

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	4.1mΩ@10V	100A
	5mΩ@4.5V	



合肥矽普半导体

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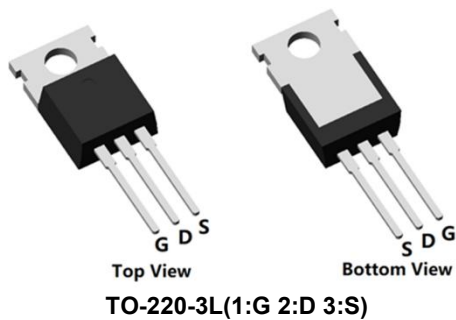
Feature

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

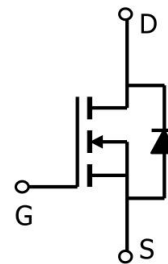
Applications

- Power switching application
- DC-DC Converter
- Power Management

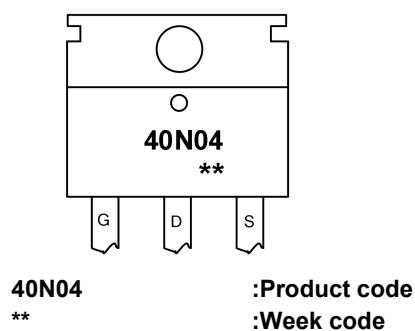
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP40N04TQ	TO-220-3L	50

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	100	A
Continuous Drain Current (Tc=100°C)	I_D	67	A
Pulsed Drain Current	I_{DM}	400	A
Single Pulse Avalanche Energy ¹	E_{AS}	169	mJ
Power Dissipation (Tc=25°C)	P_D	90	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.4	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

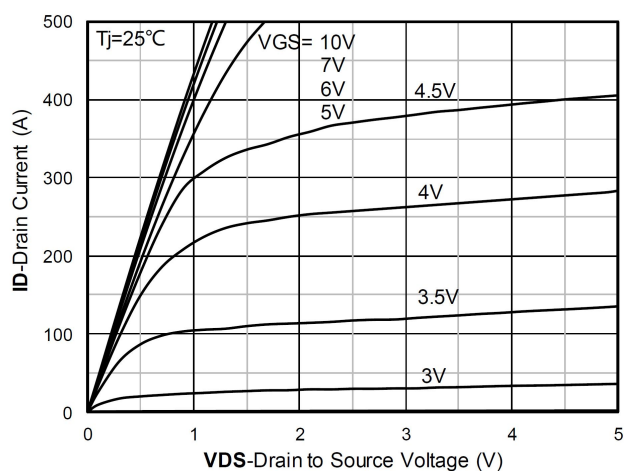
Electrical characteristics (Ta=25°C, unless otherwise noted)

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	μA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID =250uA	1.2	1.6	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	VGS=10V , ID=20A	-	4.1	6	mΩ
		VGS=4.5V , ID=10A	-	5	7	
Dynamic Characteristics						
Input Capacitance	C _{iss}	VDS=20V , VGS=0V , f=1MHz	-	3785	-	pF
Output Capacitance	C _{oss}		-	285	-	
Reverse Transfer Capacitance	C _{rss}		-	256	-	
Total Gate Charge	Q _g	VDS=20V , VGS=10V , ID=30A	-	71	-	nC
Gate-Source Charge	Q _{gs}		-	15.3	-	
Gate-Drain Charge	Q _{gd}		-	14.5	-	
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	VDD=20V,VGS=10V, RG=3Ω, ID=30A	-	12	-	nS
Rise Time	t _r		-	28	-	
Turn-Off Delay Time	t _{d(off)}		-	63	-	
Fall Time	t _f		-	12	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 1A, VGS = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	100	A
Reverse Recovery Time	T _{rr}	I _S =20A, di/dt=100A/us, TJ=25℃	-	17	-	nS
Reverse Recovery Charge	Q _{rr}		-	9	-	nC

