

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	3.5mΩ@10V	120A
	4.5mΩ@4.5V	



合肥矽普半导体

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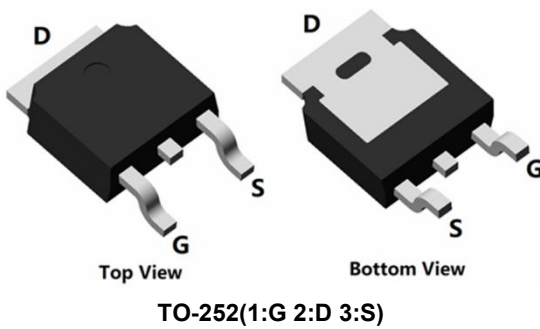
Feature

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

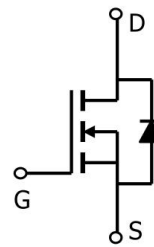
Applications

- DC-DC Converter
- Load switching

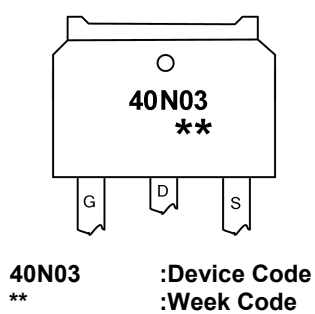
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tape
SP40N03TH	TO-252	2500

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	120	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)	I_D	80	A
Pulsed Drain Current	I_{DM}	480	A
Single Pulse Avalanche Energy ¹	E_{AS}	350	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	120	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.04	$^\circ\text{C/W}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

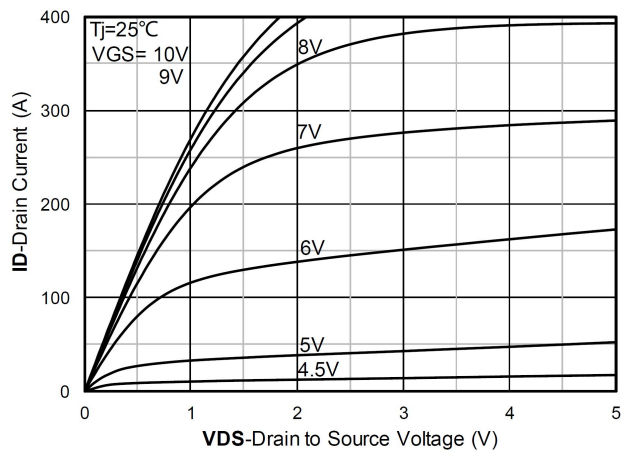
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	B _V DSS	VGS=0V , ID=250uA	40	-	-	V
Drain-Source Leakage Current	I _D SS	VDS=32V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I _G SS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS} (th)	VGS=VDS , ID =250uA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	R _{DS} (ON)	VGS=10V , ID=20A	-	3.5	4.5	mΩ
		VGS=4.5V , ID=15A	-	4.5	6.5	
Dynamic characteristics						
Input Capacitance	C _{iss}	VDS=20V , VGS=0V , f=1MHz	-	5400	-	pF
Output Capacitance	C _{oss}		-	970	-	
Reverse Transfer Capacitance	C _{rss}		-	380	-	
Total Gate Charge	Q _g	VDS=20V , VGS=10V , ID=20A	-	75	-	nC
Gate-Source Charge	Q _{gs}		-	10.5	-	
Gate-Drain Charge	Q _{gd}		-	17	-	
Switching Characteristics						
Turn-On Delay Time	T _d (on)	VDD=20V, VGS=10V , RG=3Ω, ID=2A	-	15	-	nS
Rise Time	T _r		-	18	-	
Turn-Off Delay Time	T _d (off)		-	52	-	
Fall Time	T _f		-	23	-	
Diode Characteristics						
Diode Forward Voltage	V _{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	120	A
Reverse Recovery Time	T _{rr}	IS=30A, di/dt=100A/us, TJ=25℃	-	25	-	nS
Reverse Recovery Charge	Q _{rr}		-	16	-	nC

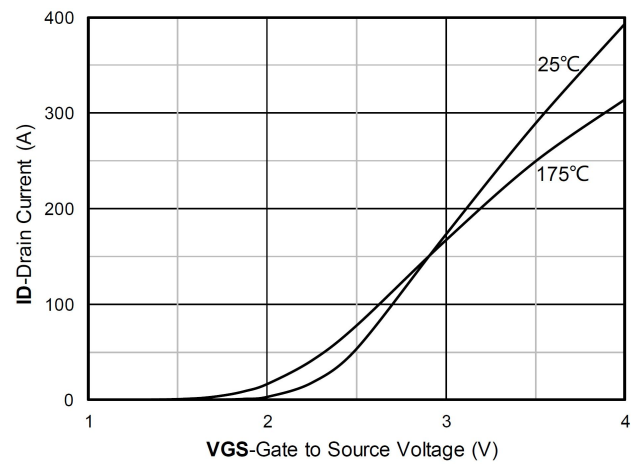
Note :

- The EAS test condition is $V_{DD}=20V$, $V_{GS}=10V$, $L=0.5\text{mH}$, $R_G=25\Omega$

