N-Channel 30V MOSFET

E030N5P8ML1

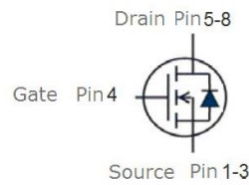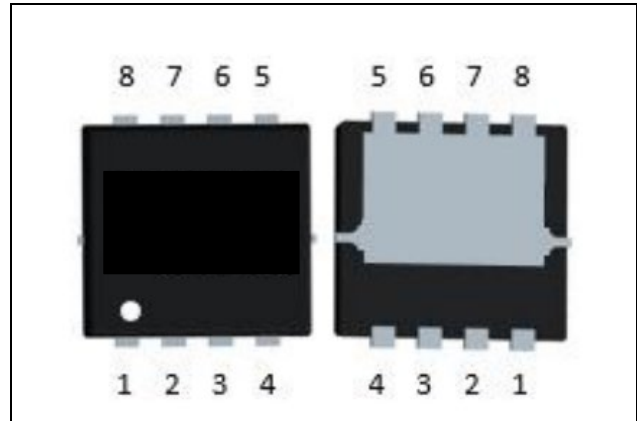| V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
30V	5.8 @ V_{GS} = 10V	40

PDFN3.3X3.3

Features

- Low $R_{DS(on)}$ trench technology

- Low thermal impedance

- Fast switching speed

- 100% avalanche tested

Applications

- DC/DC conversion

- Power switch

- PD charger

- Moto driver

Package And Ordering Information

Ordering code	Package	Marking
E030N5P8ML1	PDFN3.3*3.3	EX03N40

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
PDFN3.3*3.3	5000	1	5000

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	30	V
ID, pulse	160	A
RDS(ON), max @ VGS=10V	5.8	mΩ
Qg	15	nC

Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25°C	I_D	40	A
	T_C=100°C		30	
Pulsed drain current		$I_{D,pulse}$	160	
Avalanche energy, single pulse		E_{AS}	20	mJ
Power dissipation	T_C=25°C	P_D	30	W
	T_A=25°C		3.6	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{θJC}$	5	°C/W
Thermal resistance, junction-to-ambient	Steady state	$R_{θJA}$	42	

Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	$V_{(BR)DSS}$	30			V	V_{GS} = 0, I_D = 250 μA
Gate-source threshold voltage	$V_{GS(th)}$	1.3	1.8	2.4	V	V_{DS} = V_{GS}, I_D = 250 μA
Gate-body leakage	I_{GSS}			±100	nA	V_{DS} = 0 V, V_{GS} = ±20 V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS} = 30 V, V_{GS} = 0 V
Drain-source on-resistance	$R_{DS(on)}$		4.9	5.8	mΩ	V_{GS} = 10 V, I_D = 20 A
Drain-source on-resistance	$R_{DS(on)}$		7.8	10.5	mΩ	V_{GS} = 4.5 V, I_D = 10 A

Gate resistance	Rg	0.2	1.9	5	Ω	f=1MHz
Gate Charge						
Total gate charge	Qg		15	20	nC	V_{DS} = 15 V, I_D = 20A, V_{GS} = 10 V
Gate-source charge	Qgs		2.9	3.9		
Gate-drain charge	Qgd		3.6	5.4		
Dynamic						
Turn-on delay time	$t_{d(on)}$		5.6		ns	V_{DS} = 15 V, I_D =20 A, V_{GS} = 10 V, R_{GEN} = 3 Ω
Rise time	t_r		60			
Turn-off delay time	$t_{d(off)}$		15			
Fall time	t_f		9.6			
Input capacitance	C_{iss}	565	750	1000	pF	V_{DS} =15 V, V_{GS} = 0 V, f = 1MHz
Output capacitance	C_{oss}	415	550	730		
Reverse transfer capacitance	C_{rss}	55	70	95		
Body Diode						
Diode forward voltage	V_{SD}		0.9	1.2	V	V_{GS} = 0 V, I_F = 20A
Reverse recovery time	t_{rr}		10	20	ns	V_R= 0 V, I_S =20A, di/dt = 100 A/µs
Reverse recovery charge	Q_{rr}		1	2	nC	

