

## P-Channel Enhancement Mode Power MOSFET

### DESCRIPTION

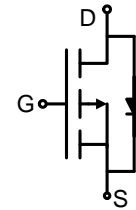
The BLM3401 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

### GENERAL FEATURES

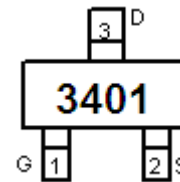
- $V_{DS} = -30V, I_D = -4.2A$   
 $R_{DS(ON)} < 120m\Omega @ V_{GS} = -2.5V$   
 $R_{DS(ON)} < 72m\Omega @ V_{GS} = -4.5V$   
 $R_{DS(ON)} < 55m\Omega @ V_{GS} = -10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

### Application

- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin Assignment



SOT-23 top view

### Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3401	BLM3401	SOT-23	Ø180mm	8 mm	3000 units

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	-4.2	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-30	A
Maximum Power Dissipation	$P_D$	1.2	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	104	°C/W
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### Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -24V, V_{GS} = 0V$	-	-	-1	μA

Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.7		-1.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.2A$	-	50	55	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	64	72	m $\Omega$
		$V_{GS}=-2.5V, I_D=-1A$		95	120	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4.2A$	-	10	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	950	-	PF
Output Capacitance	$C_{oss}$		-	115	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	75	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-3.2A$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	7	-	nS
Turn-on Rise Time	$t_r$		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	$t_f$		-	12	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-4A, V_{GS}=-4.5V$	-	9.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-1A$	-	-	-1.2	V

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

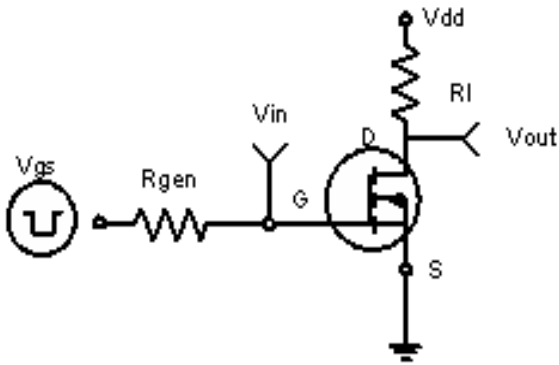


Figure 1: Switching Test Circuit

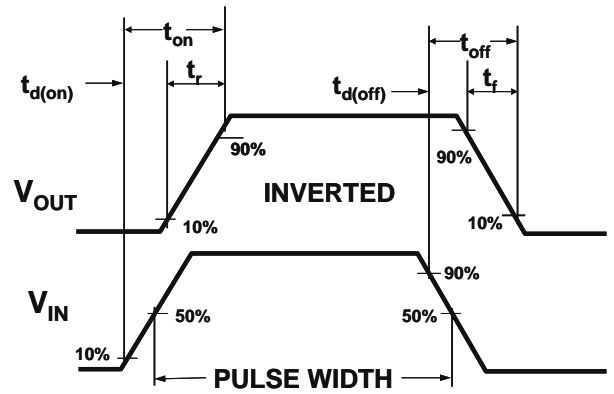
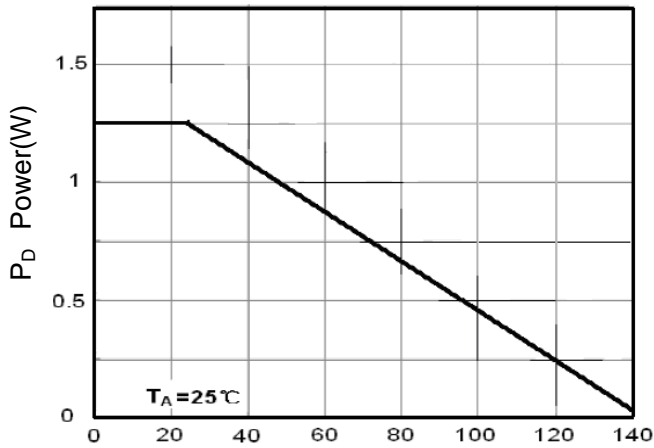
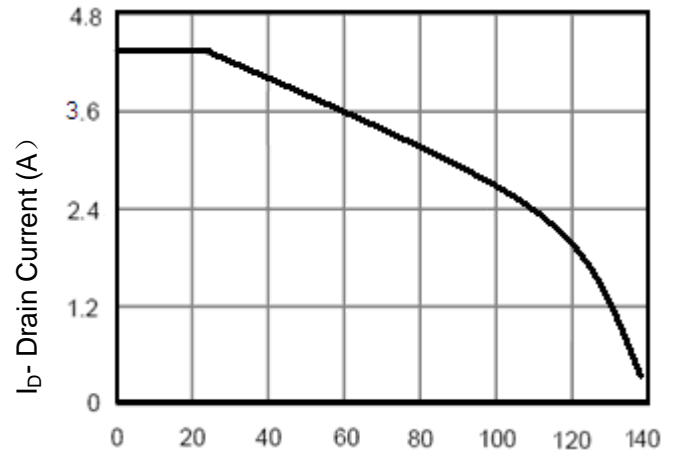


