Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
100V	4.9mΩ@10V	125A
	6.4mΩ@4.5V	

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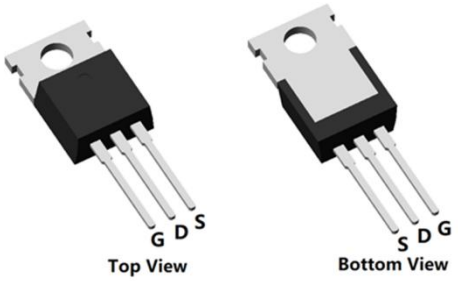
Feature

- Fast switching speed
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

Applications

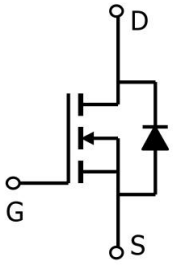
- DC-DC Converters
- Motor Control
- Portable equipment application

Package

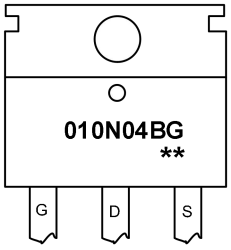


TO-220-3L(1:G 2:D 3:S)

Circuit diagram



Marking



010N04BG :Product code
** :Week code

Order Information

Device	Package	Unit/Tube
SP010N04BGTQ	TO-220-3L	50

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (Tc=25°C)	I_D	125	A
Continuous Drain Current (Tc=100°C)	I_D	83	A
Pulse Drain Current Tested	I_{DM}	500	A
Single pulsed avalanche energy[1]	E_{AS}	361	mJ
Power Dissipation (Tc=25°C)	P_D	185	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.68	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

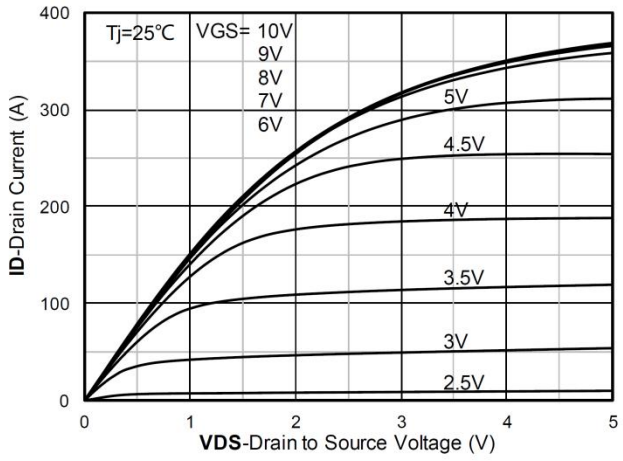
Electrical characteristics (Ta=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=250uA	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=80V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	1	2	3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=30A	-	4.9	6.1	mΩ
		VGS=4.5V , ID=20A	-	6.4	8.5	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=50V , VGS=0V , f=1MHz	-	2970	-	pF
Output Capacitance	C_{oss}		-	1125	-	
Reverse Transfer Capacitance	C_{rss}		-	24	-	
Total Gate Charge	Q_g	VDS=50V , VGS=10V , ID=50A	-	42	-	nC
Gate-Source Charge	Q_{gs}		-	27	-	
Gate-Drain Charge	Q_{gd}		-	7.3	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=50V , VGS=10V , RG=3Ω , ID=50A	-	12.1	-	nS
Rise Time	T_r		-	17.4	-	
Turn-Off Delay Time	$T_{d(off)}$		-	47	-	
Fall Time	T_f		-	32	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Diode Continuous Current	I_S		-	-	125	A
Reverse recover time	T_{rr}	IS=50A, di/dt=100A/us, Tj=25℃	-	32	-	nS
Reverse recovery charge	Q_{rr}		-	146	-	nC

