

SED5852B

P-Channel Enhancement Mode Field Effect Transistor with Schottky Diode

General Description

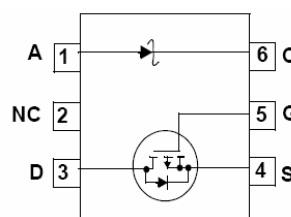
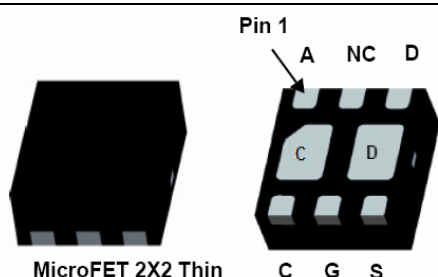
The SED5852 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. A Schottky diode is provided to facilitate the implementation of a bidirectional blocking switch, or for DC-DC conversion applications. Standard Product SED5852 is Pb-free (meets ROHS specifications).

Features

$V_{DS}(V) = -20V$
 $I_D = -3.4A (V_{GS} = -4.5V)$
 $R_{DS(ON)} < 140m\Omega (V_{GS} = -4.5V)$
 $R_{DS(ON)} < 200m\Omega (V_{GS} = -2.5V)$

SCHOTTKY

$V_{DS}(V) = 20V, I_F = 1A, V_F < 0.5V @ 0.5A$



Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	MOSFET	Schottky	Unit
Drain-Source Voltage	V_{DS}	-20		V
Gate-Source Voltage	V_{GS}	± 8		V
Continuous Drain Current ^A	I_D	$T_A = 25^\circ C$	-2.3	A
		$T_A = 70^\circ C$	-1.9	
Pulsed Drain Current ^B	I_{DM}	-15		
Schottky reverse voltage	V_{KA}		20	V
Continuous Forward Current ^A	I_F	$T_A = 25^\circ C$	1.9	A
		$T_A = 70^\circ C$	1.2	
Pulsed Forward Current ^B	I_{FM}		7	
Power Dissipation	P_D	$T_A = 25^\circ C$	1.7	W
		$T_A = 70^\circ C$	1.1	
Junction and Storage Temperature Rang	I_J, I_{STG}	-55 to 150	-55 to 150	°C

Parameter: Thermal Characteristics MOSFET	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	51	75	°C/W
Maximum Junction-to-Ambient ^A		Steady-State	88	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	28	35	

Thermal Characteristics Schottky

Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	66	80	°C/W
Maximum Junction-to-Ambient ^A		Steady-State	95	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	40	50	

Electrical Characteristics (T _J =25°C unless otherwise note)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _V DSS	Drain-Source Breakdown Voltage	I _D = -250uA, V _{GS} =0V	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -16V, V _{GS} =0V			-1	uA
		V _{DS} = -16V, V _{GS} =0V (T _J =55°C)			-5	uA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±8V			±100	nA
V _{GS(IN)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250uA	-0.3	-0.63	-1	V
I _{D(ON)}	On state drain current	V _{GS} = -4.5V, V _{DS} =-5V	-15			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D = -2.0A		120	140	mΩ
		V _{GS} = -2.5V, I _D = -2.0A		180	200	mΩ
g _{FS}	Forward Transconductance	V _{GS} = -5V, I _D = -2.0A	4	7		S
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = -1A		-0.83	-1	V
I _S	Maximum Body-Diode Continuous Current				-2	A
DYNAMIC PARAMETERS						
C _{ISS}	Input Capacitance	V _{GS} = 0V, V _{DS} = -10V, f= 1MHz		540		pF
C _{OSS}	Output Capacitance			72		pF
C _{RSS}	Reverse Transfer Capacitance			49		pF
R _g	Gate resistance	V _{GS} = 0V, V _{DS} = 0V, f= 1MHz		12		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-10V, I _D = -3.4A		6.1		nC
Q _{gs}	Gate Source Charge			0.6		nC
Q _{gd}	Gate Drain Charge			16		nC
T _{D(on)}	Turn-On DelayTime	V _{GS} = -4.5V, V _{DS} = -10V, R _L = 2.9Ω, R _{GEN} = 3Ω		10		ns
t _r	Turn-On Rise Time			12		ns
T _{D(off)}	Turn-Off DelayTime			44		ns
t _f	Turn-Off Fall Time			22		ns
t _{rr}	Reverse Recovery Time	I _F = -3.4A, dI/dt=100A/us		21		ns
Q _{rr}	Reverse Recovery Charge	I _F = -3.4A, dI/dt=100A/us		7.5		nC
SCHOTTKY PARAMETERS						
V _F	Forward Voltage Drop	I _F = 0.5A		0.39	0.5	V
I _{rm}	Maximum reverse leakage current	V _R =16V			0.05	mA
		V _R = 16V, T _J =125°C			10	
C _T	Junction Capacitance	V _R = 10V		34		pF
t _{rr}	SchottkyReverse Recovery Time	I _F = 1A, dI/dt=100A/us		5.2	10	Ns
Q _{rr}	Schottky Reverse Recovery Charge	I _F = 1A, dI/dt=100A/us		0.8		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

