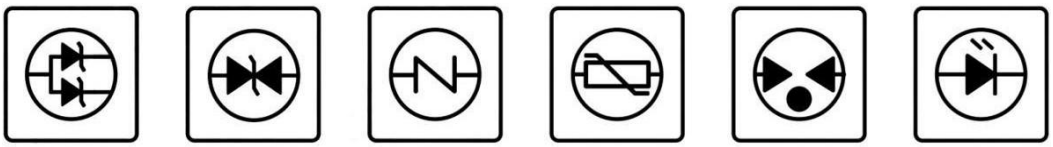
MSKSEMI 美森科
SEMICONDUCTOR



2N7002KM

Product specification

Features

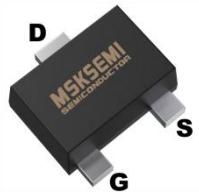
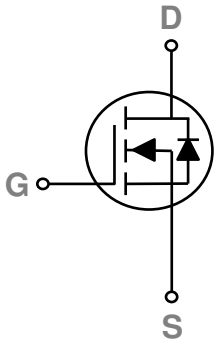
- 60V,200mA, RDS(ON) =1.7Ω@VGS = 10V
- Fast switching
- Green Device Available

Reference News

- Notebook
- Smartphone
- Battery Protection
- Hand-held Instruments

BVDSS	RDSON	ID
60V	1.7Ω	200mA

Reference News

PACKAGE OUTLINE	PIN Configuration	Marking
 SOT-723		72*

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_A=25℃)	200	mA
	Drain Current - Continuous (T_A=70℃)	160	mA
I_{DM}	Drain Current - Pulsed[1]	800	mA
P_D	Power Dissipation (T_A=25℃)	156	mW
	Power Dissipation - Derate above 25℃	1.25	mW/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	800	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V，I_D=250uA	60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V，V_{GS}=0V，T_J=25℃	---	---	10	nA
		V_{DS}=48V，V_{GS}=0V，T_J=125℃	---	---	100	nA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V，V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V，I_D=0.15A	---	1.6	3	Ω
		V_{GS}=4.5V，I_D=0.1A	---	1.7	4	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}，I_D =250uA	1.0	2	3.0	V
gfs	Forward Transconductance	V_{DS}= 10V，I_D=0.1A	---	0.3	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=30V，V_{GS}= 10V，I_D=0.1A	---	2	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	0.9	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	0.4	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=30V，V_{GS}=10V，R_G=6Ω I_D=0.1A	---	3	---	ns
T_r	Rise Time[2,3]		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	14	---	
T_f	Fall Time[2,3]		---	9	---	
C_{iss}	Input Capacitance	V_{DS}=30V，V_{GS}=0V，F=1MHz	---	25	---	pF
C_{oss}	Output Capacitance		---	15	---	
C_{rss}	Reverse Transfer Capacitance		---	6.8	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V，Force Current	---	---	200	mA
I_{SM}	Pulsed Source Current		---	---	400	mA
V_{SD}	Diode Forward Voltage	V_{GS}=0V，I_S=0.1A，T_J=25℃	---	---	1	V
T_{rr}	Reverse Recovery Time	V_R=50V，I_S=0.1A，dI/dt=100A/μs，T_J=25℃	---	18	---	ns
Q_{rr}	Reverse Recovery Charge		---	6	---	nC

Note：
1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed，pulse width ≤ 300us，duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

