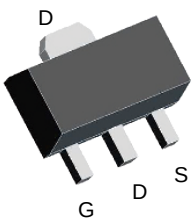
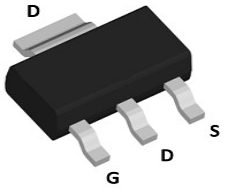
SOT-89 SOT-223

RoHS COMPLIANT

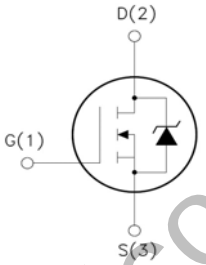




SYM601

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=7.7nC (Typ.).
- ☐ BVDSS=600V,I_D=1A
- ☐ R_{DS}(on) : 18 Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested



1.Gate (G)
2.Drain (D)
3.Source (S)

Marking:SYM601

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Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	1.0	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	0.7	A
I_{DM}	Pulsed Drain Current[1]	6	A
P_D@T_C=25℃	Total Power Dissipation	26	W
	Linear Derating Factor	0.21	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	13	mJ
I_{AR}	Avalanche Current	1.0	A
E_{AR}	Repetitive Avalanche Energy	0.5	mJ
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter		Value	Units
Rthj-c	Thermal Resistance Junction-case	Max.	4.7	℃/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	110	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	600	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.6	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=1.0A	-	-	18	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=50V, I_D=0.5A	-	0.8	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=600V, V_{GS}=0V	-	-	10	uA
	Drain-Source Leakage Current (T_j=150°C)	V_{DS}=480V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±30V	-	-	±100	nA
Q_g	Total Gate Charge[3]	I_D=1.0A	-	7.7	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=560V	-	1.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	2.6	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=300V	-	8	-	ns
t_r	Rise Time	I_D=1.0A	-	5	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω,V_{GS}=10V	-	14	-	ns
t_f	Fall Time	R_D=187.5Ω	-	7	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	286	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	25	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	5	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)	V_D=V_G=0V , V_S=1.5V	-	-	1.0	A
I_{SM}	Pulsed Source Current (Body Diode)[1]		-	-	6	A
V_{SD}	Forward On Voltage[3]	T_j=25℃, I_S=1.0A, V_{GS}=0V	-	-	1.5	V

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Notes:

1.Pulse width limited by safe operating area.

2.Starting T_j=25°C , V_{DD}=50V , L=10mH , R_G=25Ω , I_{AS}=1.6A.

3.Pulse width ≤300us , duty cycle ≤2%.