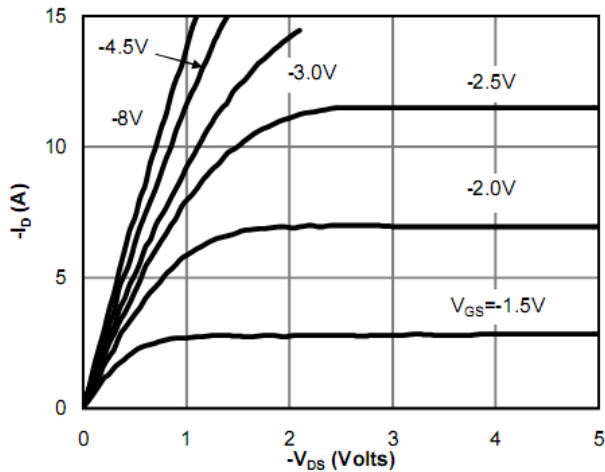


Fig 1: On-Region Characteristics

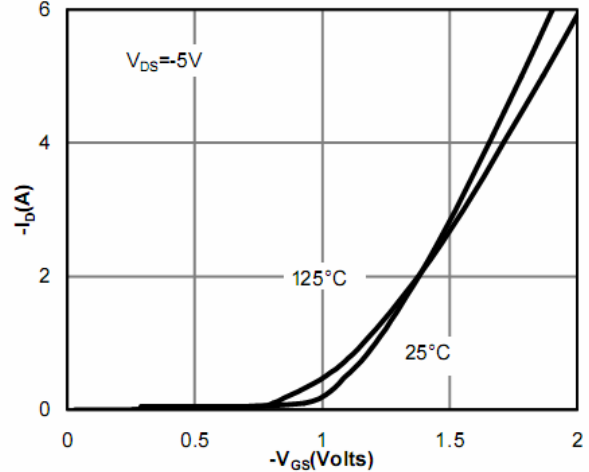


Figure 2: Transfer Characteristics

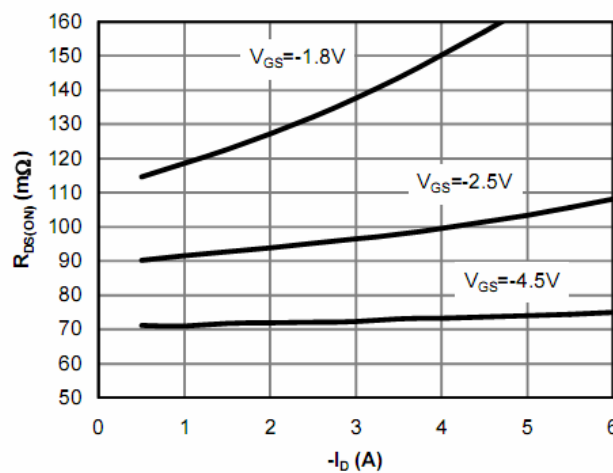


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

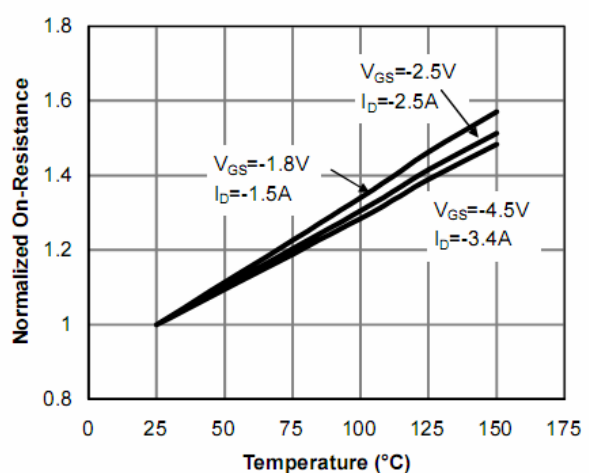


Figure 4: On-Resistance vs. Junction Temperature

