

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-60V	23mΩ@-10V	-40A
	29mΩ@-4.5V	



合肥矽普半导体

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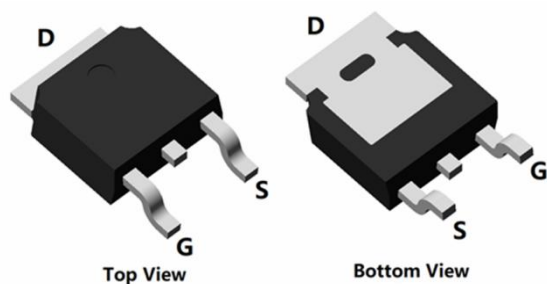
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

Applications

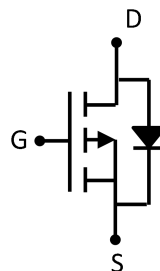
- DC-DC Converter
- Load Switching

Package

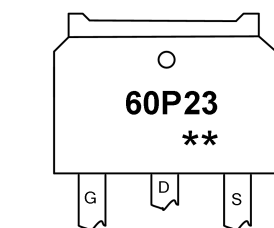


TO-252(1:G 2:D 3:S)

Circuit diagram



Marking



60P23
**

:Device Code
:Week Code

Order Information

Device	Package	Unit/Tape
SP60P23TH	TO-252	2500

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	-40	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)	I_D	-27	A
Pulsed Drain Current	I_{DM}	-160	A
Single Pulse Avalanche Energy ¹	E_{AS}	101	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	86.8	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.4	$^\circ\text{C/W}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250uA	-60	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-48V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =-250uA	-1.0	-1.5	-2.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-10V , ID=-18A	-	23	28	mΩ
		VGS=-4.5V , ID=-12A	-	29	35	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-15V , VGS=0V , f=1MHz	-	3635	-	pF
Output Capacitance	Coss		-	224	-	
Reverse Transfer Capacitance	Crss		-	141	-	
Total Gate Charge	Qg	VDS=-20V , VGS=-4.5V , ID=-12A	-	25	-	nC
Gate-Source Charge	Qgs		-	6.7	-	
Gate-Drain Charge	Qgd		-	5.5	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=-15V,VGS=-10V,RG=3.3Ω, ID=-1A	-	38	-	nS
Rise Time	Tr		-	23.6	-	
Turn-Off Delay Time	Td(off)		-	100	-	
Fall Time	Tf		-	6.8	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	-40	A

Note :

- The EAS test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, R_G=25\Omega$

