

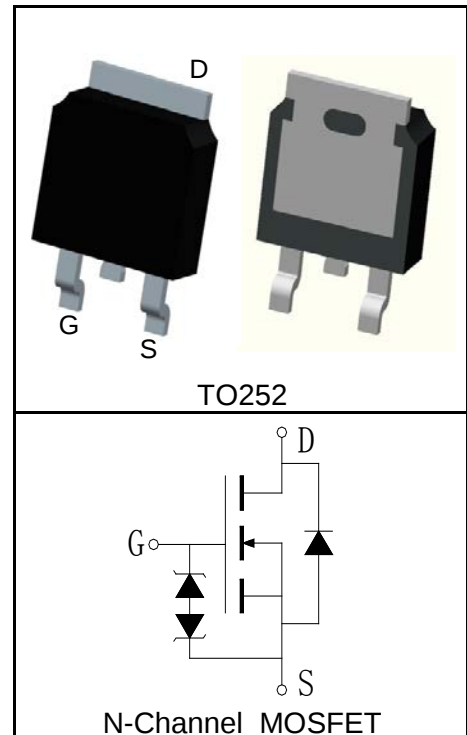
Features

- 20V/60A,
 $R_{DS(ON)} = 6m\Omega(Typ.)@V_{GS}=4.5V$
- Super High Dense Cell Design
- ESD protected
- Reliable and Rugged
- 100% avalanche tested
- 175°C Operating Temperature
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- DC/DC converter
- Motor Drives

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±16	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Diode Continuous Forward Current	T _C =25°C	60	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	240	A
I _D ^②	Continuous Drain Current(V _{GS} =4.5V)	T _C =25°C	60	A
		T _C =100°C	43	
P _D	Maximum Power Dissipation	T _C =25°C	52	W
		T _C =100°C	26	
R _{θJC}	Thermal Resistance-Junction to Case		2.9	°C/W
R _{θJA}	Thermal Resistance-Junction to Ambient		100	°C/W
Drain-Source Avalanche Ratings				
E _{AS} ^③	Avalanche Energy, Single Pulsed		90	mJ

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU20E60L			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
			T _J =125°C		30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	1	1.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±16V, V _{DS} =0V			±10	μA
R _{DS(ON)} ^④	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =30A		6	7	mΩ
Diode Characteristics						
V _{SD} ^④	Diode Forward Voltage	I _{SD} =30A, V _{GS} =0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =30A, dI _{SD} /dt=100A/μs		25		ns
Q _{rr}	Reverse Recovery Charge			15		nC
Dynamic Characteristics ^⑤						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		1.5		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Frequency=1.0MHz		1190		pF
C _{oss}	Output Capacitance			210		
C _{rss}	Reverse Transfer Capacitance			180		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =10V, R _L =0.3Ω, I _{DS} =30A, V _{GEN} =4.5V, R _G =6Ω		12		ns
t _r	Turn-on Rise Time			16		
t _{d(OFF)}	Turn-off Delay Time			33		
t _f	Turn-off Fall Time			15		
Gate Charge Characteristics ^⑤						
Q _g	Total Gate Charge	V _{DS} =16V, V _{GS} =4.5V, I _{DS} =30A		17		nC
Q _{gs}	Gate-Source Charge			2.8		
Q _{gd}	Gate-Drain Charge			8.5		