Electrical Characteristics Diagrams
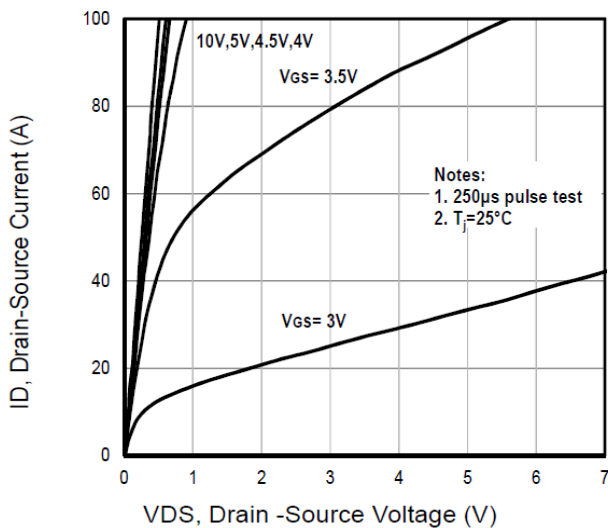
Fig1. Typical Output Characteristics
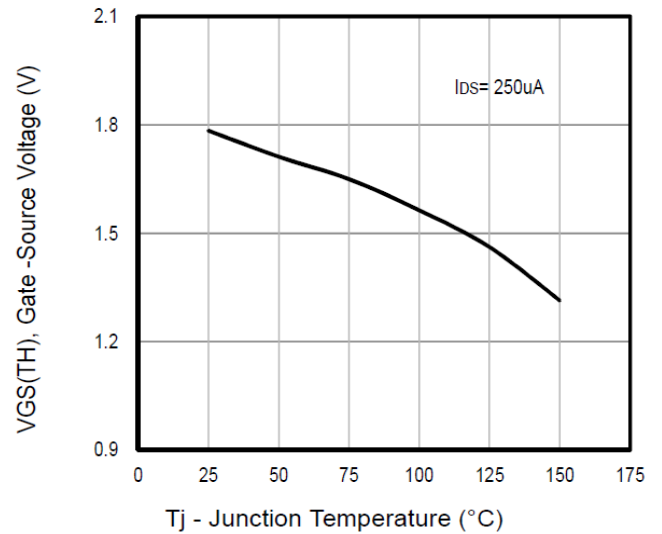
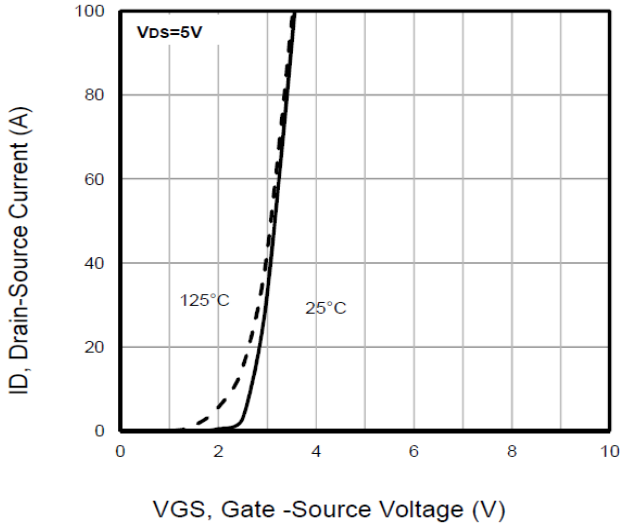**Fig2.** $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj
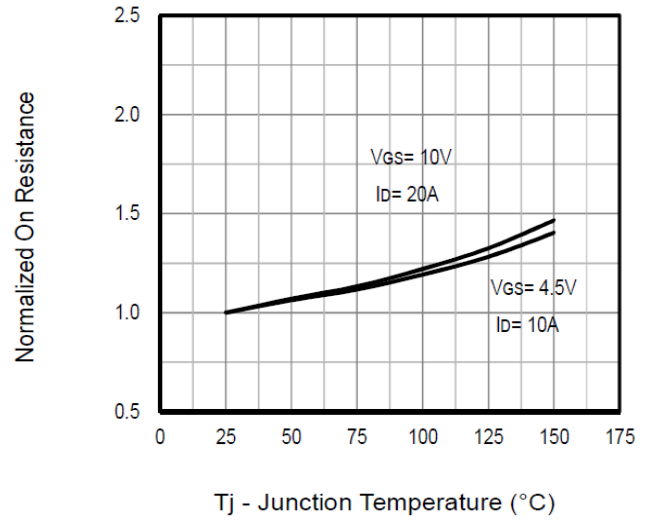
Fig3. Typical Transfer Characteristics