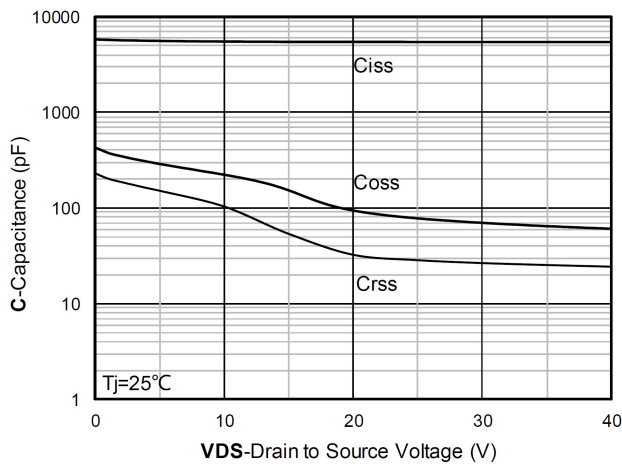
Typical Characteristics



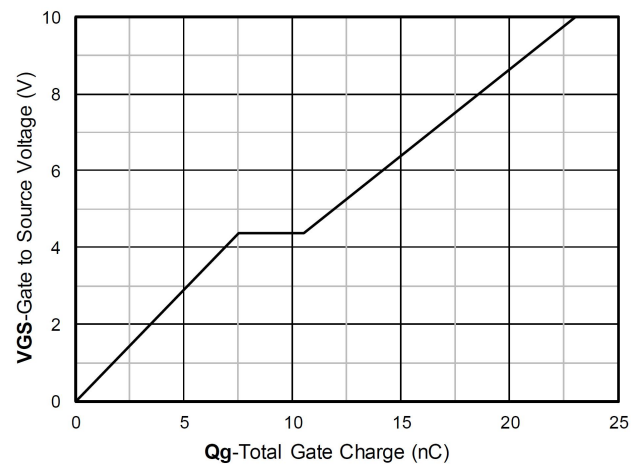
Output Characteristics



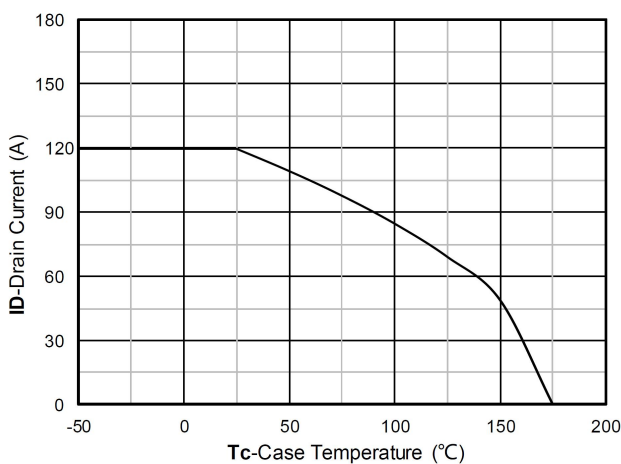
Transfer Characteristics



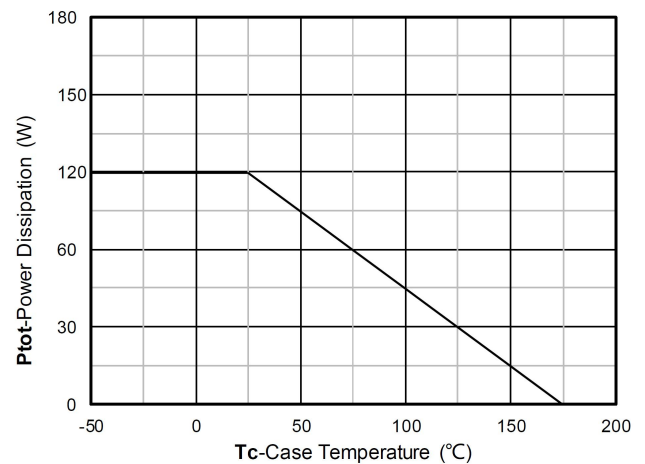
Capacitance Characteristics



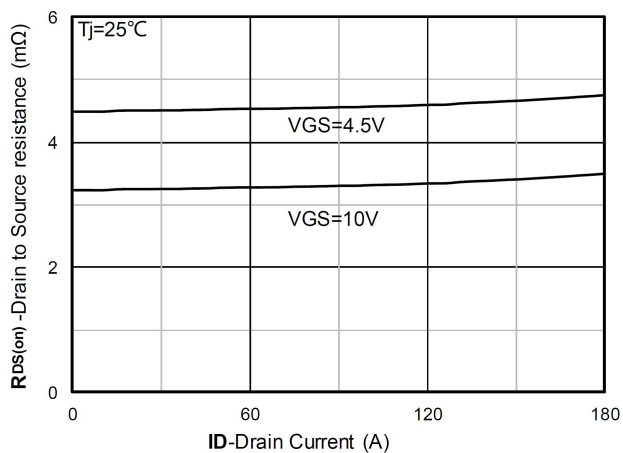
Gate Charge



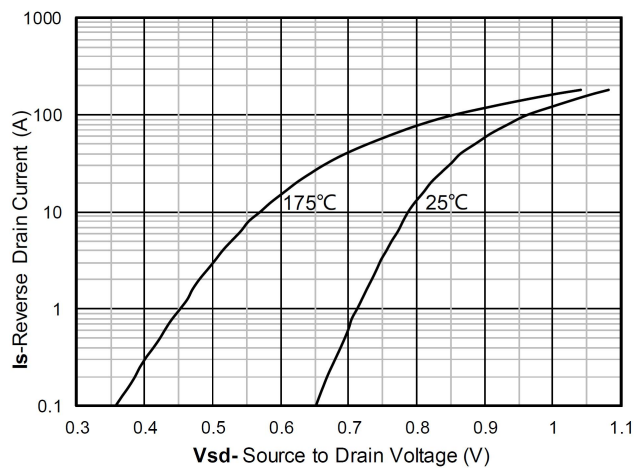
Current dissipation