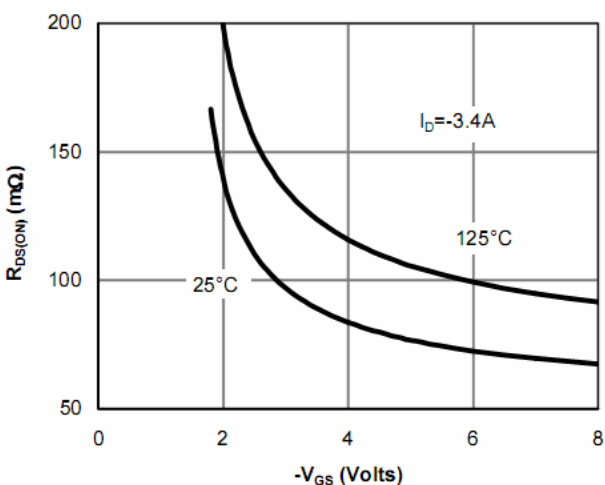


Figure 5: On-Resistance vs. Gate-Source Voltage

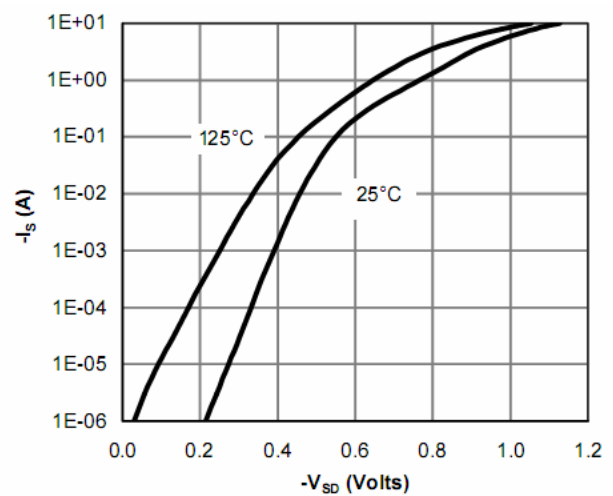


Figure 6: Body-Diode Characteristics

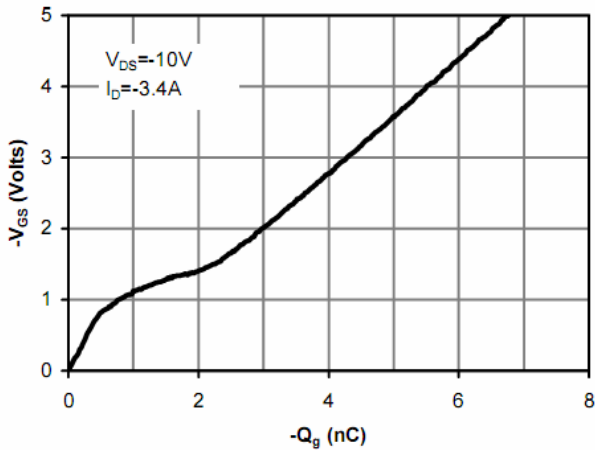


Figure 7: Gate-Charge Characteristics

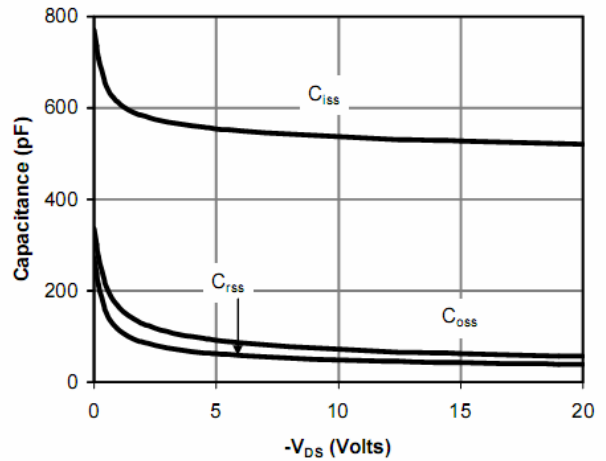


Figure 8: Capacitance Characteristics

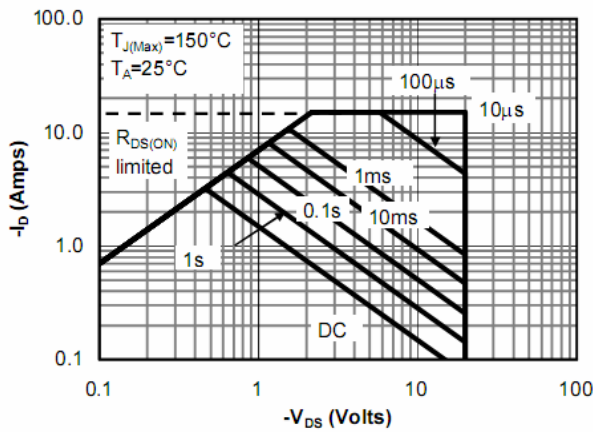


