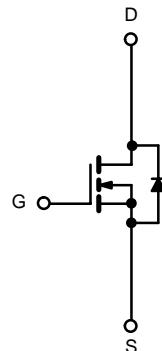
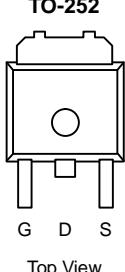


# QM3016AD-VB Datasheet

## N-Channel 30-V (D-S) MOSFET

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a, e</sup>	$Q_g$ (Typ)
30	0.002 at $V_{GS} = 10$ V	100	72 nC
	0.003 at $V_{GS} = 4.5$ V	90	



N-Channel MOSFET

### FEATURES

- TrenchFET® Power MOSFET
- 100 %  $R_g$  and UIS Tested
- Compliant to RoHS Directive 2011/65/EU

RoHS  
COMPLIANT

### APPLICATIONS

- OR-ing
- Server
- DC/DC

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	100 <sup>a, e</sup>	A
		80 <sup>e</sup>	
		35.8 <sup>b, c</sup>	
		27 <sup>b, c</sup>	
Pulsed Drain Current	$I_{DM}$	300	
Avalanche Current Pulse	$I_{AS}$	39	
Single Pulse Avalanche Energy	$E_{AS}$	94.8	
Continuous Source-Drain Diode Current	$I_S$	90 <sup>a, e</sup>	
		3.13 <sup>b, c</sup>	
Maximum Power Dissipation	$P_D$	235 <sup>a</sup>	W
		165	
		3.75 <sup>b, c</sup>	
		2.63 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typ.	Max.	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$R_{thJA}$	32	40	°C/W
Maximum Junction-to-Case	$R_{thJC}$	0.5	0.6	

Notes:

a. Based on  $T_C = 25$  °C.

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

c. t = 10 sec.

d. Maximum under steady state conditions is 90 °C/W.

e. Calculated based on maximum junction temperature. Package limitation current is 90 A.

