WM02DH50M3

N+P Dual Channel Enhancement MOSFET

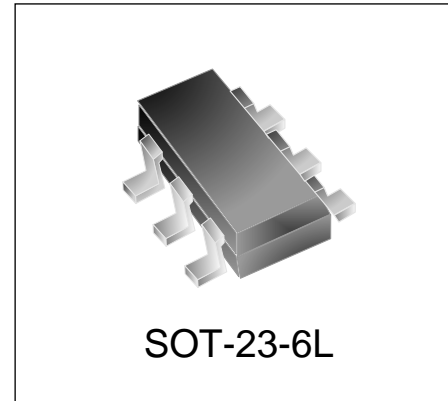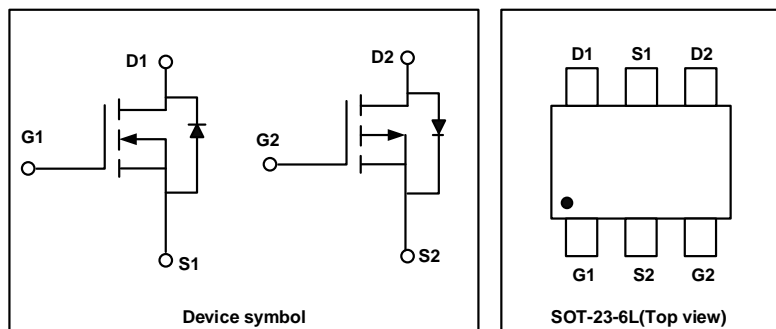## Features

- Way-on Small Signal MOSFETs
- N-Channel:

  V_{DS}= 20V, I_D = 5A

  $R_{DS(on)}$ < 34mΩ @ V_{GS} = 4.5V

  $R_{DS(on)}$ < 50mΩ @ V_{GS} = 2.5V
- P-Channel:

  V_{DS}= -20V, I_D = -3A

  $R_{DS(on)}$ < 70mΩ @ V_{GS} = -4.5V

  $R_{DS(on)}$ < 90mΩ @ V_{GS} = -2.5V
- Trench LV MOSFET Technology

SOT-23-6L

Mechanical Characteristics

- SOT-23-6L Package
- Marking : Making Code
- RoHS Compliant

Schematic & PIN Configuration

Device symbol

SOT-23-6L(Top view)

Absolute Maximum Ratings (T$_A$=25°C unless otherwise noted)

Parameter		Symbol	Value		Unit
Drain-Source voltage		V_{DS}	20	-20	V
Gate-Source voltage		V_{GS}	±8	±8	
Continuous Drain Current	T$_A$=25°C	I_D	5	-3	A
Pulsed Drain Current[1]		I_{DM}	20	-12	A
Power Dissipation[1]	T$_A$=25°C	P_D	1		W
Operating Junction and Storage Temperature Range		T$_J$, T$_{STG}$	-55 to 150		°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient[2]	R$_{θJA}$	125	°C/W

Electrical Characteristics N-Channel (T$_J$=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	20	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±8V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1	µA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	0.5	0.65	1	V
Static Drain-Source On-Resistance[3]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 4.5A	-	25	34	mΩ
		V_{GS} = 2.5V, I_D = 3.5A	-	35	50	
Dynamic characteristics[4]						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} =10V, f =1MHz	-	300	-	pF
Output Capacitance	C_{oss}		-	55	-	
Reverse Transfer Capacitance	C_{rss}		-	48	-	
Switching Characteristics[4]						
Total Gate Charge	Q_g	V_{GS} = 4.5V, V_{DS} = 10V, I_D =4.5A	-	3.6	-	nC
Gate-Source Charge	Q_{gs}		-	0.6	-	
Gate-Drain Charge	Q_{gd}		-	0.7	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS} = 4.5V, V_{DD} = 10V, I_D = 4.5A, R_G=3Ω	-	3.1	-	ns
Rise Time	t_r		-	4.6	-	
Turn-off Delay Time	$t_{d(off)}$		-	11.7	-	
Fall Time	t_f		-	3.5	-	
Drain-Source Body Diode Characteristics						
Body Diode Voltage[3]	V_{SD}	I_S= 1A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	I_S		-	-	5	A