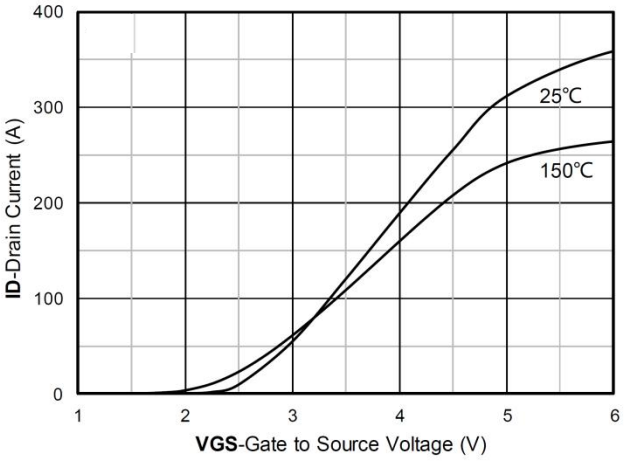
Note：

1. The EAS Test condition is VDD=50V,VGS =10V,L = 0.5mH, Rg=25Ω

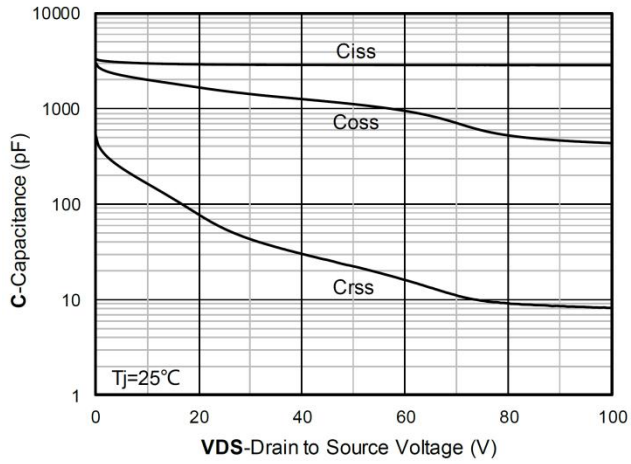
Typical Characteristics



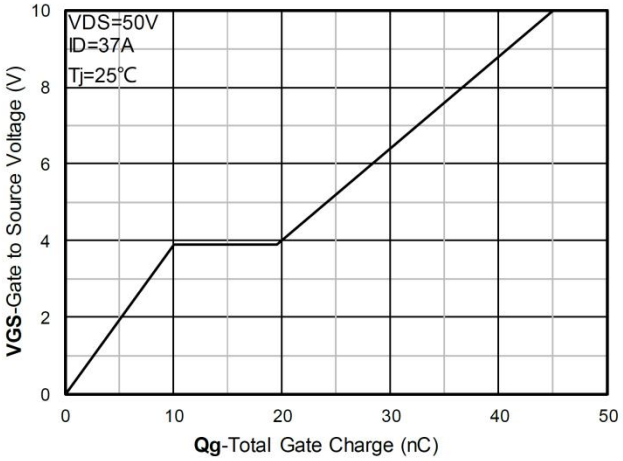
Output Characteristics



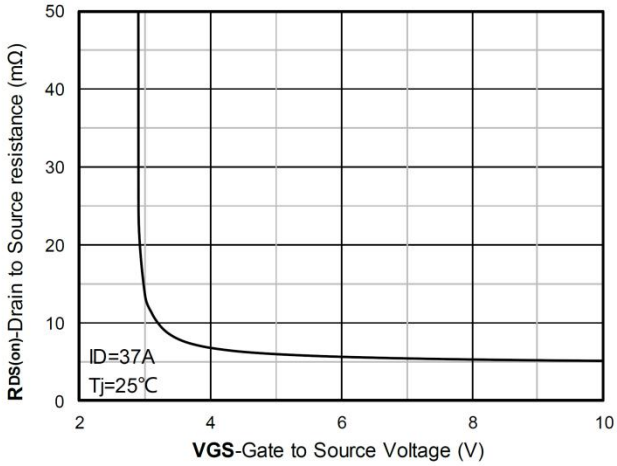