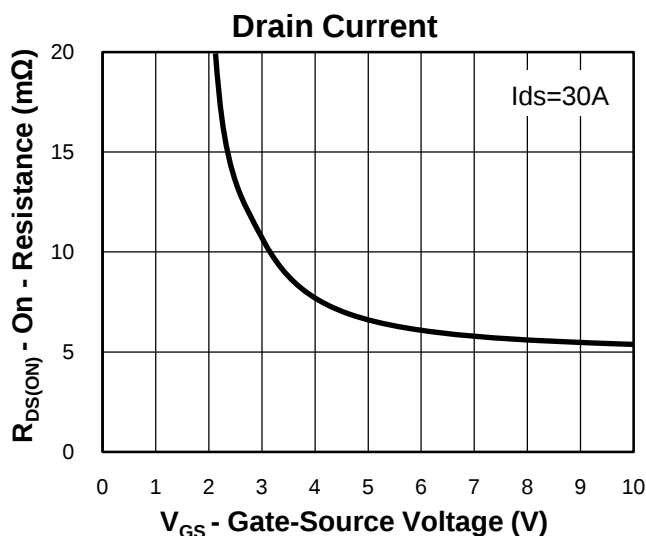
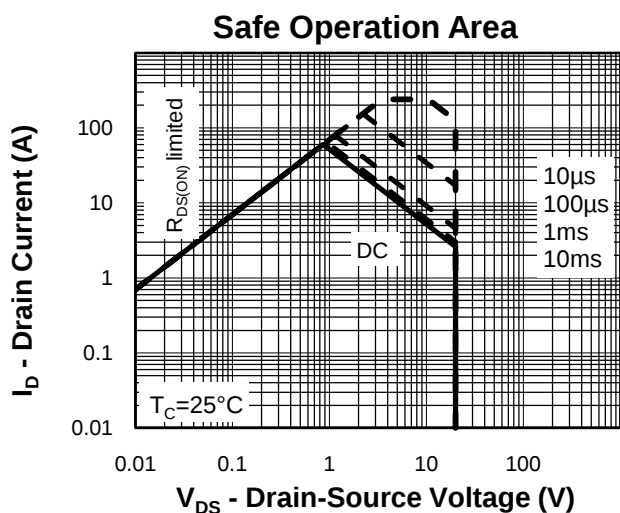
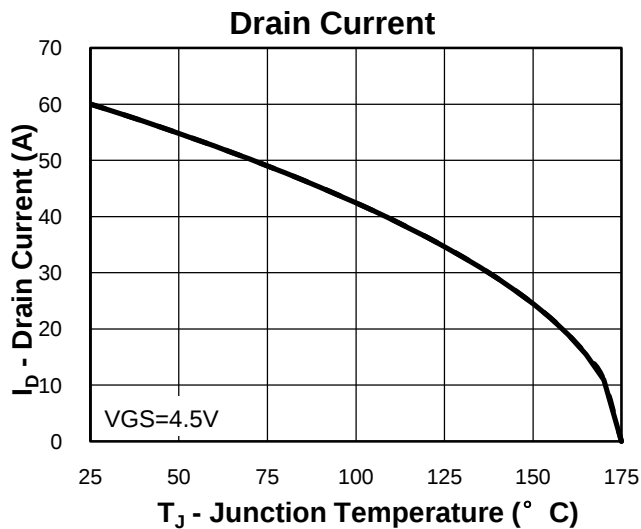
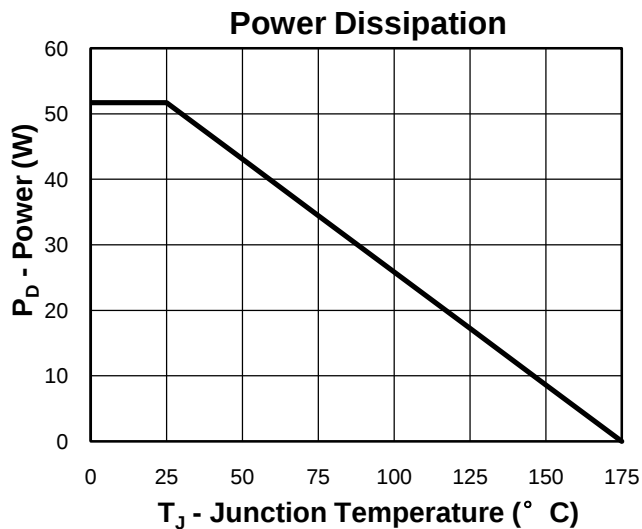
Notes:

- ① Pulse width limited by safe operating area.
- ② Calculated continuous current based on maximum allowable junction temperature. Current limited by bond wire.
- ③ Limited by T_{Jmax} , $I_{AS}=19A$, $V_{DD}=12V$, $R_G=50\Omega$, Starting $T_J=25^{\circ}\text{C}$.
- ④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- ⑤ Guaranteed by design, not subject to production testing.