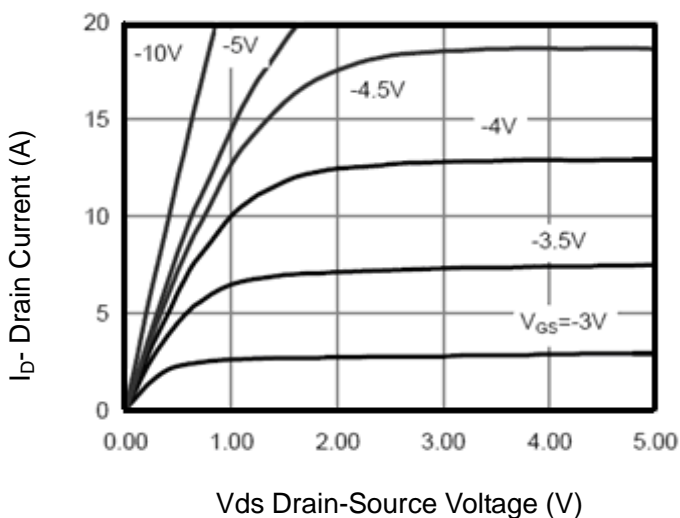
Figure 2: Switching Waveforms



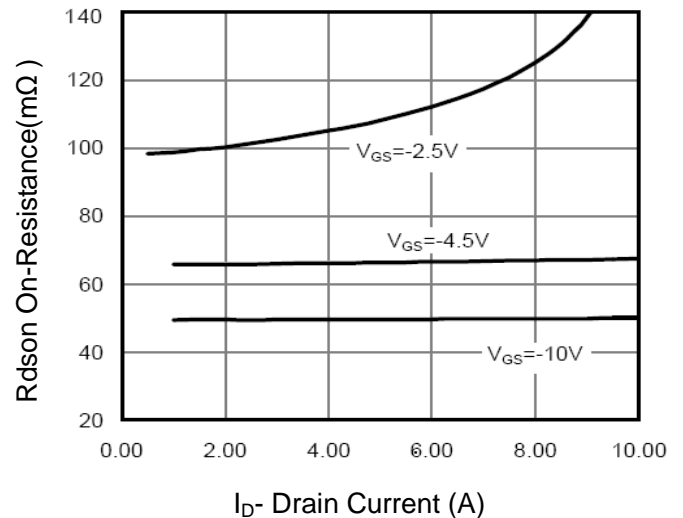
T<sub>J</sub>-Junction Temperature(°C)  
Figure 3 Power Dissipation



