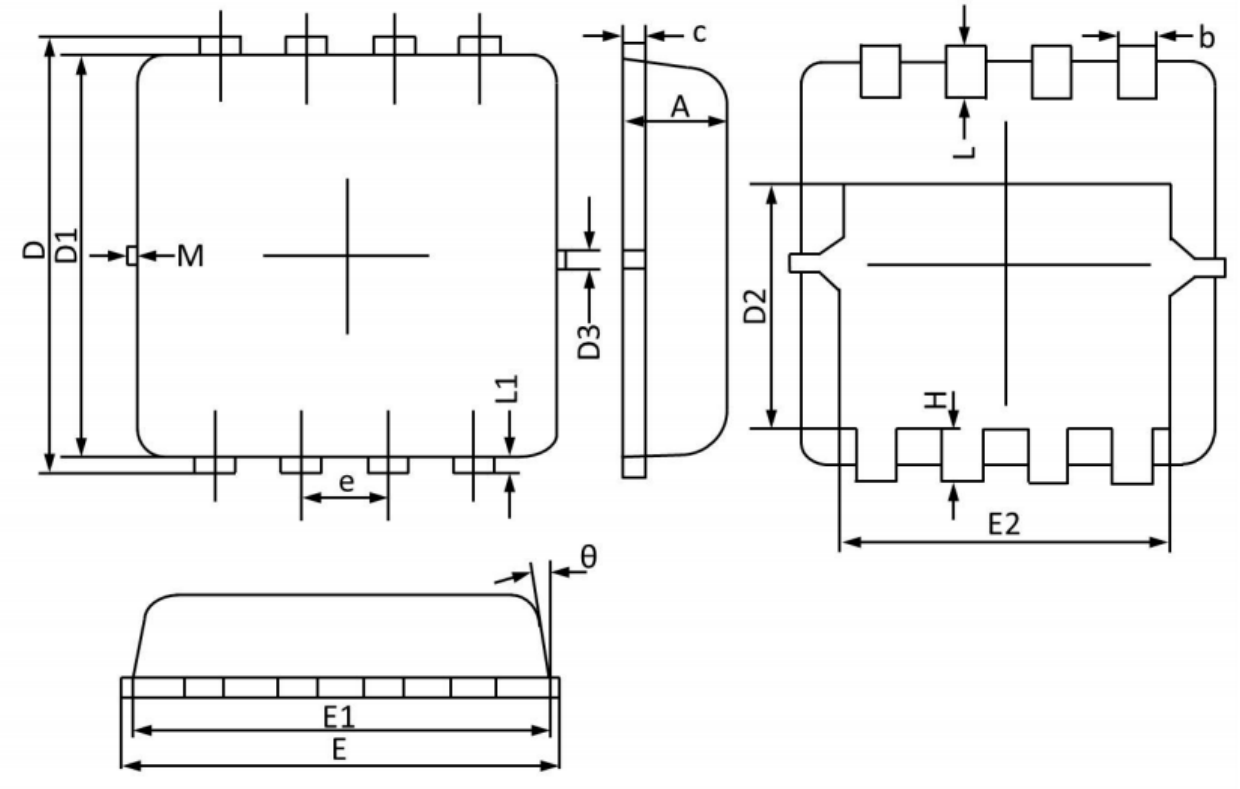


Figure 4: Diode Recovery Test Circuit & Waveform

PDFN3X3-8L Package Information (unit:mm)



DIMENSIONS

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	**b**	0.25	0.30	0.35
C	0.10	0.15	0.25	**D**	3.25	3.35	3.45
D1	3.00	3.10	3.20	**D2**	1.78	1.88	1.98
D3	--	0.13	--	**E**	3.20	3.30	3.40
E1	3.00	3.15	3.20	**E2**	2.39	2.49	2.59
e	0.65BSC			**H**	0.30	0.39	0.50
L	0.30	0.40	0.50	**L1**	--	0.13	--
θ	--	10°	12°	**M**	*	*	0.15