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

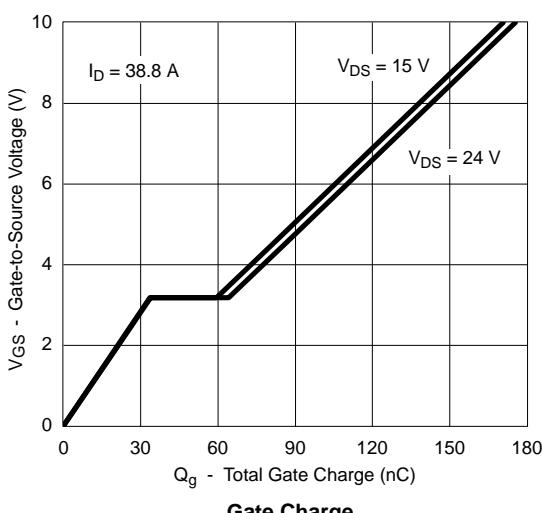
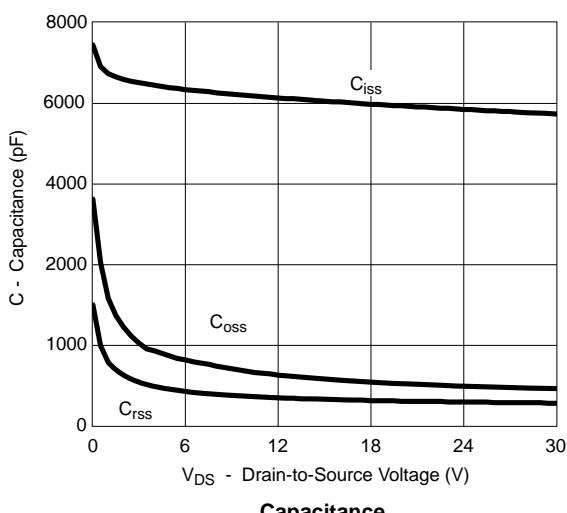
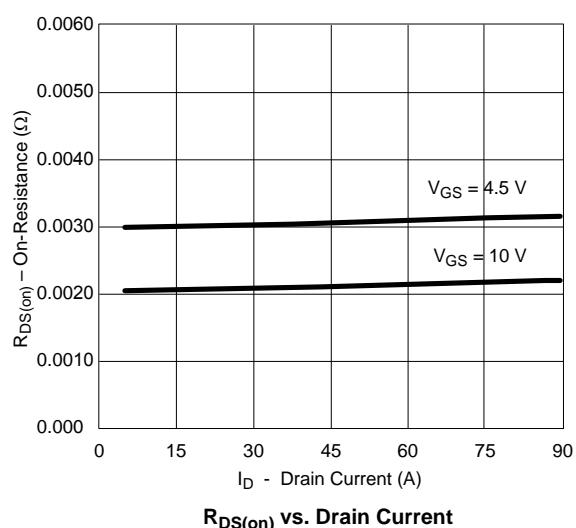
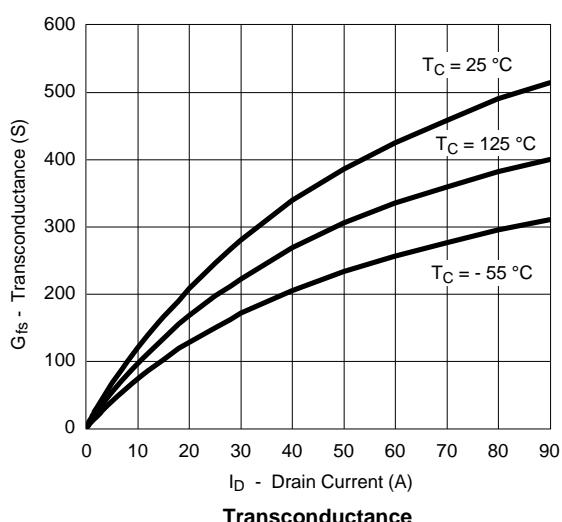
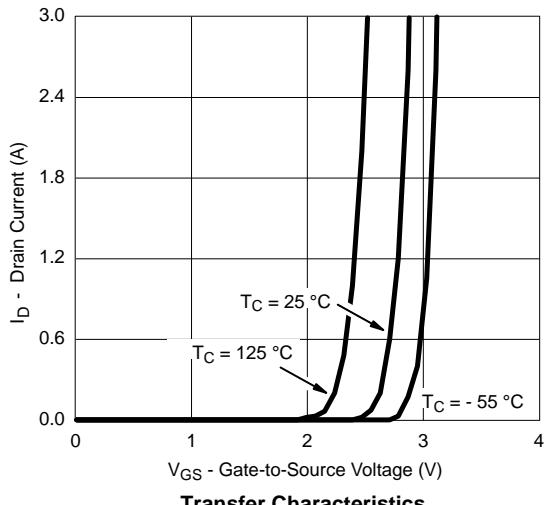
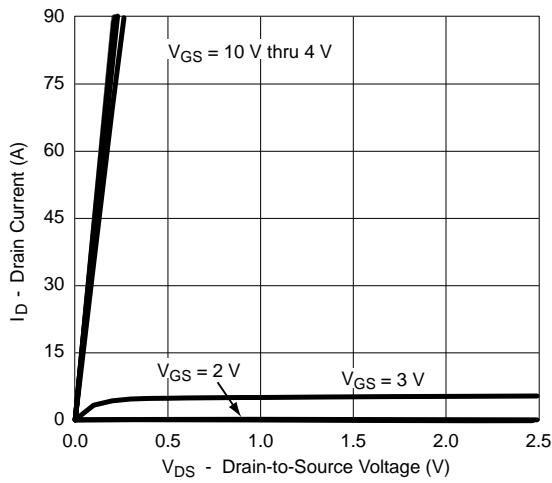
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	30			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		35		mV/°C
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 7.5		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	1.5		2.5	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$		1		$\mu\text{A}$
		$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 55^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$ , $V_{GS} = 10 \text{ V}$	90			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$ , $I_D = 38.8 \text{ A}$		0.002		$\Omega$
		$V_{GS} = 4.5 \text{ V}$ , $I_D = 37 \text{ A}$		0.003		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 38.8 \text{ A}$		160		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		5201		pF
Output Capacitance	$C_{oss}$			1525		
Reverse Transfer Capacitance	$C_{rss}$			770		
Total Gate Charge	$Q_g$	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 38.8 \text{ A}$		151	227	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 28.8 \text{ A}$		71.5	103	
Gate-Drain Charge	$Q_{gd}$			30		
Gate Resistance	$R_g$			24		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 15 \text{ V}$ , $R_L = 0.625 \Omega$ $I_D \approx 24 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 1 \Omega$		1.4	2.1	$\Omega$
Rise Time	$t_r$			18	27	ns
Turn-Off Delay Time	$t_{d(\text{off})}$			11	17	
Fall Time	$t_f$			70	105	
Turn-On Delay Time	$t_{d(\text{on})}$			10	15	
Rise Time	$t_r$			55	83	
Turn-Off Delay Time	$t_{d(\text{off})}$			180	270	
Fall Time	$t_f$			55	83	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25^\circ\text{C}$			120	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				120	
Body Diode Voltage	$V_{SD}$	$I_S = 22 \text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$ , $T_J = 25^\circ\text{C}$		52	78	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			70.2	105	nC
Reverse Recovery Fall Time	$t_a$			27		ns
Reverse Recovery Rise Time	$t_b$			25		