Electrical Characteristics P-Channel (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-20	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±8V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V, V_{GS} = 0V	-	-	-1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.5	-0.7	-1	V
Static Drain-Source On-Resistance[3]	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -3A	-	45	70	mΩ
		V_{GS} = -2.5V, I_D = -1.5A	-	58	90	
Dynamic characteristics[4]						
Input Capacitance	C_{iss}	V_{GS} =0V, V_{DS} = -10V, f =1MHz	-	502	-	pF
Output Capacitance	C_{oss}		-	69	-	
Reverse Transfer Capacitance	C_{rss}		-	58	-	
Switching Characteristics[4]						
Total Gate Charge	Q_g	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3A	-	6.2	-	nC
Gate-Source Charge	Q_{gs}		-	0.5	-	
Gate-Drain Charge	Q_{gd}		-	1.3	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = -4.5V, V_{DD} = -10V, I_D = -3A, R_G= 3Ω	-	11	-	ns
Rise Time	t_r		-	17.5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	23	-	
Fall Time[4]	t_f		-	10	-	
Drain-Source Body Diode Characteristics						
Body Diode Voltage[3]	V_{SD}	I_S= -3A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	I_S		-	-	-3	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.

3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.

4. This value is guaranteed by design hence it is not included in the production test.

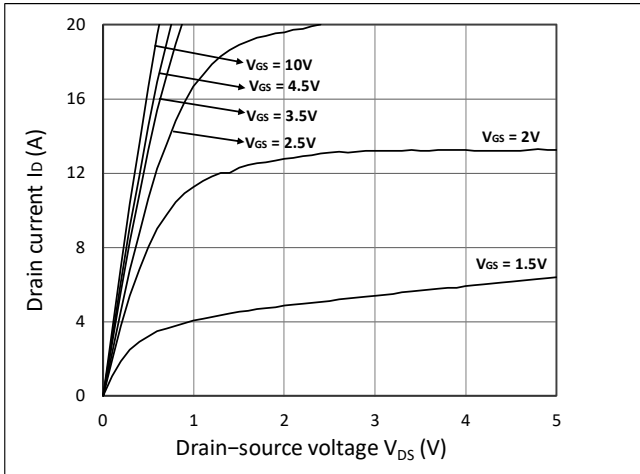## Typical Characteristics:N-CHANNEL
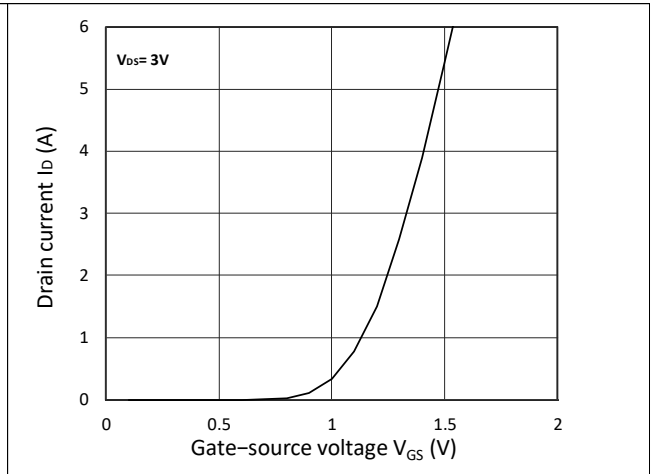

