

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	1.9mΩ@10V	130A
	3mΩ@4.5V	



合肥矽普半导体

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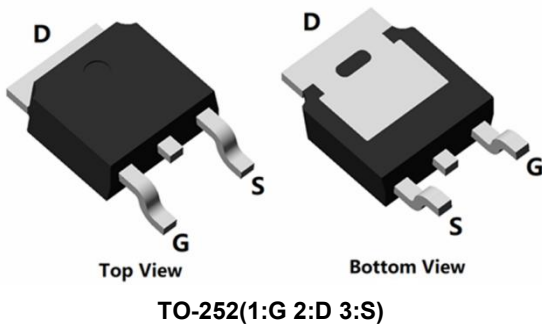
Feature

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

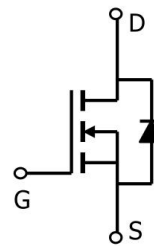
Applications

- Power switching application
- PWM Application
- DC-DC Converter

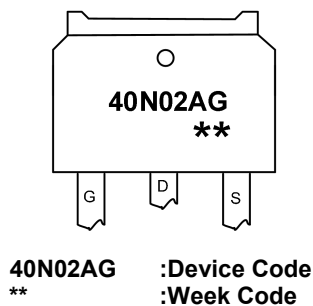
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tape
SP40N02AGTH	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 (Tc=25°C)	I_D	130	A
Continuous Drain Current (Tc=100°C)	I_D	85	A
Pulsed Drain Current	I_{DM}	520	A
Single Pulse Avalanche Energy ¹	E_{AS}	506	mJ
Power Dissipation (Tc=25°C)	P_D	125	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

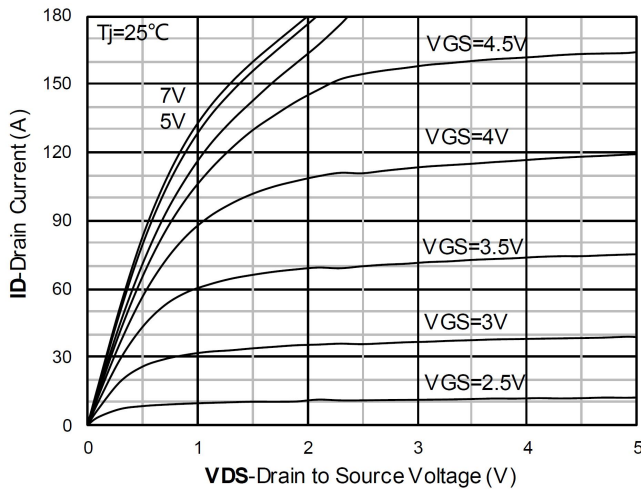
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	40	-	-	V
Drain Cut-Off Current	I _{DSS}	VDS=32V , VGS=0V , TJ=25℃	-	-	1	uA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	1.0	1.8	2.5	V
Drain-Source ON Resistance	RDS(ON)	VGS=10V , ID=20A	-	1.9	2.5	mΩ
		VGS=4.5V , ID=10A	-	3	4	
Dynamic Characteristics						
Input Capacitance	Ciss	VDS=20V , VGS=0V , f=1MHz	-	3485	-	pF
Output Capacitance	Coss		-	1208	-	
Reverse Transfer Capacitance	Crss		-	59	-	
Total Gate Charge	Qg	VDS=20V , VGS=10V , ID=85A	-	57	-	nC
Gate-Source Charge	Qgs		-	9.5	-	
Gate-Drain Charge	Qgd		-	11	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=20V, VGS=10V, RG=1.6Ω, ID=85A	-	10	-	nS
Rise Time	tr		-	3	-	
Turn-Off Delay Time	td(off)		-	35	-	
Fall Time	tf		-	4	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	VSD	Is = 1A, VGS = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	Is		-	-	130	A
Reverse Recovery Time	Trr	Is=40A, di/dt=100A/us, TJ=25℃	-	42	-	nS
Reverse Recovery Charge	Qrr		-	37	-	nC

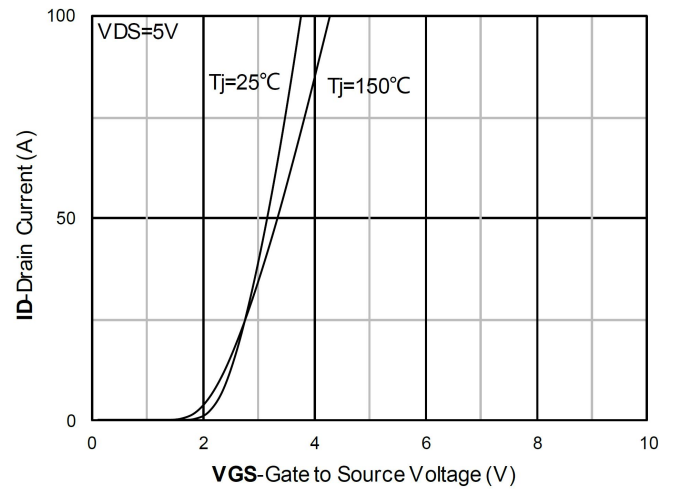
Note :

