

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE2030U uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

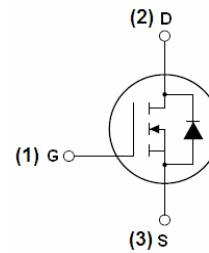
General Features

- $V_{DS} = 20V, I_D = 30A$
 $R_{DS(ON)} < 13m\Omega @ V_{GS} = 10V$ (Typ: 10.5m Ω)
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Power switching application
- Load switching
- Uninterruptible power supply

100% UIS TESTED!
100% ΔV_{ds} TESTED!



Schematic diagram



TO-262 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE2030U	NCE2030U	TO-262	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	30	A
Drain Current-Continuous ($T_C = 100^\circ C$)	$I_D (100^\circ C)$	21	A
Pulsed Drain Current	I_{DM}	75	A
Maximum Power Dissipation	P_D	40	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	150	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	3.8	$^\circ C/W$
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Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						

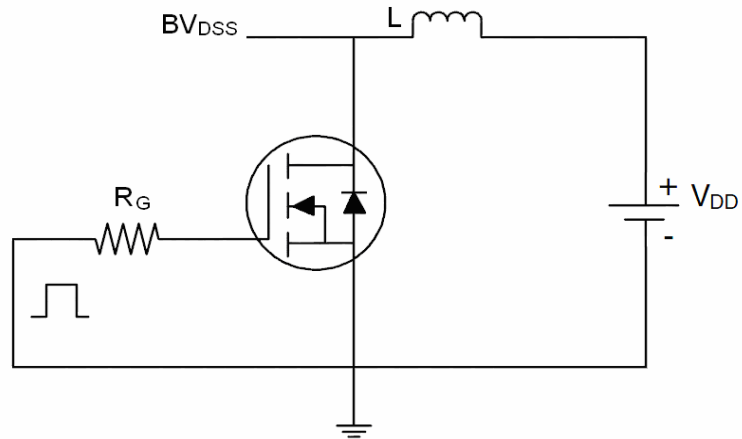
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	20	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V,V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =20A	-	10.5	13	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =20A	10	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V, F=1.0MHz		900		PF
Output Capacitance	C _{oss}			162		PF
Reverse Transfer Capacitance	C _{rss}			105		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	VGS=10V,VDS=10V RL=0. 5 Ω, RGEN=3 Ω	-	4.5	-	nS
Turn-on Rise Time	t _r		-	9.2	-	nS
Turn-Off Delay Time	t _{d(off)}		-	18.7	-	nS
Turn-Off Fall Time	t _f		-	3.3	-	nS
Total Gate Charge	Q _g	VGS=10V,VDS=10V,ID=20A		15		nC
Gate-Source Charge	Q _{gs}			1.8		nC
Gate-Drain Charge	Q _{gd}			2.8		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S	-	-	-	30	A
Reverse Recovery Time	t _{rr}	TJ = 25°C, IF = 20A di/dt = 100A/μs (Note3)	-	18	-	nS
Reverse Recovery Charge	Q _{rr}		-	9.5	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

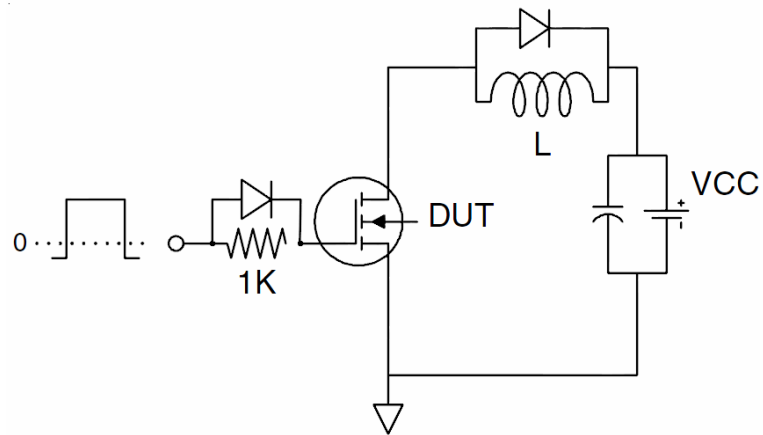
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ C, V_{DD}=10V, V_G=10V, L=0.5mH, R_g=25\Omega$