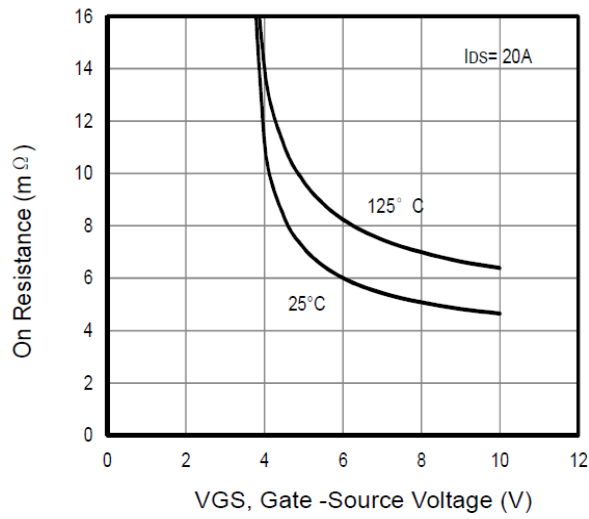Fig4. Normalized On-Resistance Vs. Tj

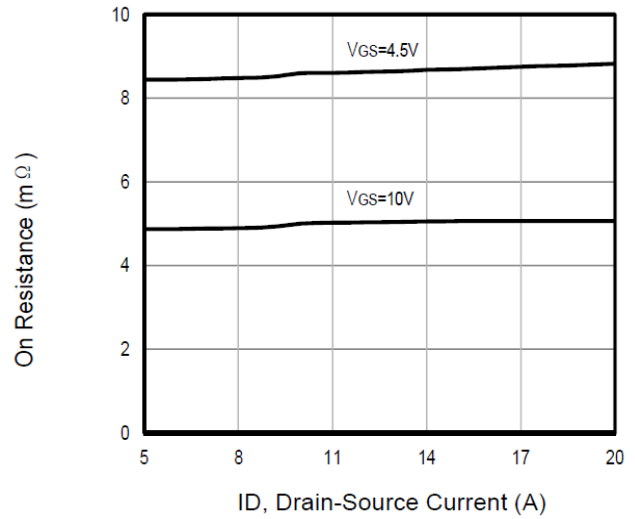
Fig5. On Resistance Vs Gate -Source Voltage

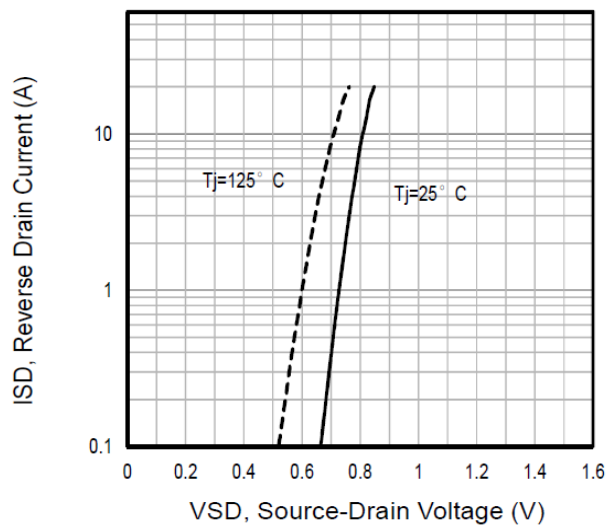Fig6. On Resistance Vs Drain Current and Gate Voltage