Transfer Characteristics



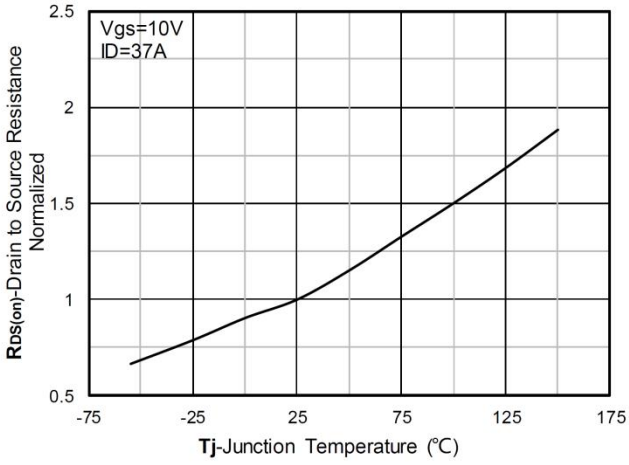
Capacitance Characteristics



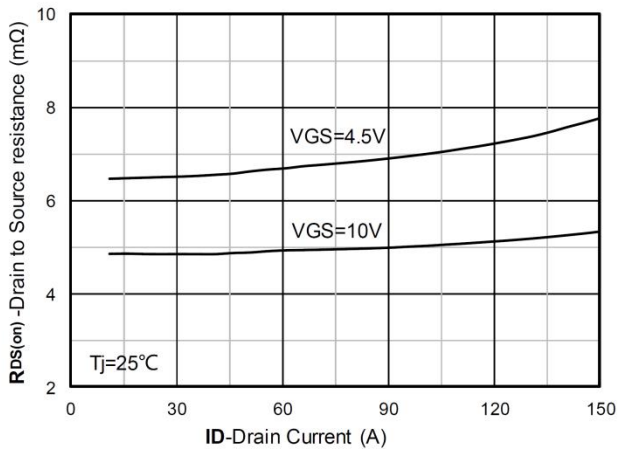
Gate Charge



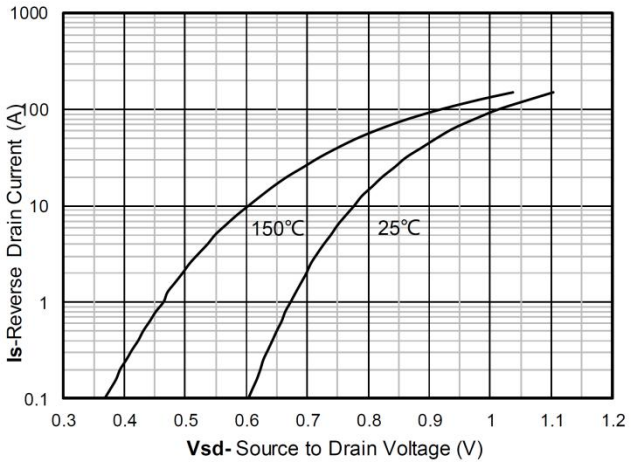
On-Resistance vs Gate to Source Voltage



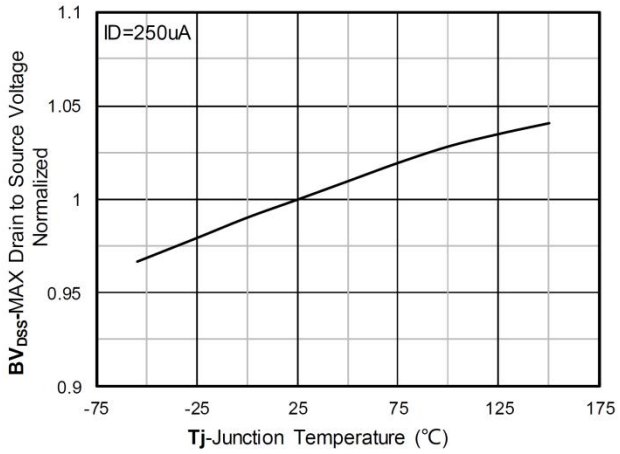
Normalized On-Resistance



