

### LMS6702-VB Datasheet P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)			
- 30	0.049 at V <sub>GS</sub> = - 10 V	- 4.8	5.1 nC			
	0.054 at $V_{GS}$ = - 4.5 V	- 4.1	5.1110			

#### **FEATURES**

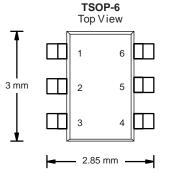
- Halogen-free According to IEC 61249-2-21 Available
- Trench Power MOSFET

#### **APPLICATIONS**

· Load Switch



Available



# (4) S (3) G O (1, 2, 5, 6) D

P-Channel MOSFET

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	- 30	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20		
	T <sub>C</sub> = 25 °C		- 4.8		
Continuous Drain Current ( $T_1 = 150 \ ^{\circ}C$ )	T <sub>C</sub> = 70 °C	I <sub>D</sub>	- 4.1		
Continuous Drain Current (1) = 150°C)	T <sub>A</sub> = 25 °C	D'D	- 4.0 <sup>b, c</sup>		
	T <sub>A</sub> = 70 °C		- 3.5 <sup>b, c</sup>	A	
Pulsed Drain Current		I <sub>DM</sub> - 20			
	T <sub>C</sub> = 25 °C		- 2.5		
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	I <sub>S</sub>	- 1.67 <sup>b, c</sup>		
	T <sub>C</sub> = 25 °C		3.0		
Maximum Dower Discinction	T <sub>C</sub> = 70 °C	P-	2.0	w	
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	P <sub>D</sub>	2.0 <sup>b, c</sup>	vv	
	T <sub>A</sub> = 70 °C	1	1.3 <sup>b, c</sup>		
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stq</sub>	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient <sup>b, d</sup>	t ≤ 5 s	R <sub>thJA</sub>	55	62.5	°C/W		
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	34	41	0/10		

Notes:

a. Based on  $T_C = 25 \text{ °C}$ . b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under Steady State conditions is 110 °C/W.



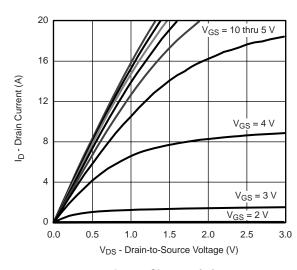
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static	1 -				1	
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA - 30				V
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	1 250 4		- 31		m\//00
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I <sub>D</sub> = - 250 μΑ		4.5		mV/°C
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	- 0.5		- 2.0	V
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
		$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$			- 1	μA
Zero Gate Voltage Drain Current	IDSS	$V_{DS}$ = - 30 V, $V_{GS}$ = 0 V, $T_{J}$ = 55 °C			- 10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \le$ - 5 V, $V_{GS}$ = - 10 V	- 20			Α
		V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 4.1 A		0.049		Ω
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 1.0 A		0.054		
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 4.1 A		8		S
Dynamic <sup>b</sup>					1	
Input Capacitance	C <sub>iss</sub>			450		pF
Output Capacitance	C <sub>oss</sub>	$V_{DS}$ = - 15 V, $V_{GS}$ = 0 V, f = 1 MHz		80		
Reverse Transfer Capacitance	C <sub>rss</sub>			63		
Total Gate Charge	Qg	$V_{DS}$ = - 15 V, $V_{GS}$ = - 10 V, $I_D$ = - 4.1 A		10	15	nC
				5.1	8	
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS}$ = - 15 V, $V_{GS}$ = - 4.5 V, $I_D$ = - 4.1 A		1.8		
Gate-Drain Charge	Q <sub>gd</sub>			2.5		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		7		Ω
Turn-On Delay Time	t <sub>d(on)</sub>			40	60	- ns
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, $R_L$ = 4.6 $\Omega$		80	120	
Turn-Off Delay Time	t <sub>d(off)</sub>	$\rm I_D \cong$ - 3.3 A, $\rm V_{GEN}$ = - 4.5 V, $\rm R_g$ = 1 $\Omega$		20	30	
Fall Time	t <sub>f</sub>			12	20	
Turn-On Delay Time	t <sub>d(on)</sub>			5	10	
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, $R_L$ = 4.6 $\Omega$		13	20	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D\cong$ - 3.3 A, $V_{GEN}$ = - 10 V, $R_g$ = 1 $\Omega$		20	30	
Fall Time	t <sub>f</sub>			10	15	
Drain-Source Body Diode Characteristic	cs					
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			- 2.5	^
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				- 20	~
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 3.3 A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>			20	30	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = - 3.3 A, di/dt = 100 A/μs, T <sub>.1</sub> = 25 °C		20	30	nC
Reverse Recovery Fall Time	t <sub>a</sub>	$r_F = -3.5 \text{ A}, \text{ u/ul} = 100 \text{ A/}\mu\text{s}, \text{ I}_J = 25 \text{ °C}$		14		
Reverse Recovery Rise Time	t <sub>b</sub>			6		ns

Notes:

a. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 % b. Guaranteed by design, not subject to production testing.