Typical Characteristics

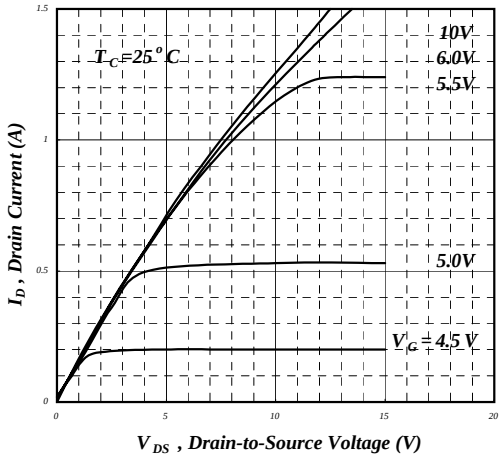

Fig 1. Typical Output Characteristics

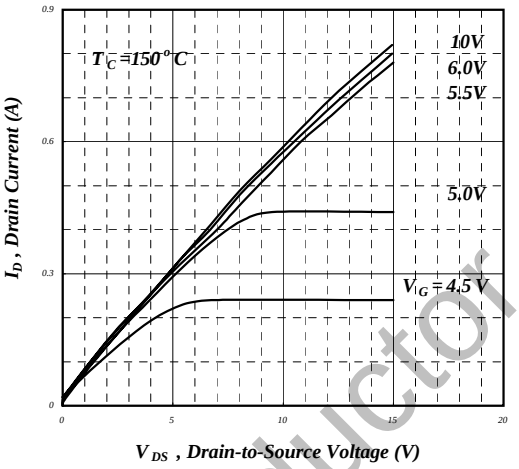

Fig 2. Typical Output Characteristics

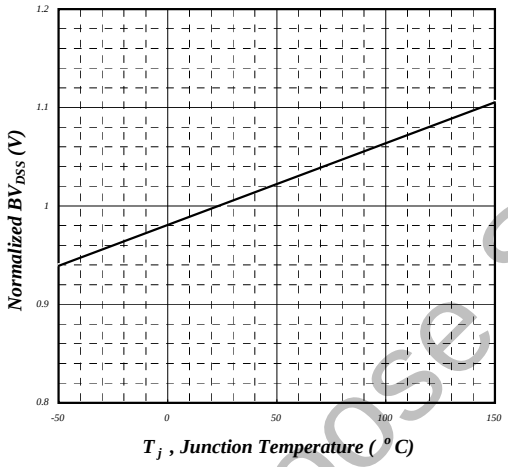

Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

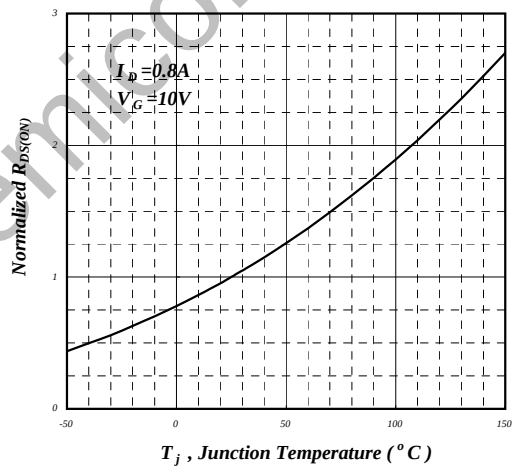

Fig 4. Normalized On-Resistance v.s. Junction Temperature

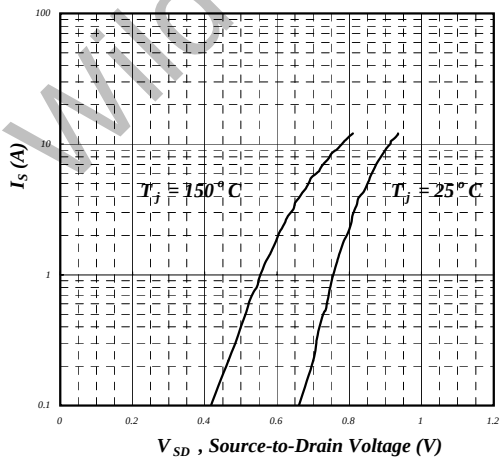

Fig 5. Forward Characteristic of Reverse Diode

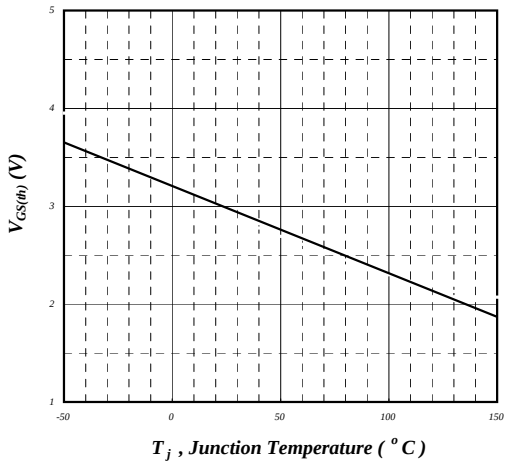

Fig 6. Gate Threshold Voltage v.s. Junction Temperature

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Typical Characteristics (Continued)

