

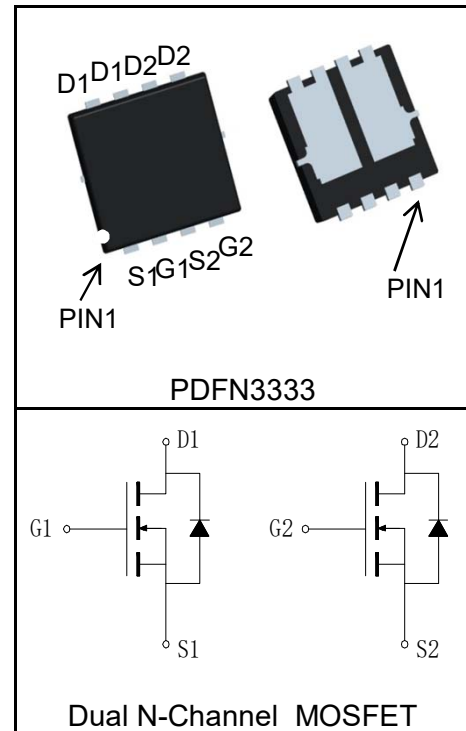
Features

- 30V/20A,
 $R_{DS(ON)} = 8.5m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 11.5m\Omega(Typ.)@V_{GS}=4.5V$
- Super High Dense Cell Design
- Fast Switching Speed
- Low gate Charge
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- Switching Application Systems

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C=25^\circ C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage	30	V	
V_{GSS}	Gate-Source Voltage	± 20		
T_J	Maximum Junction Temperature	150	$^\circ C$	
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$	
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	20	A
Mounted on Large Heat Sink				
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ C$	80	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=10V)$	$T_C=25^\circ C$	20	A
		$T_C=100^\circ C$	13	
	Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$	$T_A=25^\circ C$	10.8	
		$T_A=70^\circ C$	8.7	
P_D	Maximum Power Dissipation@ T_C	$T_C=25^\circ C$	16	W
		$T_C=100^\circ C$	6	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ C$	3.5	
		$T_A=70^\circ C$	2.3	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	8	°C/W
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	35	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{(4)}$	Avalanche Energy, Single Pulsed	42	mJ

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

Symbol	Parameter	Test Condition	RU30D20M2			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$			1	μA
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1		2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$		8.5	10	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=8A$		11.5	14	$m\Omega$
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$			1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD}=20A, di_{SD}/dt=100A/\mu s$		24		ns
Q_{rr}	Reverse Recovery Charge			13		nC
Dynamic Characteristics ⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz		930		pF
C_{oss}	Output Capacitance			230		
C_{rss}	Reverse Transfer Capacitance			90		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=0.75\Omega,$ $I_{DS}=20A, V_{GEN}=10V,$ $R_G=3\Omega$		8		ns
t_r	Turn-on Rise Time			11		
$t_{d(OFF)}$	Turn-off Delay Time			17		
t_f	Turn-off Fall Time			6		
Gate Charge Characteristics ⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=24V, V_{GS}=10V,$ $I_{DS}=20A$		18		nC
Q_{gs}	Gate-Source Charge			5		
Q_{gd}	Gate-Drain Charge			7		

