

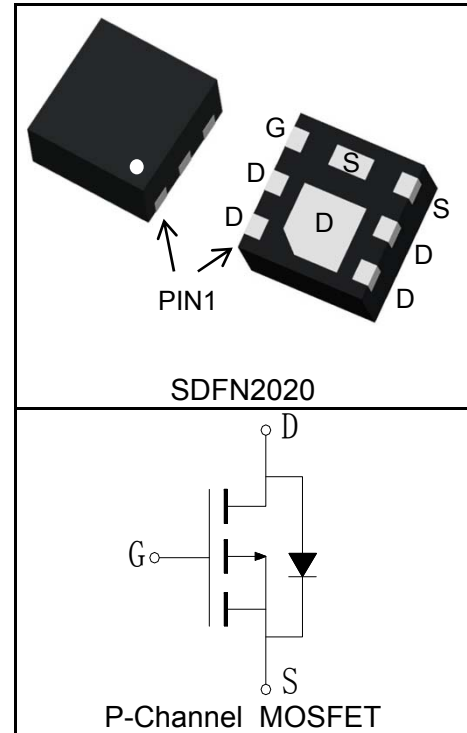
### Features

- -16V/-4A,  
 $R_{DS(ON)} = 70m\Omega(Typ.)@V_{GS}=-4.5V$   
 $R_{DS(ON)} = 100m\Omega(Typ.)@V_{GS}=-2.5V$
- Super High Dense Cell Design
- Fast Switching Speed
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

### Applications

- Load Switch
- Battery Charge
- DC/DC Converters

### Pin Description



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C=25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	-16	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	
$T_J$	Maximum Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$ -4	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{①}$	300 $\mu s$ Pulse Drain Current Tested	$T_C=25^\circ C$ -16	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=-4.5V)$	$T_C=25^\circ C$ -4	A
		$T_C=100^\circ C$ -2.5	
	Continuous Drain Current@ $T_A(V_{GS}=-4.5V)^{③}$	$T_A=25^\circ C$ 1.8	
		$T_A=70^\circ C$ 1.4	
$P_D$	Maximum Power Dissipation@ $T_C$	$T_C=25^\circ C$ 15.2	W
		$T_C=100^\circ C$ 6	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ C$ 2.5	
		$T_A=70^\circ C$ 1.6	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	8.2	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient	50	°C/W
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}$ ④	Avalanche Energy, Single Pulsed	TBD	mJ

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

Symbol	Parameter	Test Condition	RU16P4M4			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-16			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-16V, V_{GS}=0V$			-1	$\mu A$
		$T_J=125^\circ\text{C}$			-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.5		-1	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_{DS}=-4A$		70	80	$m\Omega$
		$V_{GS}=-2.5V, I_{DS}=-2A$		100	110	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}$ ⑤	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$			-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=-4A, dI_{SD}/dt=100A/\mu s$		7		ns
$Q_{rr}$	Reverse Recovery Charge			3		nC
<b>Dynamic Characteristics</b> ⑥						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		0.8		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-8V,$ Frequency=1.0MHz		480		pF
$C_{oss}$	Output Capacitance			78		
$C_{rss}$	Reverse Transfer Capacitance			42		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-8V, I_{DS}=-4A,$ $V_{GEN}=-4.5V, R_G=6\Omega$		6		ns
$t_r$	Turn-on Rise Time			10		
$t_{d(OFF)}$	Turn-off Delay Time			19		
$t_f$	Turn-off Fall Time			8		
<b>Gate Charge Characteristics</b> ⑥						
$Q_g$	Total Gate Charge	$V_{DS}=-12V, V_{GS}=-4.5V,$ $I_{DS}=-4A$		7		nC
$Q_{gs}$	Gate-Source Charge			1.1		
$Q_{gd}$	Gate-Drain Charge			2.3		