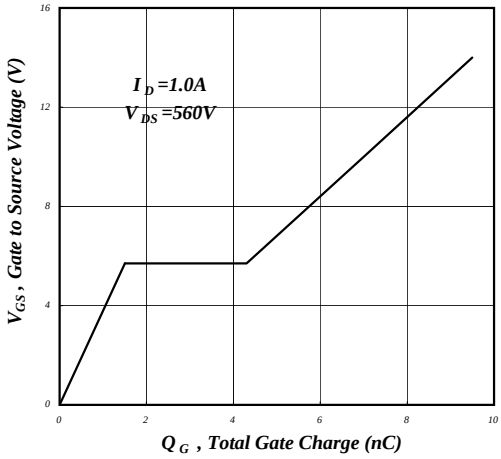

Fig 7. Gate Charge Characteristics

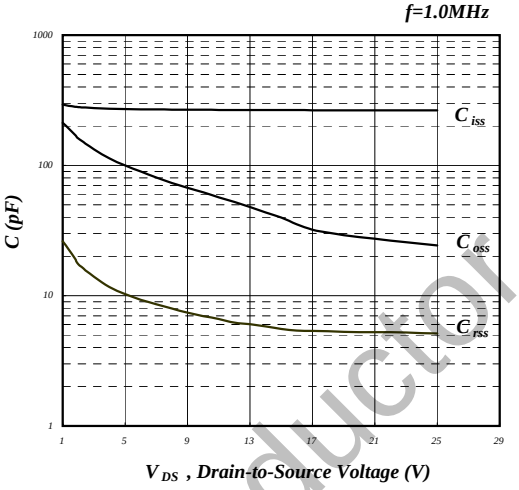

Fig 8. Typical Capacitance Characteristics

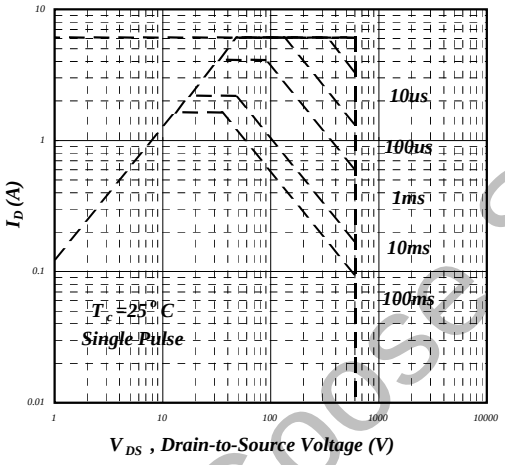

Fig 9. Maximum Safe Operating Area

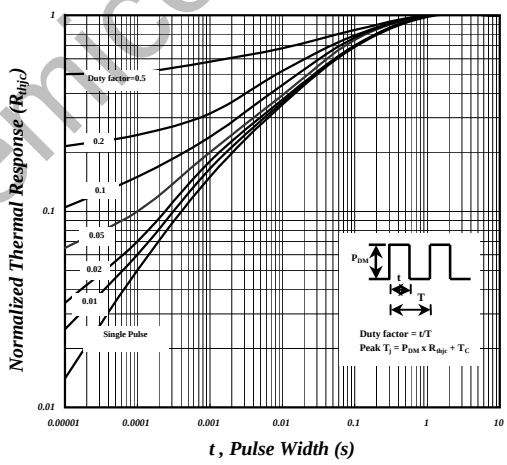

Fig 10. Effective Transient Thermal Impedance

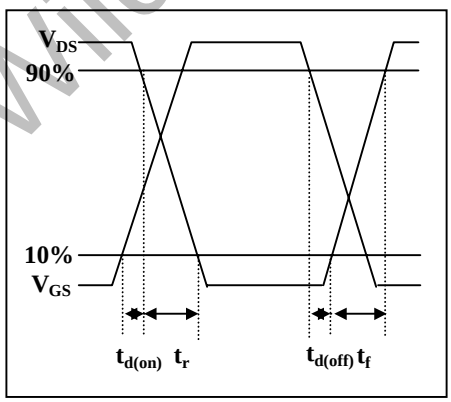

Fig 11. Switching Time Waveform

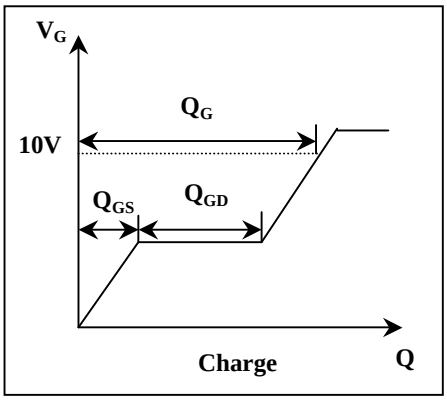

Fig 12. Gate Charge Waveform

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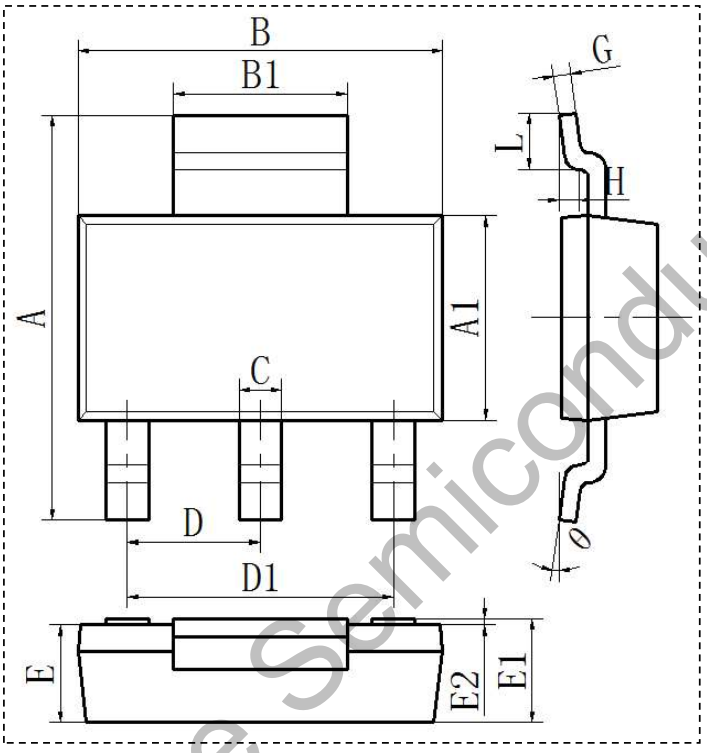
Package Dimension

SOT-223

Unit: mm



符号	标准	下公差	上公差	下限值	上限值
A	6.95	-0.24	0.24	6.71	7.19
A1	3.5	-0.1	0.1	3.4	3.6
