

**2N7000 / BS170L**

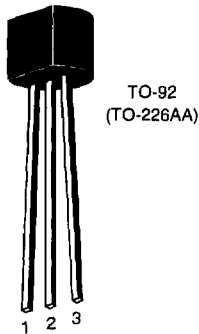
**DESCRIPTION**

The 2N7000 utilizes Calogic's vertical DMOS technology. The device is well suited for switching applications where  $V_{DS}$  of 60V and low on resistance (under 5 ohms) are required. The 2N7000 is housed in a plastic TO-92 package.

**ORDERING INFORMATION**

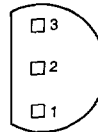
Part	Package	Temperature Range
2N7000	Plastic TO-92	-55°C to +150°C
BS170L	Plastic TO-92	-55°C to +150°C
X2N7000	Sorted Chips in Carriers	-55°C to +150°C

**PIN CONFIGURATION**

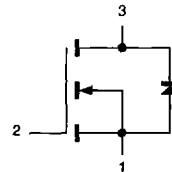


**2N7000**

- 1 SOURCE
- 2 GATE
- 3 DRAIN

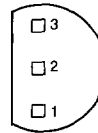


BOTTOM VIEW



**BS170L**

- 1 DRAIN
- 2 GATE
- 3 SOURCE



BOTTOM VIEW

CD5

**PRODUCT SUMMARY**

P/N	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ ( $\Omega$ )	$I_D$ (A)
2N7000	60	5	0.2
BS170	60	5	0.5

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise specified)

SYMBOL	PARAMETERS	LIMITS	UNITS	TEST CONDITIONS
V <sub>DS</sub>	Drain-Source Voltage	60	V	
V <sub>GS</sub>	Gate-Source Voltage	±40		
I <sub>D</sub>	Continuous Drain Current	0.2	A	T <sub>A</sub> = 25°C
		0.13		T <sub>A</sub> = 100°C
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	0.5		
P <sub>D</sub>	Power Dissipation <sup>1</sup>	0.4	W	T <sub>A</sub> = 25°C
		0.16		T <sub>A</sub> = 100°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C	
T <sub>stg</sub>	Storage Temperature Range	-55 to 150		
T <sub>L</sub>	Lead Temperature (1/16" from case for 10 sec.)	300		

### THERMAL RESISTANCE RATINGS

SYMBOL	THERMAL RESISTANCE	LIMITS	UNITS
R <sub>thJA</sub>	Junction-to-Ambient	312.5	K/W

NOTE: 1. Pulse width limited by maximum junction temperature.

### SPECIFICATIONS<sup>1</sup>

SYMBOL	PARAMETER	MIN	TYP <sup>2</sup>	MAX	UNIT	TEST CONDITIONS
<b>STATIC</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	60	70		V	I <sub>D</sub> = 10μA, V <sub>GS</sub> = 0V
V <sub>GS(th)</sub>	Gate-Threshold Voltage	0.8	1.9	3		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
I <sub>GSS</sub>	Gate-Body Leakage			±10	nA	V <sub>GS</sub> = ±15V, V <sub>DS</sub> = 0V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current			1	μA	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V
				1000		T <sub>C</sub> = 125°C
I <sub>D(ON)</sub>	On-State Drain Current <sup>3</sup>	75	210		mA	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V
r <sub>DS(ON)</sub>	Drain-Source On-Resistance <sup>3</sup>		4.8	5.3		Ω
			2.5	5	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A	
			4.4	9	T <sub>C</sub> = 125°C	
V <sub>DS(ON)</sub>	Drain-Source On-Voltage <sup>3</sup>		0.36	0.4	V	<sup>4</sup> V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 75mA
			1.25	2.5		V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A
			2.2	4.5		T <sub>C</sub> = 125°C <sup>4</sup>
g <sub>FS</sub>	Forward Transconductance <sup>3</sup>	100	170		mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A
g <sub>OS</sub>	Common Source Output Conductance <sup>3,4</sup>		500		μS	V <sub>DS</sub> = 5V, I <sub>D</sub> = 50mA
<b>DYNAMIC</b>						
C <sub>iss</sub>	Input Capacitance		16	60	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz
C <sub>oss</sub>	Output Capacitance <sup>4</sup>		11	25		
C <sub>rss</sub>	Reverse Transfer Capacitance		2	5		
<b>SWITCHING</b>						
t <sub>ON</sub>	Turn-On Time		7	10	nS	V <sub>DD</sub> = 15V, R <sub>L</sub> = 25Ω, I <sub>D</sub> = 0.5A V <sub>GEN</sub> = 10V, R <sub>G</sub> = 25Ω (Switching time is essentially independent of operating temperature)
t <sub>OFF</sub>	Turn-Off Time		7	10		

- NOTES: 1. T<sub>A</sub> = 25°C unless otherwise specified.  
 2. For design aid only, not subject to production testing.  
 3. Pulse test; PW = ≤300μS, duty cycle ≤3%.  
 4. This parameter not registered with JEDEC.