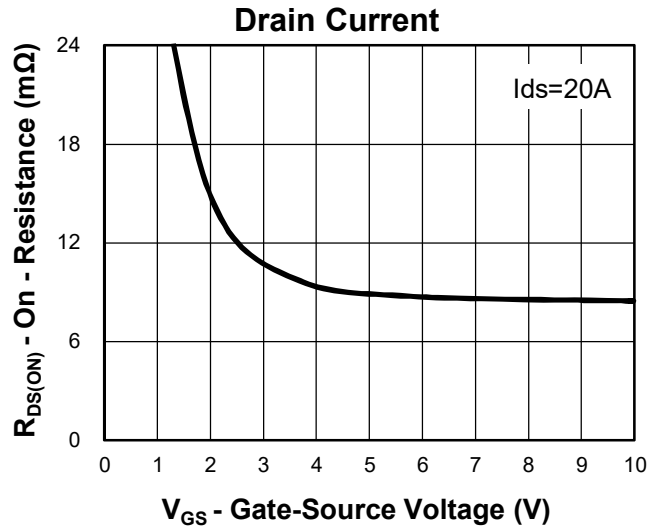
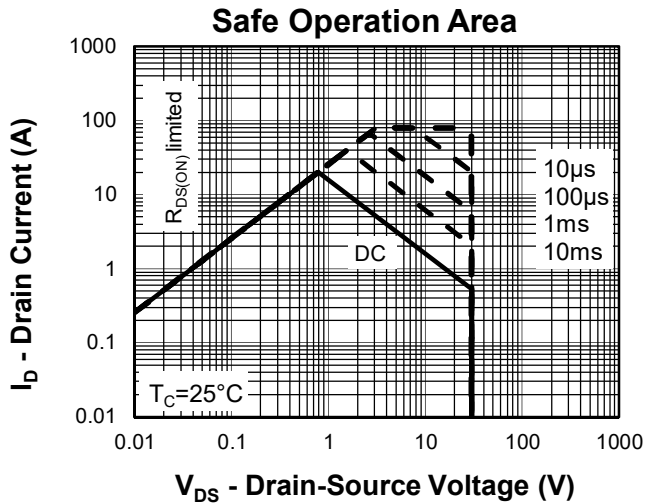
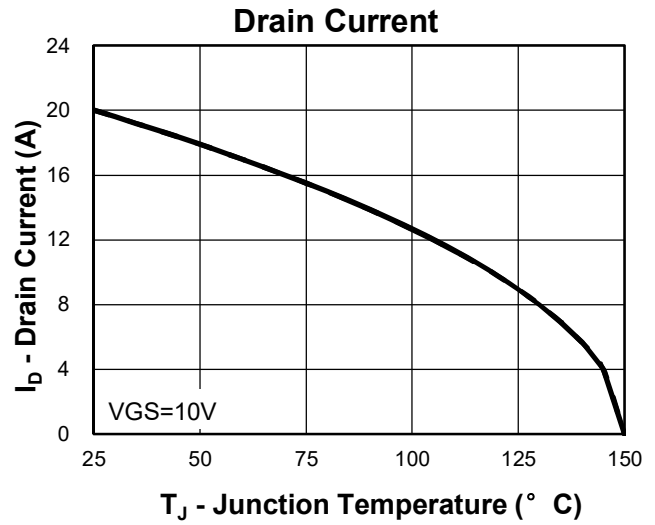
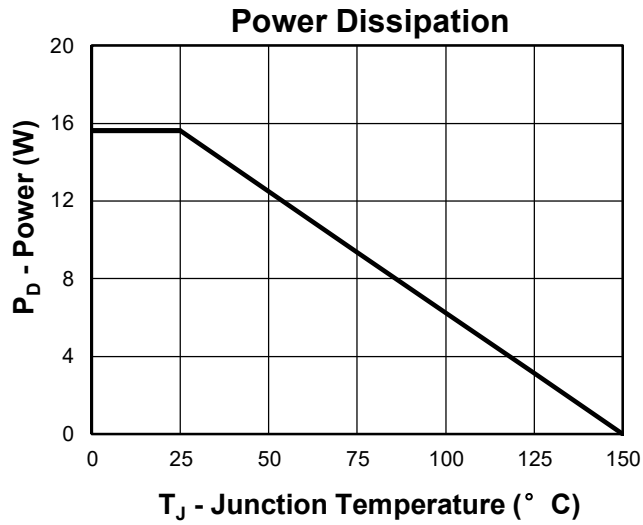
Notes:

- ① Pulse width limited by safe operating area.
- ② Calculated continuous current based on maximum allowable junction temperature.
- ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④ Limited by T_{Jmax} , $I_{AS} = 13\text{A}$, $V_{DD} = 24\text{V}$, $R_G = 50\Omega$, Starting $T_J = 25^\circ\text{C}$.
- ⑤ Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥ Guaranteed by design, not subject to production testing.