Typical Characteristics

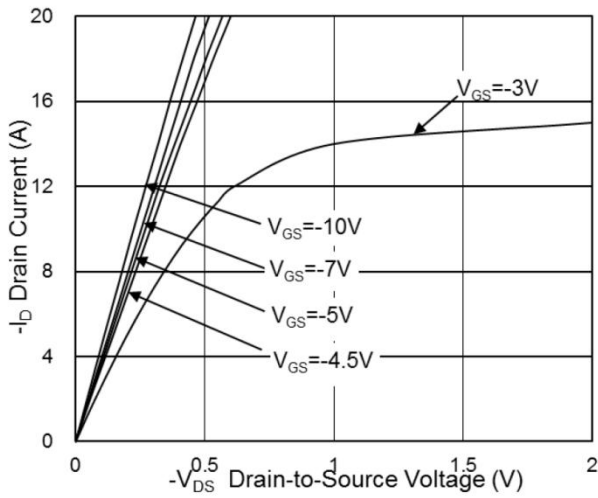


Fig.1 Typical Output Characteristics

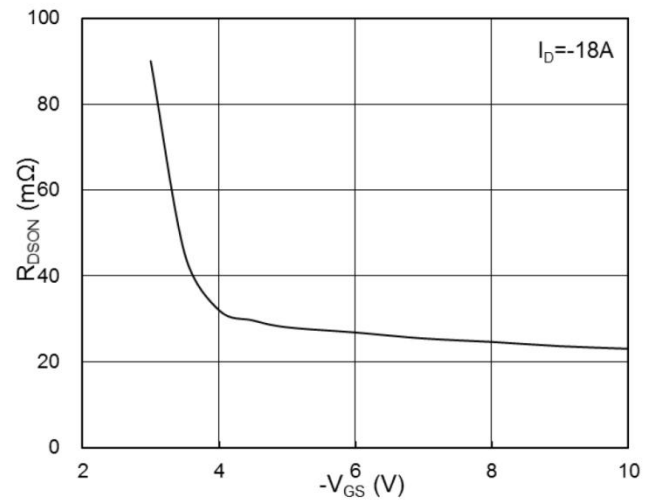


Fig.2 On-Resistance vs. G-S Voltage

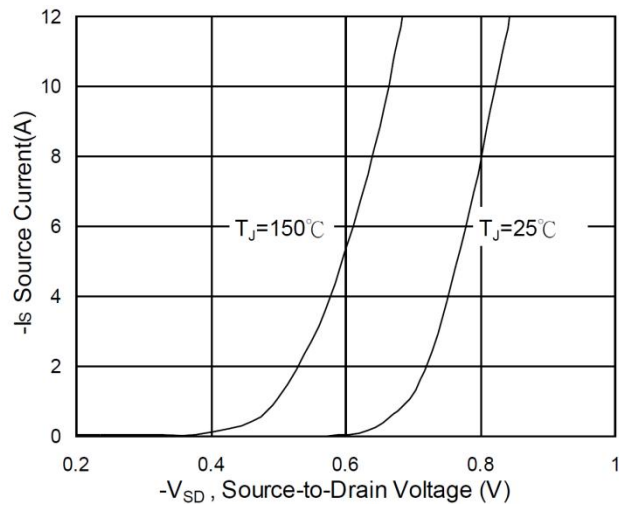


Fig.3 Source Drain Forward Characteristics

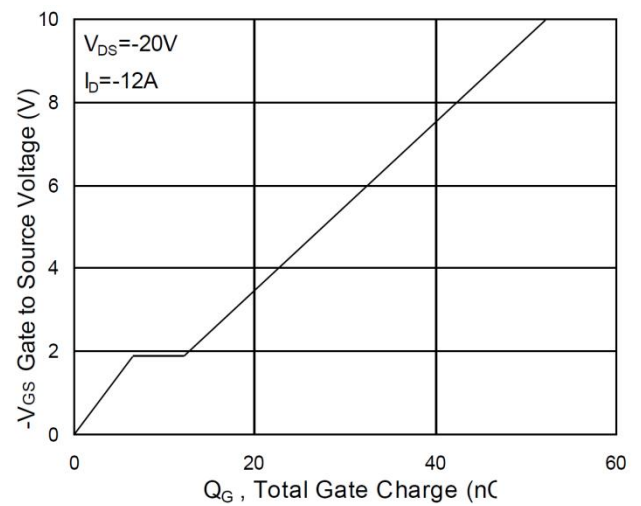


Fig.4 Gate-Charge Characteristics