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

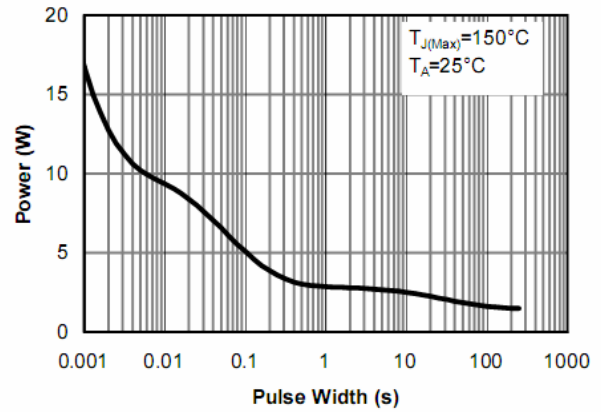


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

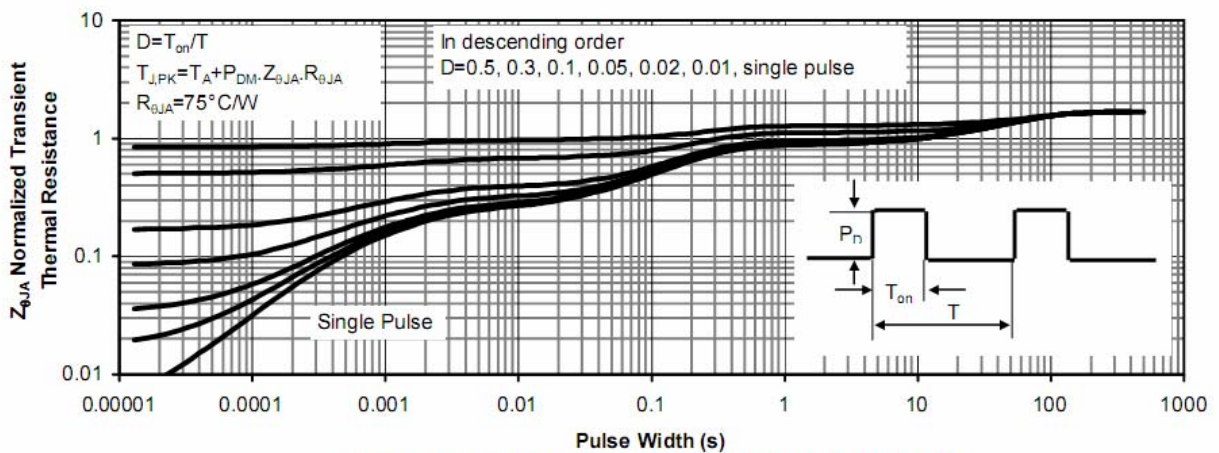


Figure 11: Normalized Maximum Transient Thermal Impedance

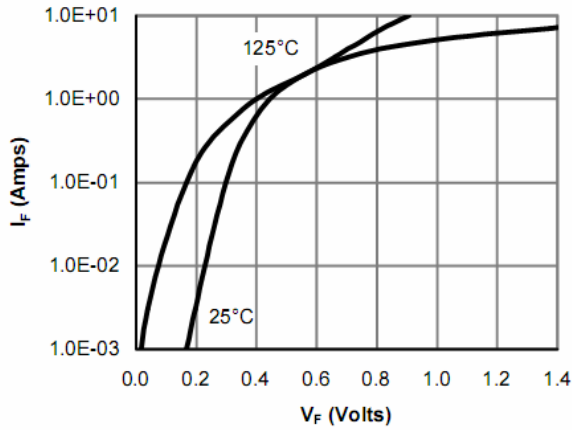


Figure 12: Schottky Forward Characteristics

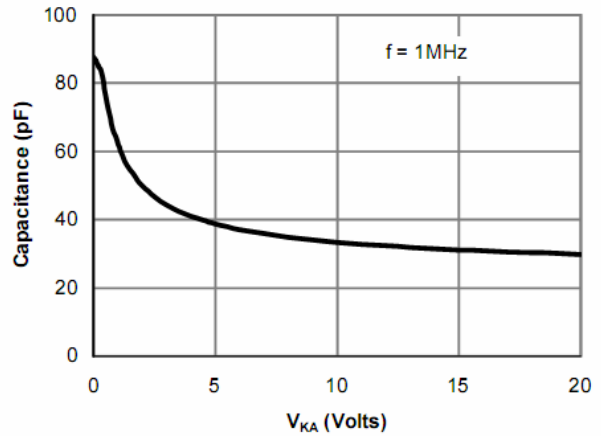