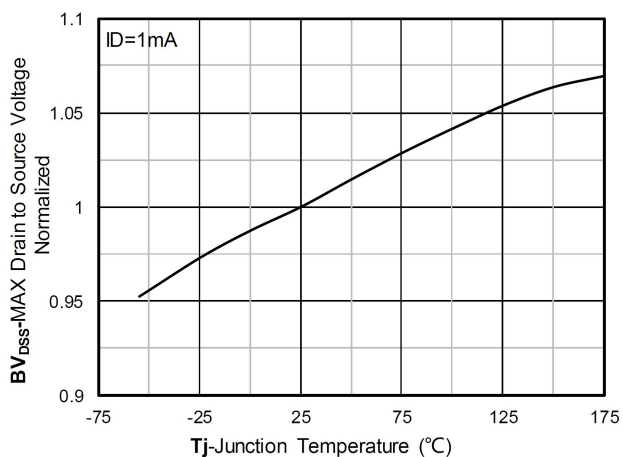
Power dissipation



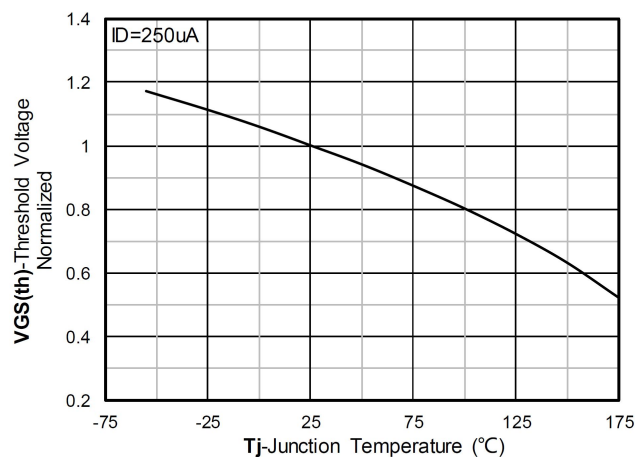
$R_{DS(on)}$ VS Drain Current



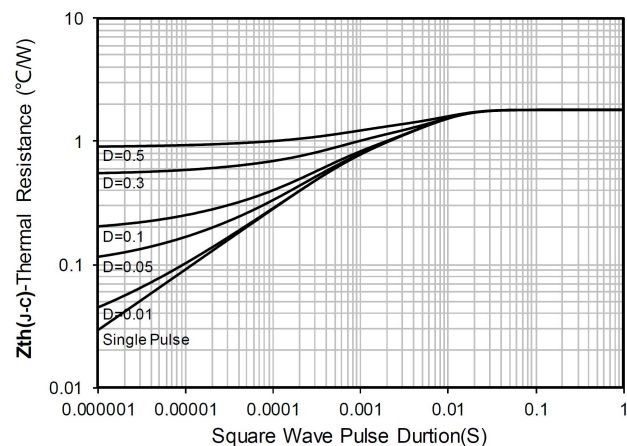
Forward characteristics of reverse diode



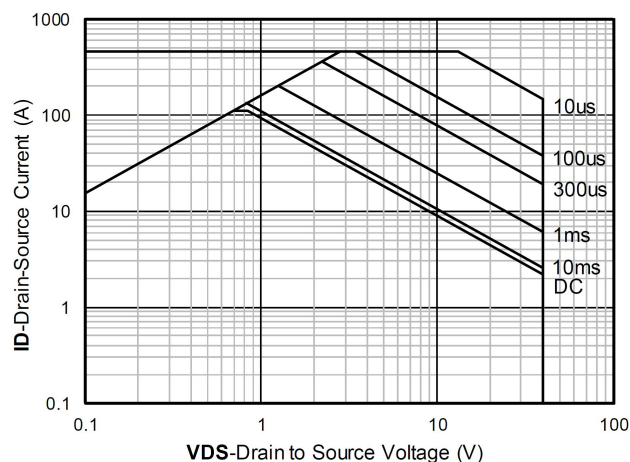
Normalized breakdown voltage



Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

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.	