2N7000
N–Ch, Enhancement Mode
Field Effect Transistor
TO–92 Type Package

Features:

- High Density Cell Design for Low $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch
- Rugged and Reliable
- High Saturation Current Capability
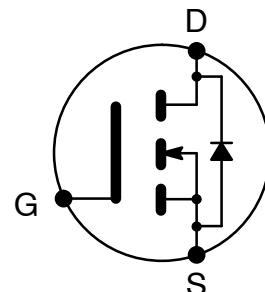
Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Drain–Source Voltage, V_{DSS} 60V

Drain–Gate Voltage (R_{GS} ≤ 1MΩ), V_{DGR} 60V

Gate–Source Voltage, V_{GS}
    Continuous . . . . ±20V
    Non–Repetitive (t_p ≤ 50μs) . . . . ±40V

Maximum Drain Current, I_D
    Continuous 200mA
    Pulsed 500mA

Maximum Power Dissipation, P_D 400mW
    Derate above 25°C . . . . 3.2mW/°C

Operating Junction Temperature Range, T_J . . . . −55° to +150°C

Storage Temperature Range, T_{stg} . . . . −55° to +150°C

Thermal Resistance, Junction–to–Ambient, $R_{th(JA)}$ . . . . 312.5°C/W

Maximum Lead Temperature for Soldering Purposes, 1/16" from Case, 10sec), T_L . . . . +300°C

Electrical Characteristics: (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
OFF Characteristics							
Drain–Source Breakdown Voltage	BV_{Dss}	V_{GS} = 0V, I_D = 10μA		60	–	–	V
Zero–Gate–Voltage Drain Current	I_{DSS}	V_{DS} = 48V, V_{GS} = 0		–	–	1.0	μA
			T_J = +125°C	–	–	1.0	mA
Gate–Body Leakage Current, Forward	I_{GSSF}	V_{GSF} = 15V, V_{DS} = 0		–	–	10	nA
Gate–Body Leakage Current, Reverse	I_{GSSR}	V_{GSF} = −15V, V_{DS} = 0		–	–	−10	nA

Electrical Characteristics (Cont'd): $(T_A = +25°C$ unless otherwise specified)

ON Characteristics (Note 1)							
Gate Threshold Voltage	$V_{GS(th)}$	$I_D = 1mA$, $V_{DS} = V_{GS}$		0.8	2.1	3.0	V
Static Drain–Source ON Resistance	$r_{DS(on)}$	$V_{GS} = 10V$, $I_D = 500mA$		–	1.2	5.0	Ω
			$T_J = +125°C$	–	1.9	9.0	Ω
		$V_{GS} = 4.5V$, $I_D = 75mA$		–	1.8	5.3	Ω
Drain–Source ON–Voltage	$V_{DS(on)}$	$V_{GS} = 10V$, $I_D = 500mA$		–	0.6	2.5	V
		$V_{GS} = 4.5V$, $I_D = 75mA$		–	0.14	0.4	V
ON–State Drain Current	$I_{D(on)}$	$V_{GS} = 4.5V$, $V_{DS} = 10V$		75	600	–	mA
Forward Transconductance	g_{FS}	$V_{DS} = 10V$, $I_D = 200mA$		100	320	–	mS
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS} = 25V$, $V_{GS} = 0V$, $f = 1MHz$		–	20	50	pF
Reverse Transfer Capacitance	C_{oss}			–	11	25	pF
Output Capacitance	C_{rss}			–	4	5	pF
Turn–On Time	t_{on}	$V_{DD} = 15V$, $R_L = 25Ω$, $I_D = 500mA$, $V_{GS} = 10V$, $R_{GEN} = 25Ω$		–	–	10	ns
Turn–Off Time	t_{off}			–	–	10	ns

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.