Test circuit

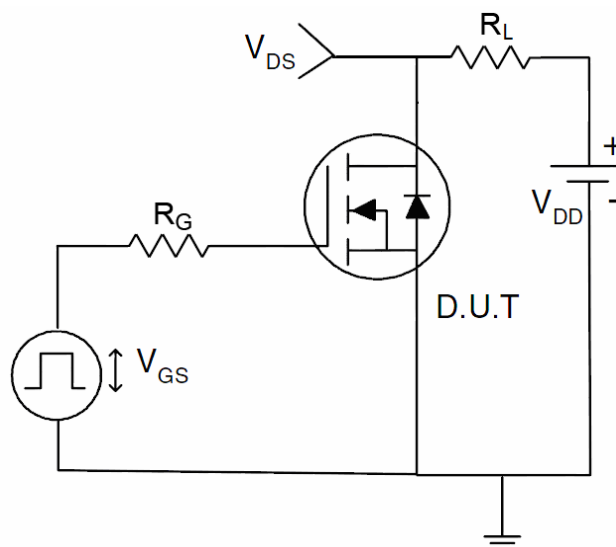
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics (Curves)

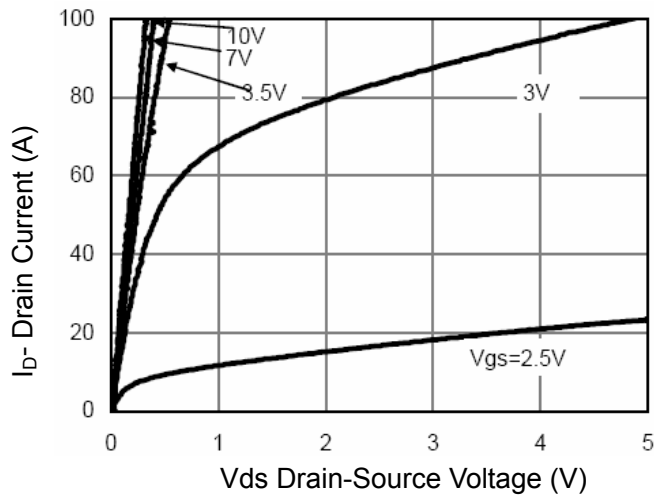


Figure 1 Output Characteristics

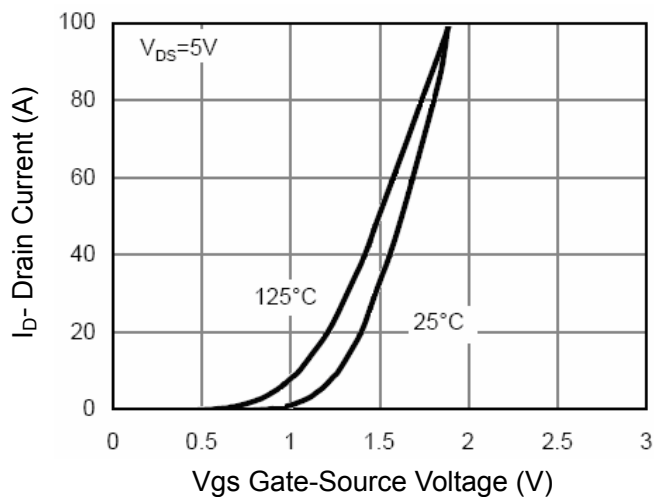


Figure 2 Transfer Characteristics

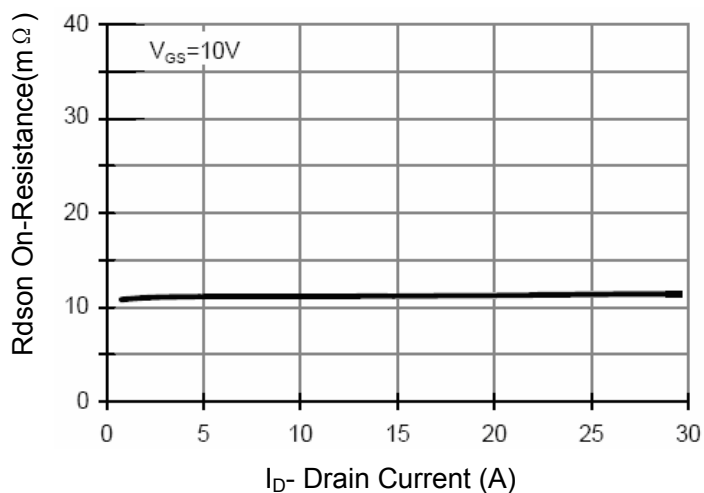


Figure 3 Rdson- Drain Current