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

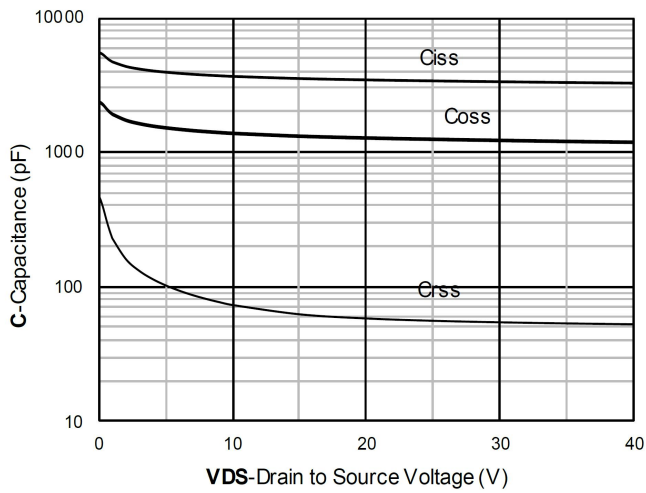
Typical Characteristics



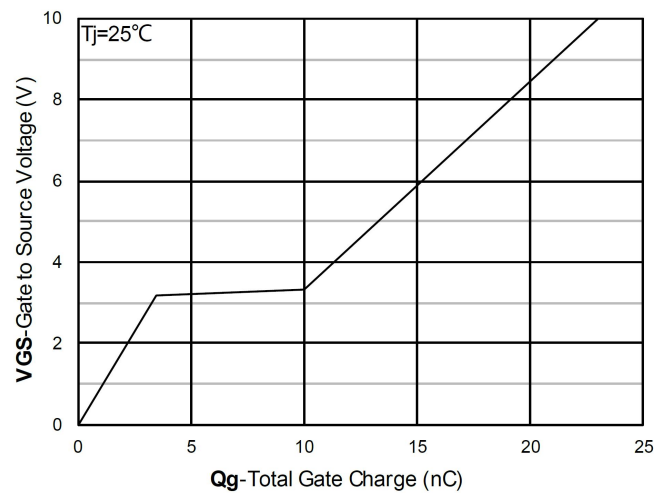
Output Characteristics



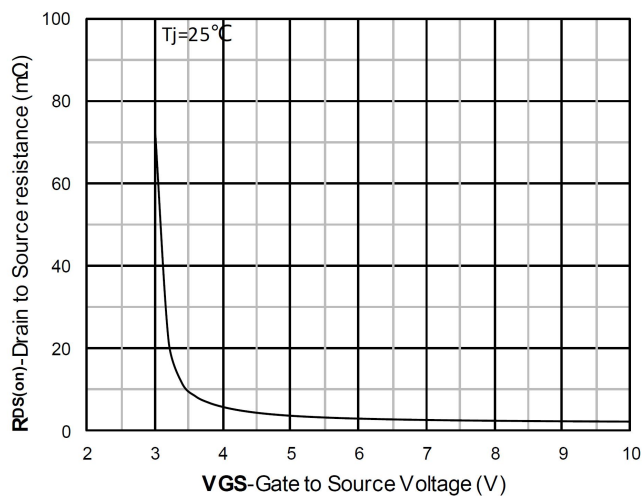
Transfer Characteristics



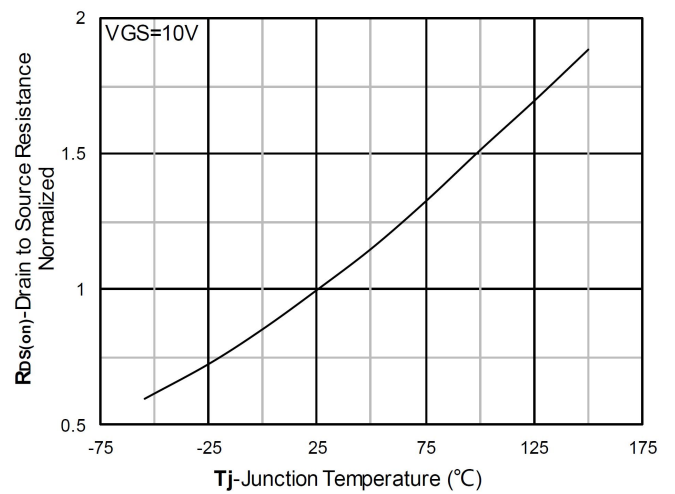