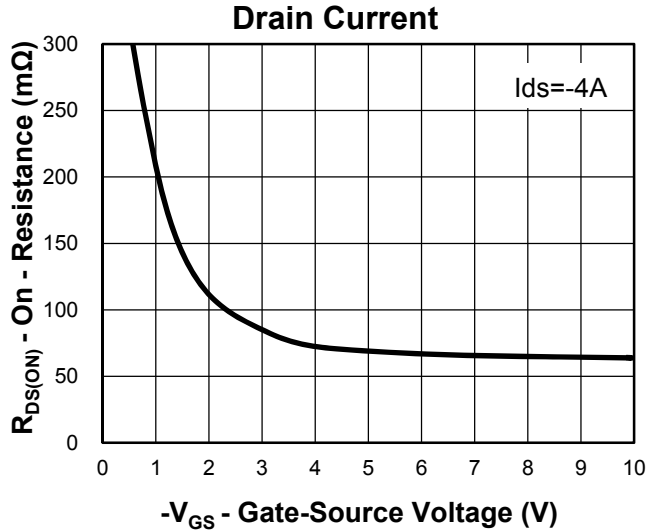
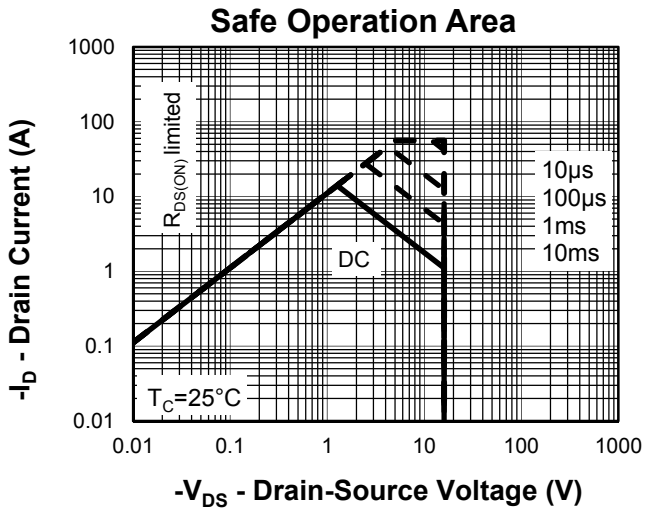
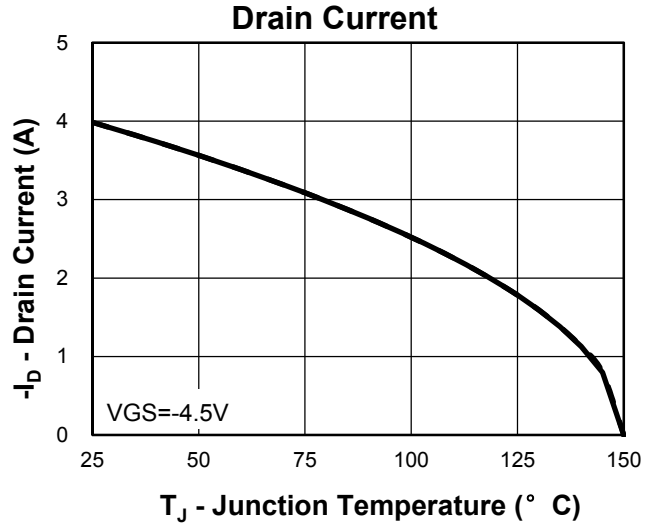
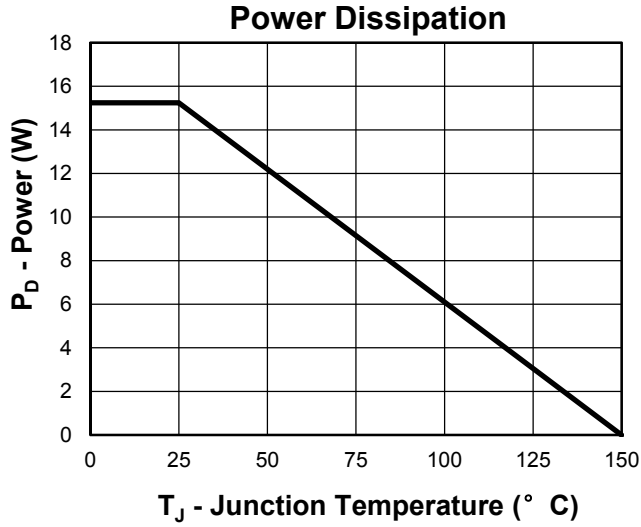
**Notes:**