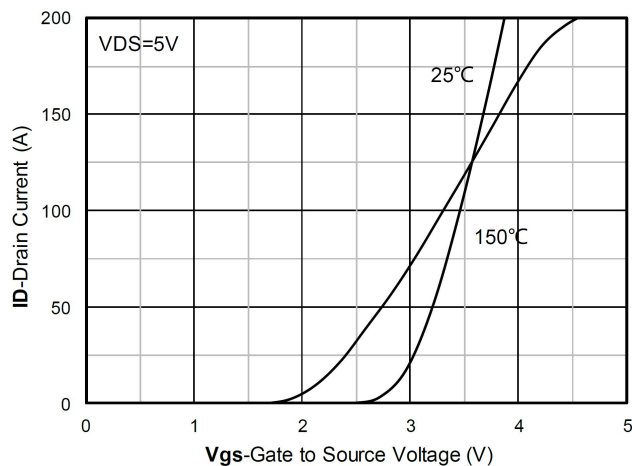
Note :

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

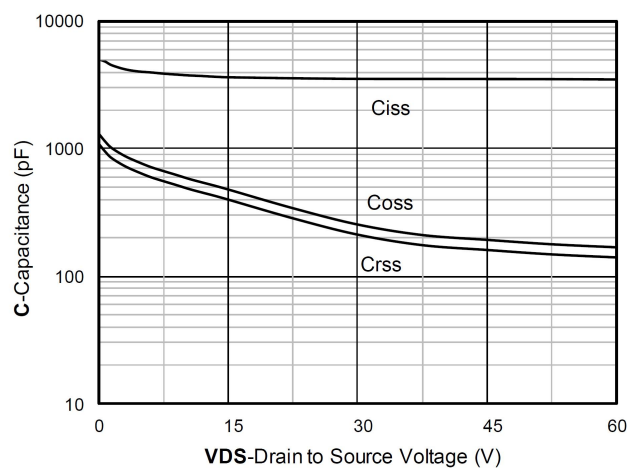
Typical Characteristics



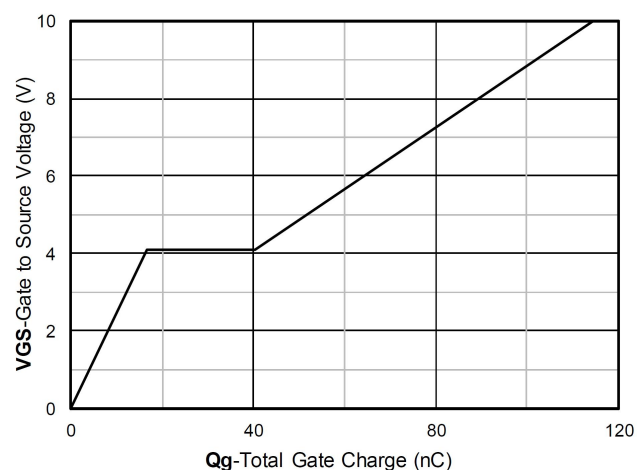
Output Characteristics



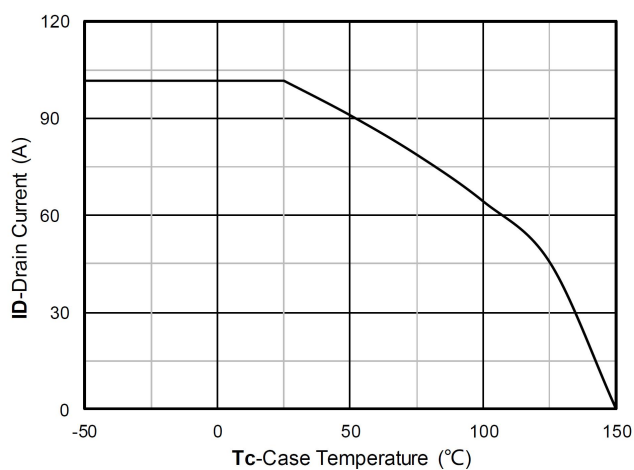
Transfer Characteristics