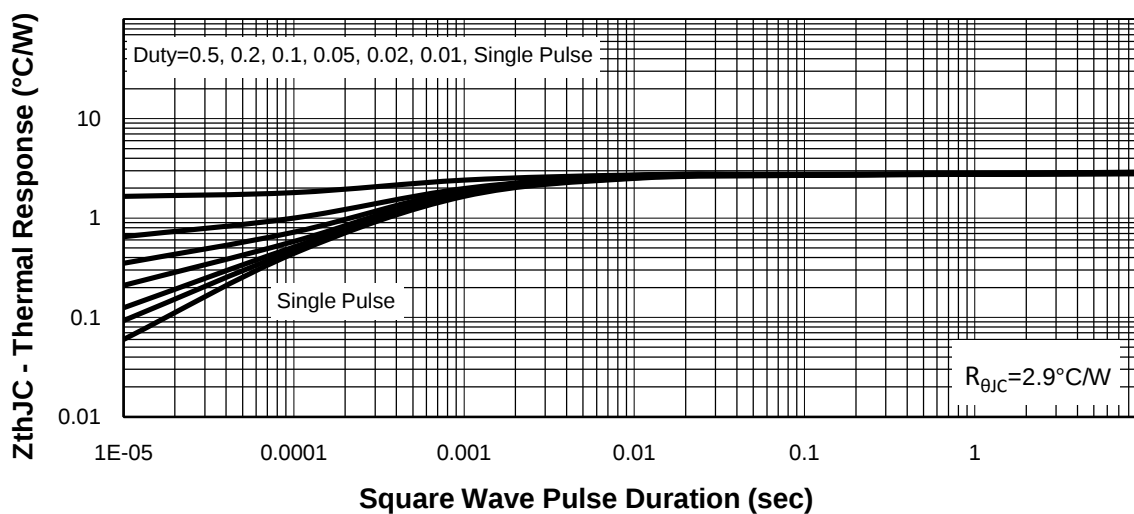
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU20E60L	RU20E60L	TO252	Tape&Reel	2500	13"	16mm