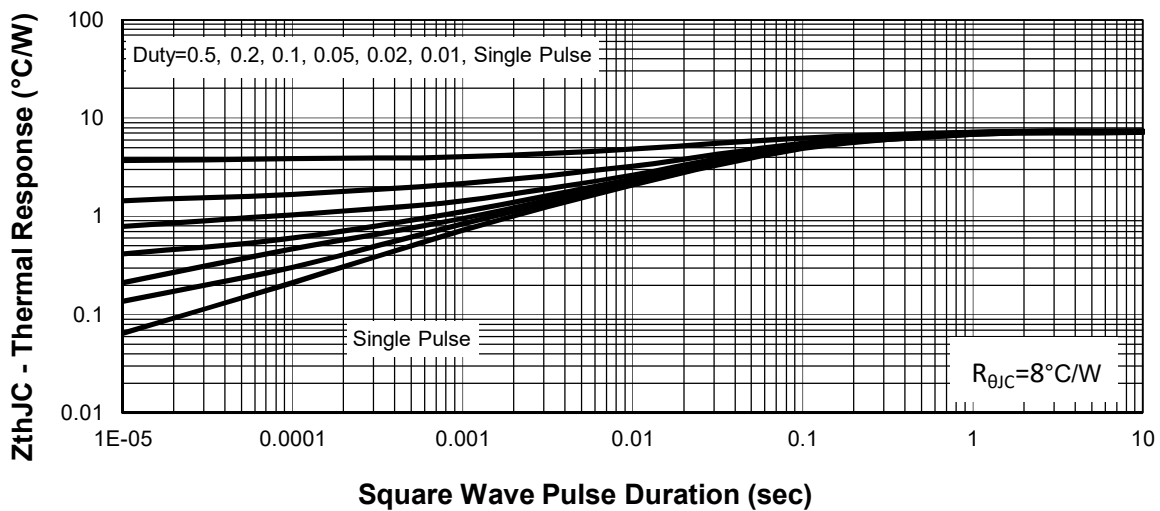
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU30D20M2	30D20	PDFN3333	Tape&Reel	5000	13"	12mm