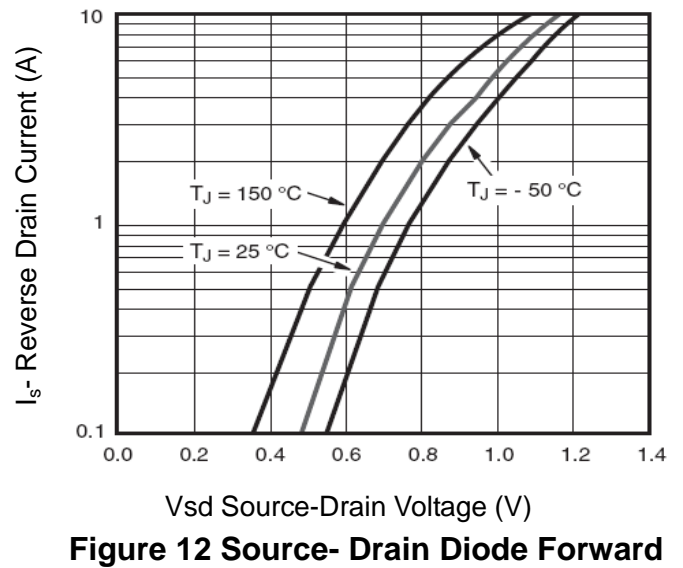
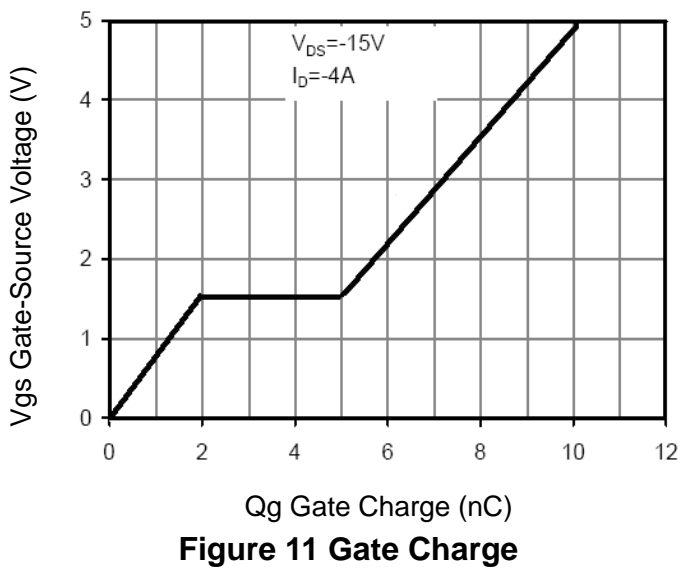
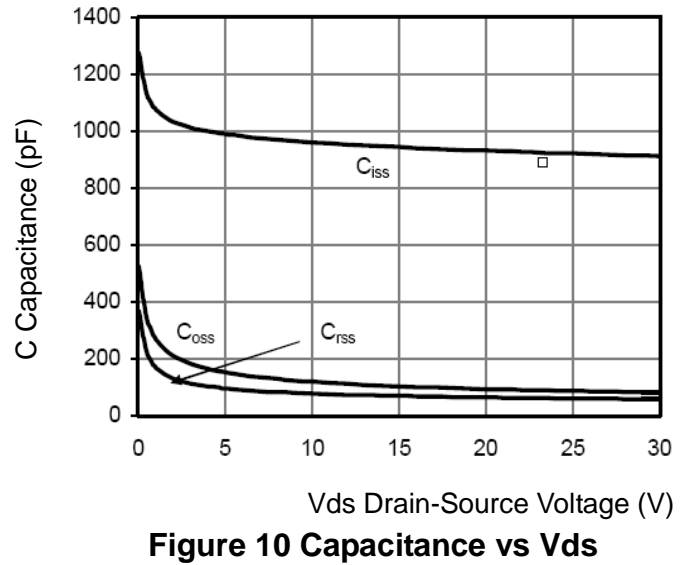
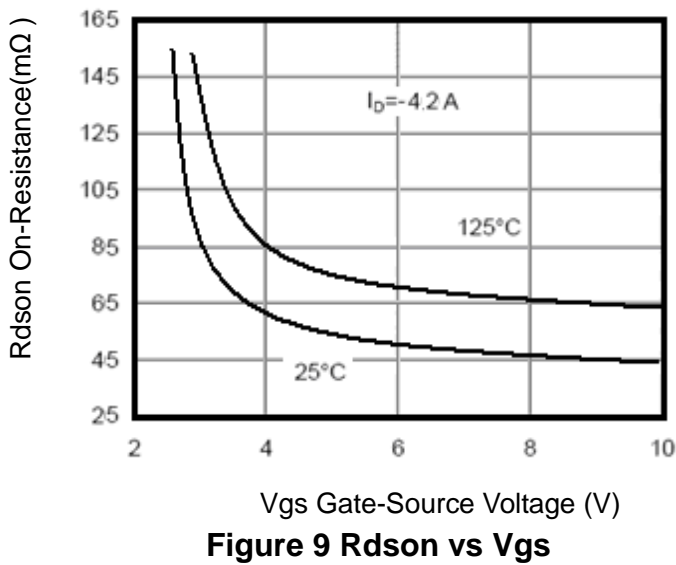