Fig7. Typical Source-Drain Diode Forward Voltage
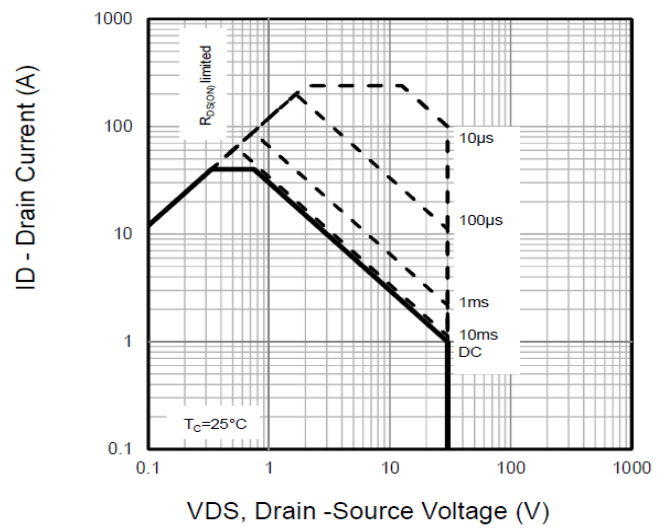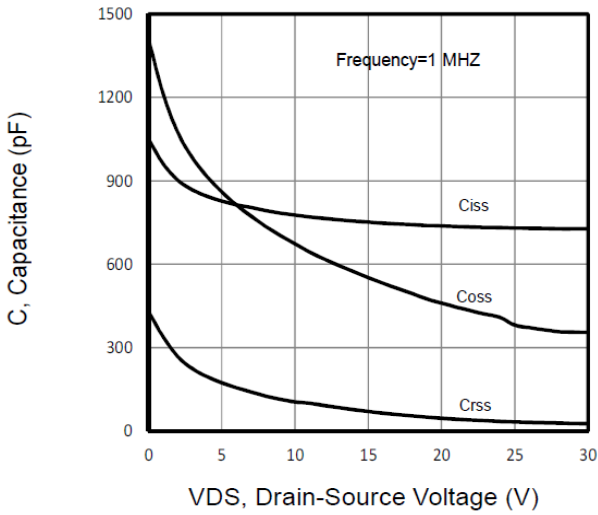

Fig8. Maximum Safe Operating Area

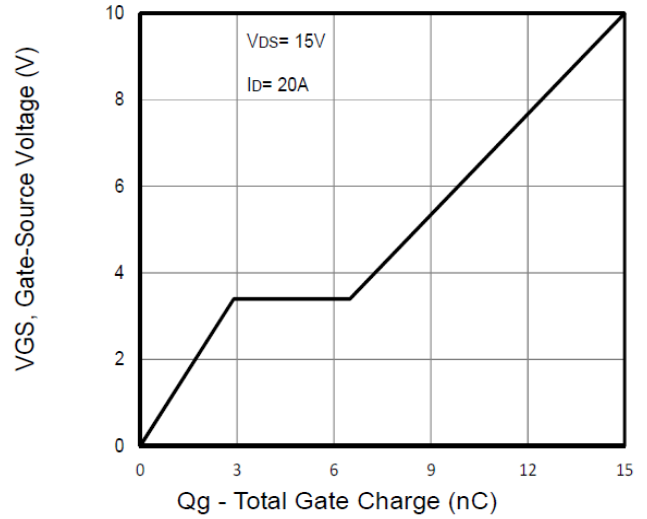**Fig9.** Typical Capacitance Vs. Drain-Source Voltage