B	6.4	-0.1	0.1	6.2	6.4
B1	3.00	-0.1	0.1	2.9	3.1
C	0.74	-0.08	0.08	0.66	0.82
D	2.3	-0.05	0.05	2.25	2.35
D1	4.6	-0.1	0.1	4.5	4.7
E	1.6	-0.1	0.1	1.5	1.7
E1	1.66	-0.14	0.14	1.52	1.8
E2(测试后)	/	/	/	0	0.1
E2（成型后）	/	/	/	0.02	0.08
G	0.3	-0.05	0.05	0.25	0.35
H	0.25	-0.05	0.05	0.20	0.30
L	0.95	-0.15	0.15	0.8	1.1
θ	8	/	/	8	8

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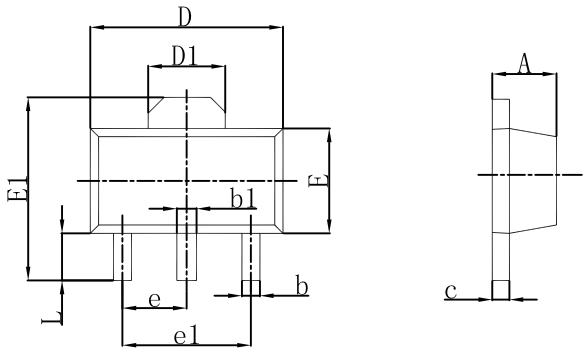
Package Dimension

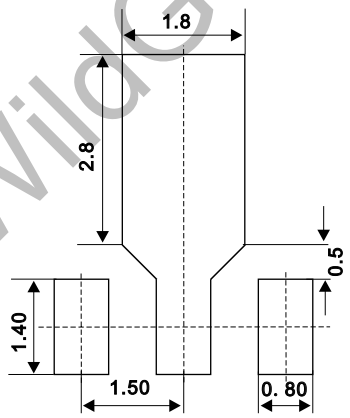
SOT-89

Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

SOT-89-3L Suggested Pad Layout



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

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