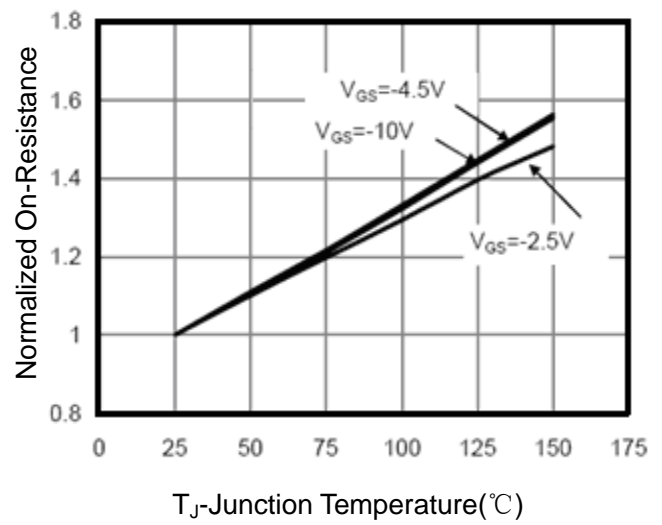
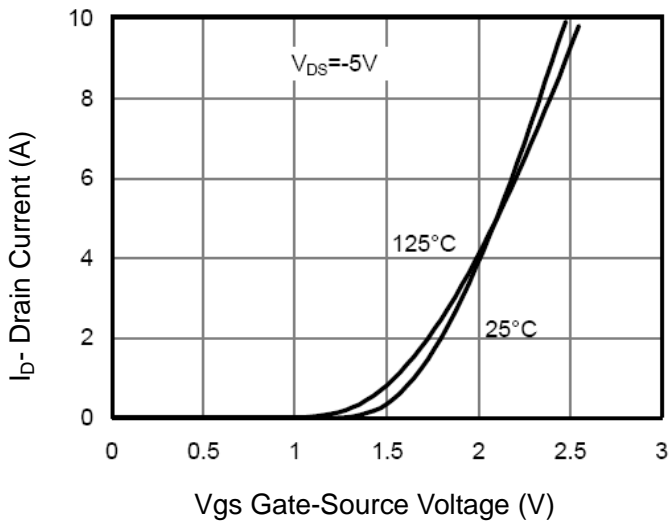
T<sub>J</sub>-Junction Temperature(°C)  
Figure 4 Drain Current