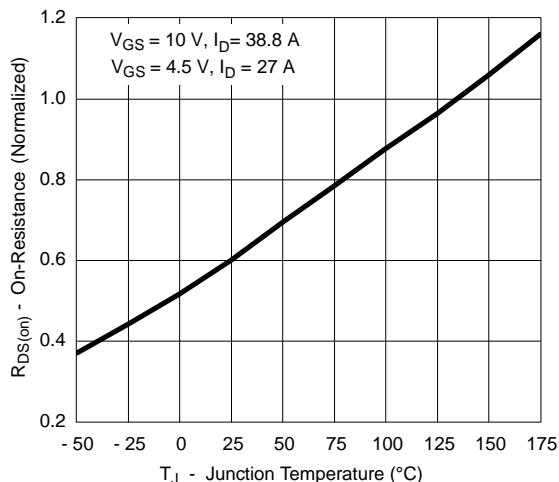
Notes:

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

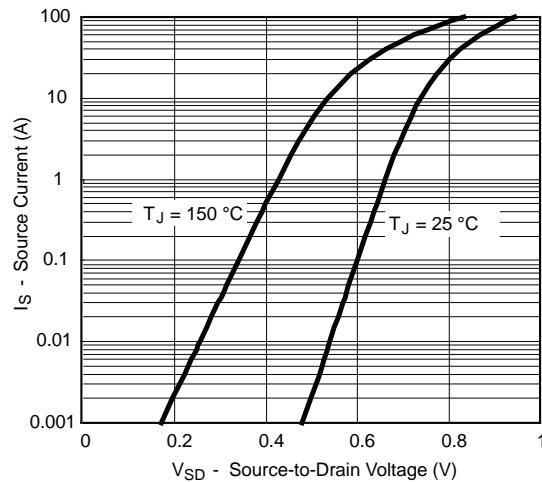
b. Guaranteed by design, not subject to production testing.

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.

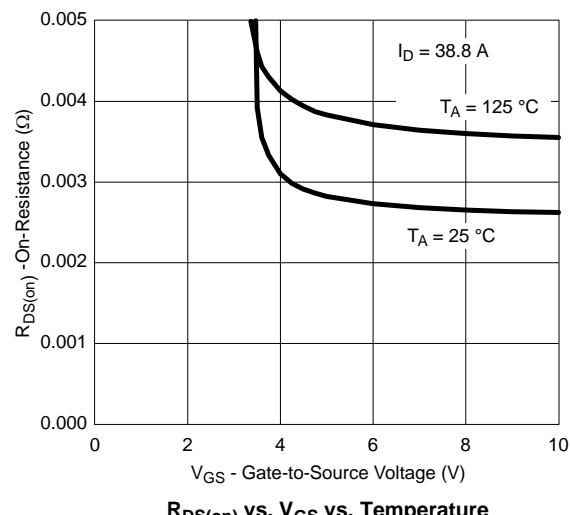
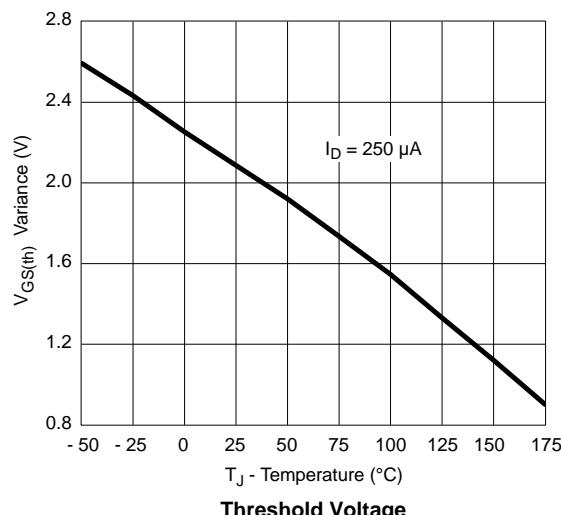
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)


