

P-Channel 60-V (D-S) MOSFET

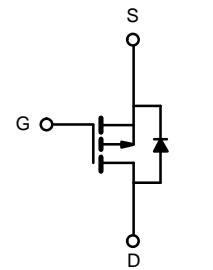
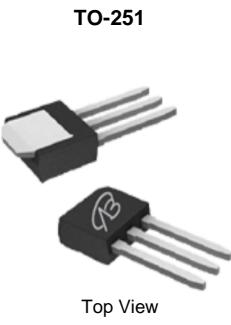
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
- 60	0.066 at V _{GS} = - 10 V	- 20	40 nC
	0.080 at V _{GS} = - 4.5 V	- 18	

FEATURES

- TrenchFET® Power MOSFET
- 100 % UIS Tested

APPLICATIONS

- Load Switch



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	- 60	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	A
	T _C = 70 °C		
	T _A = 25 °C		
	T _A = 70 °C		
Pulsed Drain Current	I _{DM}	- 100	
Avalanche Current Pulse	I _{AS}	- 35	
Single Pulse Avalanche Energy	E _{AS}	101	
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	A
	T _A = 25 °C		
Maximum Power Dissipation	T _C = 25 °C	P _D	W
	T _C = 70 °C		
	T _A = 25 °C		
	T _A = 70 °C		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^b	R _{thJA}	33	40	°C/W
Maximum Junction-to-Case	R _{thJC}	0.98	1.2	

Notes:

a. Based on T_C = 25 °C.

b. Surface mounted on 1" x 1" FR4 board.

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

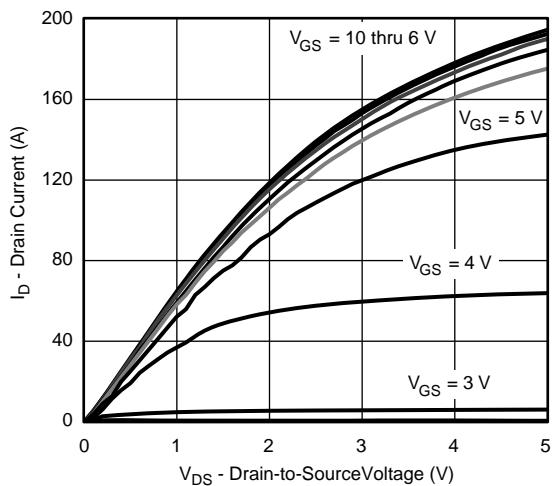
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250 \mu\text{A}$		68		$\text{mV}/^\circ\text{C}$
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 5.2		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$	- 1.0		- 2.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60 \text{ V}, V_{GS} = 0 \text{ V}$			- 1	μA
		$V_{DS} = -60 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}, V_{GS} = -10 \text{ V}$	- 120			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}, I_D = -30 \text{ A}$		0.066		Ω
		$V_{GS} = -4.5 \text{ V}, I_D = -20 \text{ A}$		0.080		
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}, I_D = -50 \text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		1200		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			150		
Total Gate Charge	Q_g	$V_{DS} = -30 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -55 \text{ A}$		40		nC
Gate-Source Charge	Q_{gs}			38		
Gate-Drain Charge	Q_{gd}			16		
Gate Resistance	R_g		$f = 1 \text{ MHz}$	19		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = -2 \text{ V}, R_L = 2 \Omega$ $I_D \equiv -10 \text{ A}, V_{GEN} = -10 \text{ V}, R_g = 1 \Omega$		5.2		Ω
Rise Time	t_r			10	15	ns
Turn-Off Delay Time	$t_{d(\text{off})}$			7	15	
Fall Time	t_f			70	110	
				40	60	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			- 66	A
Pulse Diode Forward Current ^a	I_{SM}				- 150	
Body Diode Voltage	V_{SD}	$I_S = -30 \text{ A}$		- 1	- 1.5	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -50 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$		45	68	ns
Body Diode Reverse Recovery Charge	Q_{rr}			59	120	nC
Reverse Recovery Fall Time	t_a			29		ns
Reverse Recovery Rise Time	t_b			16		

Notes:

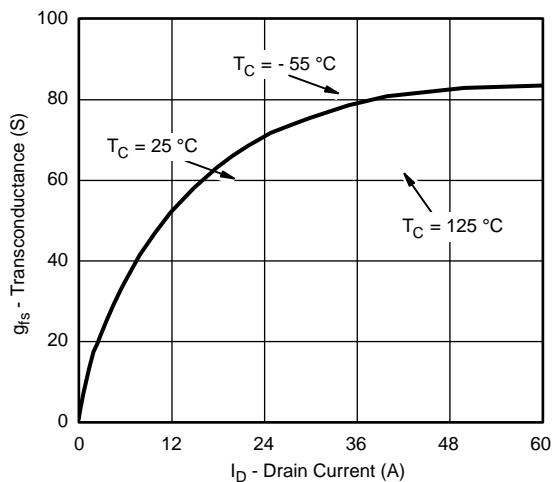
a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

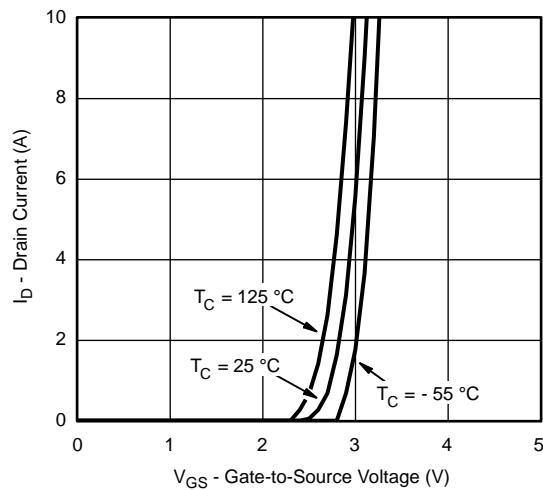
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