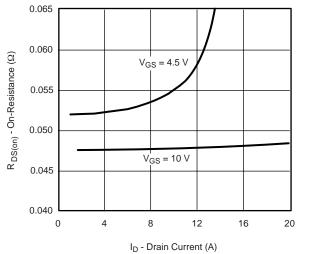
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



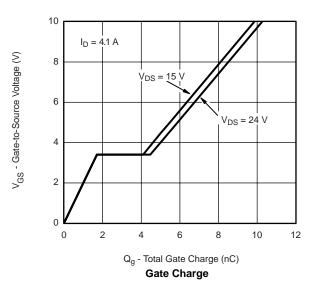


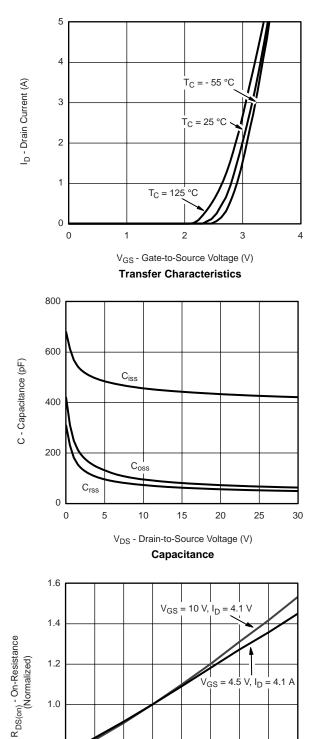
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





On-Resistance vs. Drain Current and Gate Voltage





0.8

0.6

- 50

- 25

0

25

50

T<sub>J</sub> - Junction Temperature (°C)

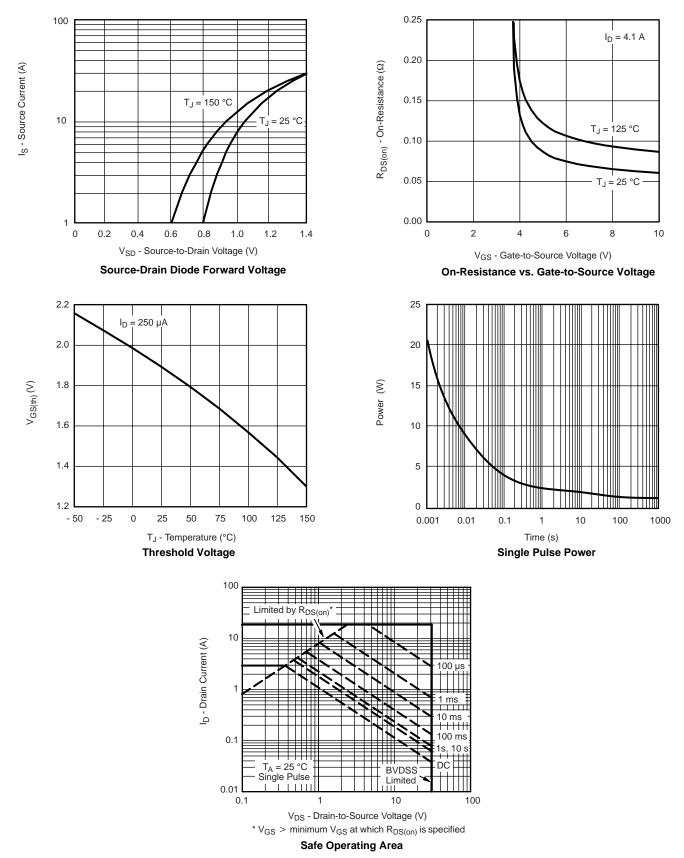
**On-Resistance vs. Junction Temperature** 

