

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE85H25T 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.

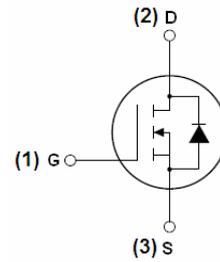
General Features

- $V_{DS} = 85V, I_D = 250A$
 $R_{DS(ON)} < 3.5m\Omega @ V_{GS}=10V$ (Typ:2.8m Ω)
- Special process technology for high ESD capability
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

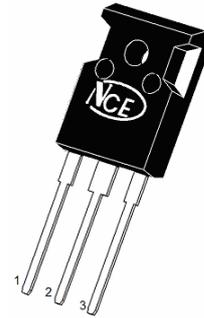
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!
100% ΔV_d s TESTED!



Schematic diagram



TO-247 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE85H25T	NCE85H25T	TO-247	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	250	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	177	A
Pulsed Drain Current	I_{DM}	1000	A
Maximum Power Dissipation	P_D	350	W
Derating factor		2.33	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	2880	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)	$R_{\theta Jc}$	0.43	$^\circ C/W$
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Electrical Characteristics (T_C=25°C unless otherwise noted)

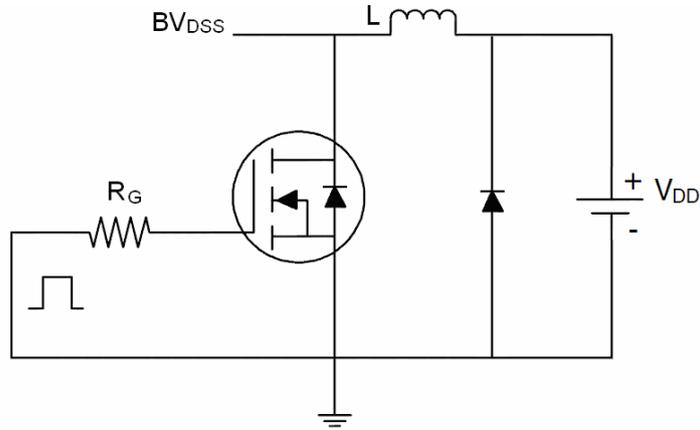
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	85	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	2.8	3.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	-	70	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{ISS}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	16880	-	PF
Output Capacitance	C _{OSS}		-	863	-	PF
Reverse Transfer Capacitance	C _{rss}		-	731	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =1Ω V _{GS} =10V, R _{GEN} =2.5Ω	-	62	-	nS
Turn-on Rise Time	t _r		-	66	-	nS
Turn-Off Delay Time	t _{d(off)}		-	92	-	nS
Turn-Off Fall Time	t _f		-	35	-	nS
Total Gate Charge	Q _g	V _{DS} =40V, I _D =20A, V _{GS} =10V	-	296	-	nC
Gate-Source Charge	Q _{gs}		-	76	-	nC
Gate-Drain Charge	Q _{gd}		-	78	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A	-	-	1.2	V
Diode Forward Current	I _S	-	-	-	250	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A	-	100	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs (Note 3)	-	210	-	nC

Notes:

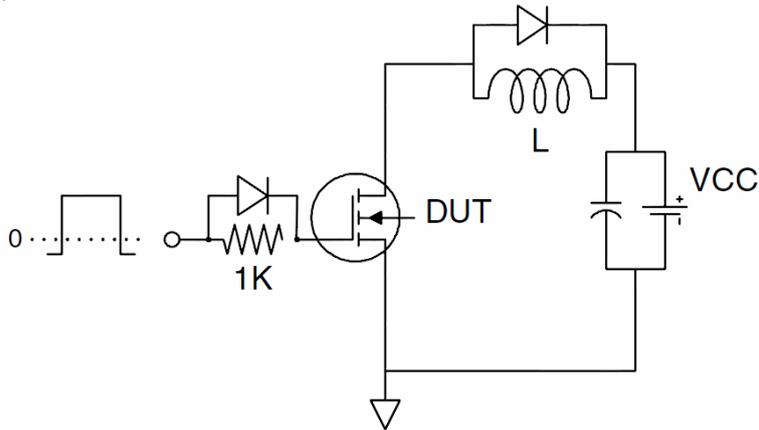
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25Ω