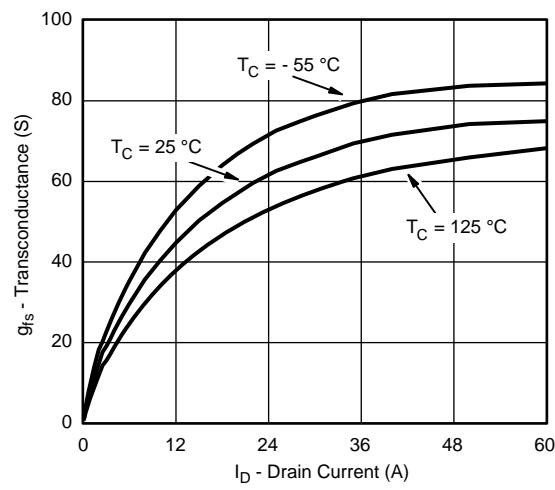
Output Characteristics



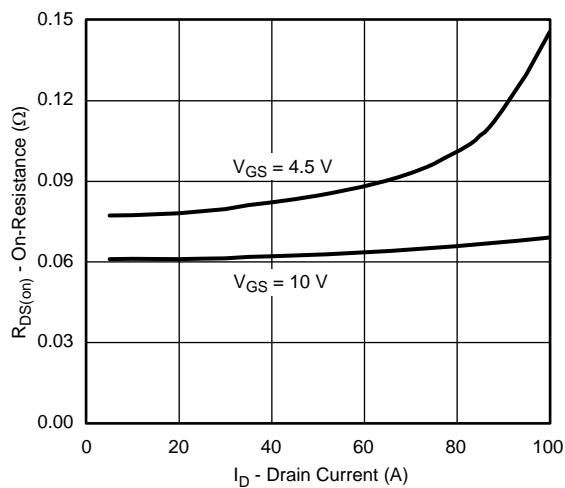
Transconductance



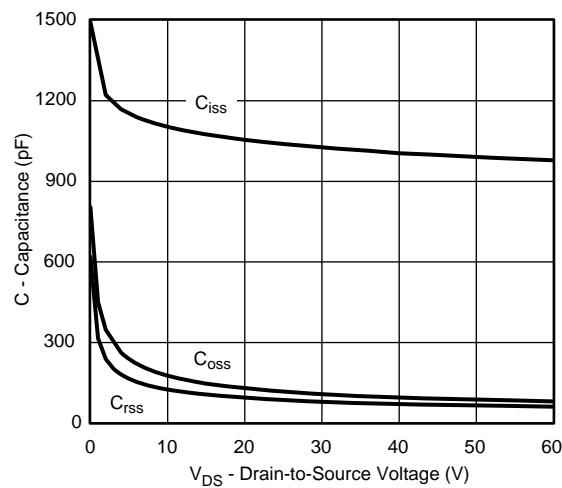
Transfer Characteristics



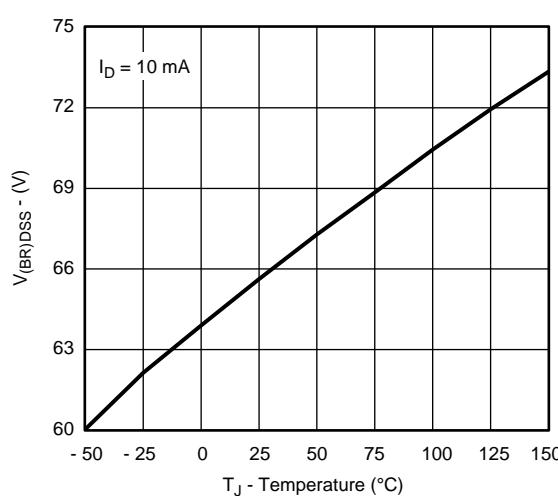
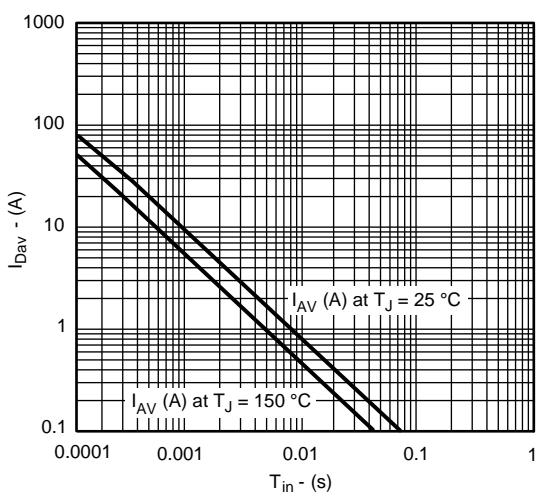
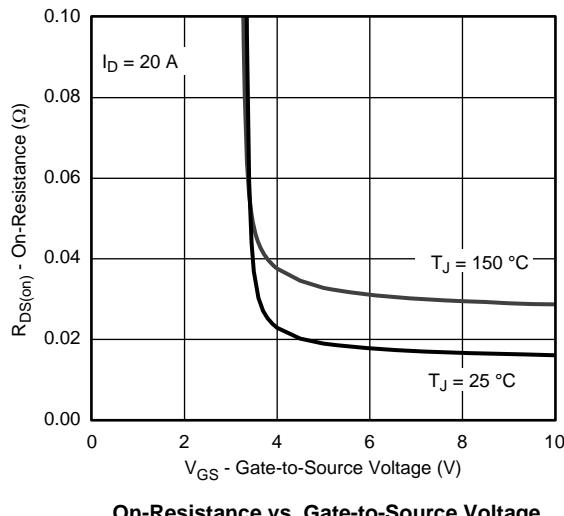
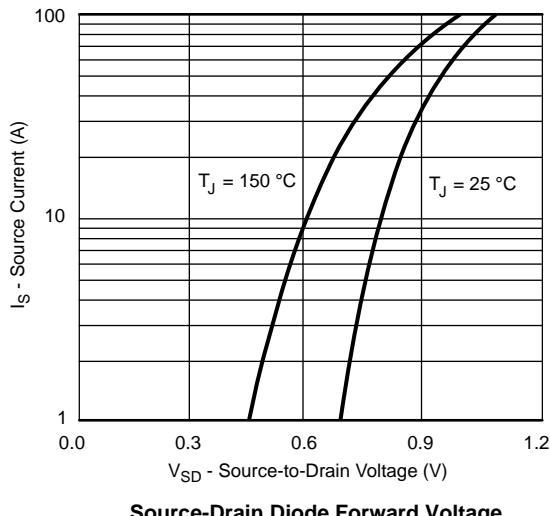
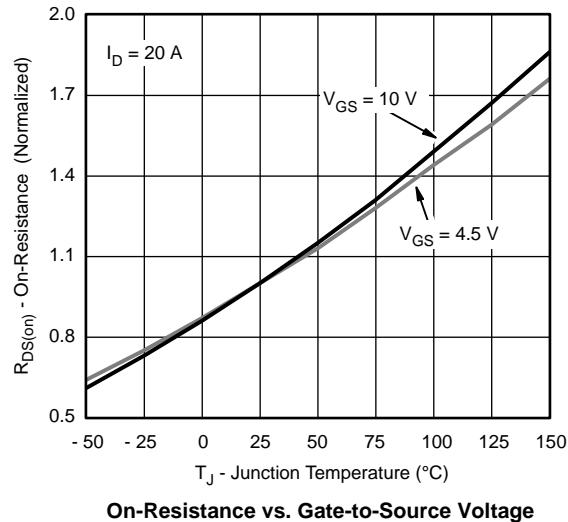
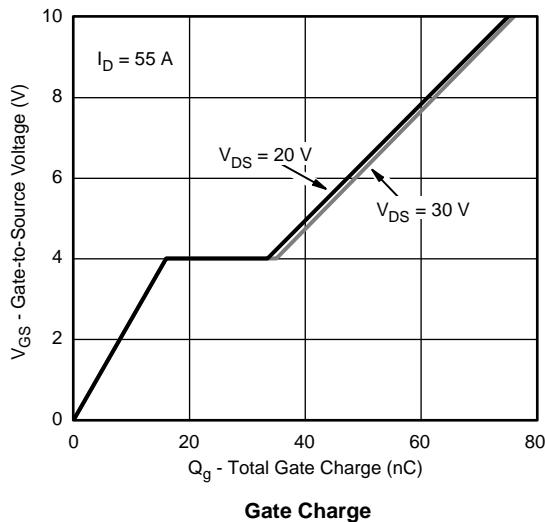
Transconductance