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

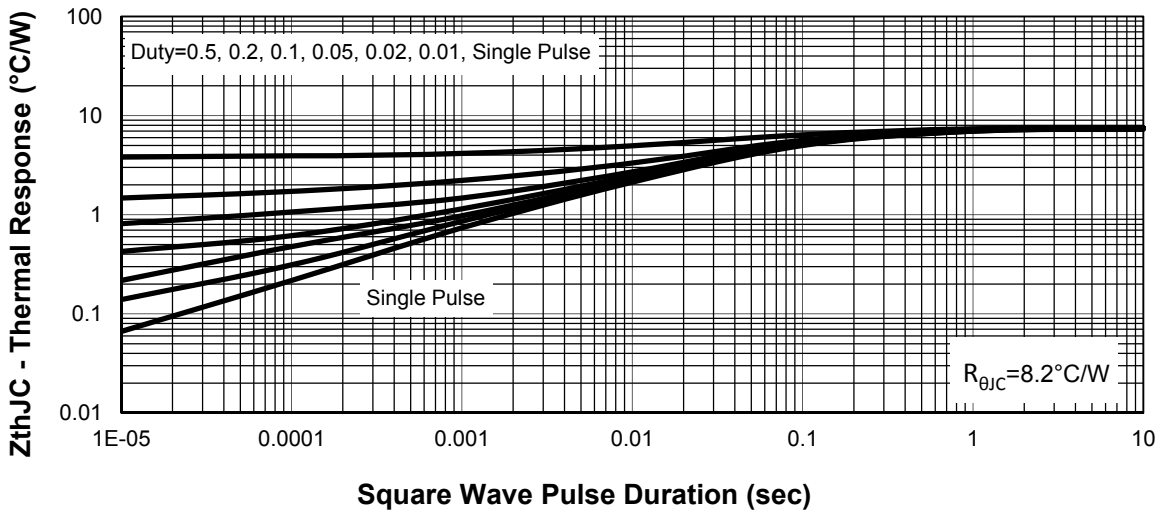
**Ordering and Marking Information**

<b>Device</b>	<b>Marking</b>	<b>Package</b>	<b>Packaging</b>	<b>Quantity</b>	<b>Reel Size</b>	<b>Tape width</b>
RU16P4M4	16P4	SDFN2020	Tape&Reel	3000	7"	8mm

