2N7000

Siliconix

N-Channel Enhancement Mode
MOSPOWER FETlington™

APPLICATIONS

- CMOS or TTL Logic Compatible
- Bipolar Darlington Replacement
- Lamp, Relay Driver or Buffer
- Analog Signal Switching

PRODUCT SUMMARY

Part Number	BV_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
2N7000	60	5	TO–92

PIN 1 – Source
PIN 2 – Gate
PIN 3 – Drain

TO–92

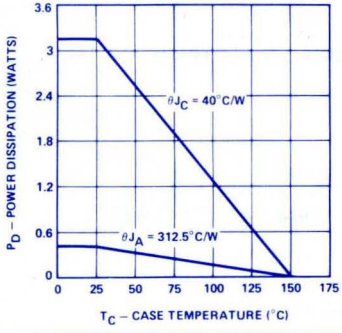
NEW
LOGIC-TO-LOAD
DESIGN
5 Volts in-100 mA out

ABSOLUTE MAXIMUM RATINGS (T_C = 25° C unless otherwise noted)

	Parameter	2N7000	Units
V_{DS}	Drain-Source Voltage	60	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1 MΩ)	60	V
I_D @ T_C = 25° C	Continuous Drain Current	±200	mA
I_D @ T_C = 100° C	Continuous Drain Current	±123	mA
I_{DM}	Pulsed Drain Current[1]	±500	mA
V_{GS}	Gate-Source Voltage	±40	V
P_D	Max. Continuous Power Dissipation	400	mW
P_D	Max. Pulsed Power Dissipation[2]	3.125	W
Junction to Case	Linear Derating Factor	25	mW/° C
Junction to Ambient	Linear Derating Factor	3.2	mW/° C
T_J Tstg	Operating and Storage Temperature Range	−55 To +150	° C
Lead Temperature	(1/16" from case for 10 secs.)	300	° C

1 **Pulse Test:** Pulsewidth ≤ 300μsec, Duty Cycle ≤ 2%
2 One Second Single, Power Pulse

Power Derating



ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

STATIC

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	2N7000	60	80		V	V_{GS} = 0 I_D = 10 μA
$V_{GS(th)}$	Gate-Threshold Voltage	2N7000	0.8	1.8	3	V	V_{DS} = V_{GS}, I_D = 1 mA
I_{GSSF}	Gate-Body Leakage Forward	2N7000		1	10	nA	V_{GS} = +15V
I_{GSSR}	Gate-Body Leakage Reverse	2N7000		−1	−10	nA	V_{GS} = −15V
I_{DSS}	Zero Gate Voltage Drain Current	2N7000		0.1	1	μA	V_{DS} = 48V , V_{GS} = 0
		2N7000		0.1	1	mA	V_{DS} = 48V , V_{GS} = 0 T_C = 125°C
$I_{D(on)}$	On-State Drain Current[1]	2N7000	75	100		mA	V_{GS} = 4.5V , V_{DS} = 10V
$V_{DS(on)}$	Static Drain-Source On-State Voltage[1]	2N7000		1.2	2.5	V	V_{GS} = 10V , I_D = 0.5A
		2N7000			0.40	V	V_{GS} = 4.5V , I_D = 75 mA
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	2N7000		2.4	5	Ω	V_{GS} = 10V , I_D = 0.5A
$R_{DS(on)}$	Static Drain-Source On-State Resistance[1]	2N7000		4.3	9	Ω	V_{GS} = 10V, I_D = 0.5A, T_C = 125°C

DYNAMIC

g_{fs}	Forward Transductance[1]	2N7000	100	200		mS(℧)	V_{DS} = 10V, I_D = 0.2A
C_{iss}	Input Capacitance	2N7000		30	60	pF	V_{GS} = 0 , V_{DS} = 25V f = 1 MHz
C_{oss}	Output Capacitance	2N7000		14	25	pF	
C_{rss}	Reverse Transfer Capacitance	2N7000		2	5	pF	
$t_{(ON)}$	Turn-On Time	2N7000		6	10	ns	V_{DD} = 15V , I_D ≅ 0.50A R_g = 25Ω , R_L = 25Ω
$t_{(OFF)}$	Turn-Off Time	2N7000		6	10	ns	(MOSFET switching times are essentially independent of operating temperature.)

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	2N7000		33	40	°C/W	
R_{thJA}	Junction-to-Ambient	2N7000			312.5	°C/W	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)	2N7000			−0.2	A	Modified MOSPOWER symbol showing the integral P N Junction rectifier
I_{SM}	Source Current[1] (Body Diode)	2N7000			−0.5	A	
V_{SD}	Diode Forward Voltage[1]	2N7000		−0.85		V	T_C=25°C, I_S=−0.2A, V_{GS} = 0

1 Pulse Test: Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%