Test circuit

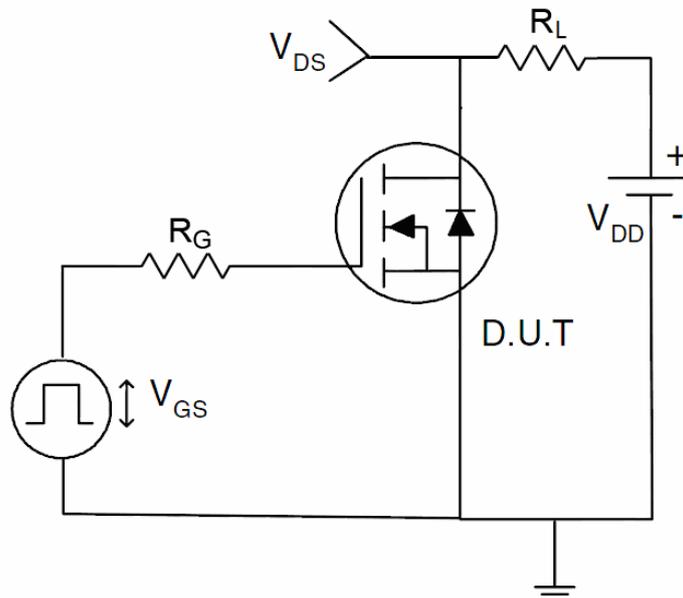
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