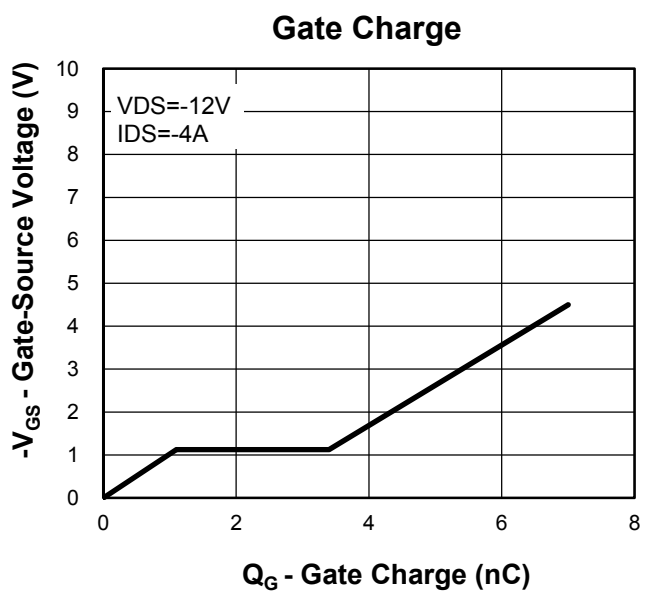
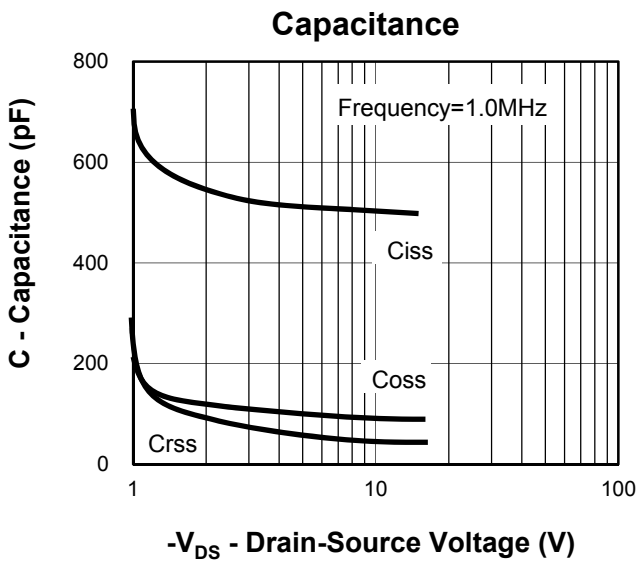
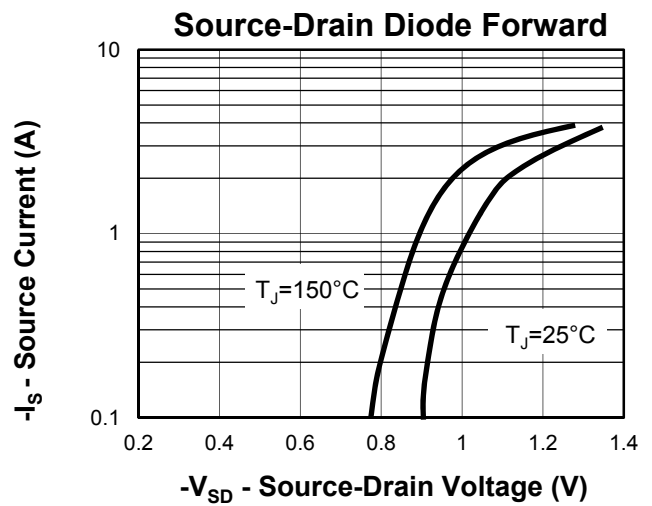