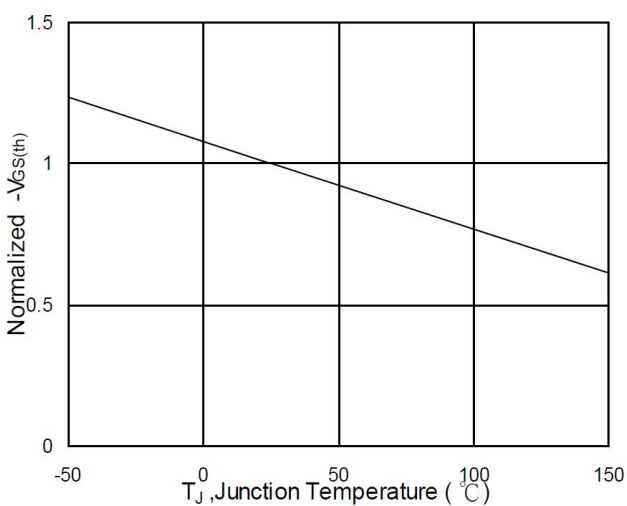


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

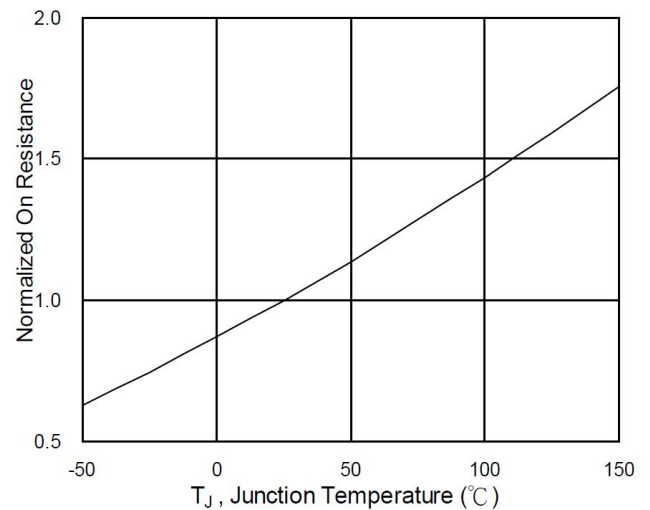


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

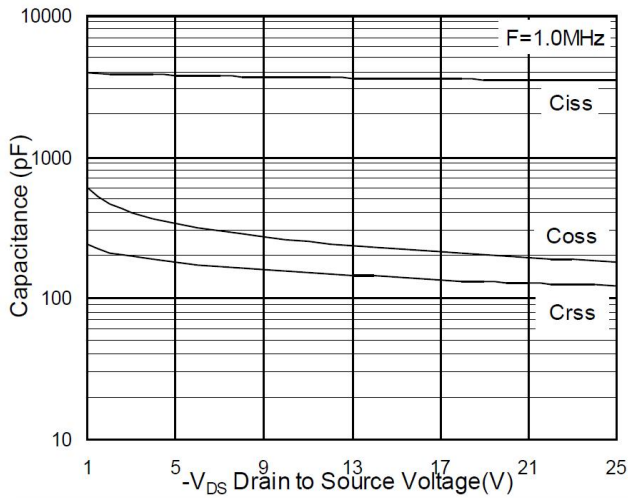


Fig.7 Capacitance

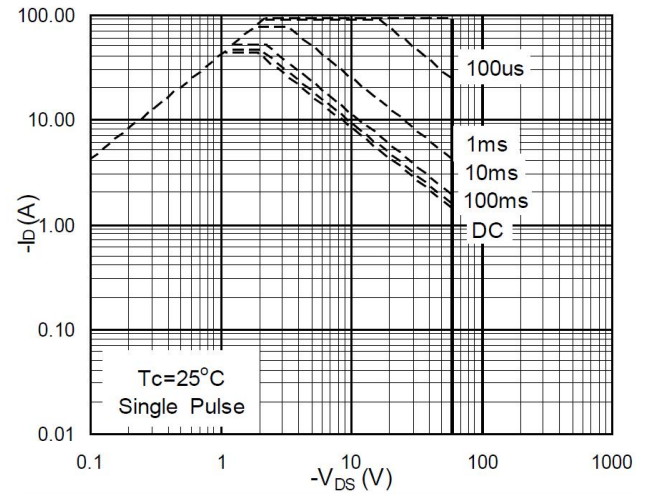


Fig.8 Safe Operating Area

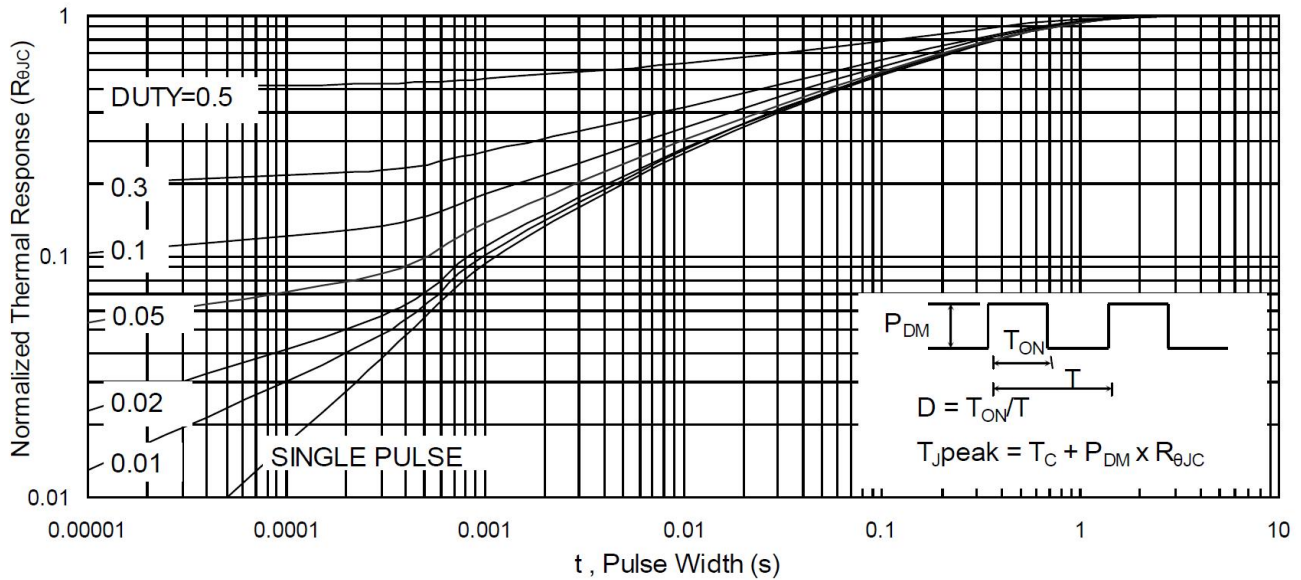