Figure 1. Output Characteristics
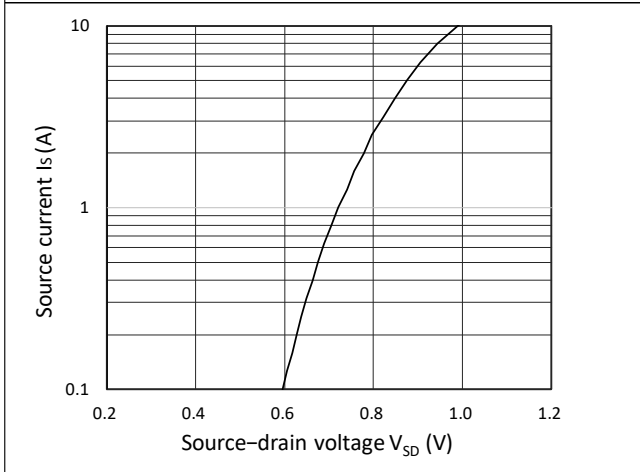

Figure 2. Transfer Characteristics

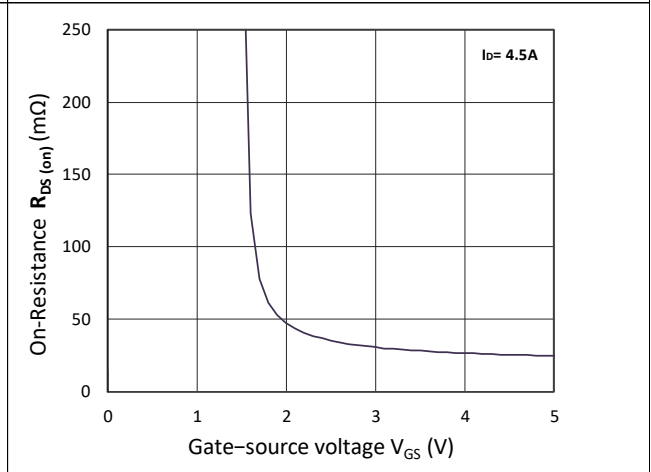Figure 3. Forward Characteristics of Reverse
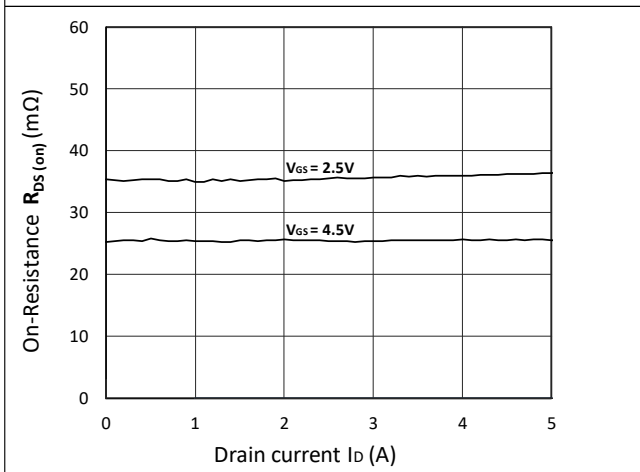

