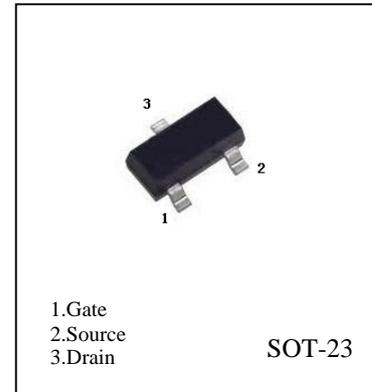


FEATURES

- 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)	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 = 250μA, 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	μA μA
I _{GSS}	Gate-body leakage current (V _{DS} = 0)	V _{GS} = ± 18V			±100	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 250μA	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

2N7002

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
$I_{SDM}^{(4)}$	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
 2. When mounted on 1inch2 FR-4, 2 Oz copper board.
 3.Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
 4.Pulse width limited by safe operating area.
 5.Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

2N7002 Typical Characteristics

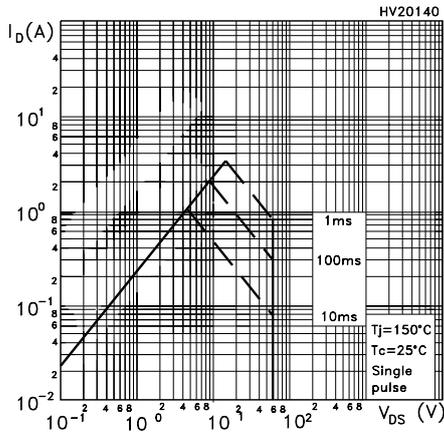