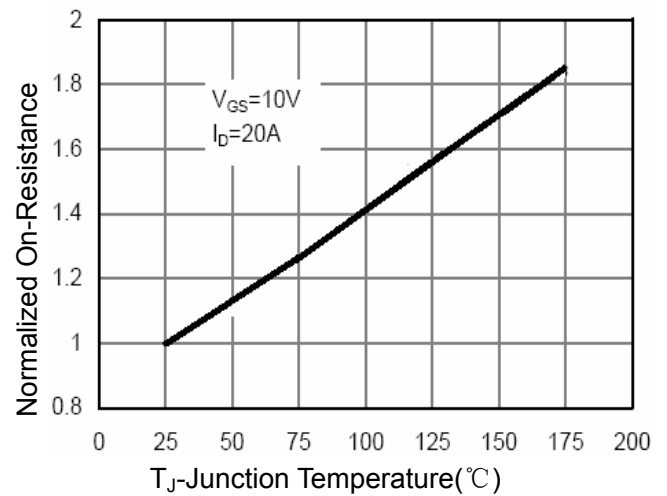


Figure 4 Rdson-Junction Temperature

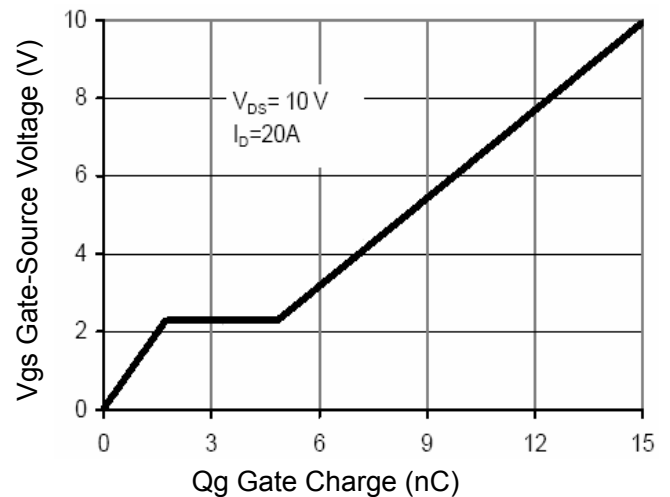


Figure 5 Gate Charge

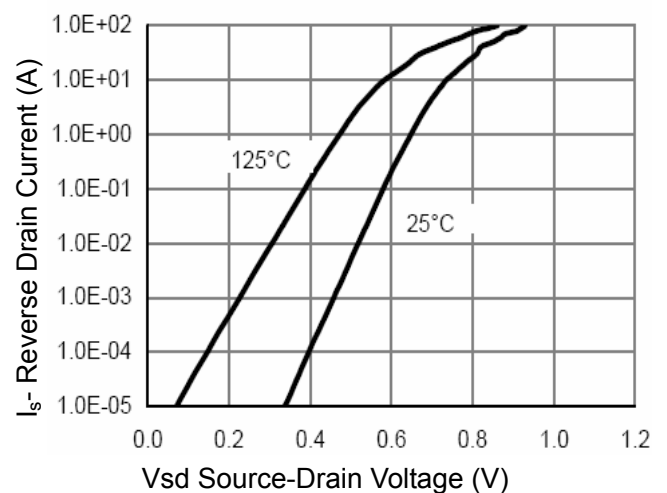


Figure 6 Source- Drain Diode Forward

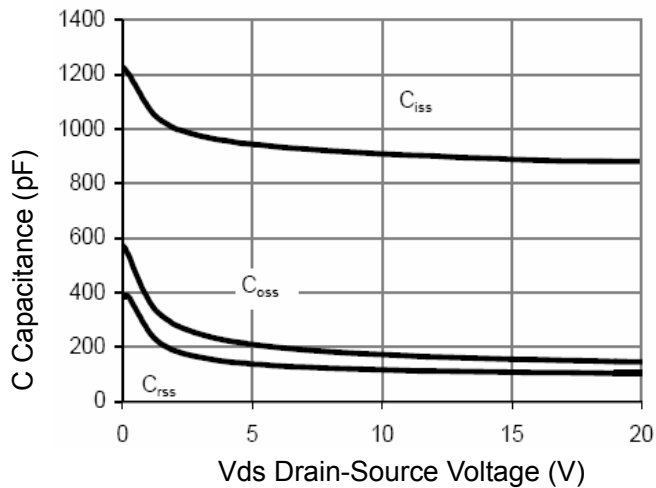


Figure 7 Capacitance vs Vds

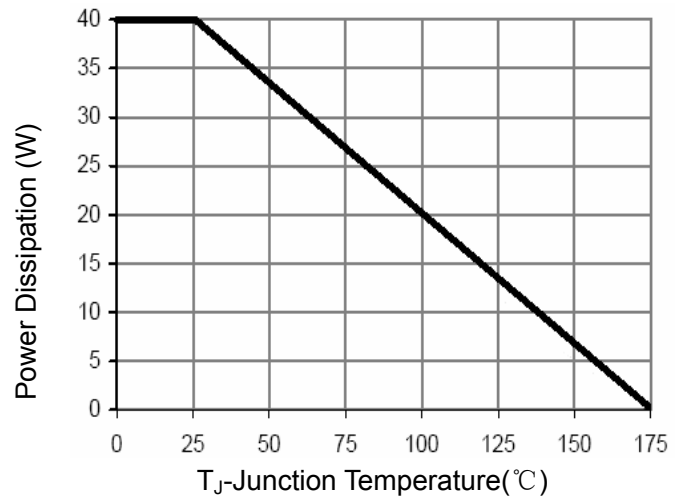


Figure 9 Power De-rating