Figure 4. $R_{DS(ON)}$ vs. V_{GS}
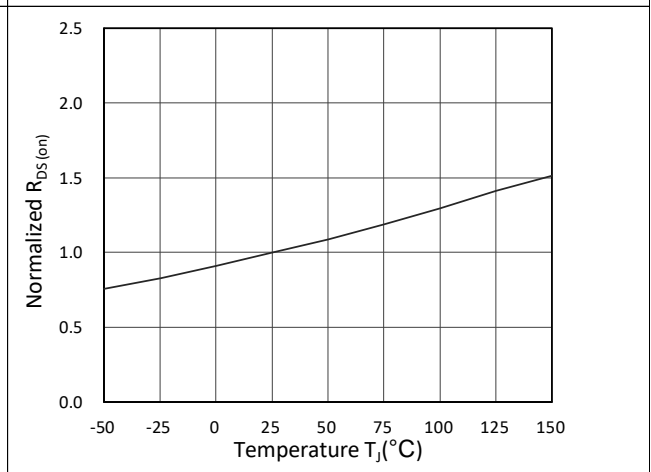

Figure 5. $R_{DS(ON)}$ vs. I_D

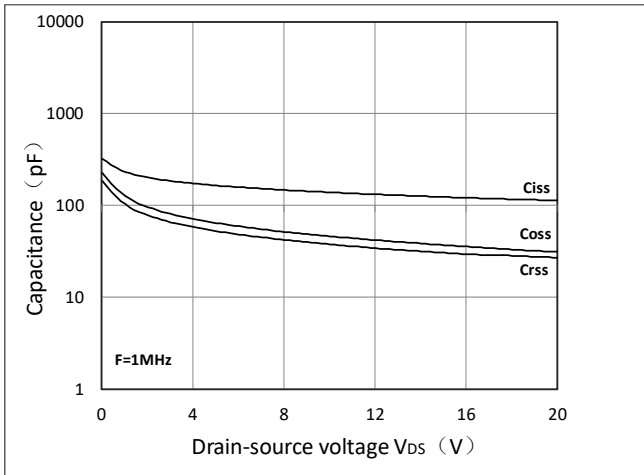Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

Figure 7. Capacitance Characteristics

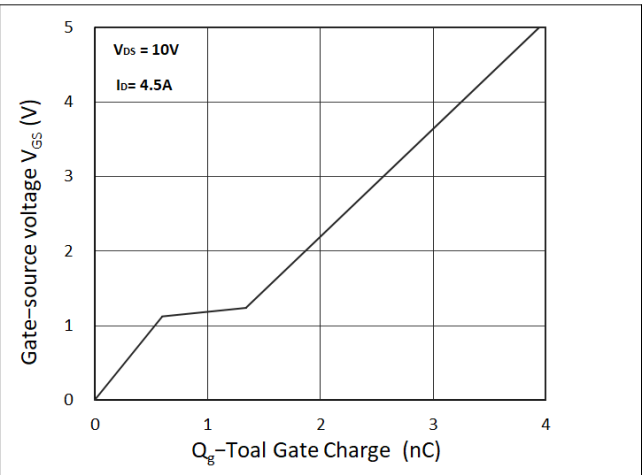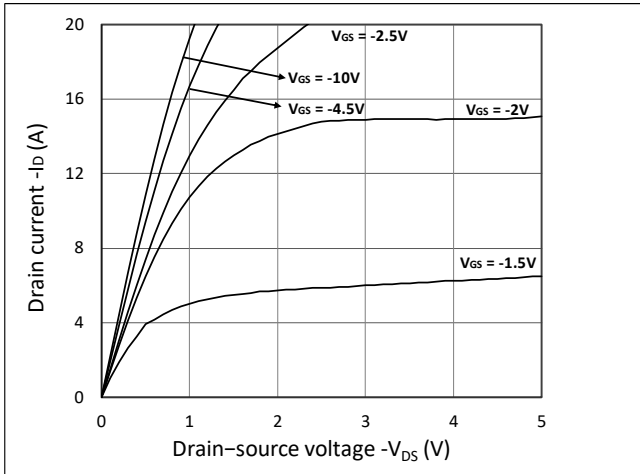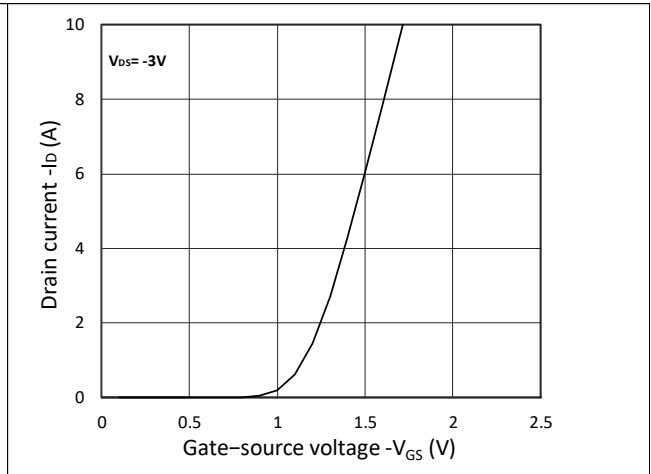Figure 8. Gate Charge Characteristics

