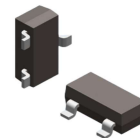


N-Channel MOSFET

RoHS Device

Halogen Free



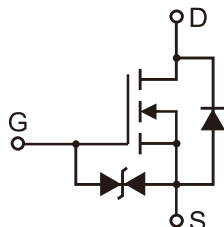
Features

- Voltage controlled small signal switch.
- Low input capacitance.
- Fast switching speed.
- Low input / output leakage.
- ESD Protected 2KV HBM.

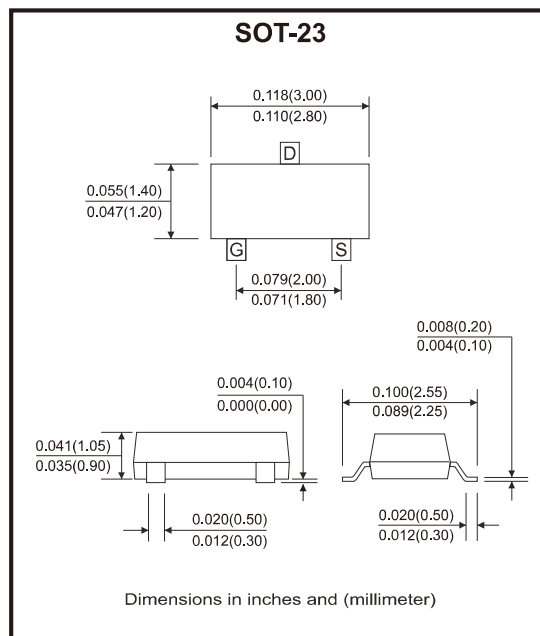
Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

Circuit Diagram



G : GATE
S : SOURCE
D : DRAIN



Maximum Ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	± 20	V
Drain current	$T_A=25^\circ\text{C}$ @ steady state	I_D	380	mA
	$T_A=70^\circ\text{C}$ @ steady state		300	
Pulsed drain current (Note 1)		I_{DM}	1.5	A
Total power dissipation @ $T_A=25^\circ\text{C}$		P_D	350	mW
Thermal resistance junction to ambient @ steady state (Note 2)		$R_{\theta JA}$	416	$^\circ\text{C/W}$
Junction and storage temperature range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Notes: 1. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

2. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Electrical Characteristics (at $T_J=25^{\circ}\text{C}$ 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} = ±20V, V _{DS} = 0V			±10	μA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	2.5	V
Static drain-source on-resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 300mA		1.8	2.3	Ω
		V _{GS} = 4.5V, I _D = 200mA		2.0	3.0	
Diode forward voltage	V _{SD}	I _S = 300mA, V _{GS} = 0V			1.2	V
Max. body-diode continuous current	I _S				300	mA
Forward transconductance	g _{FS}	V _{DS} = 5V, I _D = 0.3A		0.13		S
Dynamic Parameters						
Input capacitance	C _{iss}	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz		21		pF
Output capacitance	C _{oss}			9		
Reverse transfer capacitance	C _{rss}			4		
Switching Parameters						
Total gate charge	Q _g	V _{GS} = 10V, V _{DS} = 30V, I _D = 0.3A		1.22	2.4	nC
Gate-source charge	Q _{gs}			0.5		
Gate-drain charge	Q _{gd}			0.18		
Reverse recovery charge	Q _{rr}	V _{GS} = 0V, I _S = 300mA, V _R = 25V, di / dt = 100A/μs		3.6		
Reverse recovery time	t _{rr}			16		
Turn-on delay time	t _{d(on)}	V _{GS} = 10V, V _{DD} = 50V, I _D = 200mA, R _{GEN} = 50Ω		7		ns
Turn-on rise time	t _r			19		
Turn-off delay time	t _{d(off)}			20		
Turn-off fall time	t _f			84		