75

100

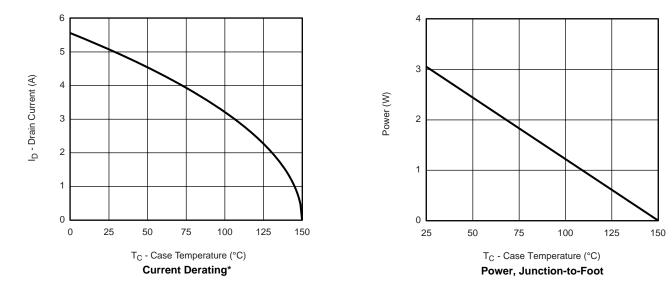
125 150





#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



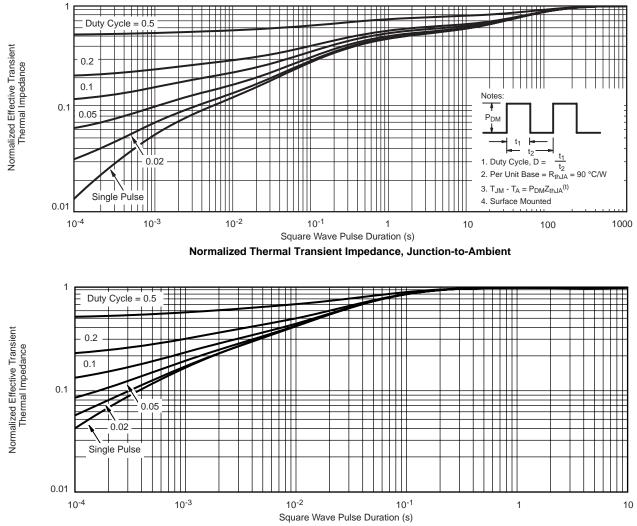


#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

\* The power dissipation  $P_D$  is based on  $T_{J(max)}$  = 150 °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.



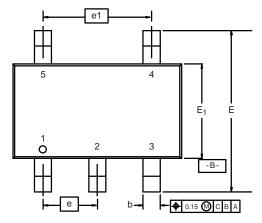




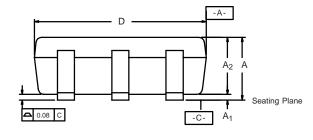
Normalized Thermal Transient Impedance, Junction-to-Foot

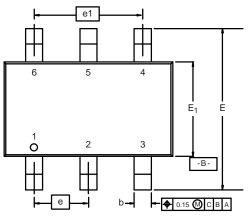


TSOP: 5/6-LEAD JEDEC Part Number: MO-193C

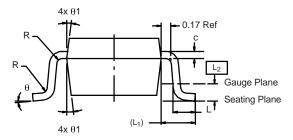








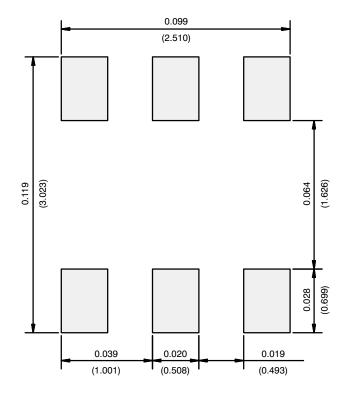
6-LEAD TSOP



	MILLIMETERS			INCHES			
Dim	Min	Nom	Max	Min	Nom	Max	
Α	0.91	-	1.10	0.036	-	0.043	
<b>A</b> <sub>1</sub>	0.01	-	0.10	0.0004	-	0.004	
A <sub>2</sub>	0.90	-	1.00	0.035	0.038	0.039	
b	0.30	0.32	0.45	0.012	0.013	0.018	
С	0.10	0.15	0.20	0.004	0.006	0.008	
D	2.95	3.05	3.10	0.116	0.120	0.122	
Е	2.70	2.85	2.98	0.106	0.112	0.117	
E <sub>1</sub>	1.55	1.65	1.70	0.061	0.065	0.067	
е	0.95 BSC			0.0374 BSC			
<b>e</b> 1	1.80	1.90	2.00	0.071	0.075	0.079	
L	0.32	-	0.50	0.012	-	0.020	
L <sub>1</sub>	0.60 Ref			0.024 Ref			
L <sub>2</sub>	0.25 BSC			0.010 BSC			
R	0.10	-	-	0.004	-	-	
θ	0°	4°	8°	0°	4°	8°	
$\theta_1$	7° Nom			7° Nom			
ECN: C-06593-Rev. I, 18-Dec-06 DWG: 5540							



#### **RECOMMENDED MINIMUM PADS FOR TSOP-6**



Recommended Minimum Pads Dimensions in Inches/(mm)



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