Fig10. Typical Gate Charge Vs. Gate-Source Voltage
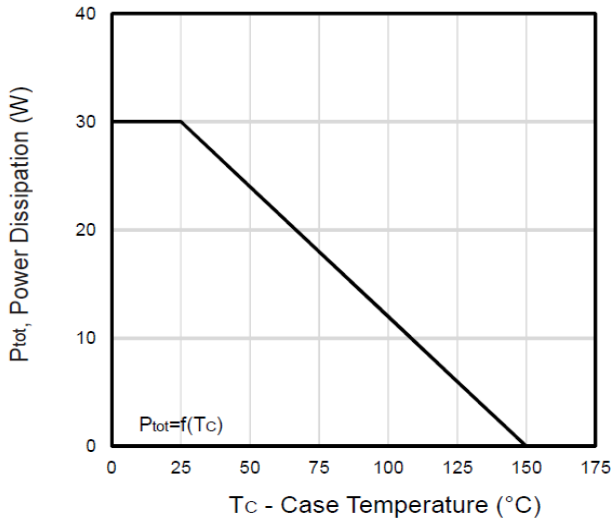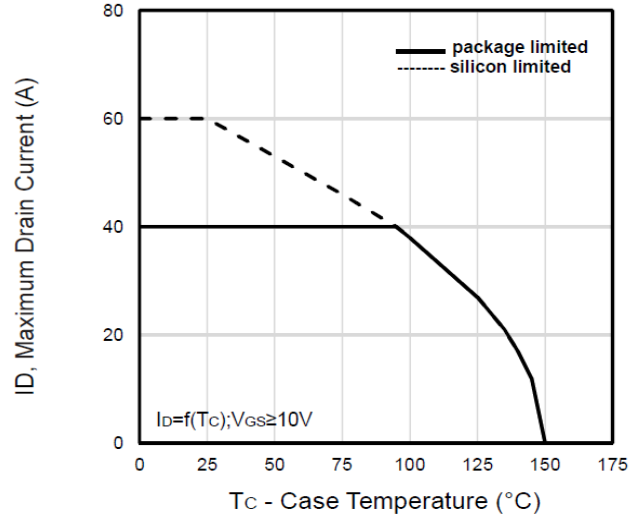

Fig11. Power Dissipation Vs. Case Temperature

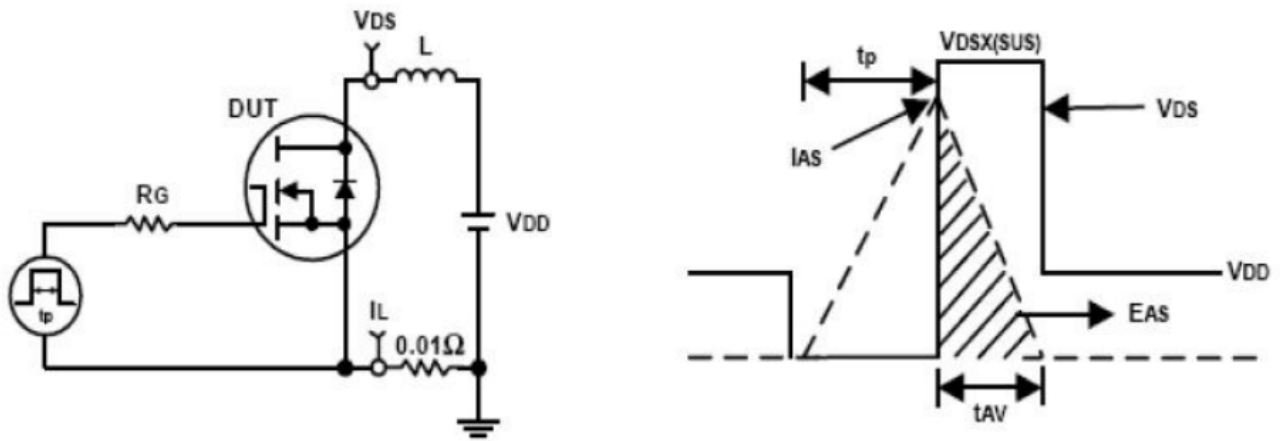**Fig12.** Maximum Drain Current Vs. Case Temperature