Typical Rating and Characteristic Curves

Fig.1 - Output Characteristics

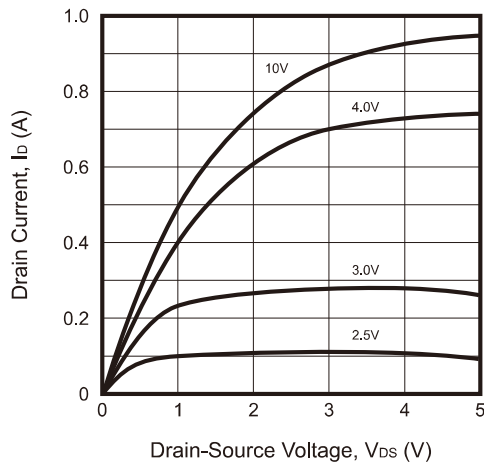


Fig.2 - Transfer Characteristics

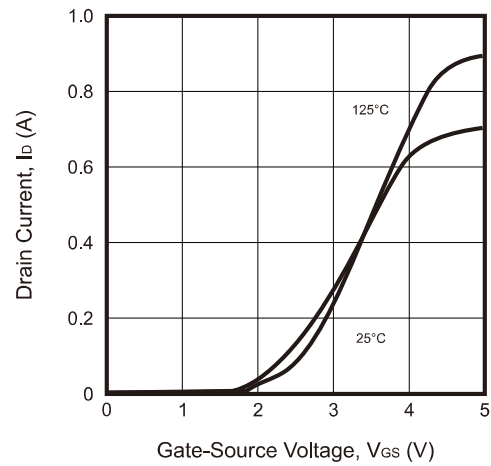


Fig.3 - Capacitance Characteristics

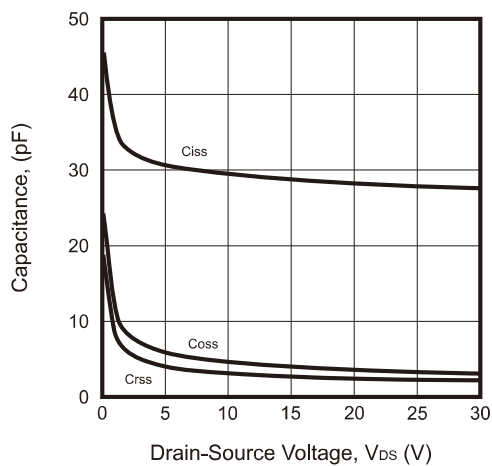


Fig.4 - Gate Charge

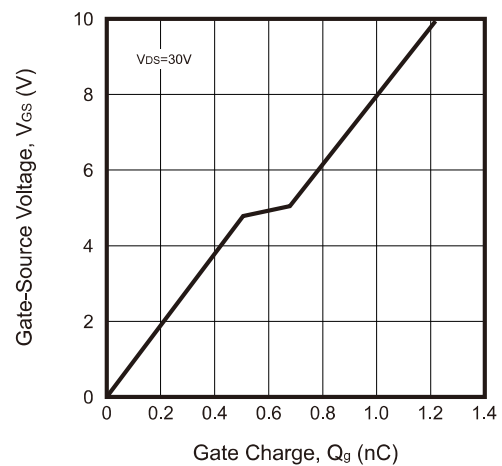


Fig.5 - Drain-Source on Resistance

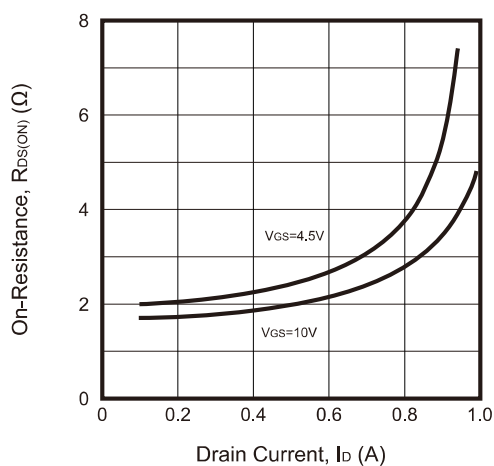
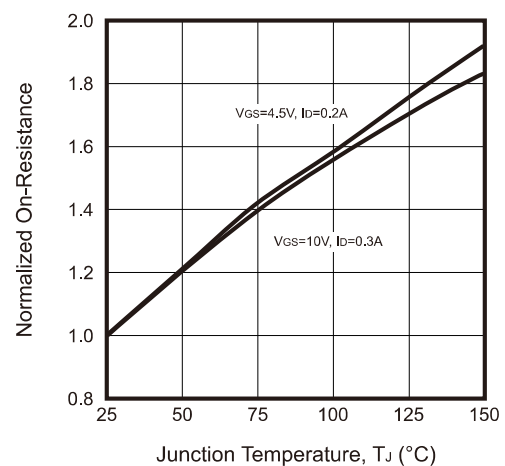


