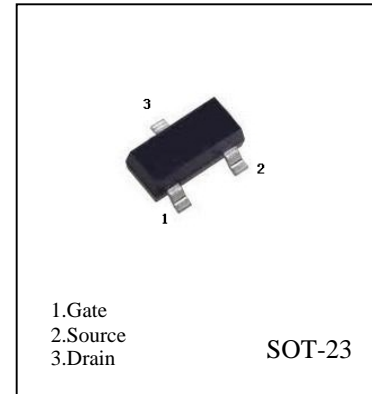


FEATURES

- High density cell design for low RDS(ON)
- Voltage controlled small signal switch.
- Rugged and reliable.
- High saturation current capability.

2N7002

MAXIMUM RATINGS (TA=25°C unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V _{DS}	Drain-source voltage (V _{GS} = 0)	60	V
V _{DGR}	Drain-gate voltage (R _{GS} = 20 k Ω)	60	V
V _{GS}	Gate- source voltage	± 20	V
I _D	Drain current (continuous) at T _C = 25°C	0.20	A
I _{DM} ⁽¹⁾	Drain current (pulsed)	800	mA
P _{TOT}	Total dissipation at T _C = 25°C	0.35	W
R _{thj- amb}	Thermal resistance junction-ambient max	357.1 ⁽²⁾	°C/W
T _J , T _{stg}	Operating junction temperature, Storage temperature	- 55 to 150 °C	

ELECTRICAL CHARACTERISTICS (Tamb=25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source breakdown voltage	I _D = 250 μ A, V _{GS} = 0	60			V
I _{DSS}	Zero gate voltage drain current (V _{DS} = 0)	V _{DS} = max rating V _{DS} = max rating, T _C = 125°C			1 10	μ A μ A
I _{GSS}	Gate-body leakage current (V _{DS} = 0)	V _{GS} = ± 18 V			± 100	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 250 μ A	1	2.1	2.5	V
R _{DS(on)}	Static drain-source on resistance	V _{GS} = 10V, I _D = 0.5A V _{GS} = 4.5V, I _D = 0.5A		1.8 2	5 5.3	
g _{fs} ⁽³⁾	Forward transconductance	V _{DS} = 10V, I _D = 0.5A		0.6		S
C _{iss} C _{oss} C _{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V _{DS} = 25V, f = 1MHz, V _{GS} = 0		43 20 6		pF pF pF

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ELECTRICAL CHARACTERISTICS (Tamb=25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V = 30V, I = 0.5A$ $R_G = 4.7 \quad V_{GS} = 4.5V$		5		ns
t_r	Rise time			15		ns
$t_{d(off)}$	Turn-off delay time			7		ns
t_f	Fall time			8		ns
Q_g	Total gate charge	$V_{DD} = 30V, I_D = 1A,$ $V_{GS} = 5V$		1.4		nC
Q_{gs}	Gate-source charge			0.8	2	nC
Q_{gd}	Gate-drain charge			0.5		nC
I_{SD}	Source-drain current				0.35	A
$I_{SDM}^{(4)}$	Source-drain current (pulsed)				1.40	A
$V_{SD}^{(5)}$	Forward on voltage	$I_{SD} = 1A, V_{GS} = 0$			1.2	V
t_{rr}	Reverse recovery time	$I_{SD} = 1A, di/dt = 100A/\mu s,$ $V_{DD} = 20V, T_j = 150^\circ C$		32		ns
Q_{rr}	Reverse recovery charge			25		nC
I_{RRM}	Reverse recovery current			1.6		A

NOTE: 1. Pulse width limited by safe operating area
3. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %
5. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