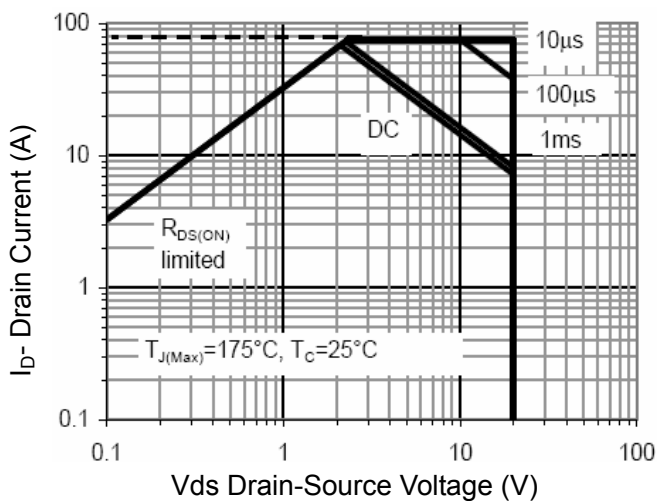


Figure 8 Safe Operation Area

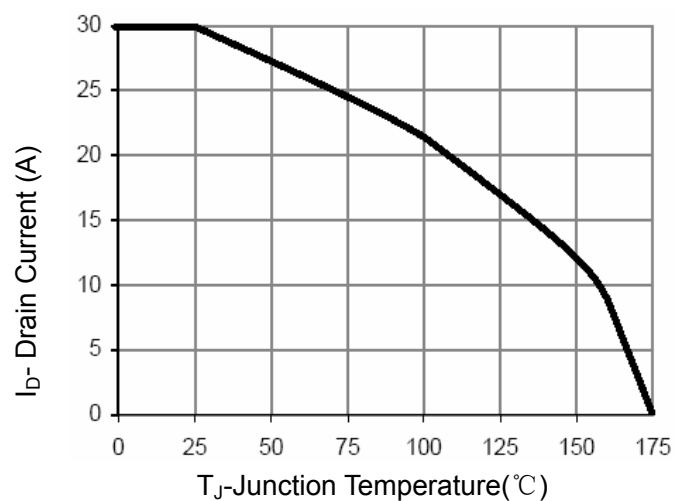


Figure 10 Current De-rating

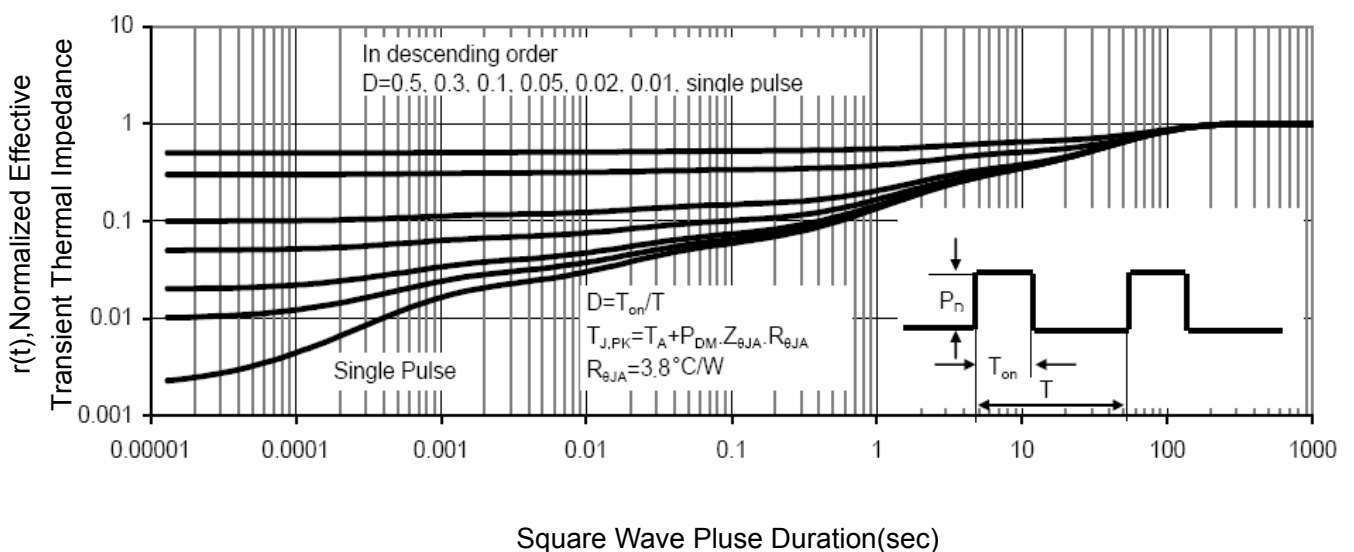
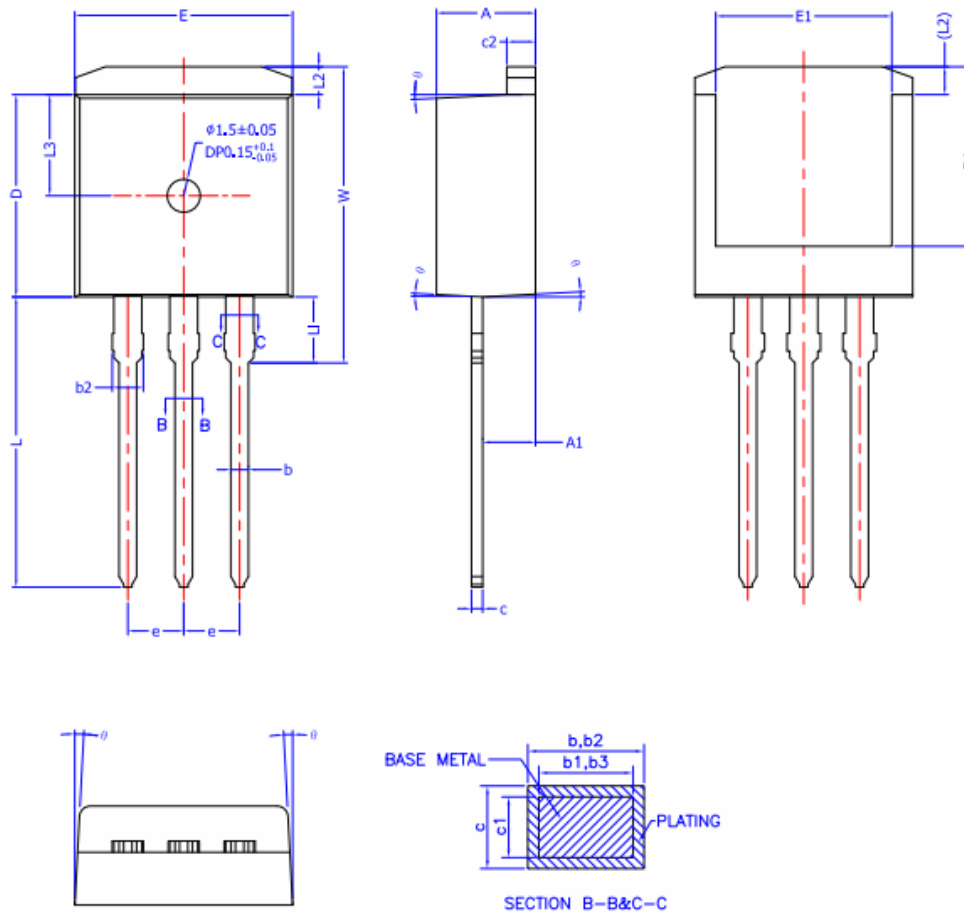


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-262 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	2.20	2.40	2.60
b	0.76	--	0.89
b1	0.75	0.80	0.85
b2	1.23	--	1.37
b3	1.22	1.27	1.32
c	0.47	--	0.60
c1	0.46	0.51	0.56
c2	1.25	1.30	1.35
D	9.10	9.20	9.30
D1	8.00	--	--
E	9.80	9.90	10.00
E1	7.80	--	--
e	2.54 BSC		
L	12.90	13.20	13.50
L1	2.80	3.00	3.20
L2	1.17	1.27	1.40
L3	4.60 REF		
W	13.25	--	14.00
θ	1°	3°	5°

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