Fig.6 - Drain-Source on Resistance



Typical Rating and Characteristic Curves

Fig.7 - On-Resistance vs V_{GS}

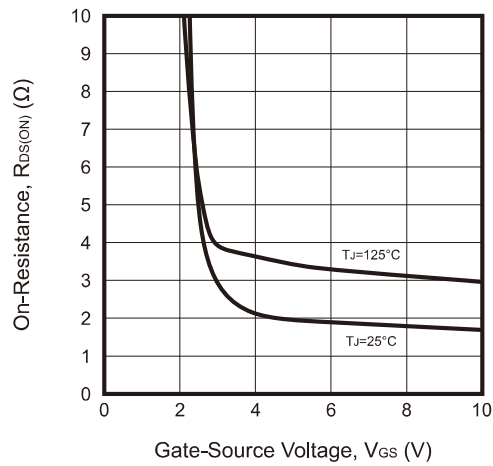


Fig.8 - Threshold Voltage vs Temperature

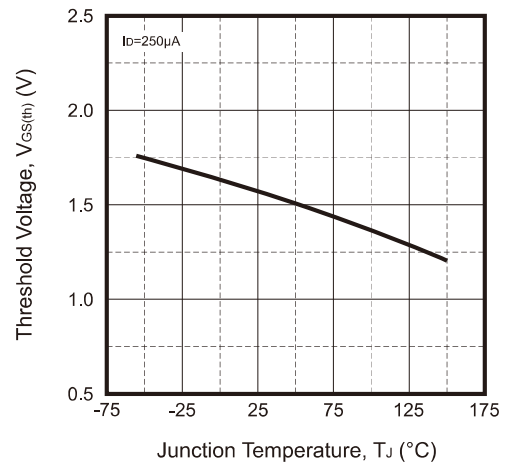


Fig.9 - Breakdown Voltage vs Temperature

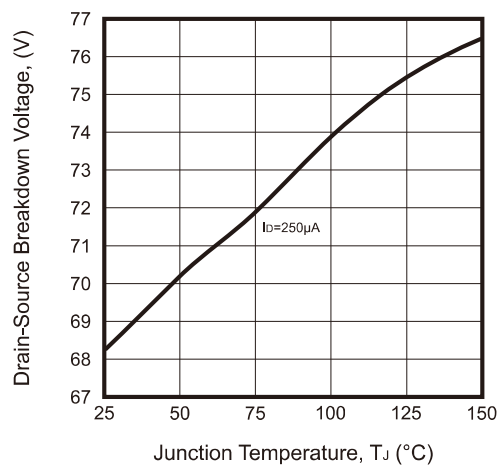
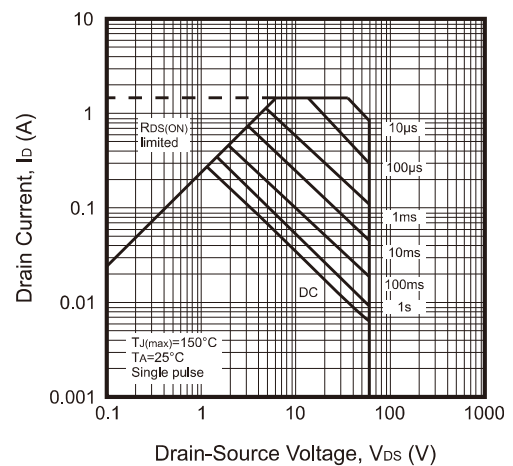
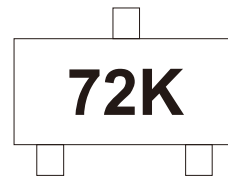