Figure 1. Safe operating area

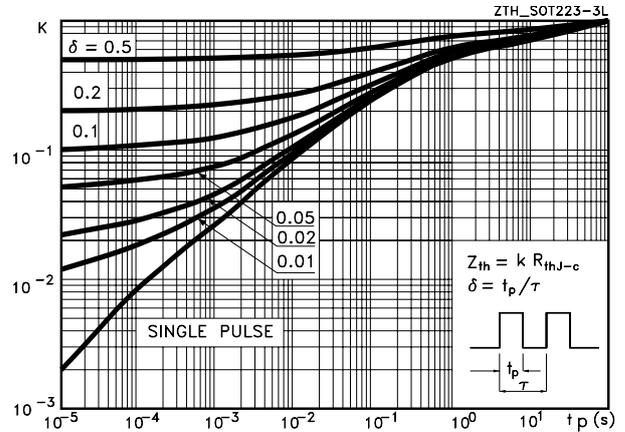


Figure 2. Thermal impedance

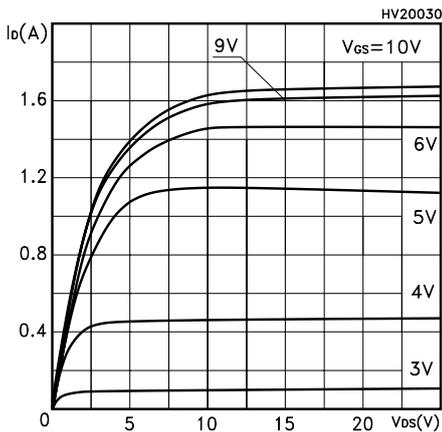


Figure 3. Output characteristics

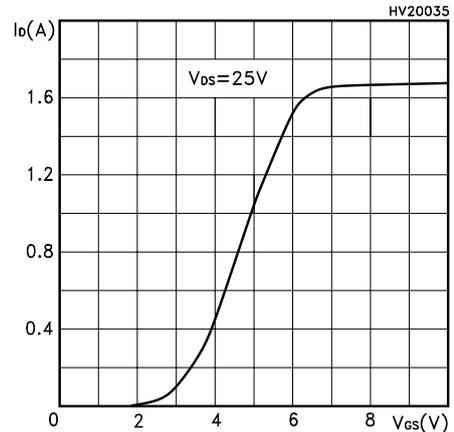


Figure 4. Transfer characteristics

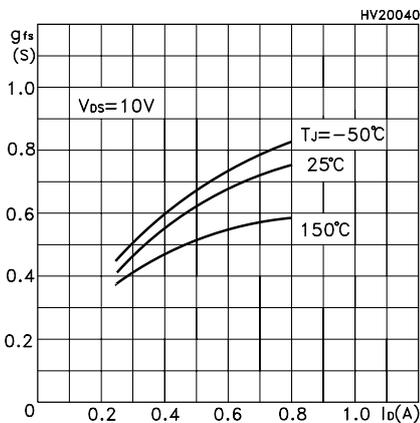


Figure 5. Transconductance

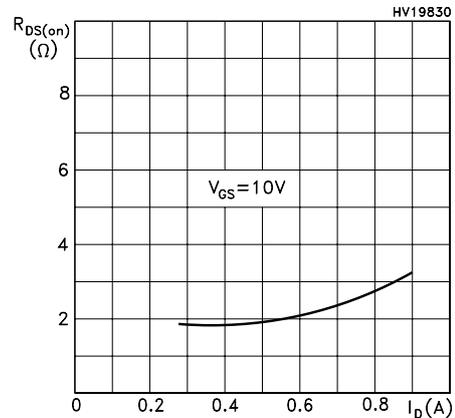


Figure 6. Static drain-source on resistance

2N7002 Typical Characteristics

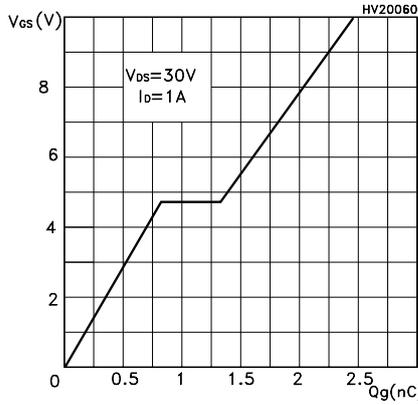


Figure 7. Gate charge vs gate-source voltage

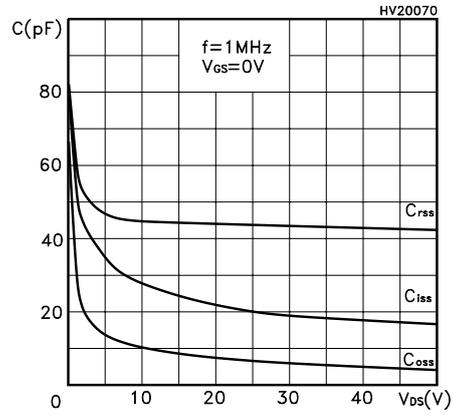


Figure 8. Capacitance variations

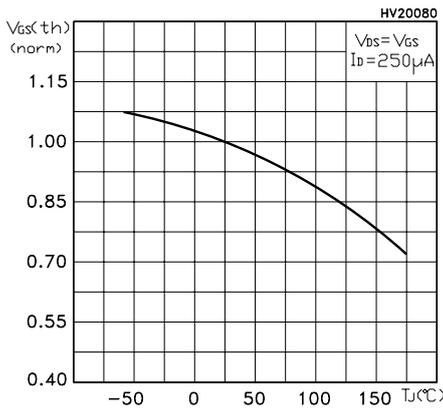


Figure 9. Normalized gate threshold voltage vs temperature

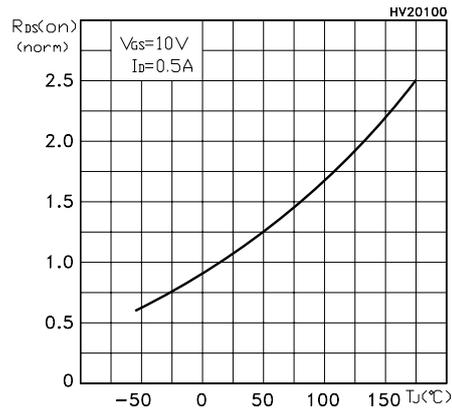


Figure 10. Normalized on resistance vs temperature