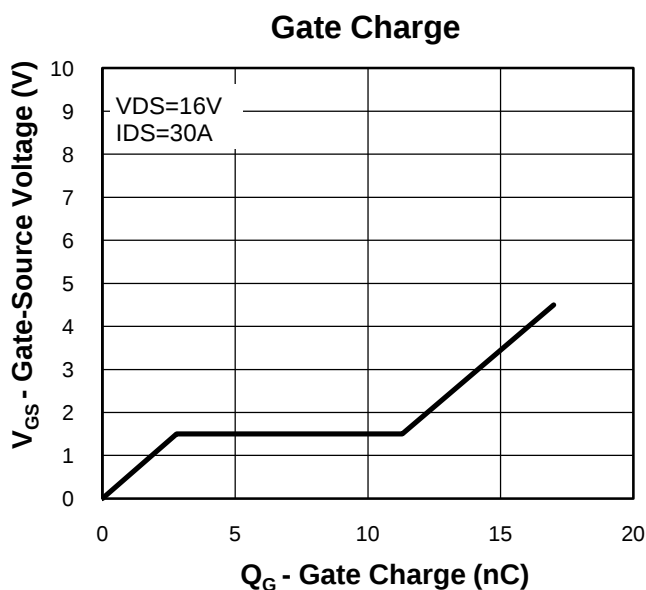
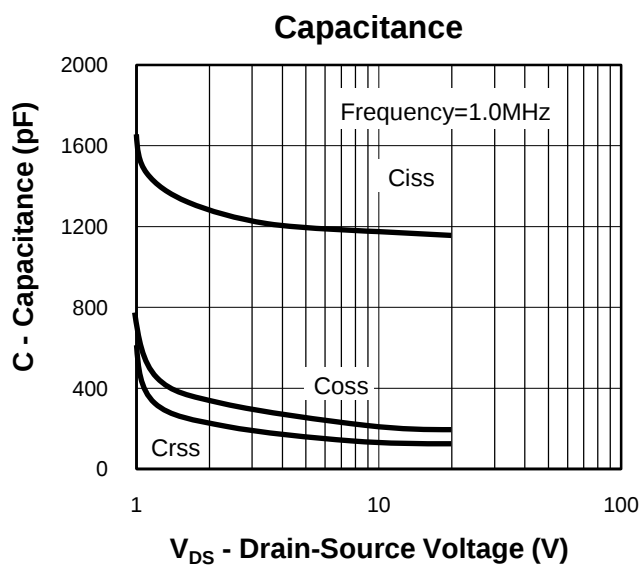
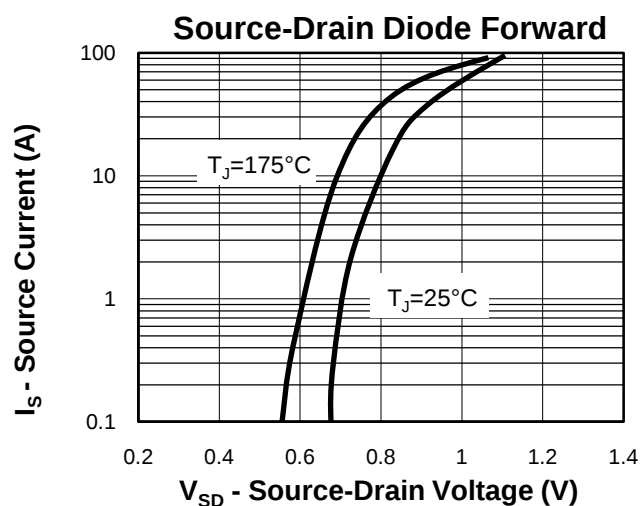
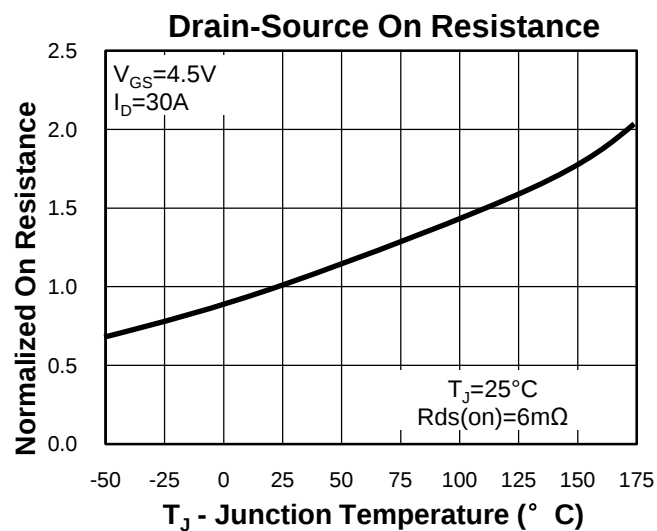
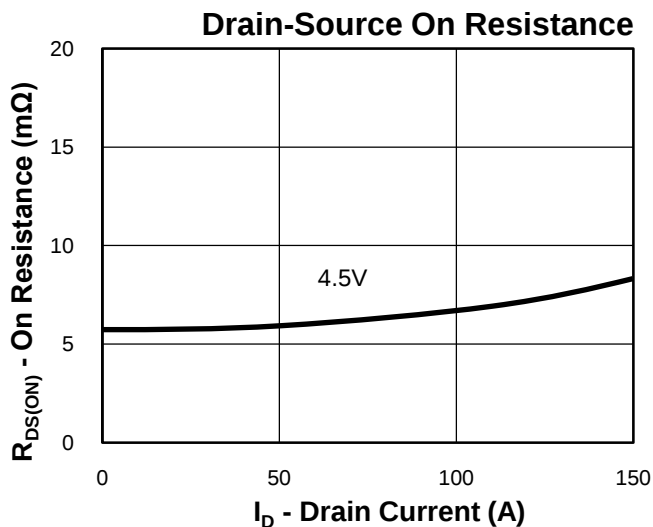
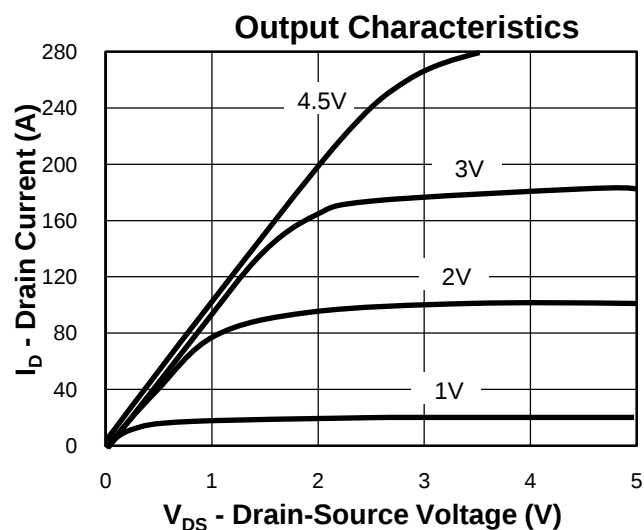
Typical Characteristics