Fig.10 - Safe Operation Area



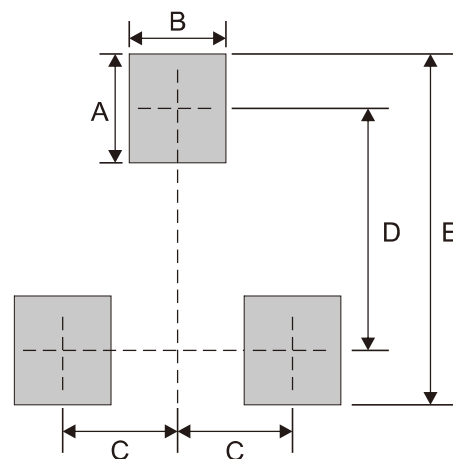
Marking Code

Part Number	Marking Code
2N7002K	72K



Suggested P.C.B. PAD Layout

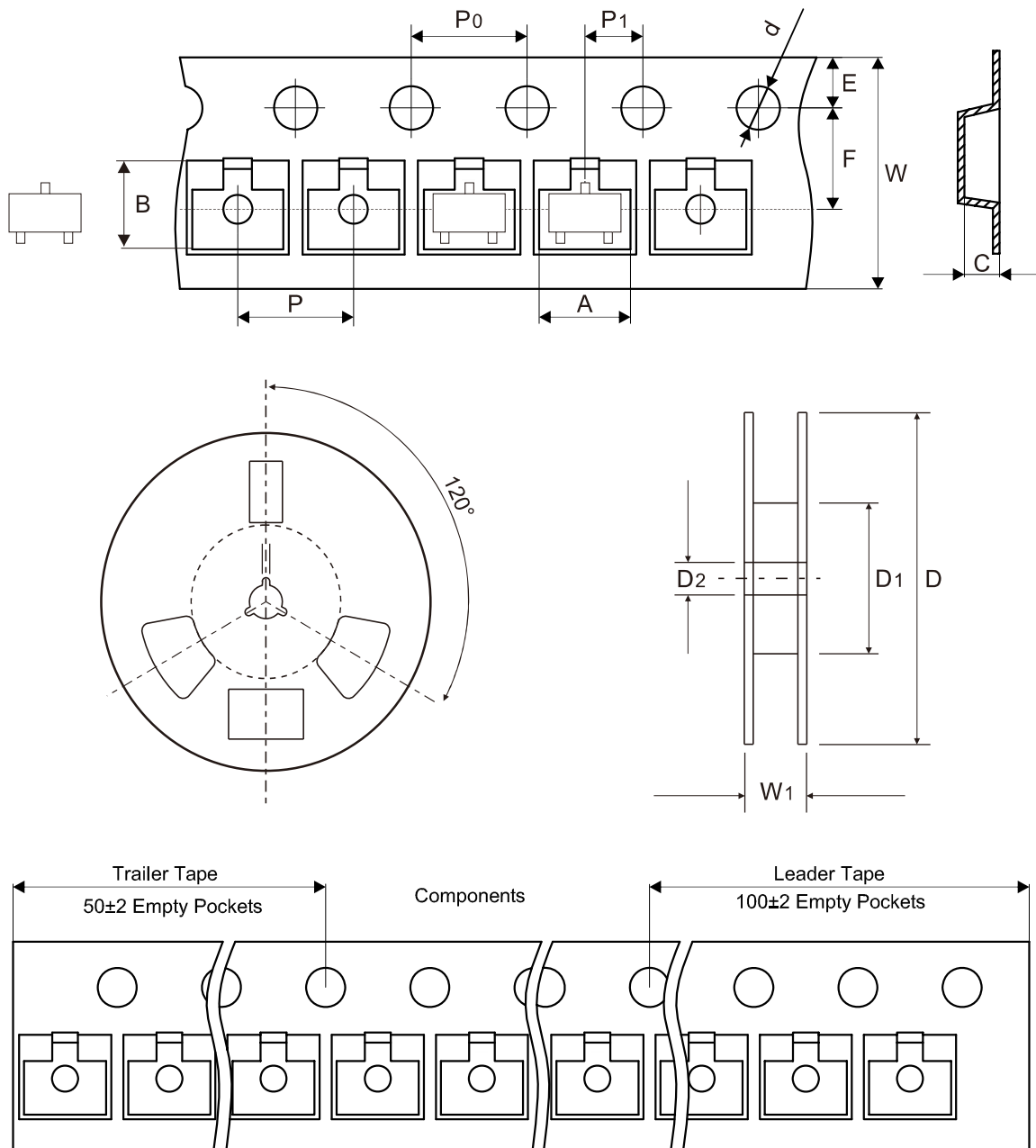
SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114



Standard Packaging

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

Reel Taping Specification



SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(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

SOT-23	SYMBOL	E	F	P	P ₀	P ₁	W	W ₁
	(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