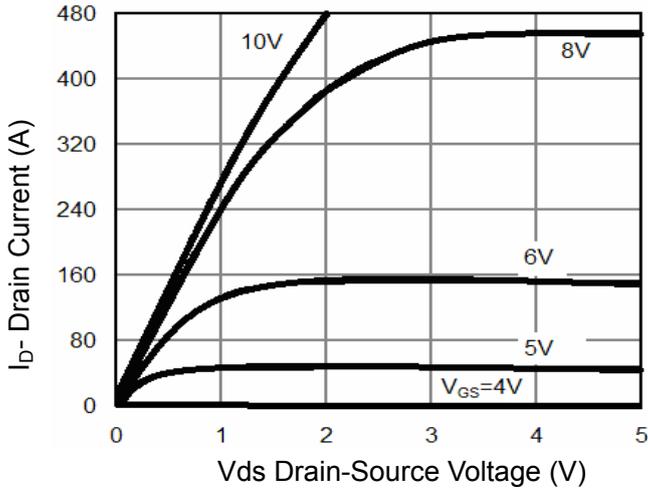


Figure 1 Output Characteristics

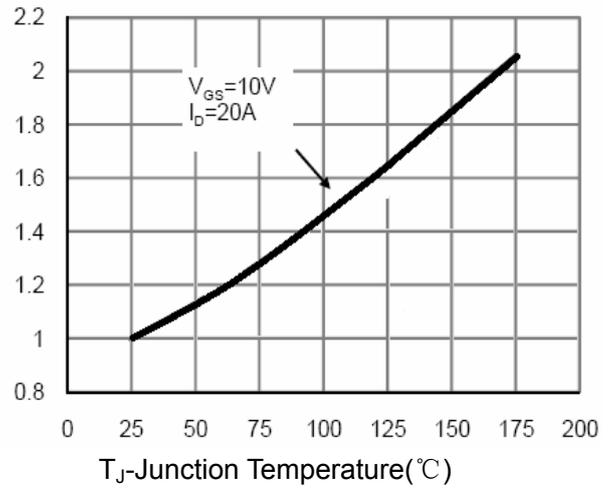


Figure 4 $R_{DS(on)}$ -Junction Temperature

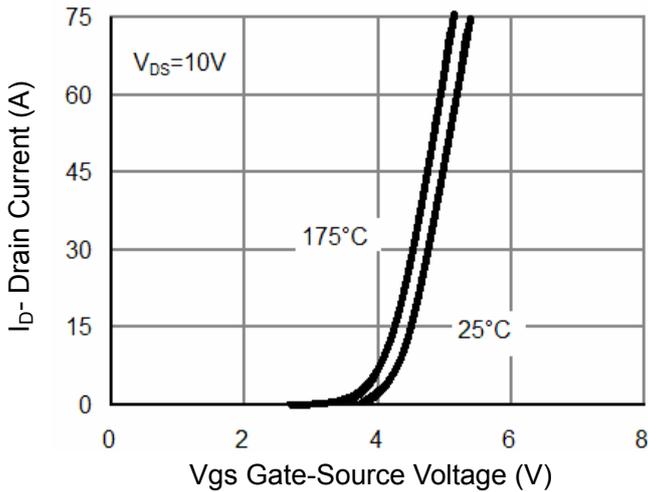


Figure 2 Transfer Characteristics

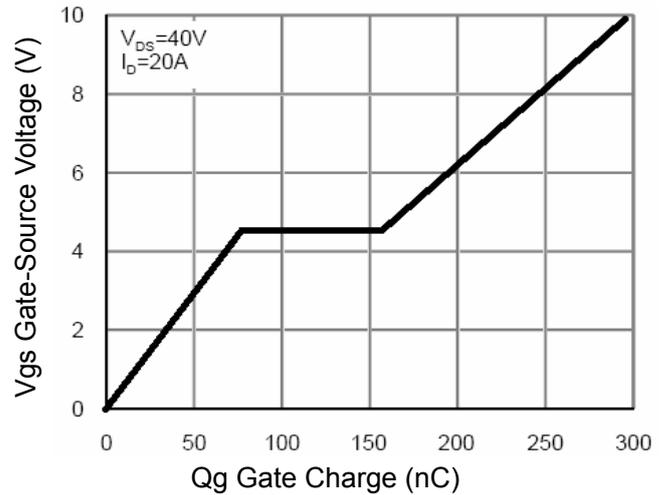


Figure 5 Gate Charge

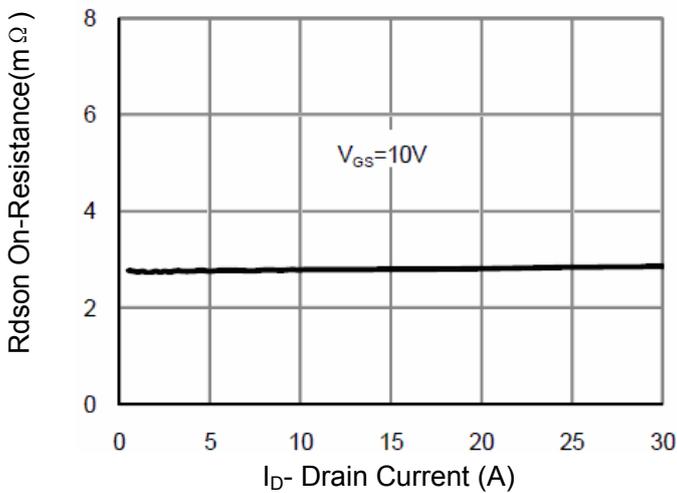


Figure 3 $R_{DS(on)}$ - Drain Current

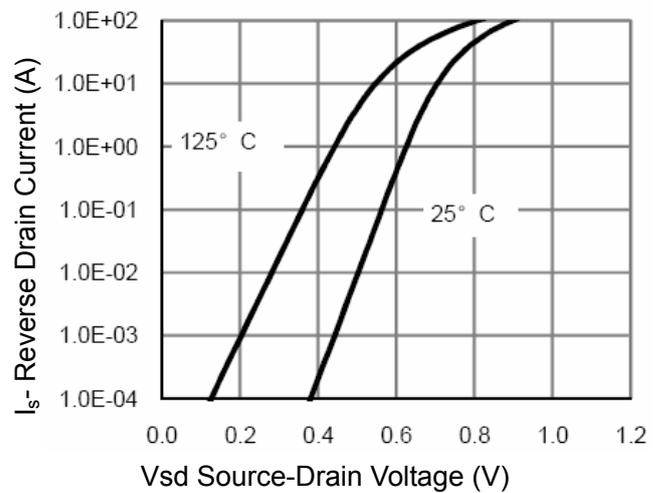


Figure 6 Source- Drain Diode Forward