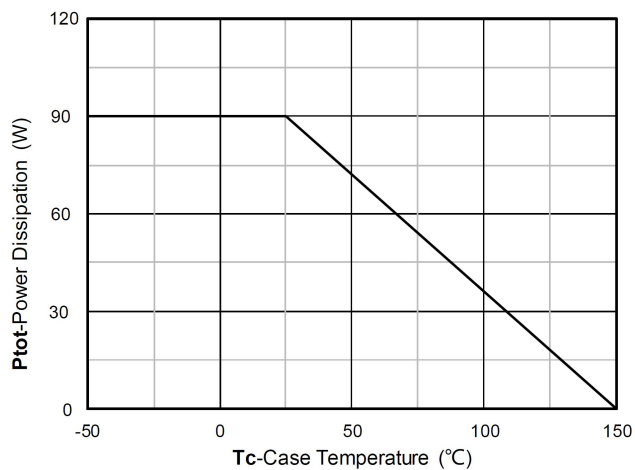
Capacitance Characteristics



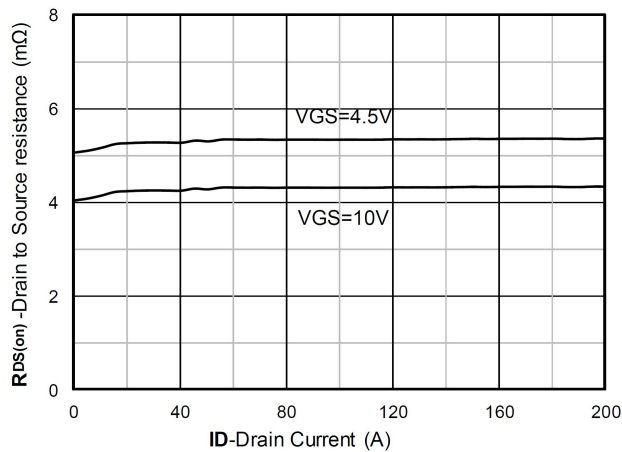
Gate Charge



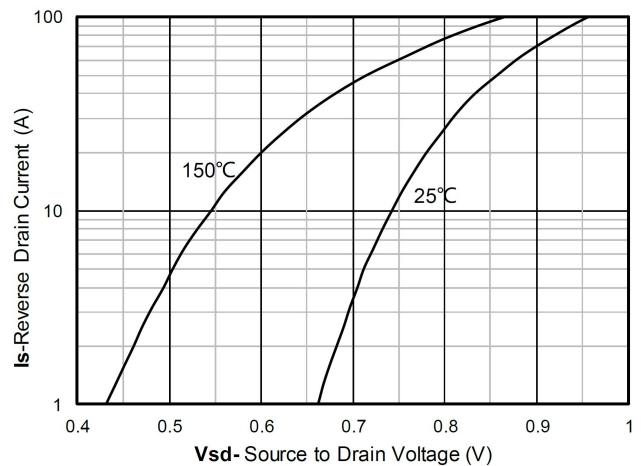
Current dissipation



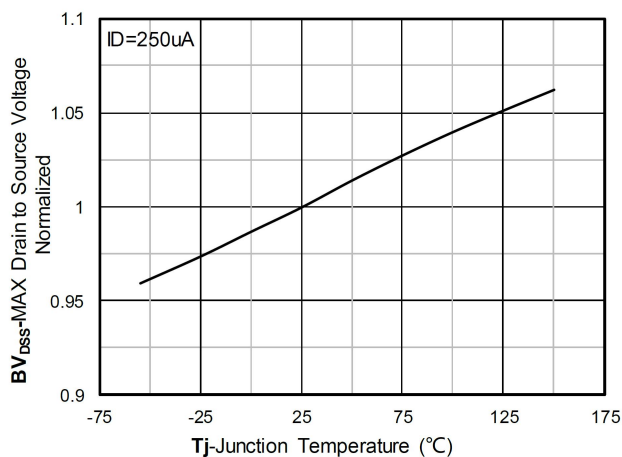
Power dissipation



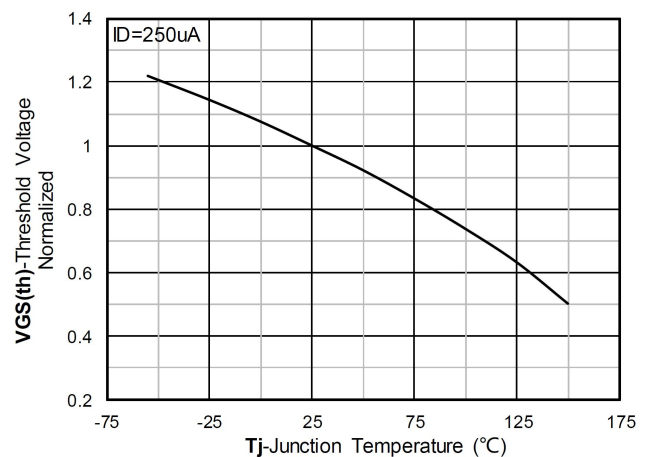
$R_{DS(on)}$ VS Drain Current



