
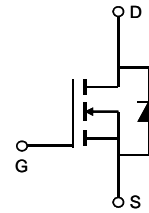
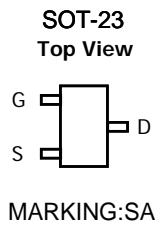




## TMBS123 N-CHANNEL ENHANCEMENT MOSFET

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>Low Gate Threshold Voltage</li> <li>Low Input Capacitance</li> <li>Fast Switching Speed</li> <li>Low Input/Output Leakage</li> <li>High Drain-Source Voltage Rating</li> </ul>	<p><b>Product Summary</b></p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;"><math>V_{DS}</math></td> <td style="padding: 2px; text-align: right;">100V</td> </tr> <tr> <td style="padding: 2px;"><math>R_{DS(ON)}</math> (at <math>V_{GS}=10V</math>)</td> <td style="padding: 2px; text-align: right;"><math>&lt; 6.0 \Omega</math></td> </tr> </table> <p style="margin-top: 20px;">100% UIS Tested 100% <math>R_g</math> Tested</p> <div style="text-align: right; margin-top: 10px;">  </div>	$V_{DS}$	100V	$R_{DS(ON)}$ (at $V_{GS}=10V$ )	$< 6.0 \Omega$
$V_{DS}$	100V				
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	$< 6.0 \Omega$				



**Maximum Ratings** @  $T_A = 25^\circ C$  unless otherwise specified

Characteristic	Symbol	BSS123	Units
Drain-Source Voltage	$V_{DSS}$	100	V
Drain-Gate Voltage $R_{GS} \leq 20K\Omega$	$V_{DGR}$	100	V
Gate-Source Voltage      Continuous	$V_{GSS}$	$\pm 20$	V
Drain Current (Note 1)      Continuous Pulsed	$I_D$	170	mA
	$I_{DM}$	680	
Total Power Dissipation (Note 1)	$P_d$	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	417	$^\circ C/W$
Operating and Storage Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ C$

Note: 1. Part mounted on FR-4 board with recommended pad layout, which can be found on our website

## Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 2)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0 10	μA nA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Body Leakage, Forward	I <sub>GSSF</sub>	—	—	50	nA	V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 2)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.8	1.4	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	6.0 10	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.17A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.17A
Forward Transconductance	g <sub>FS</sub>	80	370	—	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.17A, f = 1.0KHz
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	—	0.84	1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.34A
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	—	29	60	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	10	15	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	2	6	pF	
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Rise Time	t <sub>r</sub>	—	—	8	ns	V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.28A, R <sub>GEN</sub> = 50Ω, V <sub>GS</sub> = 10V
Turn-Off Fall Time	t <sub>f</sub>	—	—	16	ns	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	—	8	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	—	13	ns	

Note: 2. Short duration test pulse used to minimize self-heating effect.

