

**DESCRIPTION**

The 2N7000 utilizes Calogic's vertical DMOS technology. The device is well suited for switching applications where  $B_V$  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

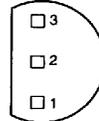
**PIN CONFIGURATION**



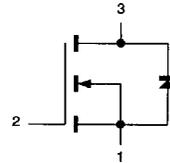
TO-92  
(TO-226AA)

2N7000

- 1 SOURCE
- 2 GATE
- 3 DRAIN

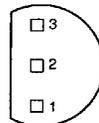


BOTTOM VIEW



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

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**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

SYMBOL	PARAMETERS	LIMITS	UNITS	TEST CONDITIONS
$V_{DS}$	Drain-Source Voltage	60	V	
$V_{GS}$	Gate-Source Voltage	$\pm 4.0$		
$I_D$	Continuous Drain Current	0.2	A	$T_A = 25^\circ\text{C}$
		0.13		$T_A = 100^\circ\text{C}$
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	0.5		
$P_D$	Power Dissipation <sup>1</sup>	0.4	W	$T_A = 25^\circ\text{C}$
		0.16		$T_A = 100^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	°C	
$T_{stg}$	Storage Temperature Range	-55 to 150		
$T_L$	Lead Temperature (1/16" from case for 10 sec.)	300		

**THERMAL RESISTANCE RATINGS**

SYMBOL	THERMAL RESISTANCE	LIMITS	UNITS
$R_{thJA}$	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>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	60	70		V	$I_D = 10\mu\text{A}, V_{GS} = 0\text{V}$
$V_{GS(th)}$	Gate-Threshold Voltage	0.8	1.9	3		$V_{DS} = V_{GS}, I_D = 1\text{mA}$
$I_{GSS}$	Gate-Body Leakage			$\pm 10$	nA	$V_{GS} = \pm 15\text{V}, V_{DS} = 0\text{V}$
$I_{DSS}$	Zero Gate Voltage Drain Current			1	$\mu\text{A}$	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
				1000		$T_C = 125^\circ\text{C}$
$I_{D(ON)}$	On-State Drain Current <sup>3</sup>	75	210		mA	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V}$
$r_{DS(ON)}$	Drain-Source On-Resistance <sup>3</sup>		4.8	5.3	$\Omega$	<sup>4</sup> $V_{GS} = 4.5\text{V}, I_D = 75\text{mA}$
			2.5	5		$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$
			4.4	9		$T_C = 125^\circ\text{C}$
$V_{DS(ON)}$	Drain-Source On-Voltage <sup>3</sup>		0.36	0.4	V	<sup>4</sup> $V_{GS} = 4.5\text{V}, I_D = 75\text{mA}$
			1.25	2.5		$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$
			2.2	4.5		$T_C = 125^\circ\text{C}$ <sup>4</sup>
$g_{FS}$	Forward Transconductance <sup>3</sup>	100	170		mS	$V_{DS} = 10\text{V}, I_D = 0.2\text{A}$
$g_{OS}$	Common Source Output Conductance <sup>3,4</sup>		500		$\mu\text{S}$	$V_{DS} = 5\text{V}, I_D = 50\text{mA}$
<b>DYNAMIC</b>						
$C_{iss}$	Input Capacitance		16	60	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
$C_{oss}$	Output Capacitance <sup>4</sup>		11	25		
$C_{rss}$	Reverse Transfer Capacitance		2	5		
<b>SWITCHING</b>						
$t_{ON}$	Turn-On Time		7	10	nS	$V_{DD} = 15\text{V}, R_L = 25\Omega, I_D = 0.5\text{A}$ $V_{GEN} = 10\text{V}, R_G = 25\Omega$ (Switching time is essentially independent of operating temperature)
$t_{OFF}$	Turn-Off Time		7	10		

- NOTES: 1.  $T_A = 25^\circ\text{C}$  unless otherwise specified.  
 2. For design aid only, not subject to production testing.  
 3. Pulse test;  $PW = \leq 300\mu\text{s}$ , duty cycle  $\leq 3\%$ .  
 4. This parameter not registered with JEDEC.

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