**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)


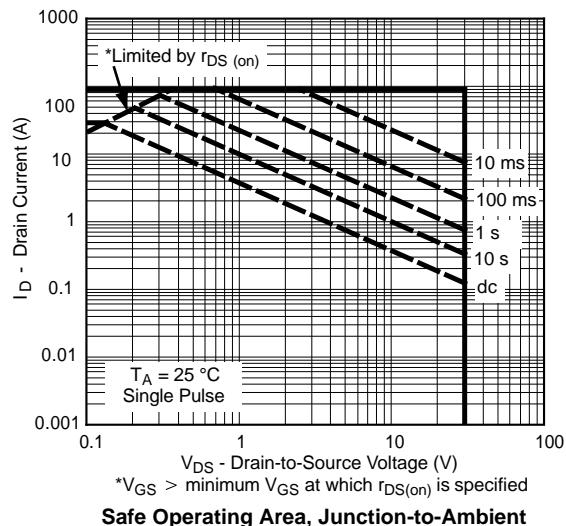
On-Resistance vs. Junction Temperature



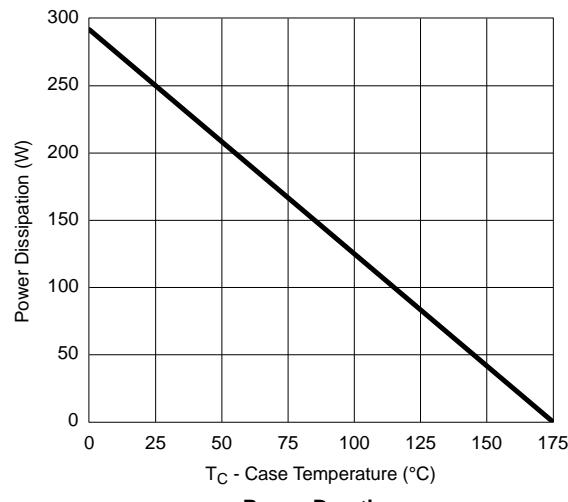
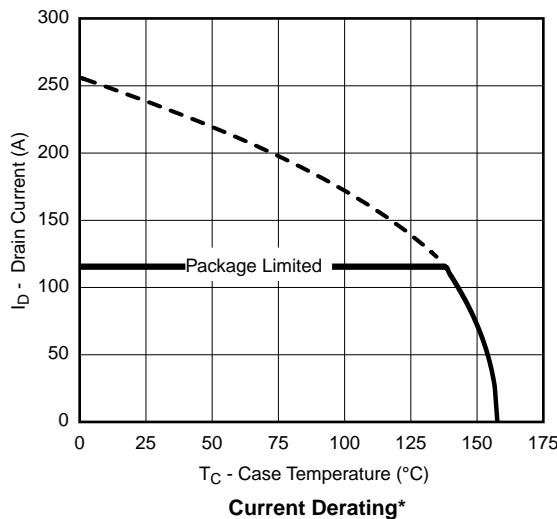
Forward Diode Voltage vs. Temperature