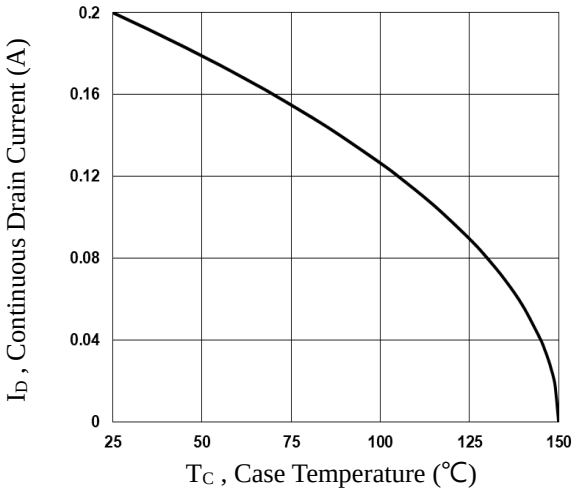


Fig.1 Continuous Drain Current vs. T_C

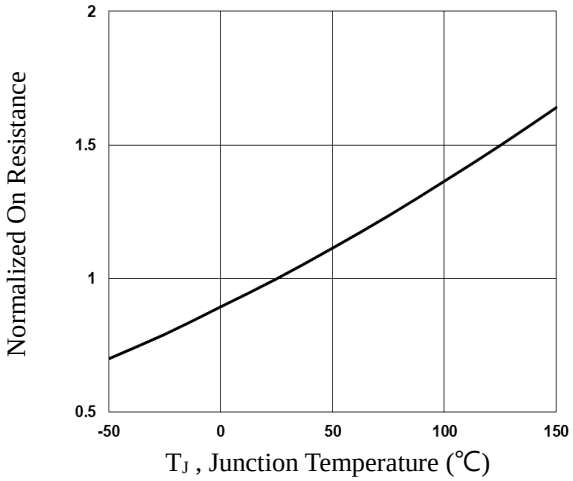


Fig.2 Normalized RDSON vs. T_J

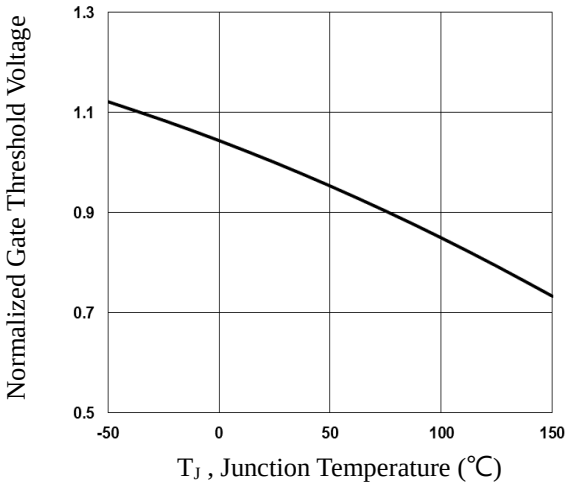


Fig.3 Normalized V_{th} vs. T_J

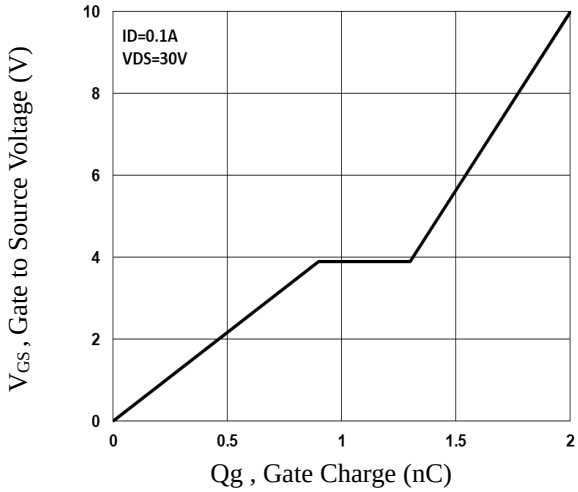


Fig.4 Gate Charge Waveform

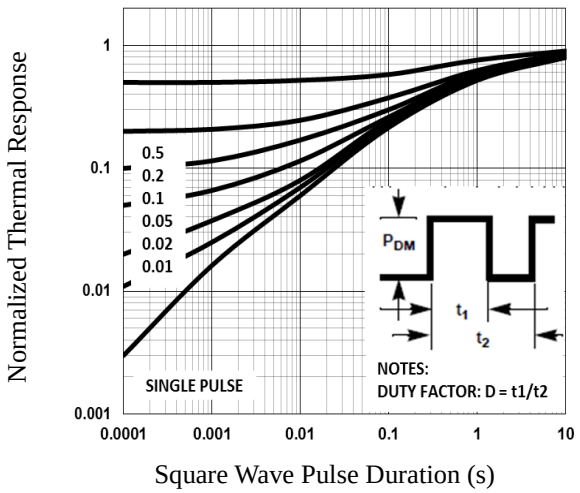


Fig.5 Normalized Transient Response

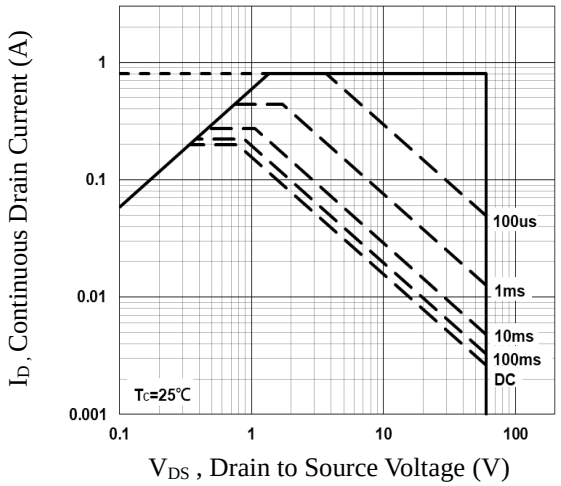


Fig.6 Maximum Safe Operation Area