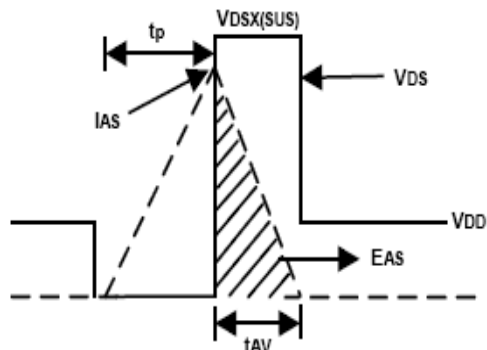
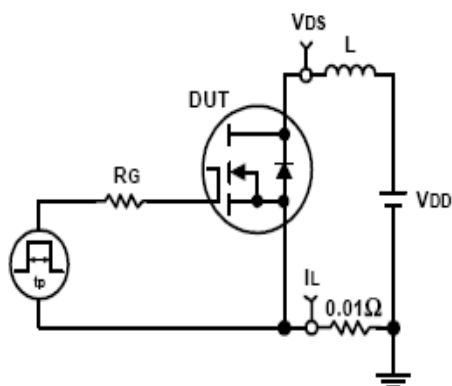
Thermal Transient Impedance



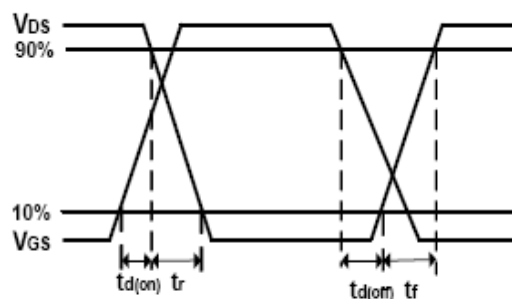
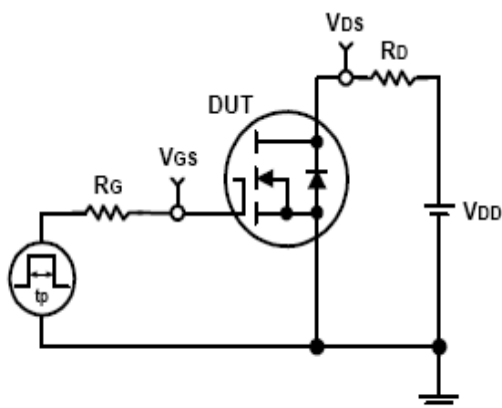
Typical Characteristics