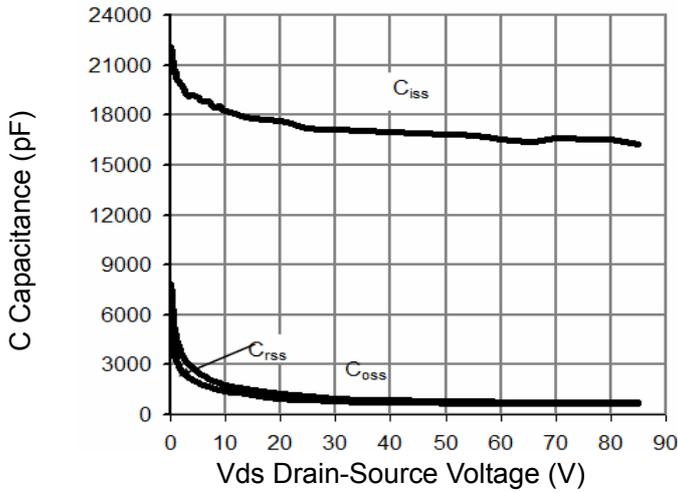


Figure 7 Capacitance vs Vds

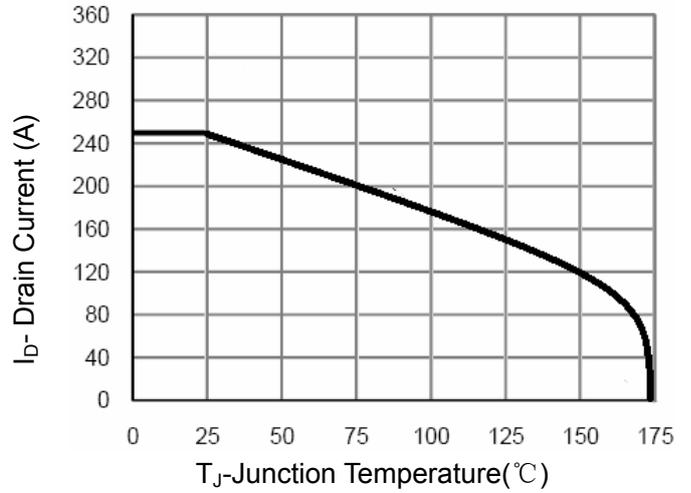


Figure 9 Current De-rating

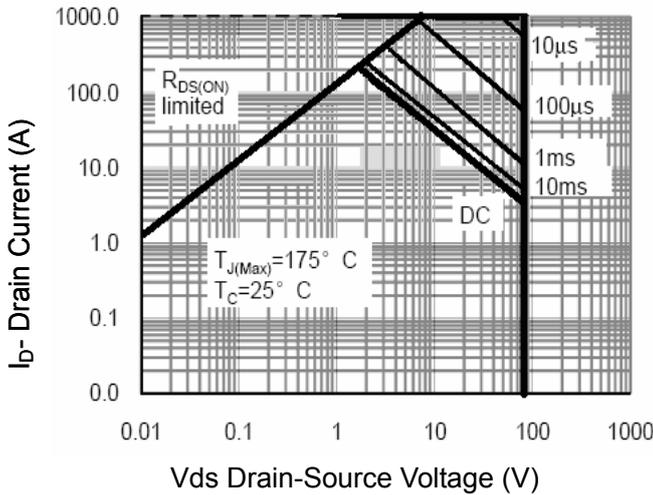


Figure 8 Safe Operation Area

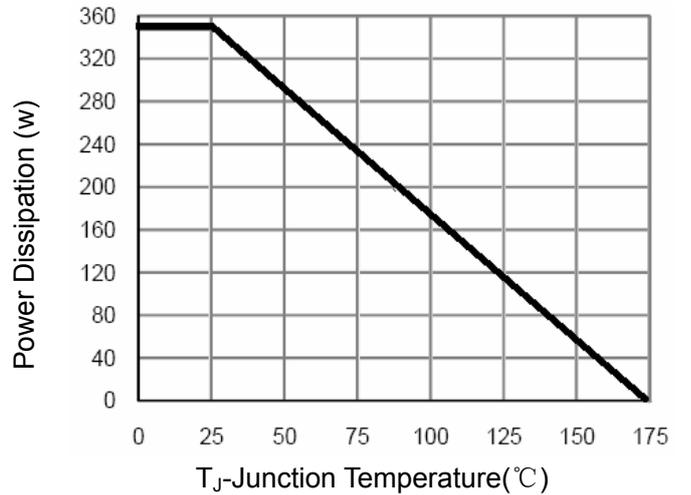


Figure 10 Power De-rating

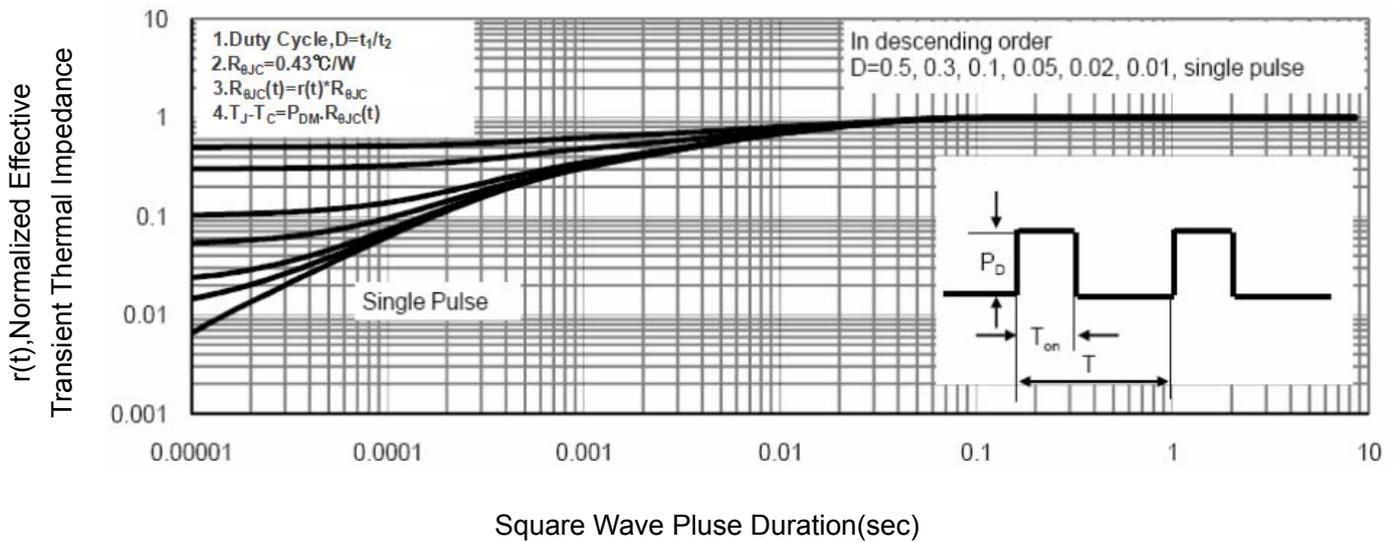
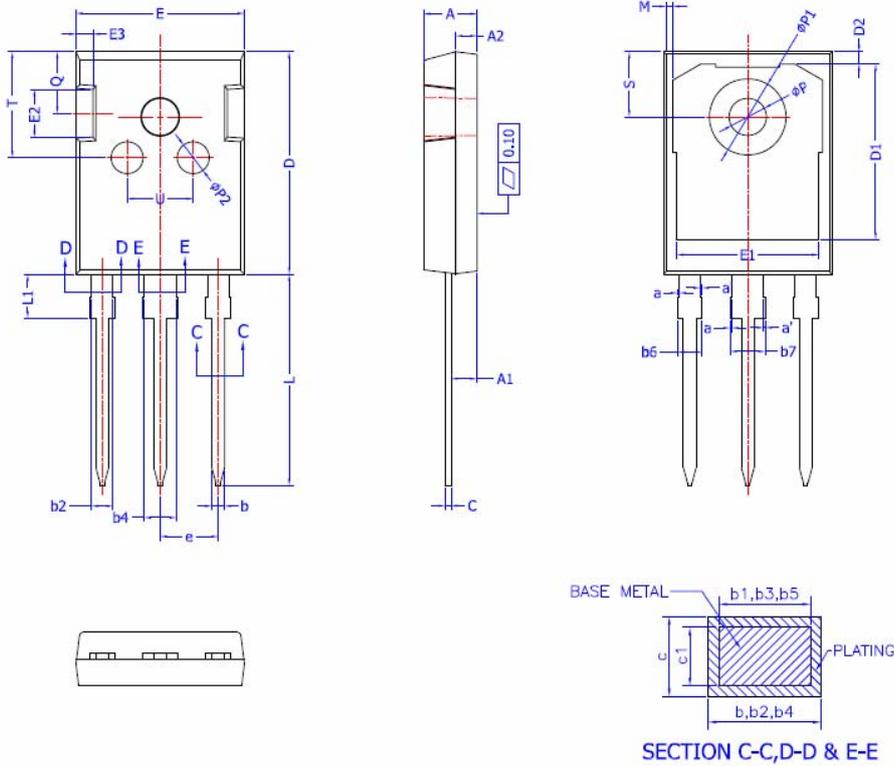


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-247 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	—	0.15
a'	0	—	0.15
b	1.16	—	1.26
b1	1.15	1.2	1.22
b2	1.96	—	2.06
b3	1.95	2.00	2.02
b4	2.96	—	3.06
b5	2.96	3.00	3.02
b6	—	—	2.25
b7	—	—	3.25
c	0.59	—	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.40	4.50	4.60
E3	2.40	2.50	2.60
e	5,436 BSC		
L	19.80	19.92	20.10
L1	—	—	4.30
M	0.35	—	0.95
P	3.40	3.50	3.60
P1	7.00	—	7.40
P2	2.40	2.50	2.60
Q	5.60	—	6.00
S	6.05	6.15	6.25
T	9.80	—	10.20
U	6.00	—	6.40

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