 $R_{DS(on)}$  vs.  $V_{GS}$  vs. Temperature

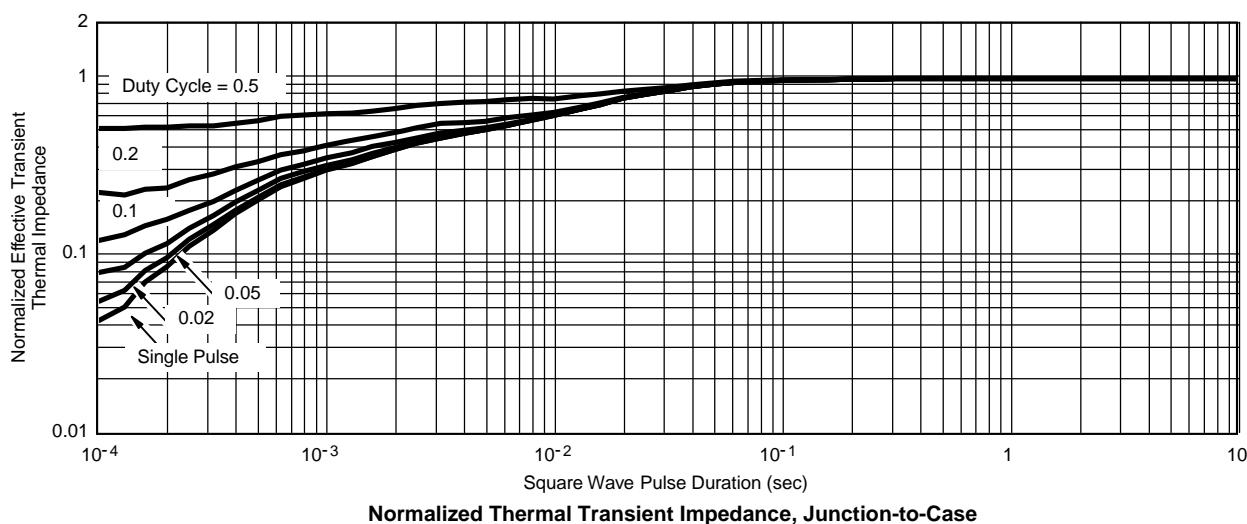
Threshold Voltage



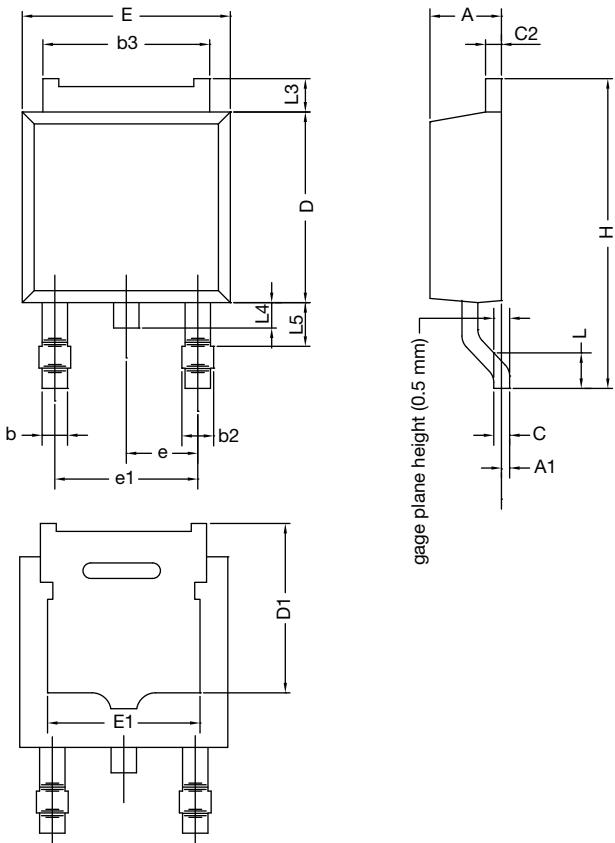
Safe Operating Area, Junction-to-Ambient

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)


\*The power dissipation  $P_D$  is based on  $T_{J(max)} = 175$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



## TO-252AA CASE OUTLINE



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060

ECN: X12-0247-Rev. M, 24-Dec-12  
 DWG: 5347

**Note**

- Dimension L3 is for reference only.

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