V<sub>ds</sub> Drain-Source Voltage (V)  
Figure 5 Output CHARACTERISTICS



I<sub>D</sub>- Drain Current (A)  
Figure 6 Drain-Source On-Resistance



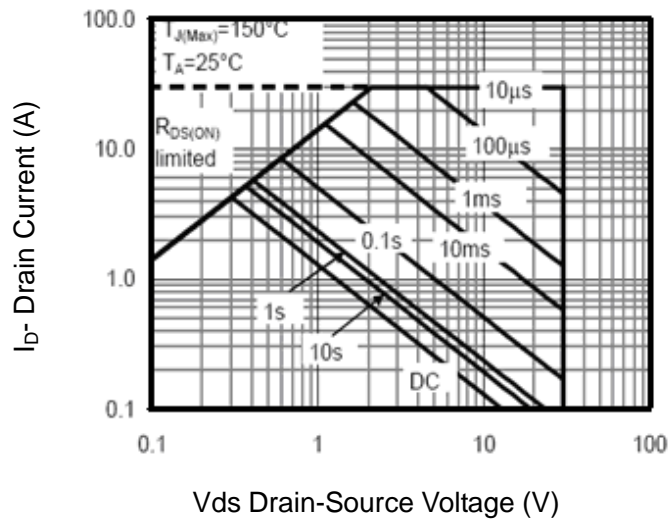


Figure 13 Safe Operation Area

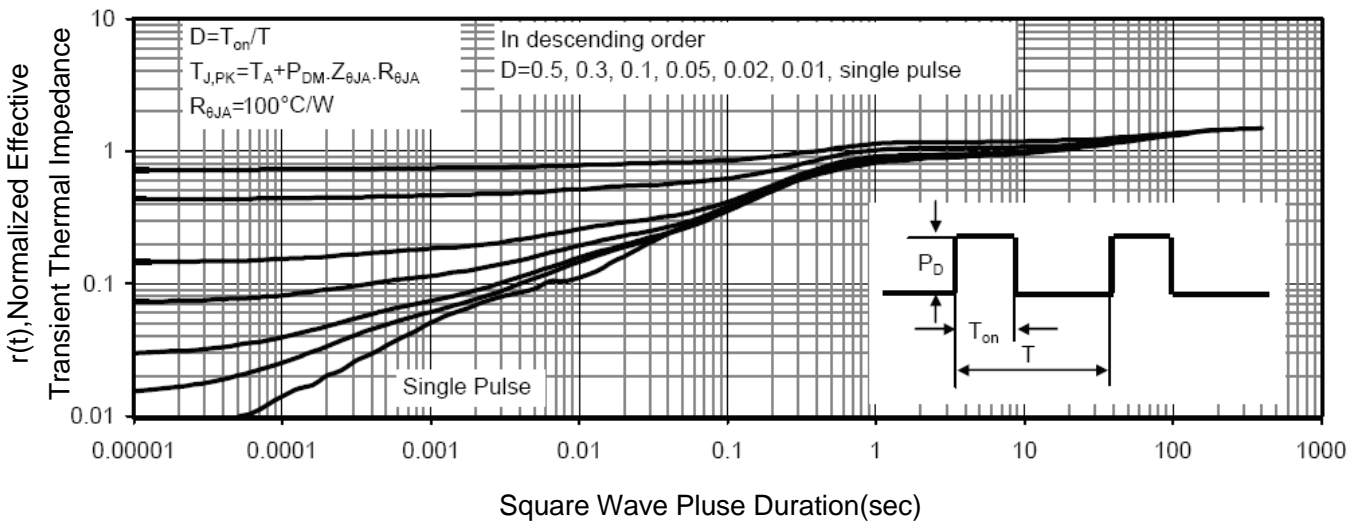
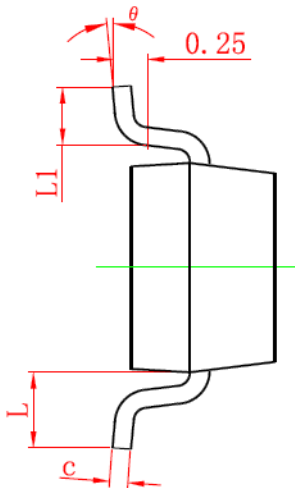
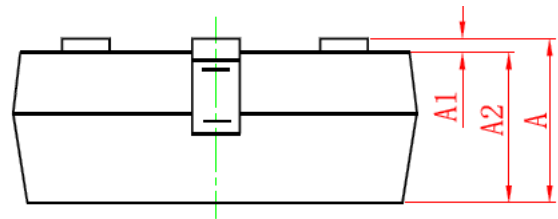
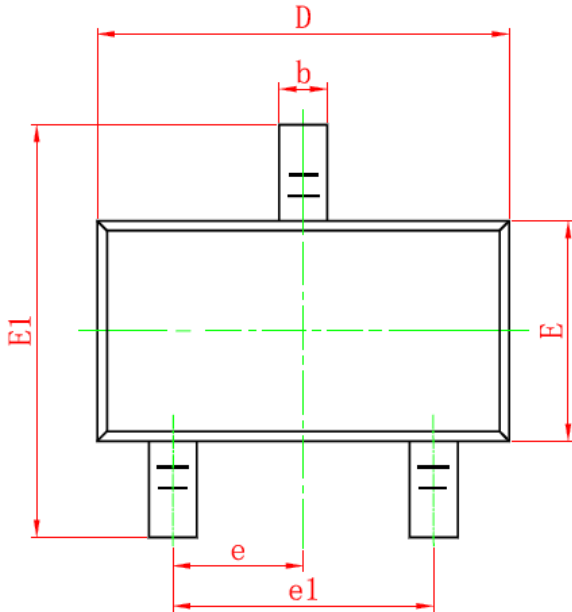


Figure 14 Normalized Maximum Transient Thermal Impedance

## SOT-23 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
$\theta$	0°	8°

### NOTES

- All dimensions are in millimeters.
- Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
- Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
- Dimension L is measured in gauge plane.
- Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.