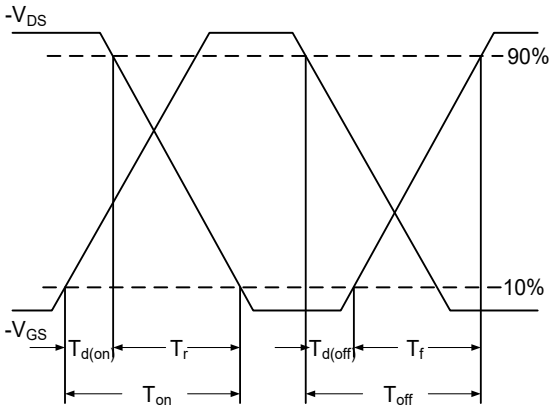


Fig.7 Switching Time Waveform

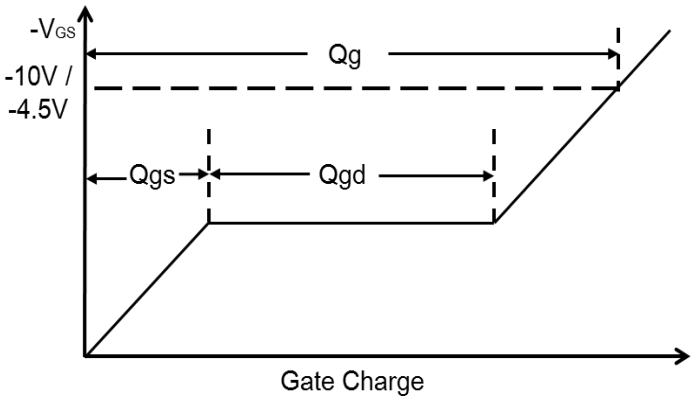
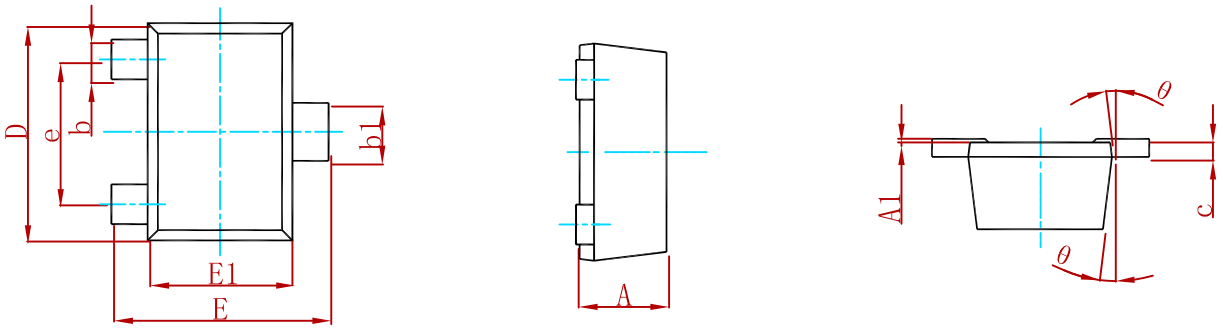


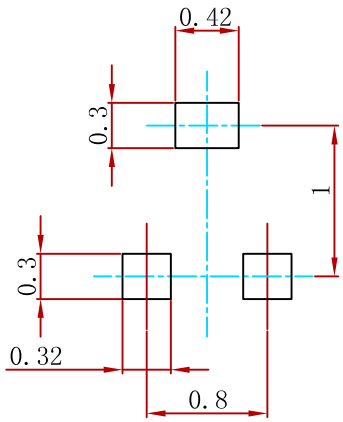
Fig.8 Gate Charge Waveform

PACKAGEMECHANICALDATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
θ	7° REF.		7° REF.	

Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

REELSPECIFICATION

P/N	PKG	QTY
2N7002KM	SOT-723	8000

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