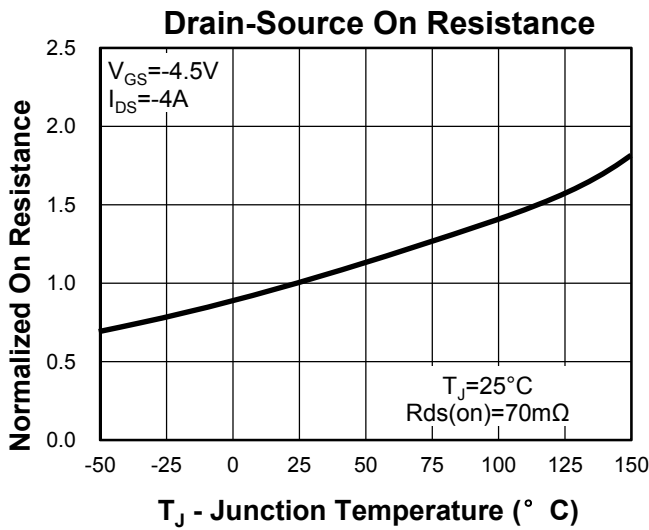
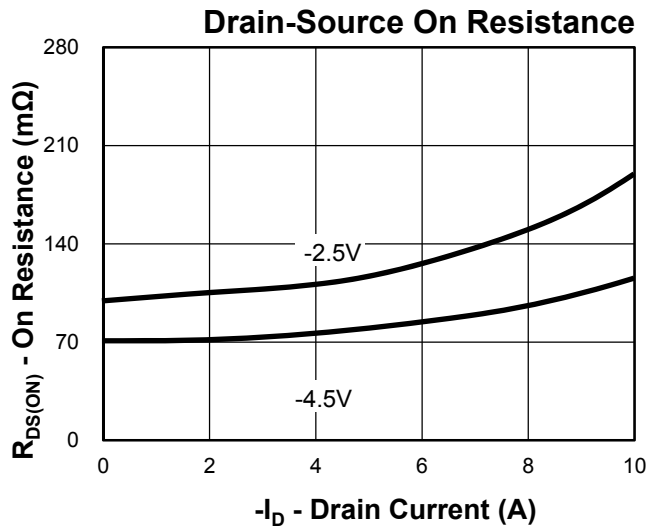
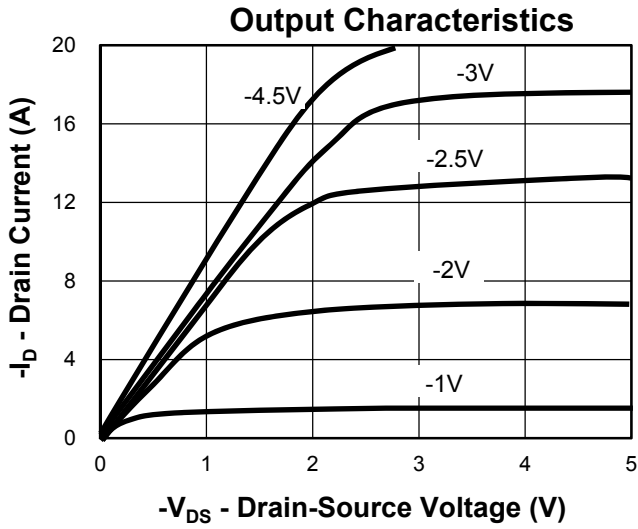
**Typical Characteristics**



