

2N7000 / BS170L

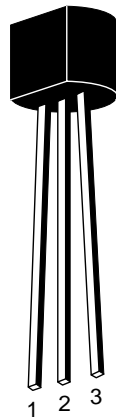
DESCRIPTION

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

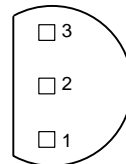
PIN CONFIGURATION



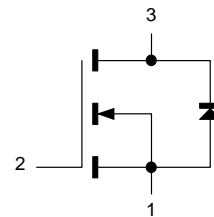
TO-92
(TO-226AA)

- 1 SOURCE
- 2 GATE
- 3 DRAIN

2N7000

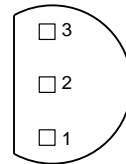


BOTTOM VIEW



BS170L

- 1 DRAIN
- 2 GATE
- 3 SOURCE



BOTTOM VIEW

CD5

PRODUCT SUMMARY

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

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	± 40		
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 ¹	0.5		
P_D	Power Dissipation ¹	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	$^\circ\text{C}$	
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.

SPECIFICATIONS¹

SYMBOL	PARAMETER	MIN	TYP ²	MAX	UNIT	TEST CONDITIONS
STATIC						
$V_{(BR)DSS}$	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			± 10	nA	$V_{GS} = \pm 15\text{V}$, $V_{DS} = 0\text{V}$
I_{DSS}	Zero Gate Voltage Drain Current			1	μA	$V_{DS} = 48\text{V}$, $V_{GS} = 0\text{V}$ $T_C = 125^\circ\text{C}$
				1000		
$I_{D(ON)}$	On-State Drain Current ³	75	210		mA	$V_{DS} = 10\text{V}$, $V_{GS} = 4.5\text{V}$
$r_{DS(ON)}$	Drain-Source On-Resistance ³		4.8	5.3	Ω	⁴ $V_{GS} = 4.5\text{V}$, $I_D = 75\text{mA}$
			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 ³		0.36	0.4	V	⁴ $V_{GS} = 4.5\text{V}$, $I_D = 75\text{mA}$
			1.25	2.5		$V_{GS} = 10\text{V}$, $I_D = 0.5\text{A}$
			2.2	4.5		$T_C = 125^\circ\text{C}$ ⁴
g_{FS}	Forward Transconductance ³	100	170		mS	$V_{DS} = 10\text{V}$, $I_D = 0.2\text{A}$
g_{OS}	Common Source Output Conductance ^{3,4}		500		μS	$V_{DS} = 5\text{V}$, $I_D = 50\text{mA}$
DYNAMIC						
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 ⁴		11	25		
C_{rss}	Reverse Transfer Capacitance		2	5		
SWITCHING						
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.