2. When mounted on 1inch2 FR-4, 2 Oz copper board.
4. Pulse width limited by safe operating area.

2N7002 Typical Characteristics

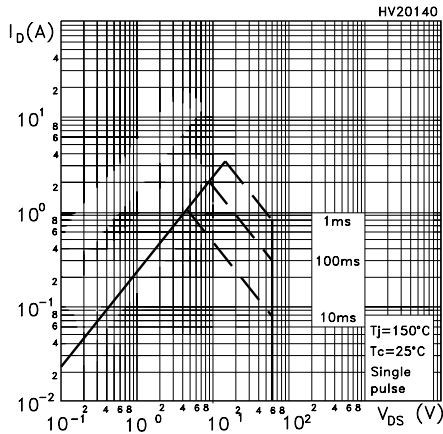


Figure 1. Safe operating area

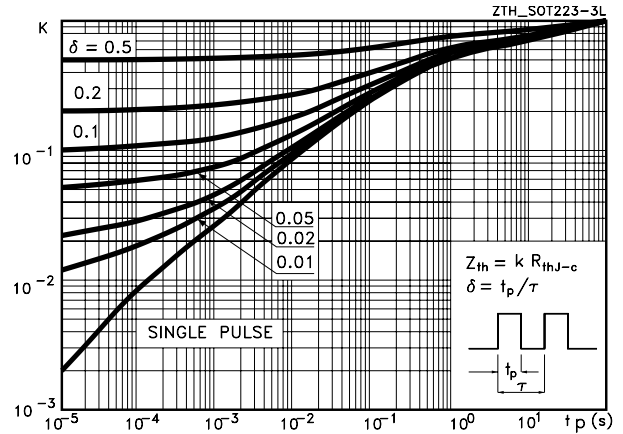


Figure 2. Thermal impedance

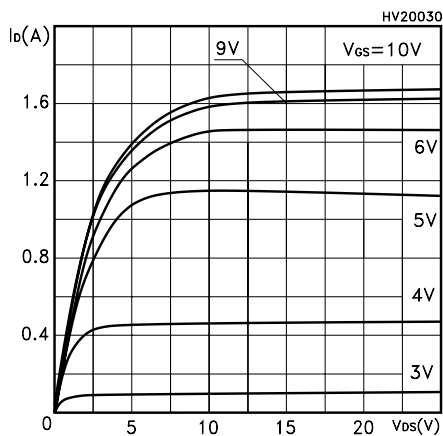


Figure 3. Output characteristics

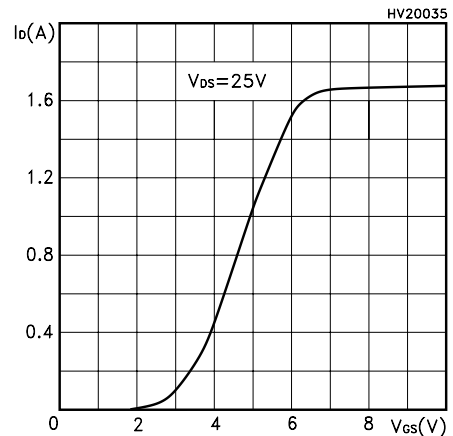


Figure 4. Transfer characteristics

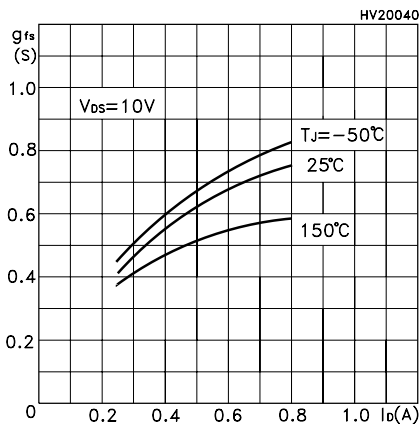


Figure 5. Transconductance

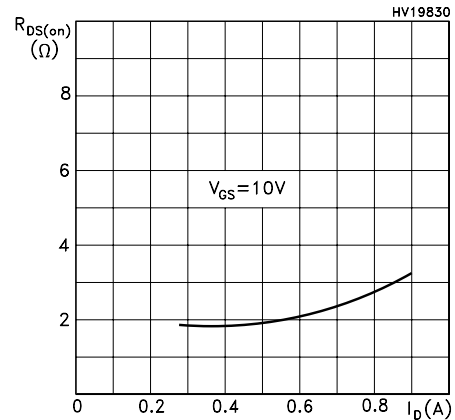


Figure 6. Static drain-source on resistance

2N7002 Typical Characteristics

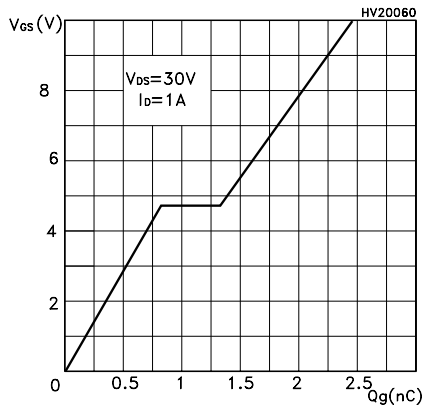


Figure 7. Gate charge vs gate-source voltage

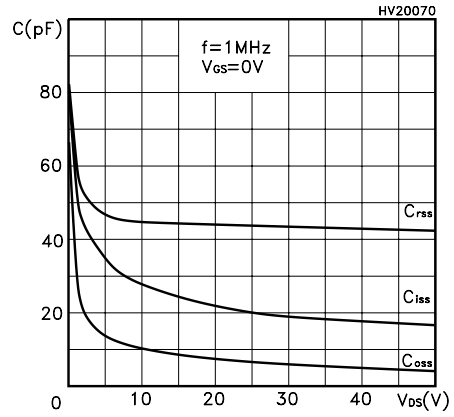


Figure 8. Capacitance variations

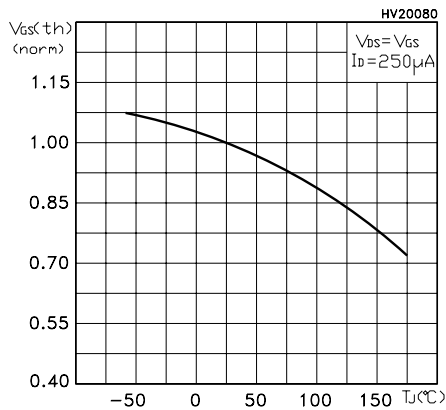


Figure 9. Normalized gate threshold voltage vs temperature

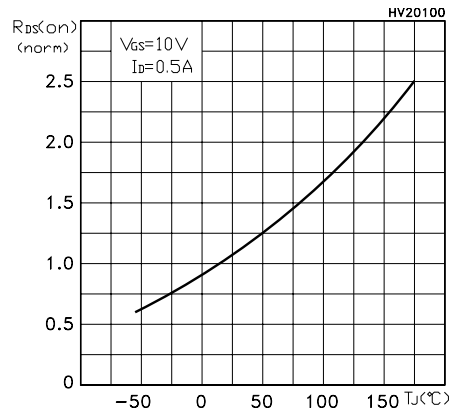


Figure 10. Normalized on resistance vs temperature