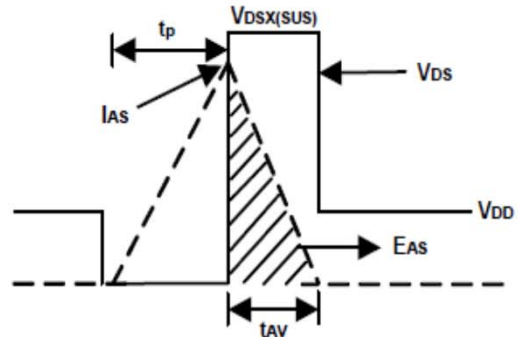
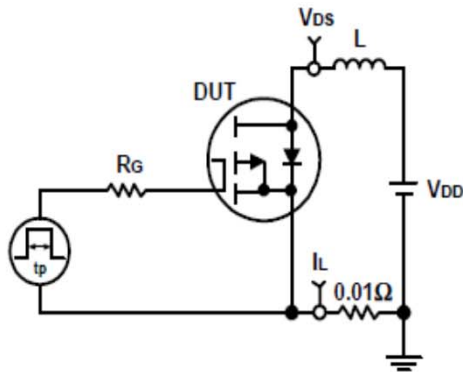
**Transient Impedance**



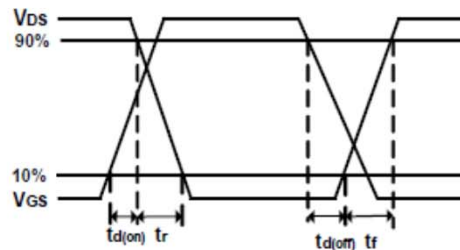
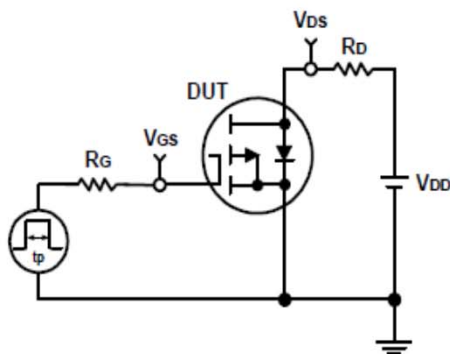
**Typical Characteristics**



**Avalanche Test Circuit and Waveforms**

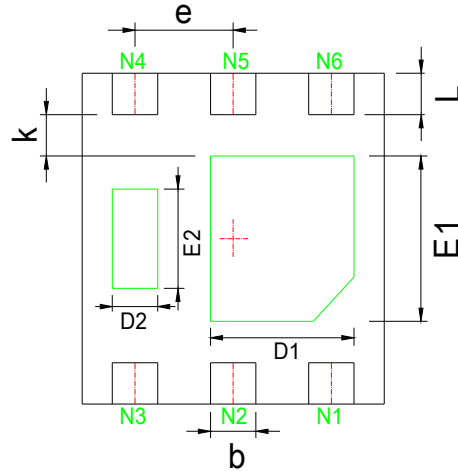
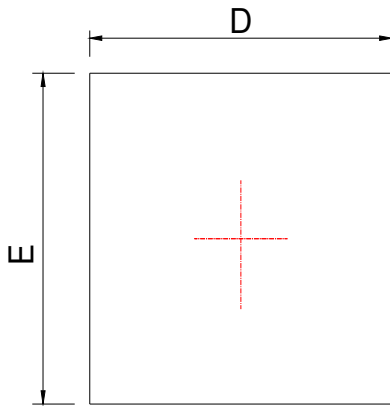


**Switching Time Test Circuit and Waveforms**

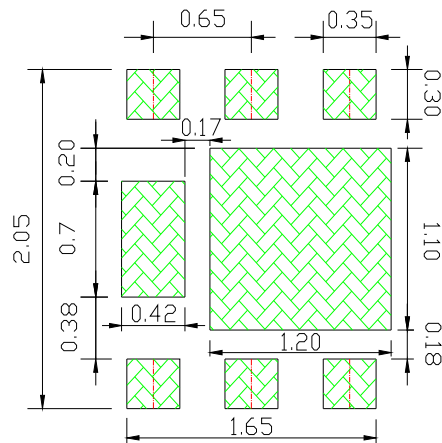
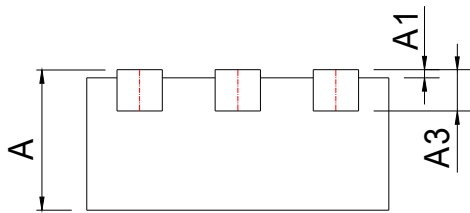


**Package Information**

**SDFN2020**



Land Pattern  
(Only for Reference)



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.500	0.550	0.600	0.020	0.022	0.024
A1	0.000	0.025	0.050	0.000	0.001	0.002
A3	0.203 REF.			0.008 REF.		
D	1.924	2.000	2.076	0.076	0.079	0.082
E	1.924	2.000	2.076	0.076	0.079	0.082
D1	0.800	0.900	1.000	0.031	0.035	0.039
E1	0.850	0.950	1.050	0.033	0.037	0.041
D2	0.200	0.300	0.400	0.008	0.012	0.016
E2	0.460	0.560	0.660	0.018	0.022	0.026
K	0.200 MIN.			0.008 MIN.		
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.650 TYP			0.026 TYP		
L	0.174	0.250	0.326	0.007	0.010	0.013

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