Typical Characteristics:P-CHANNEL

Figure 1. Output Characteristics

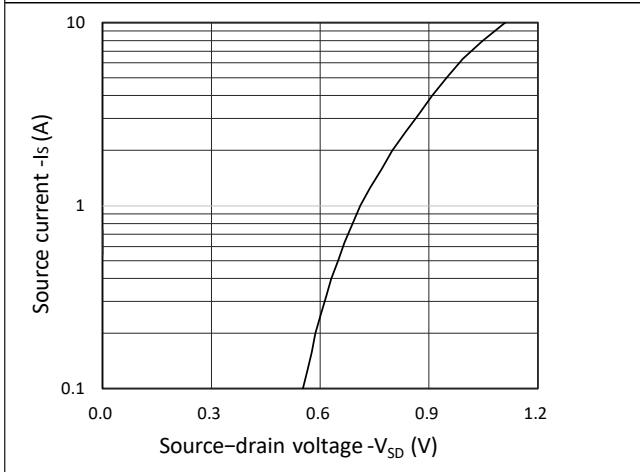Figure 2. Transfer Characteristics

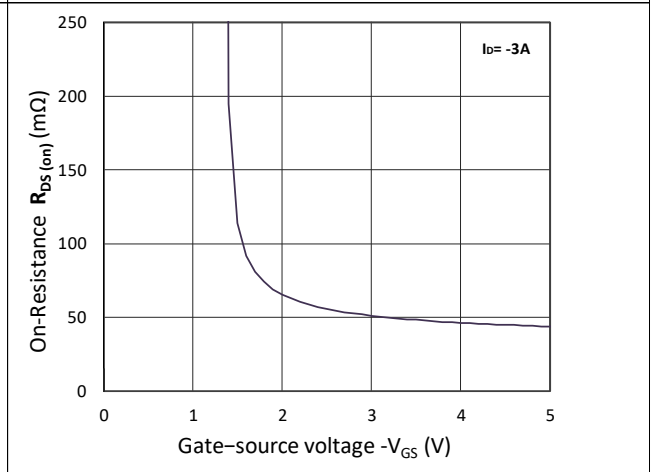Figure 3. Forward Characteristics of Reverse
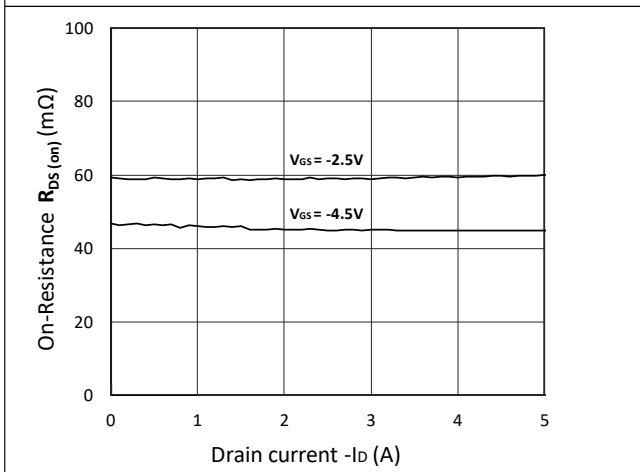
Figure 4. $R_{DS(ON)}$ vs. V_{GS}