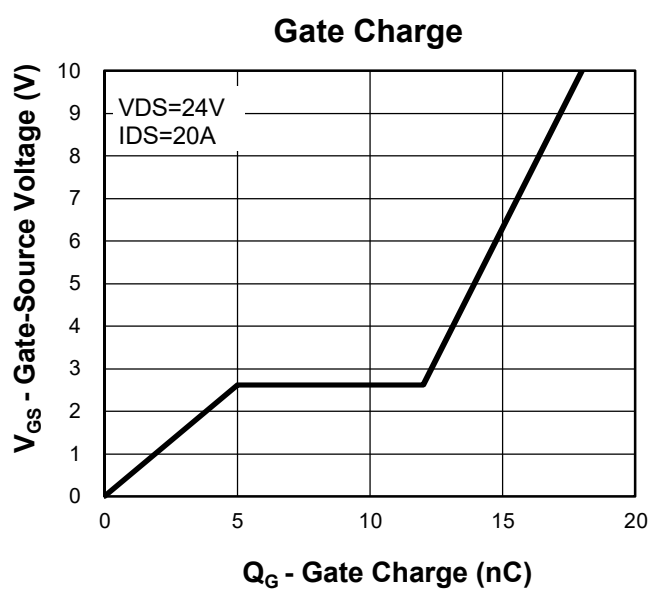
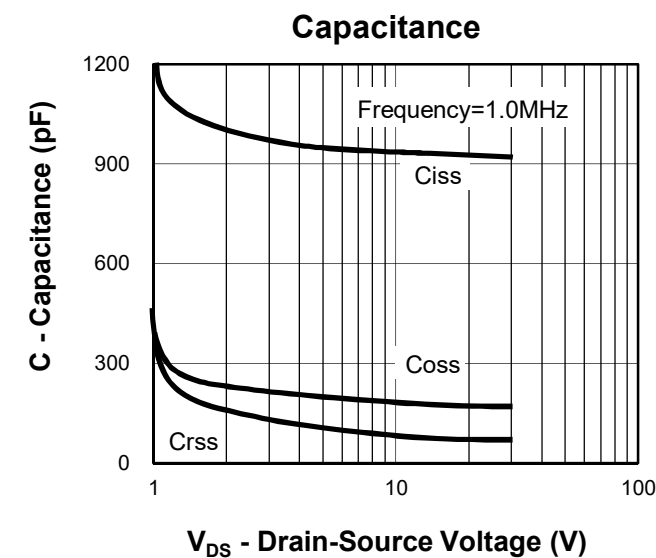
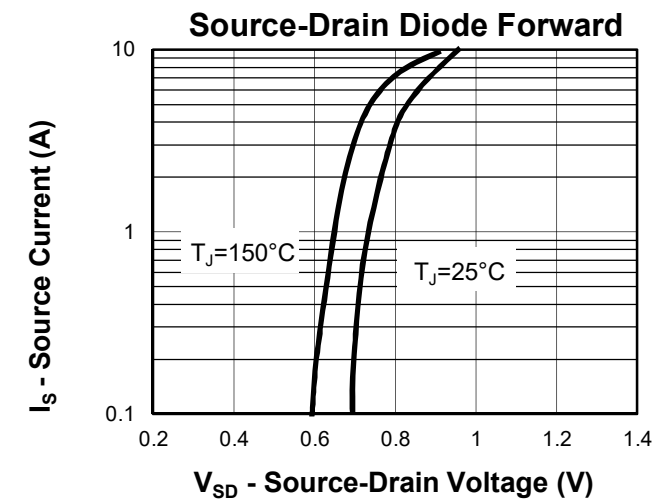