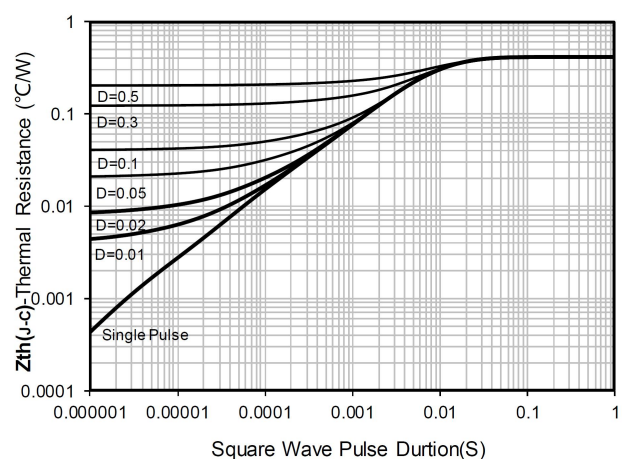
Forward characteristics of reverse diode



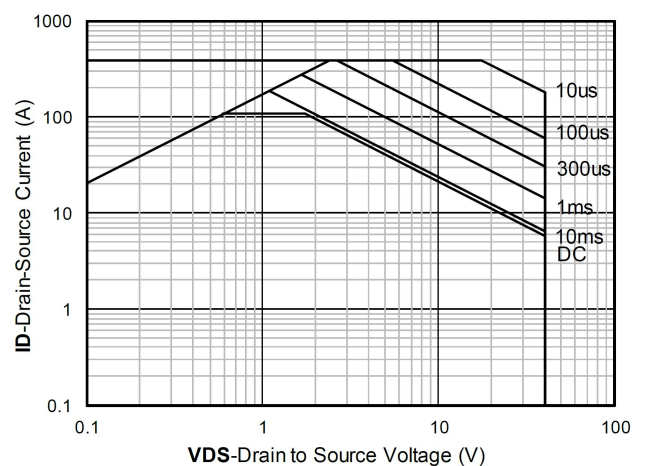
Normalized breakdown voltage



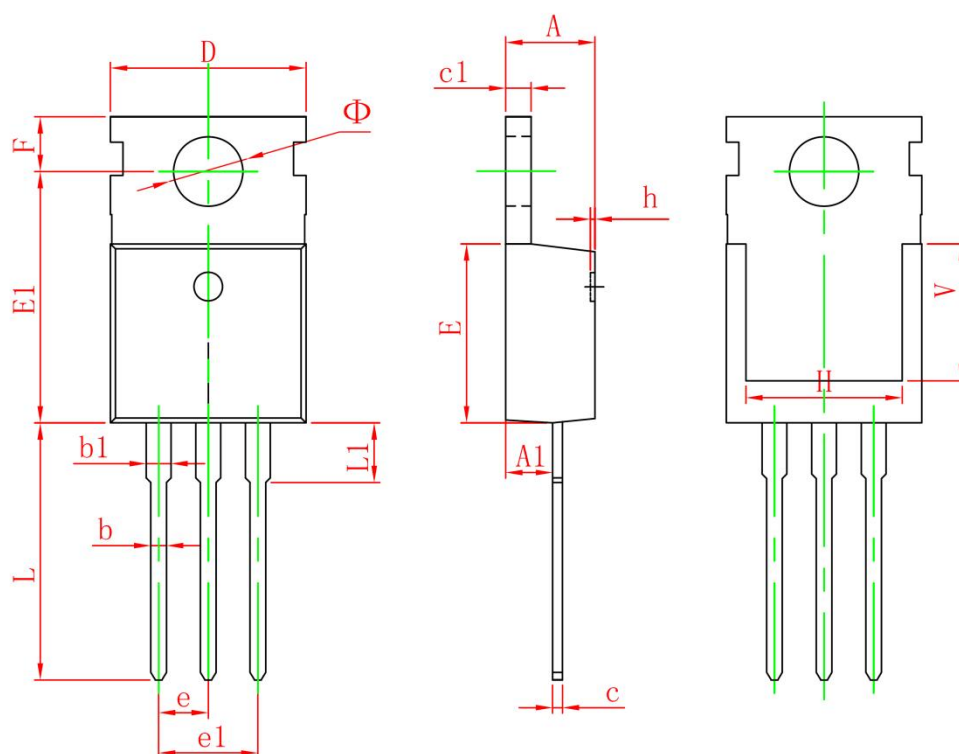
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

**TO-220-3L Package Information**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150