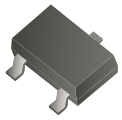
2N7002A-HF

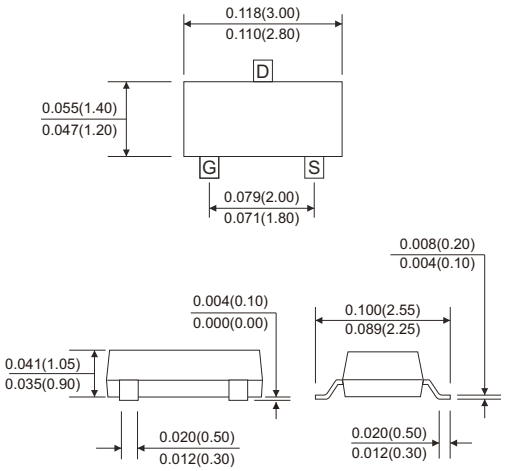
N-Channel
RoHS Device
Halogen Free



Features

- Trench power MV MOSFET technology.
- Voltage controlled small signal switch.
- Low input capacitance.
- Fast switching speed.
- Low input / output leakage.

SOT-23

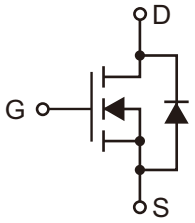


Dimensions in inches and (millimeter)

Mechanical data

- Case: SOT-23, molded plastic.

Circuit Diagram



G : GATE
S : SOURCE
D : DRAIN

Maximum Ratings (at Ta=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±30	V
Peak gate-source voltage Tp < 50μS, duty cycle = 0.25		V_{GSm}	±40	V
Drain current	T_A=25°C @ steady state	I_D	340	mA
	T_A=70°C @ steady state		272	
Pulsed drain current (Note 1)		I_{DM}	1.5	A
Total power dissipation @ T_A=25°C		P_D	350	mW
Thermal resistance junction to ambient @ steady state (Note 2)		$R_{\theta JA}$	357	°C/W
Junction and storage temperature range		T_J, T_{STG}	-55 to +150	°C

Notes: 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.
2. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Electrical Characteristics (at T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±100	nA
		V_{GS} = ±20V, V_{DS} = 0V			±50	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.6	2.5	V
Static drain-source on-resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 300mA		1.2	2.5	Ω
		V_{GS} = 4.5V, I_D = 200mA		1.3	3.0	
Diode forward voltage	V_{SD}	I_S = 300mA, V_{GS} = 0V			1.2	V
Max. body-diode continuous current	I_S				340	mA
Dynamic Parameters						
Input capacitance	C_{iss}	V_{DS} = 30V, V_{GS} = 0V, f = 1MHz		15		pF
Output capacitance	C_{oss}			9.5		
Reverse transfer capacitance	C_{rss}			5.5		
Switching Parameters						
Total gate charge	Q_g	V_{GS} = 15V, V_{DS} = 30V, I_D = 0.3A		1.7	2.4	nC
Turn-on delay time	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 30V		5		ns
Turn-off delay time	$t_{d(off)}$	I_D = 300mA, R_{GEN} = 6Ω		17		
Reverse recovery time	t_{rr}	V_{GS} = 0V, I_S = 300mA, V_R = 25V dI_S/d_t = -100A/μs		30		ns

Rating and Characteristic Curves (2N7002A-HF)