Fig.9 Normalized Maximum Transient Thermal Impedance

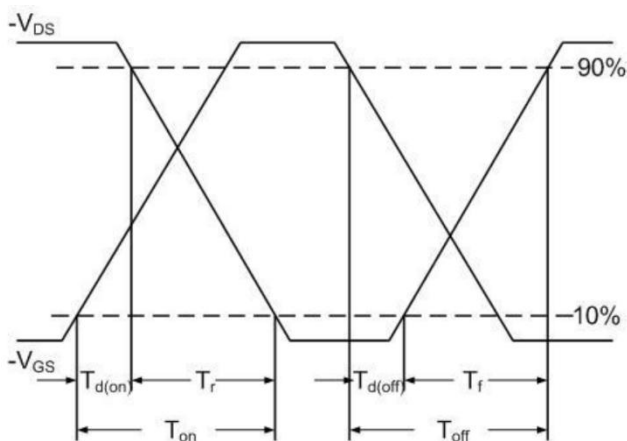


Fig.10 Switching Time Waveform

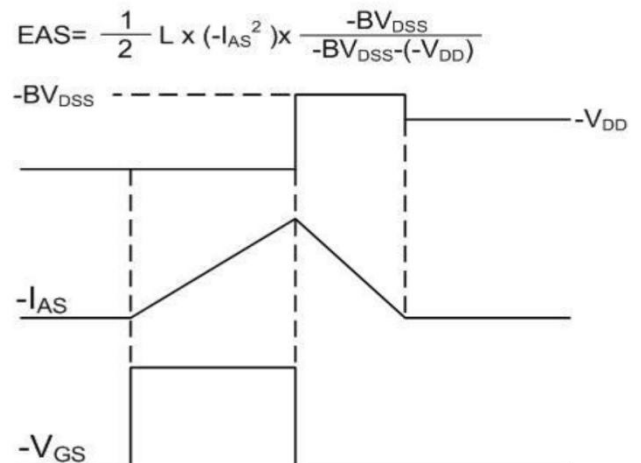
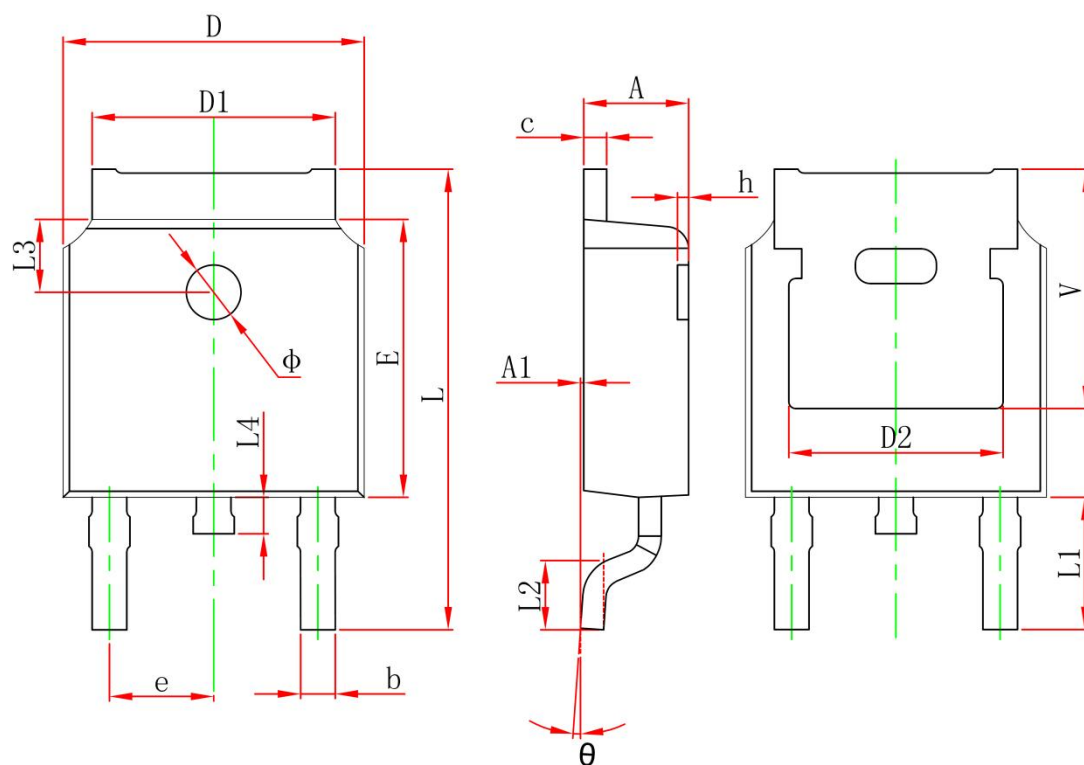


Fig.11 Unclamped Inductive Waveform

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
ϕ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	