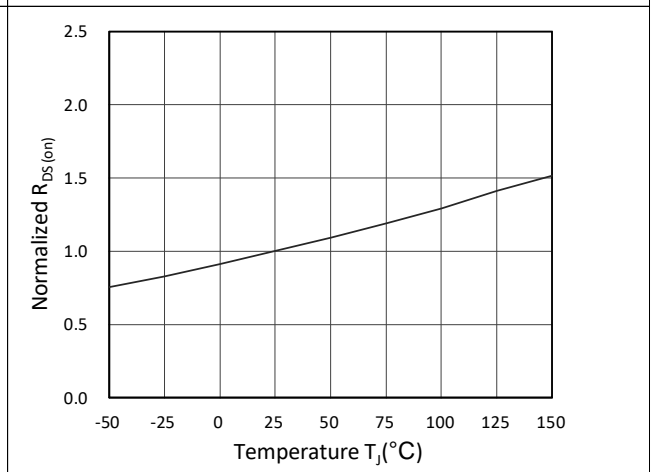Figure 5. $R_{DS(ON)}$ vs. I_D
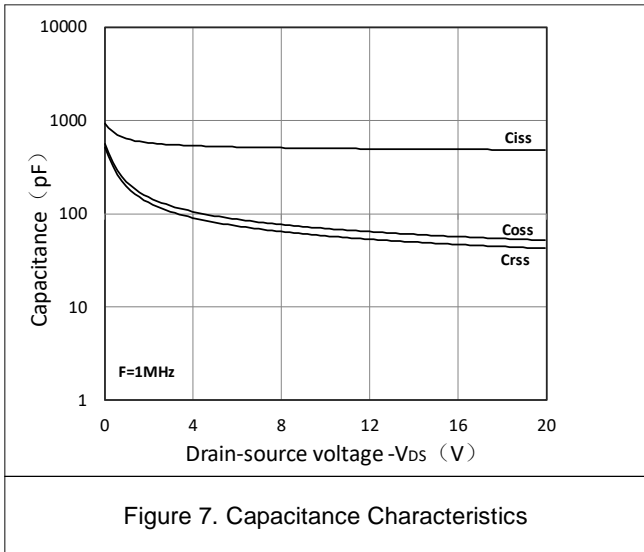
Figure 6. Normalized $R_{DS(on)}$ vs. Temperature
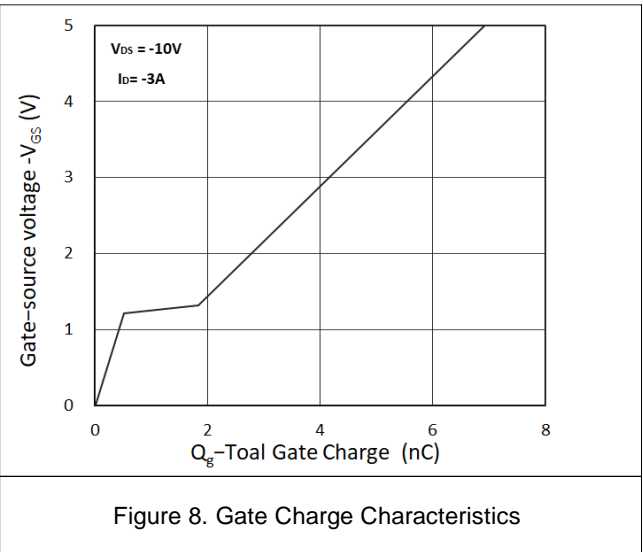
Figure 7. Capacitance Characteristics

Figure 8. Gate Charge Characteristics

Outline Drawing – SOT-23-6L

PACKAGE OUTLINE

SIDE VIEW

SEE DETAIL A

DETAIL A

SOT-23-6L

SYMBOL	MILLIMETERS		INCHES	
DIMENSIONS				
	MIN	MAX	MIN	MAX
A	0.90	1.25	0.035	0.049
A1	0.00	0.15	0.000	0.006
b	0.25	0.55	0.010	0.022
c	0.08	0.22	0.003	0.009
D	2.80	3.10	0.110	0.122
E1	1.50	1.75	0.060	0.069
E	2.60	3.00	0.102	0.118
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0. 0.075BSC	
L	0.30	0.60	0.012	0.024
L1	0.55	0.75	0.022	0.030
θ1	0°	8°	0°	8°

DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	0.098	2.50
G	0.055	1.40
P	0.037	0.95
X	0.024	0.60
Y	0.043	1.10
Z	0.141	3.60

Notes:

Controlling Dimension: Millimeter.

Marking Codes

Part Number	WM02DH50M3
Marking Code	2038

Package Information

Qty：3k/Reel

CONTACT INFORMATION

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