Avalanche Test Circuit and Waveforms

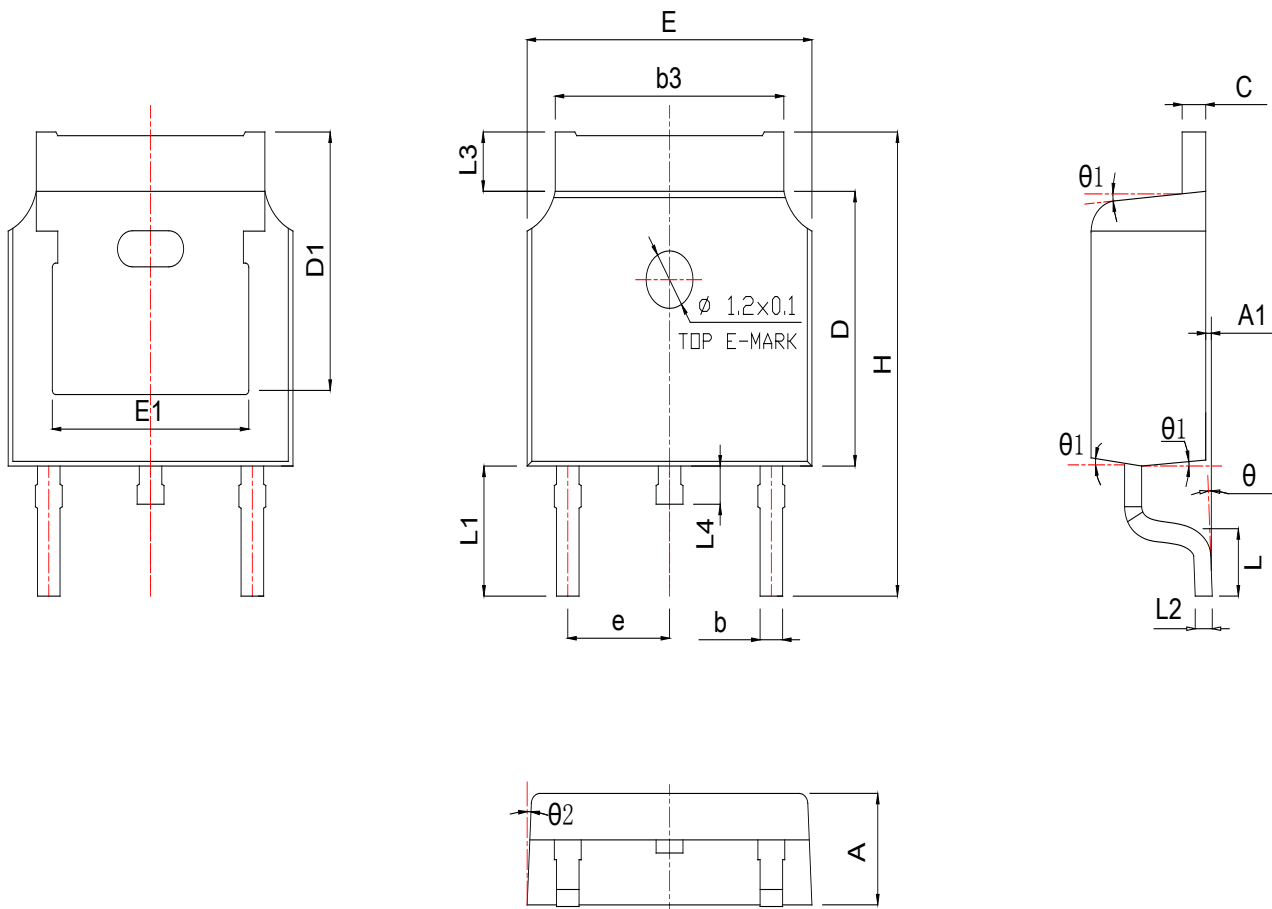


Switching Time Test Circuit and Waveforms



Package Information

TO252



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.200	2.290	2.380	0.087	0.090	0.094
A1	0.000		0.100	0.000		0.004
b	0.720	0.785	0.850	0.028	0.031	0.033
b3	5.230	5.345	5.460	0.206	0.210	0.215
c	0.470	0.525	0.580	0.019	0.021	0.023
D	6.000	6.100	6.200	0.236	0.240	0.244
D1		5.30 REF			0.20 REF	
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.700	4.810	4.920	0.185	0.189	0.194
e	2.28 REF			0.09 REF		
H	9.900	10.100	10.300	0.390	0.398	0.406
L	1.400	1.550	1.700	0.055	0.061	0.067
L1		2.743 REF			0.108 REF	
L2	0.510 BSC			0.020 BSC		
L3	0.900	1.075	1.250	0.035	0.042	0.049
L4	0.600	0.800	1.000	0.024	0.031	0.039
θ	0°		8°	0°		8°
$\theta 1$	5°	7°	9°	5°	7°	9°
$\theta 2$	5°	7°	9°	5°	7°	9°

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