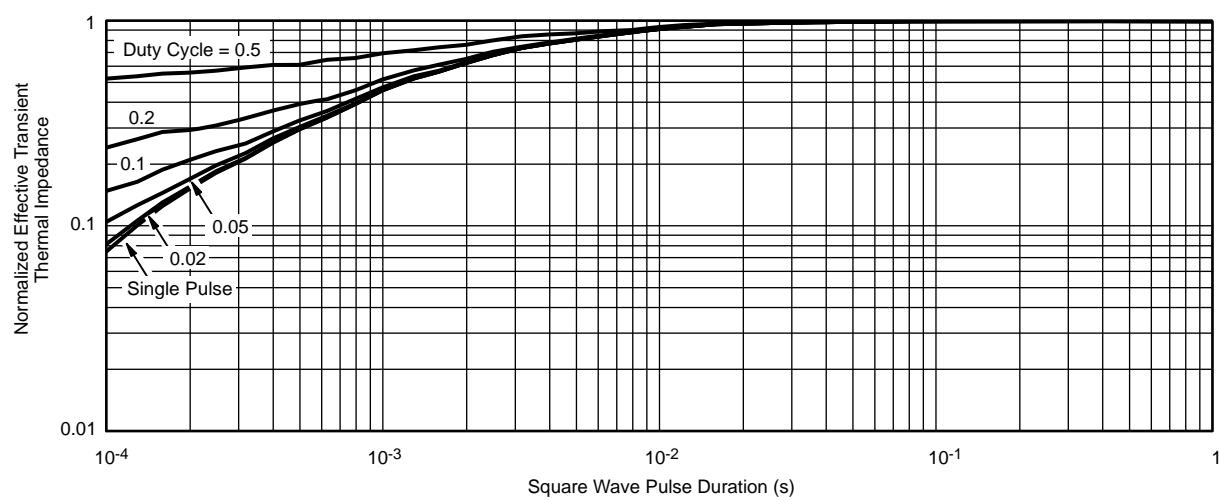
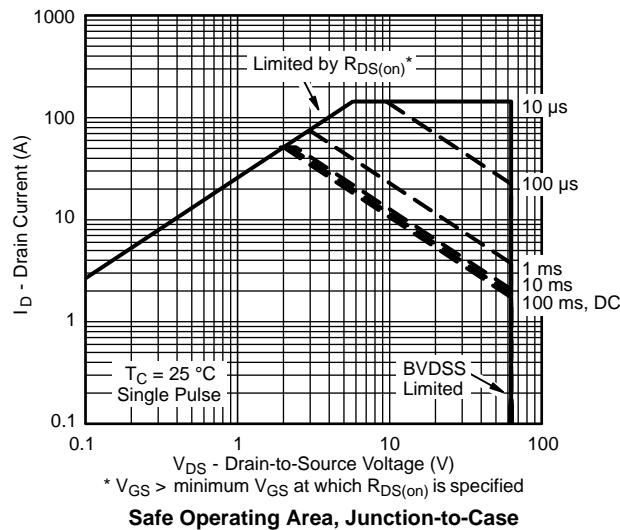
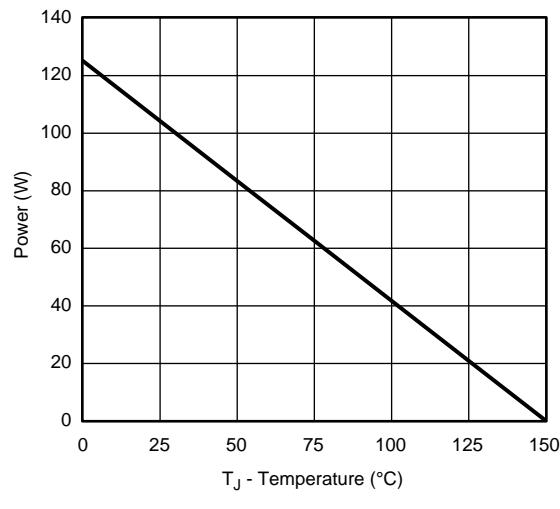
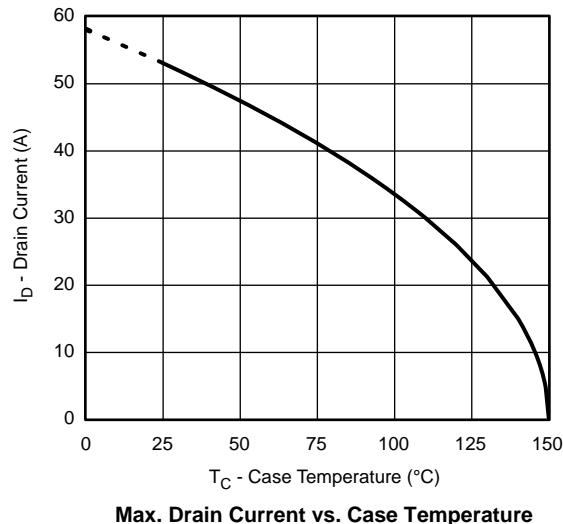
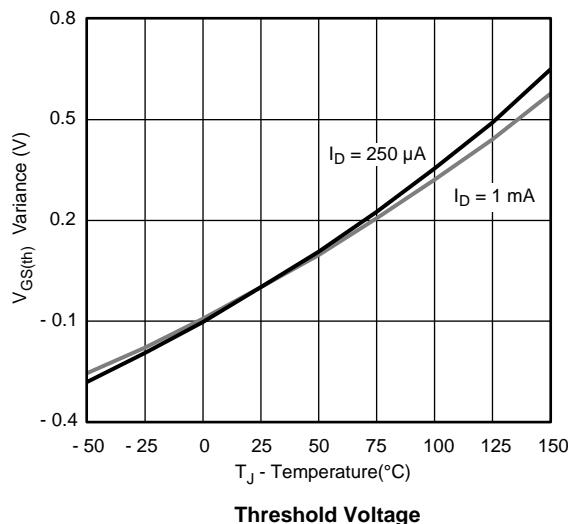