Fig.1 - Output Characteristics

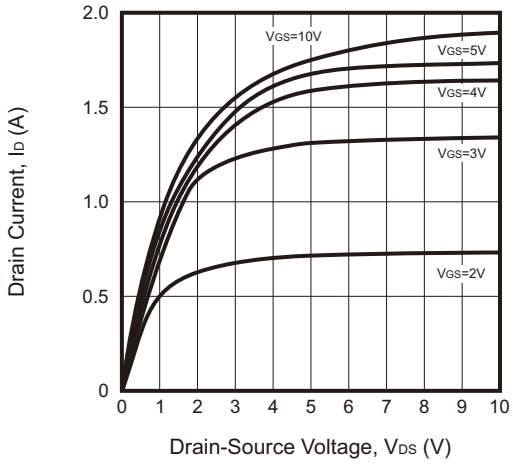


Fig.2 - Transfer Characteristics

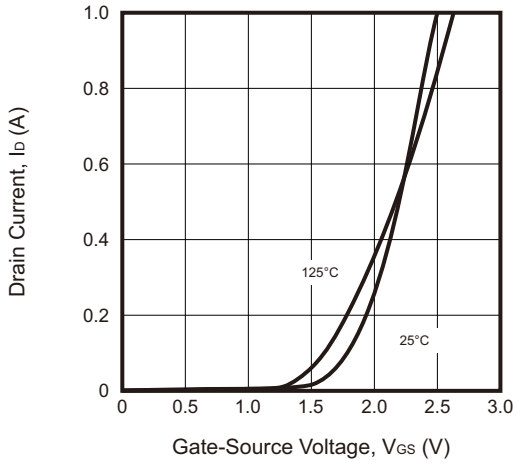


Fig.3 - Capacitance Characteristics

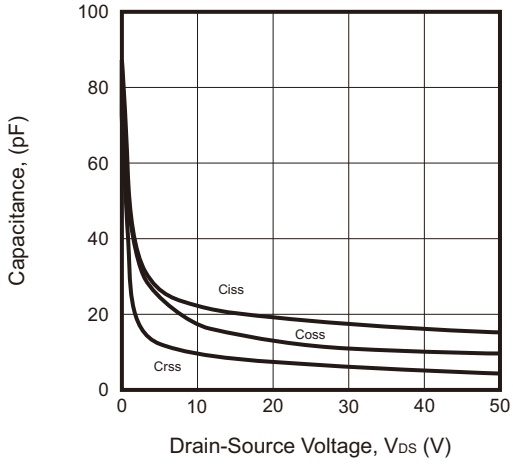


Fig.4 - Gate Charge

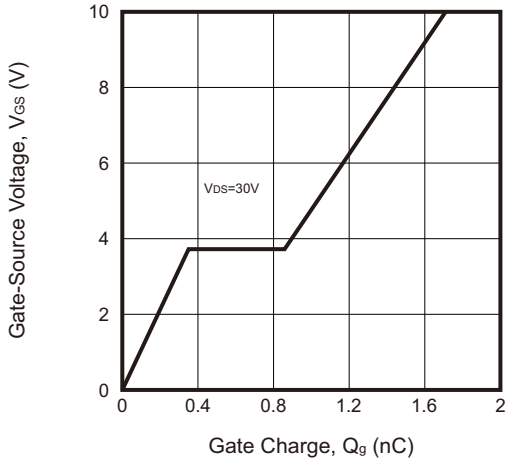


Fig.5 - Drain-Source on Resistance

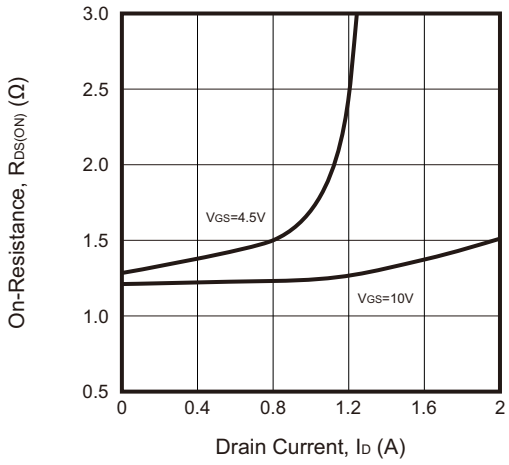
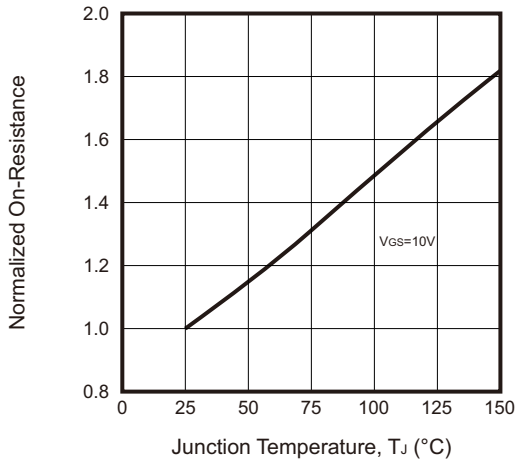


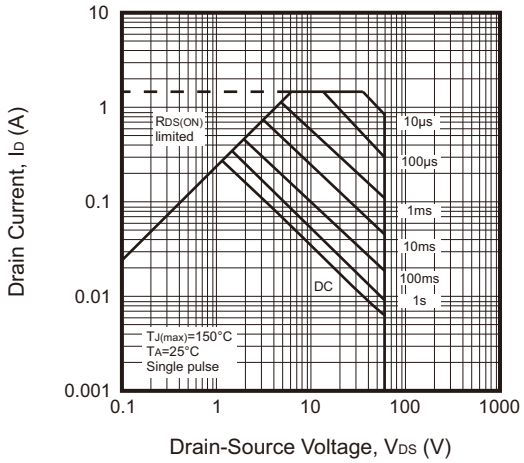
Fig.6 - Drain-Source on Resistance



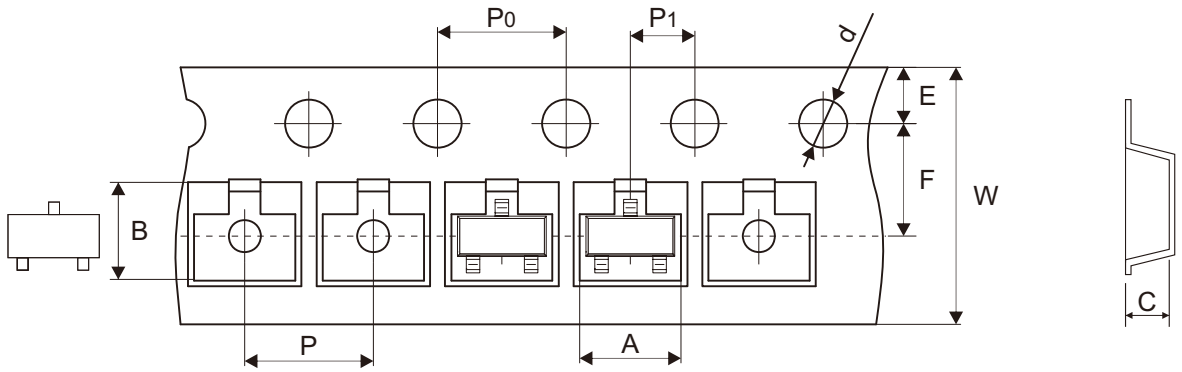
Company reserves the right to improve product design , functions and reliability without notice. REV:A