Figure 13: Schottky Capacitance Characteristics

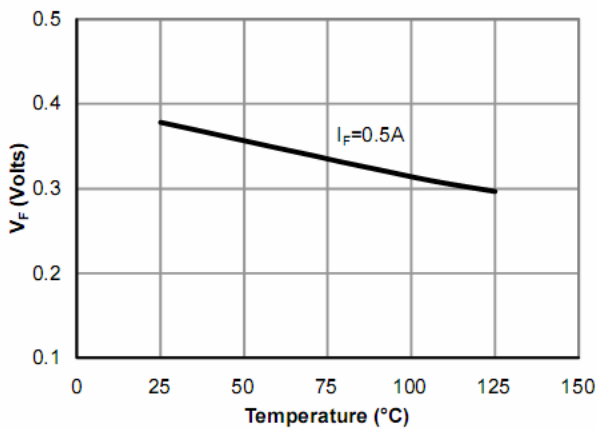


Figure 14: Schottky Forward Drop vs. Junction Temperature

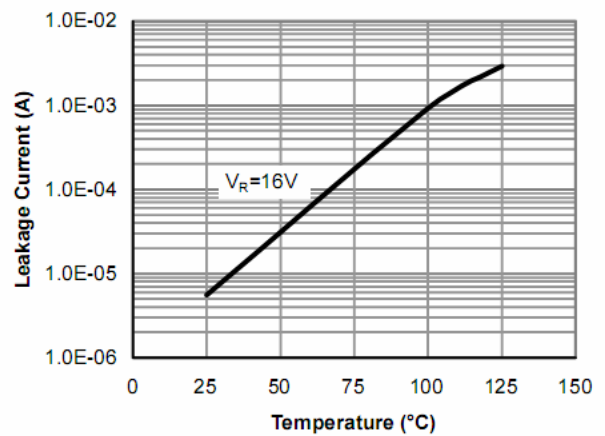


Figure 15: Schottky Leakage current vs. Junction Temperature

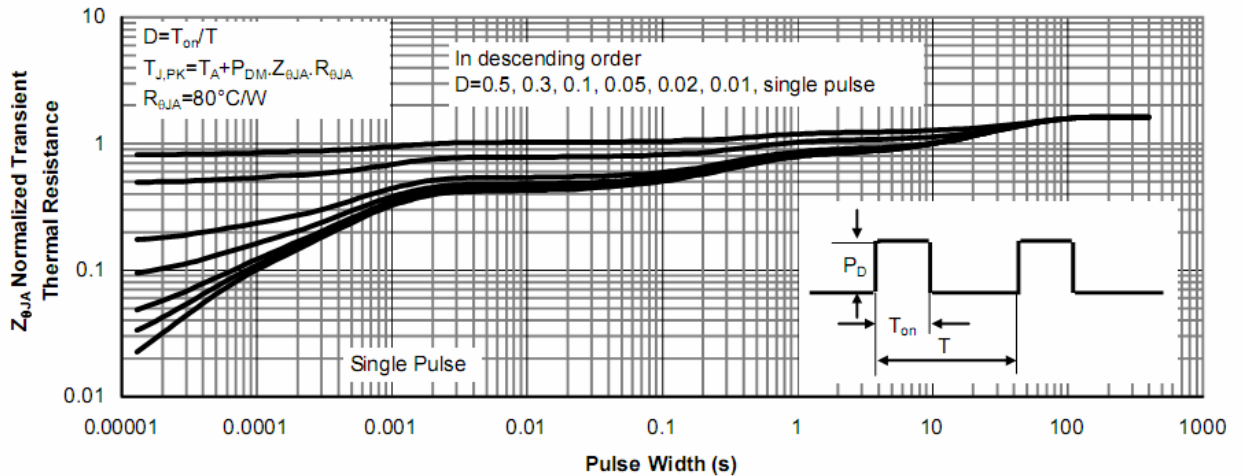
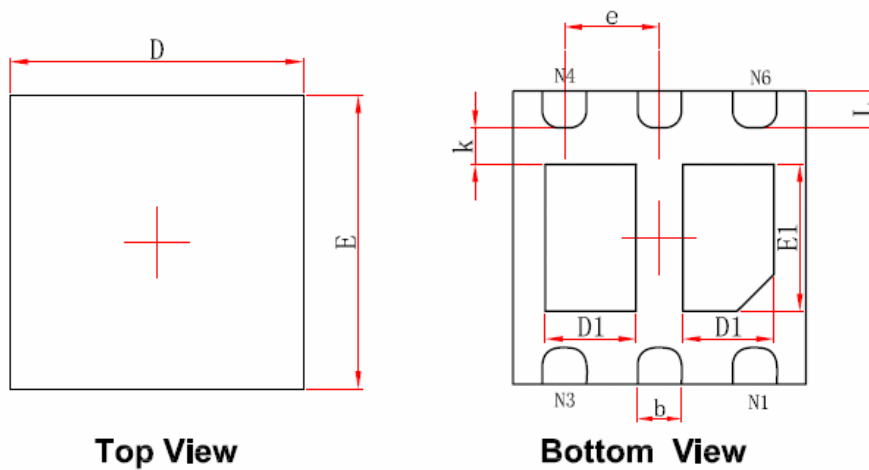


Figure 16: Schottky Normalized Maximum Transient Thermal Impedance

DFNWB2×2-6L-A (P0. 65T0. 75/0. 85) PACKAGE OUTLINE DIMENSIONS



Top View

Bottom View

Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.520	0.720	0.020	0.028
E1	0.900	1.100	0.035	0.043
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

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