On-Resistance vs. Drain Current

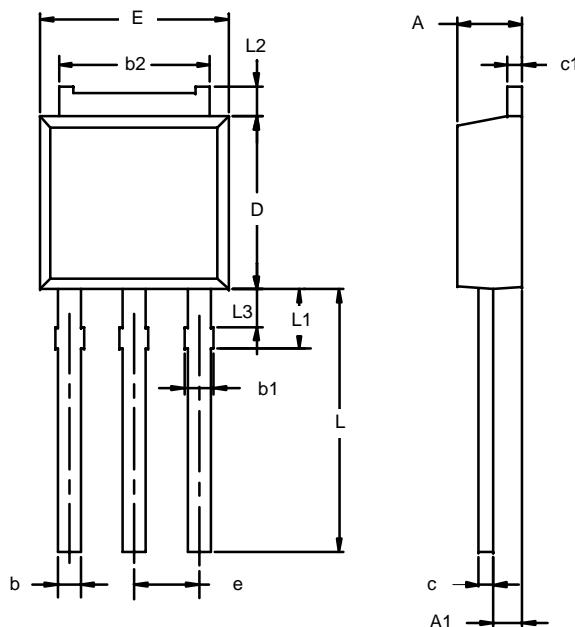


Capacitance

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


TO-251AA (DPAK)



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	2.21	2.38	0.087	0.094
A1	0.89	1.14	0.035	0.045
b	0.71	0.89	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.43	0.206	0.214
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
E	6.48	6.73	0.255	0.265
e	2.28 BSC		0.090 BSC	
L	8.89	9.53	0.350	0.375
L1	1.91	2.28	0.075	0.090
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.045	0.060

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DWG: 5346

Note: Dimension L3 is for reference only.

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