Test circuits and waveforms
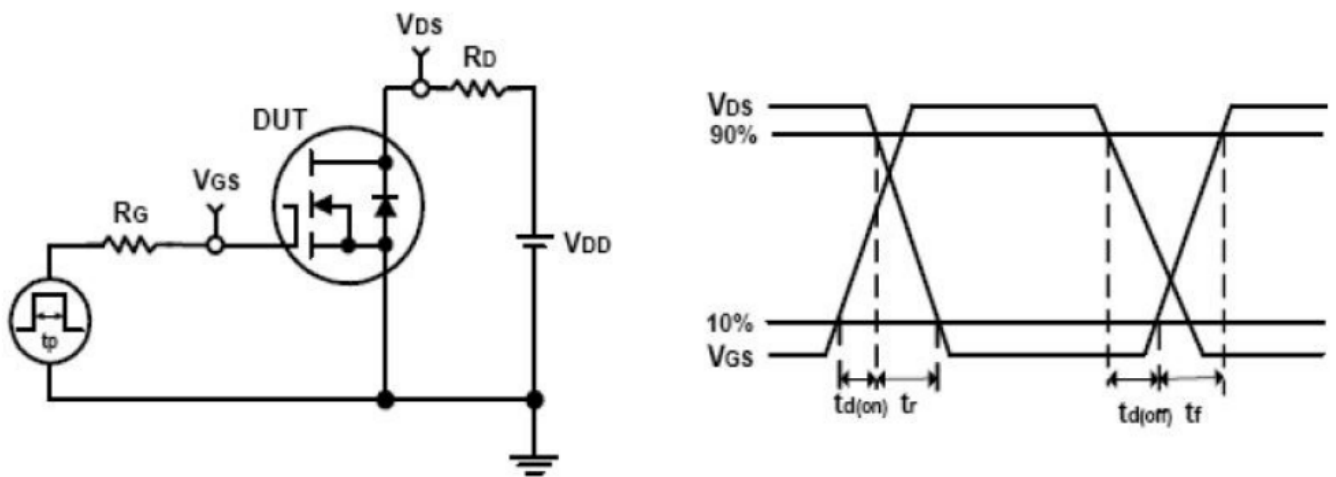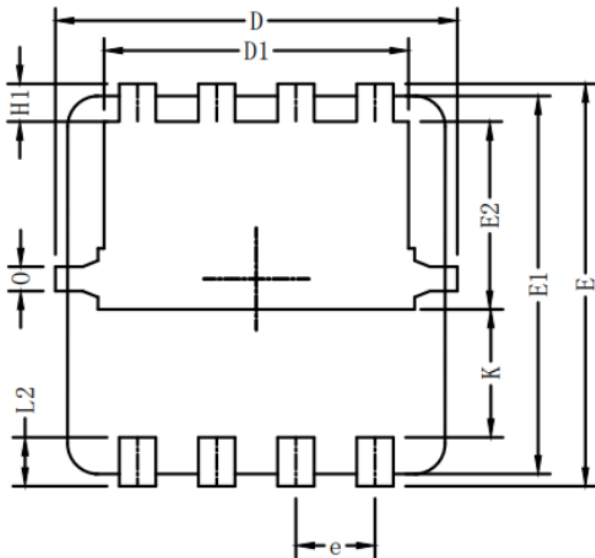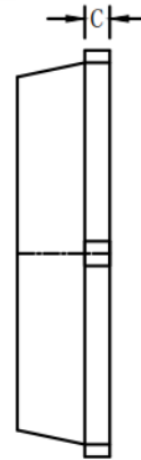

Fig1. Unclamped Inductive Test Circuit and waveforms

Fig2. Switching Time Test Circuit and waveforms

Package Outline Dimensions

PDFN3.3*3.3
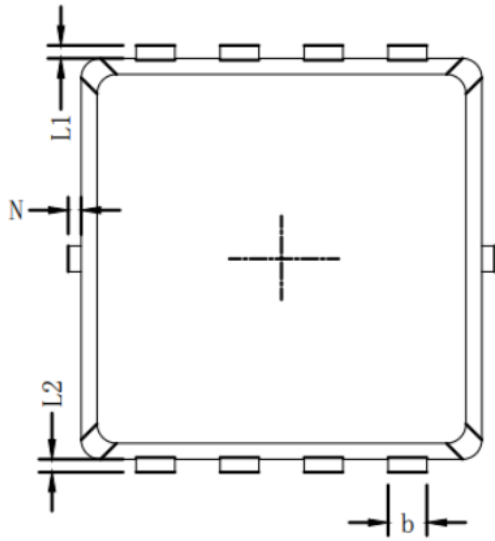
Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.95	1.05	1.15
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	–	0.15
O	0.2 REF.		

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