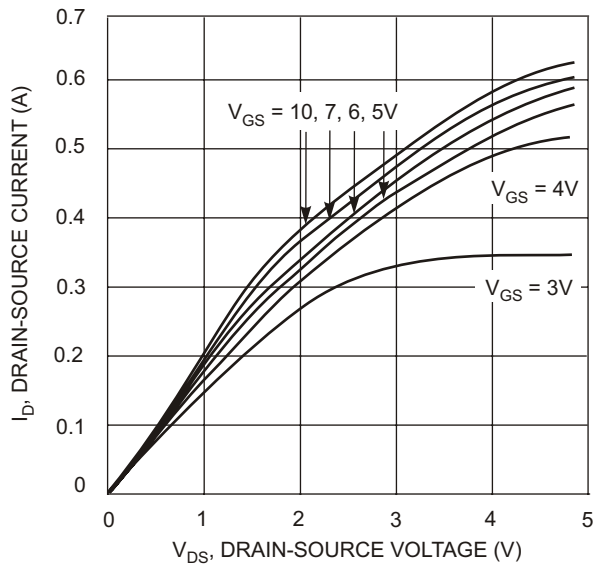


Fig. 1 On-Region Characteristics

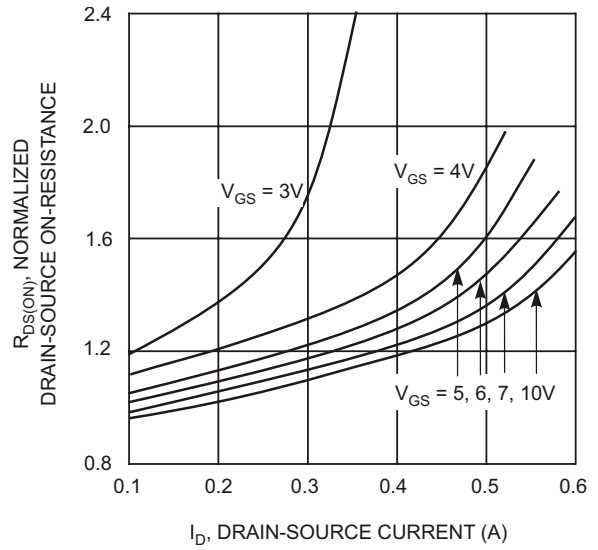


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

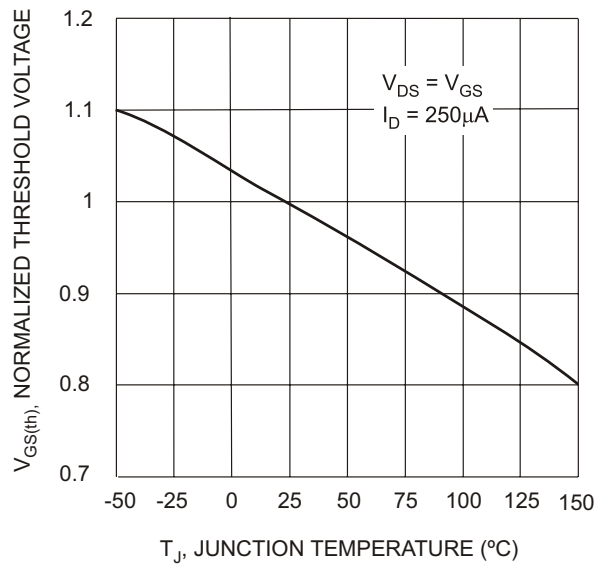


Fig. 3 Gate Threshold Variation with Temperature

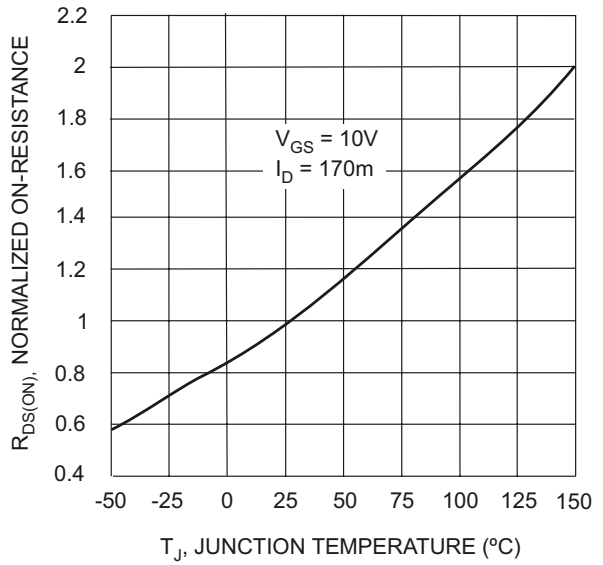


Fig. 4 On-Resistance Variation with Temperature

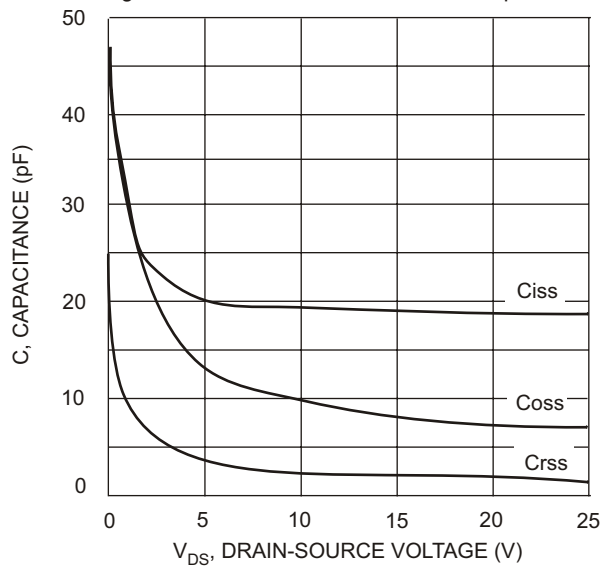
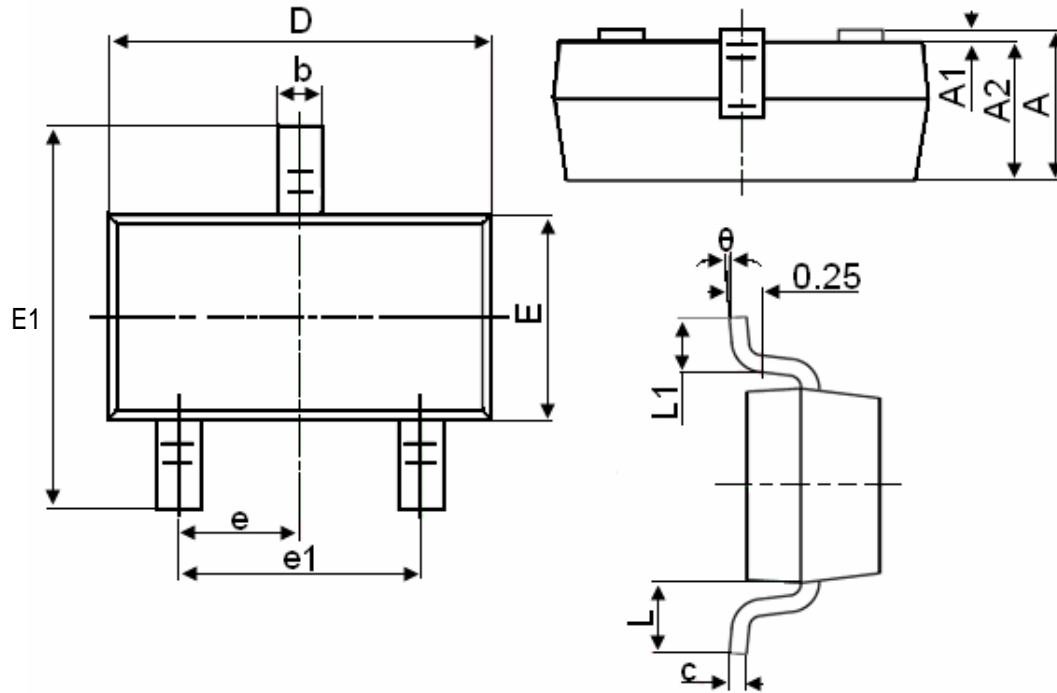


Fig. 5 Typical Capacitance

## SOT-23 Package Information



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

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