Capacitance Characteristics



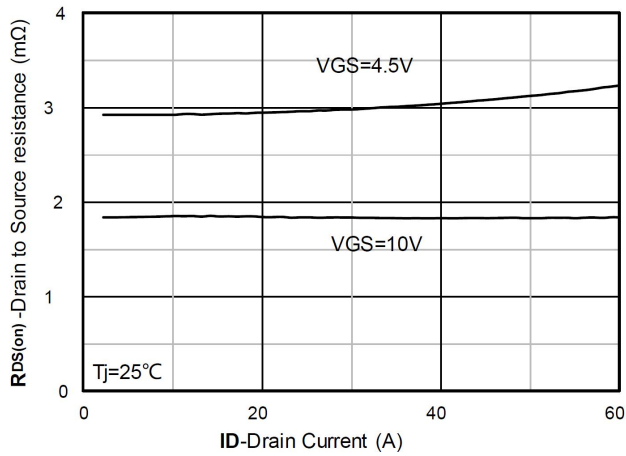
Gate Charge



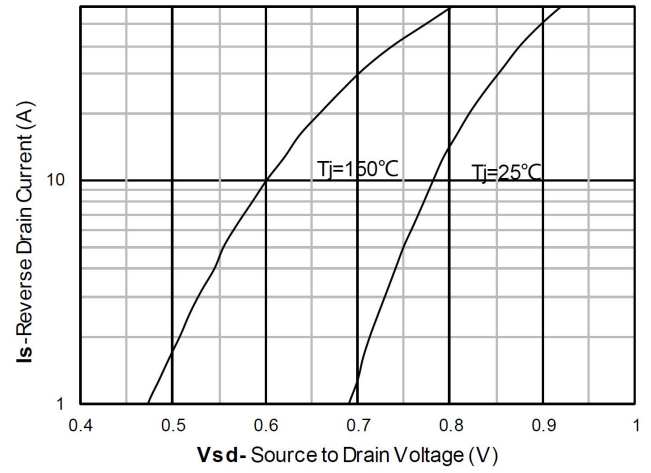
On-Resistance vs Gate to Source Voltage



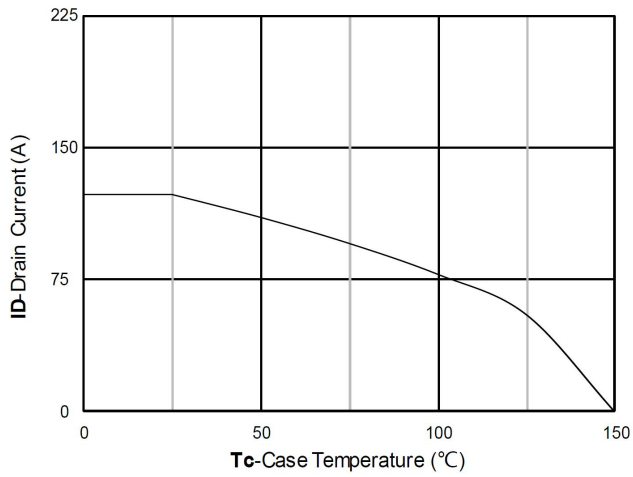
Normalized On-Resistance



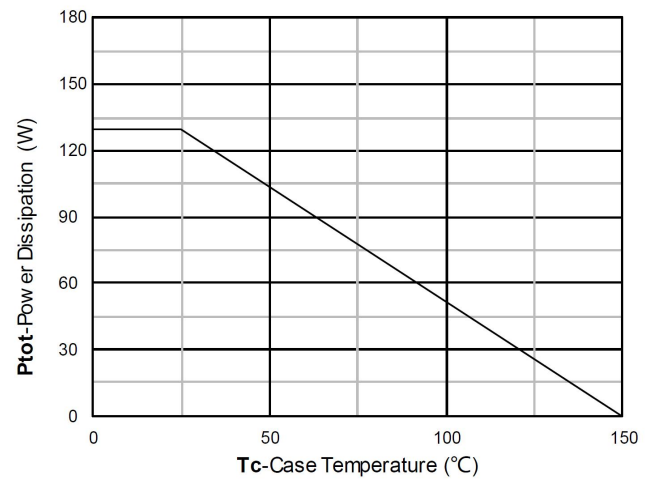
RDS(on) VS Drain Current