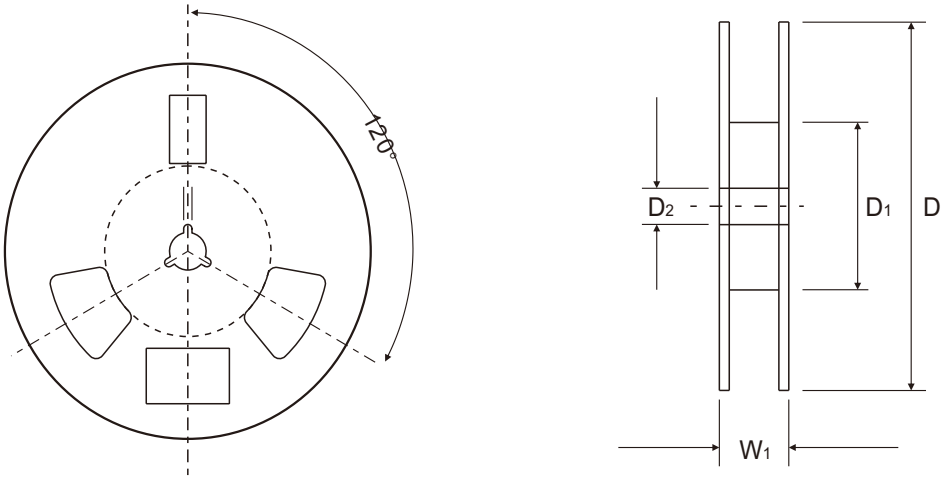
Rating and Characteristic Curves (2N7002A-HF)

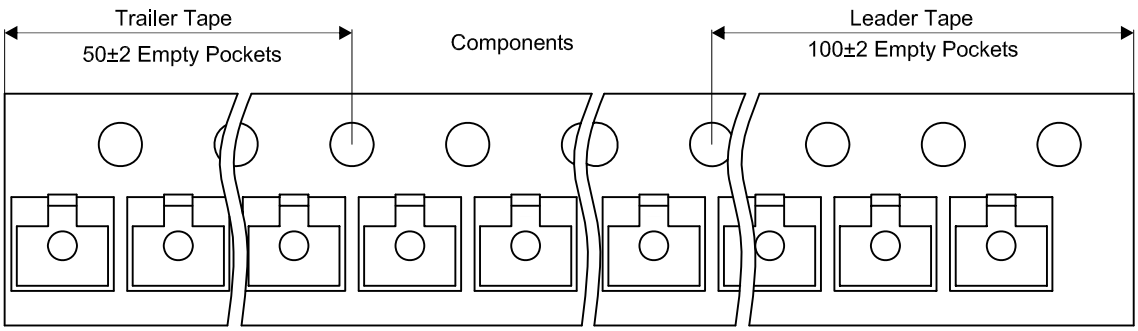
Fig.7 - Safe Operation Area



Reel Taping Specification





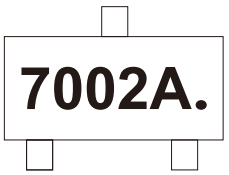


	SYMBOL	A	B	C	d	D	D1	D2
SOT-23	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 + 0.10 − 0.00	178.00 ± 1.00	54.60 ± 1.00	13.30 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 + 0.004 − 0.000	7.008 ± 0.039	2.150 ± 0.039	0.524 ± 0.039

	SYMBOL	E	F	P	P0	P1	W	W1
SOT-23	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 + 0.30 − 0.10	11.10 ± 0.20
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 + 0.012 − 0.004	0.437 ± 0.008

Marking Code

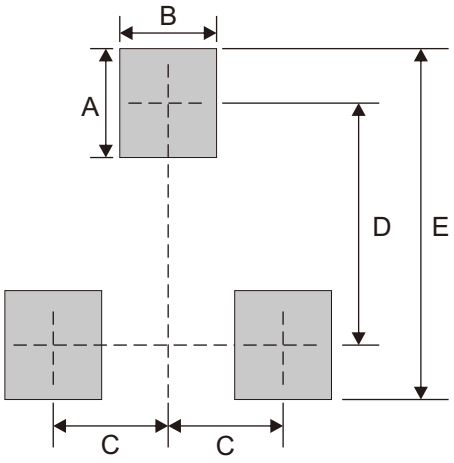
Part Number	Marking Code
2N7002A-HF	7002A.



Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114

Note: 1. The pad layout is for reference purposes only.



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7