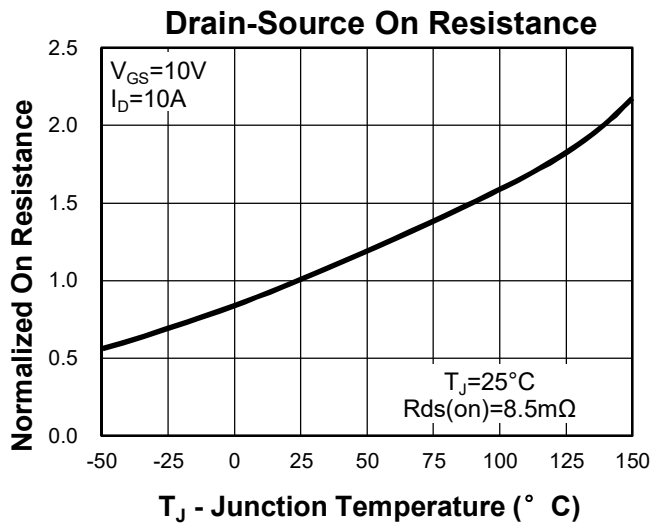
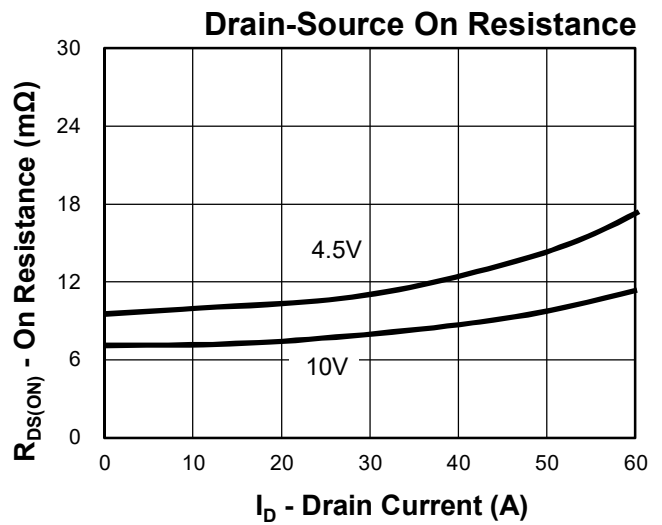
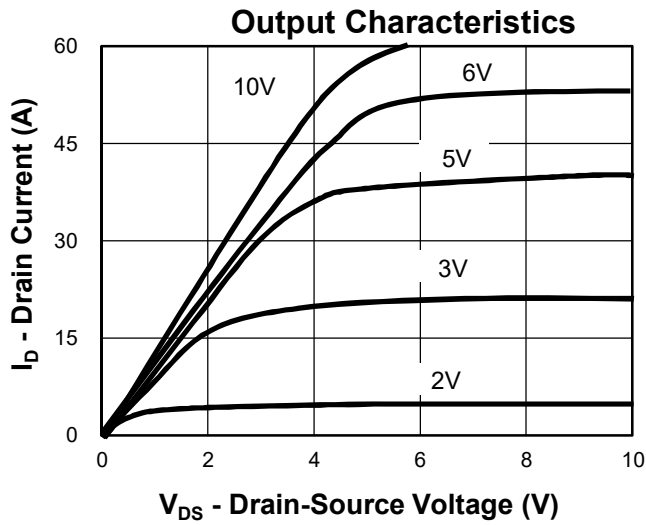
Typical Characteristics