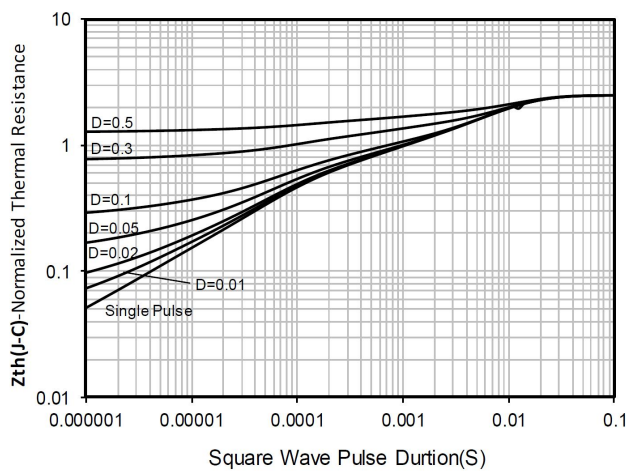
Forward characteristics of reverse diode



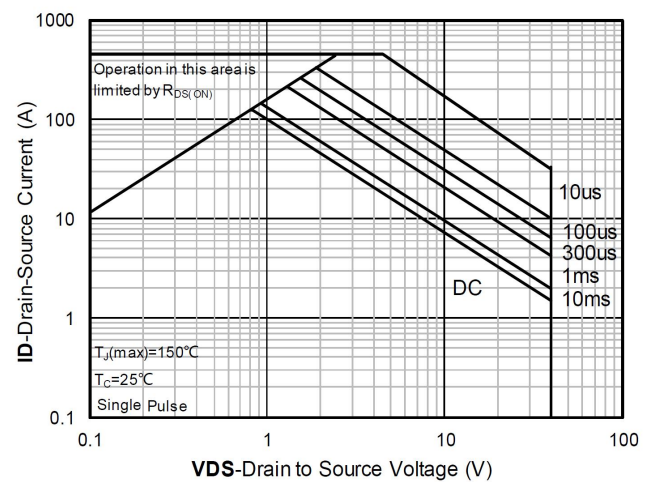
Current dissipation



Power dissipation

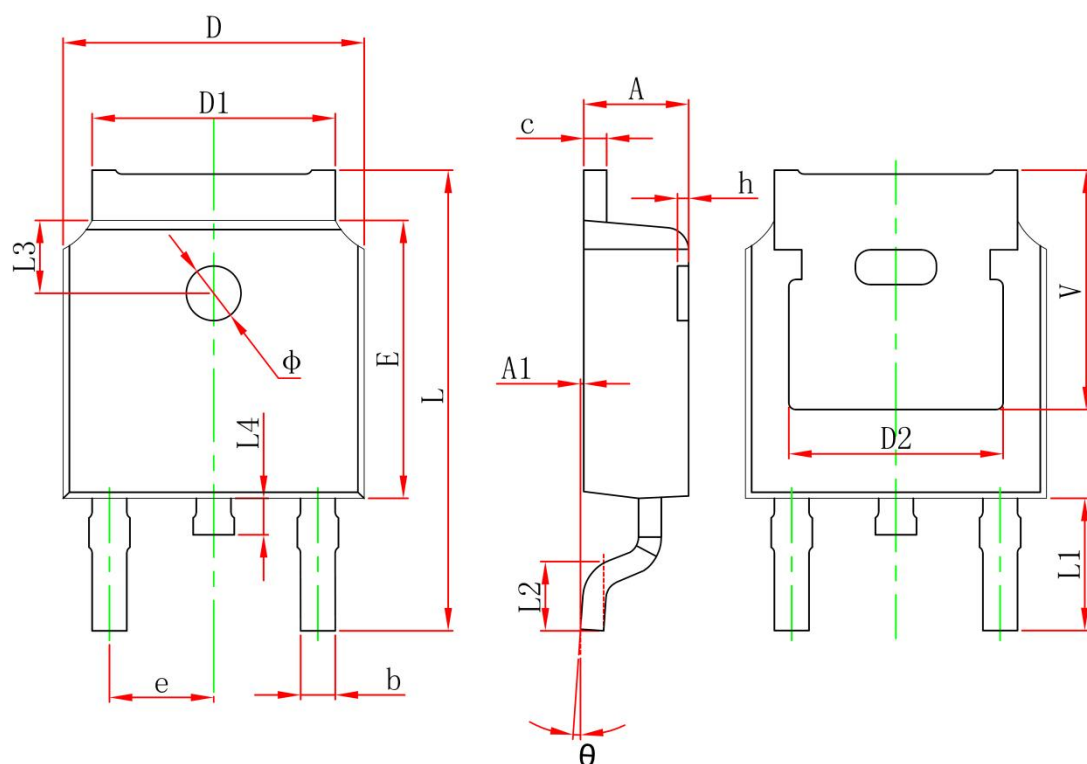


Maximum Transient Thermal Impedance



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.	