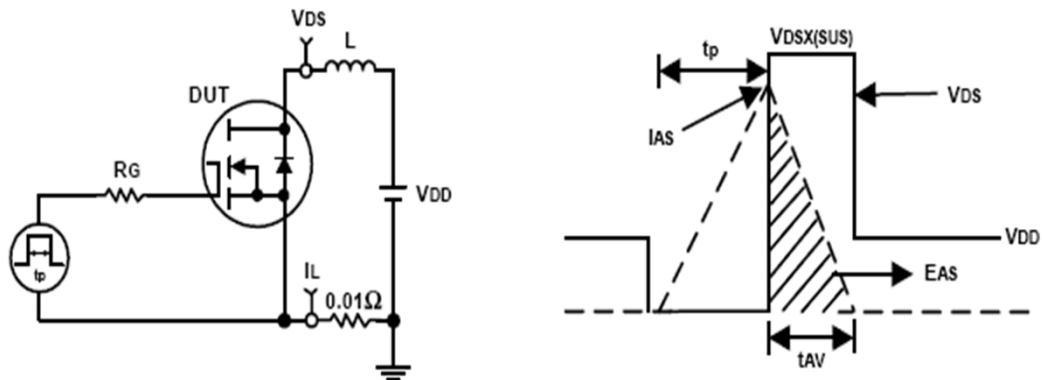
Thermal Transient Impedance



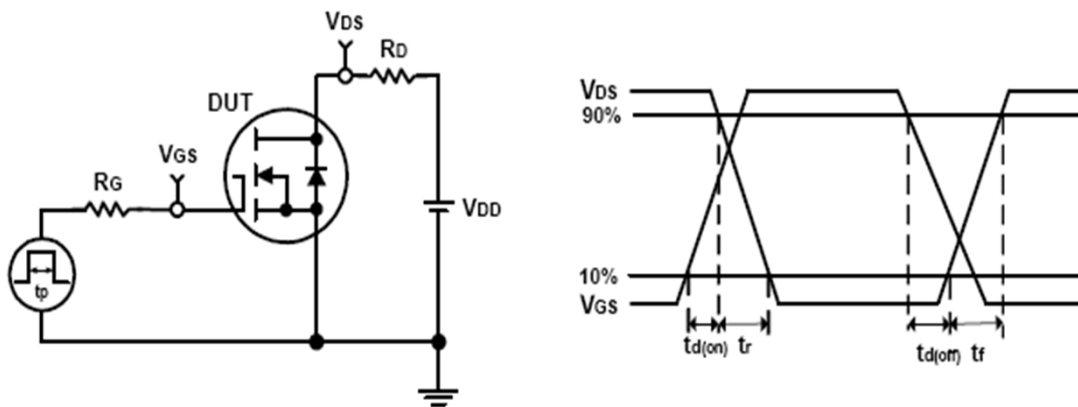
Typical Characteristics



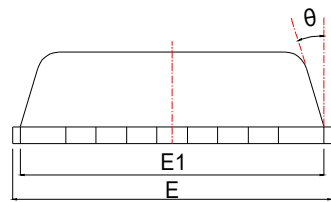
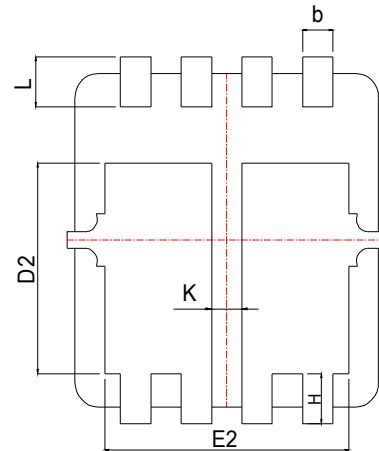
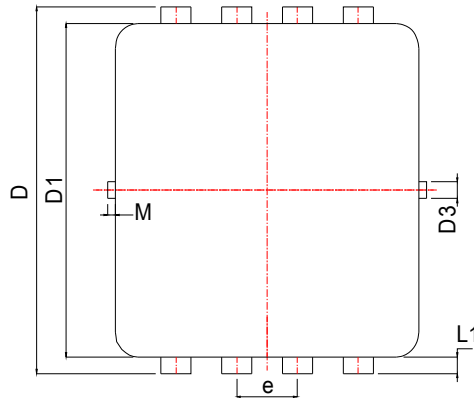
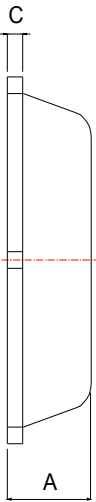
Avalanche Test Circuit and Waveforms



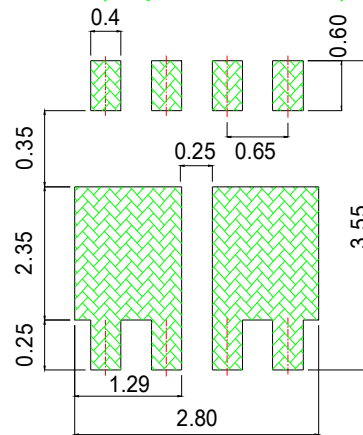
Switching Time Test Circuit and Waveforms



PDFN3333



Land Pattern
(Only for Reference)



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031	E1	3.00	3.15	3.20	0.118	0.122	0.126
b	0.25	0.30	0.35	0.010	0.012	0.014	E2	2.39	2.49	2.59	0.094	0.098	0.102
c	0.10	0.15	0.25	0.004	0.007	0.010	e	0.65BSC			0.026BSC		
D	3.25	3.35	3.45	0.128	0.132	0.136	H	0.30	0.40	0.50	0.012	0.016	0.020
D1	3.00	3.10	3.20	0.118	0.122	0.126	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	1.78	1.88	1.98	0.070	0.074	0.078	L1	*	0.13	*	*	0.005	*
D3	*	0.13	*	*	0.005	*	theta	*	10°	12°	*	10°	12°
E	3.20	3.30	3.40	0.126	0.130	0.134	M	*	*	0.15	*	*	0.006
K	0.30	*	*	0.012	*	*							

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