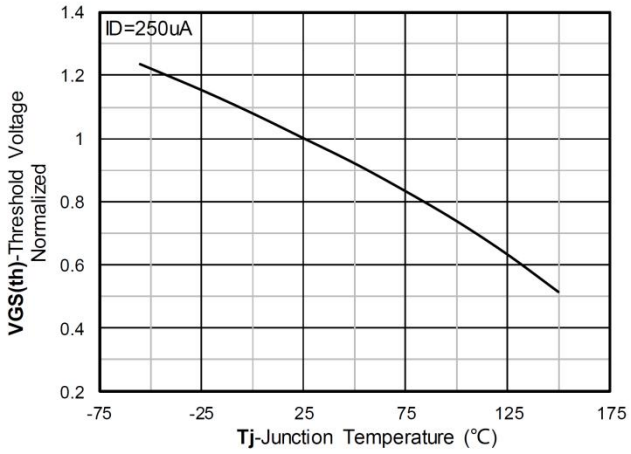
RDS(on) VS Drain Current



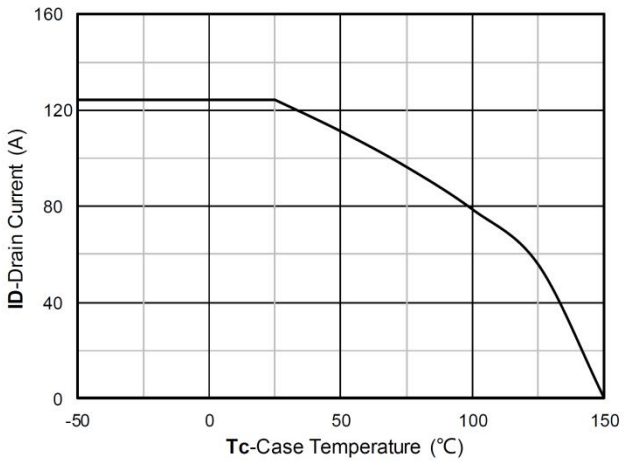
Forward characteristics of reverse diode



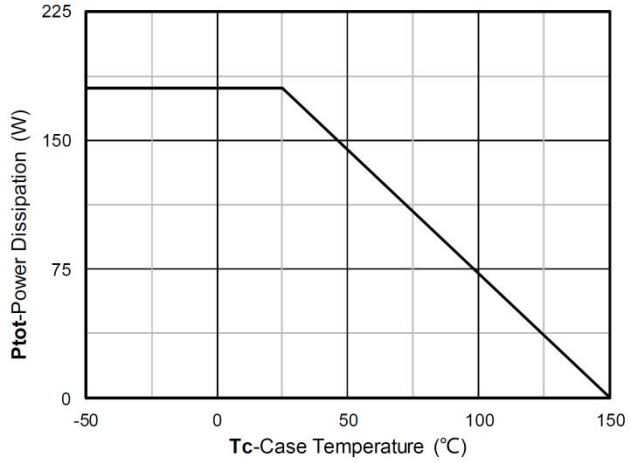
Normalized breakdown voltage



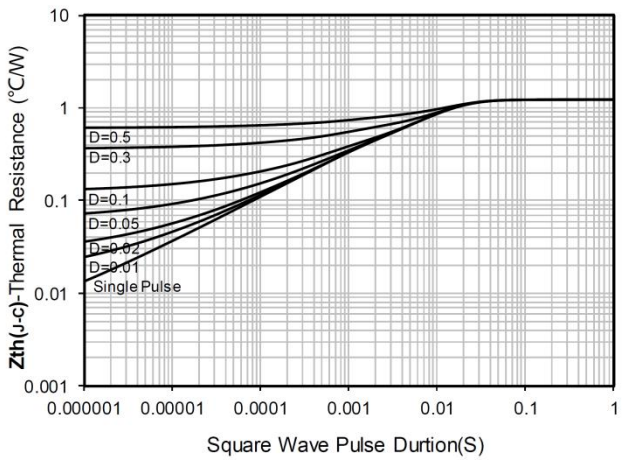
Normalized Threshold voltage



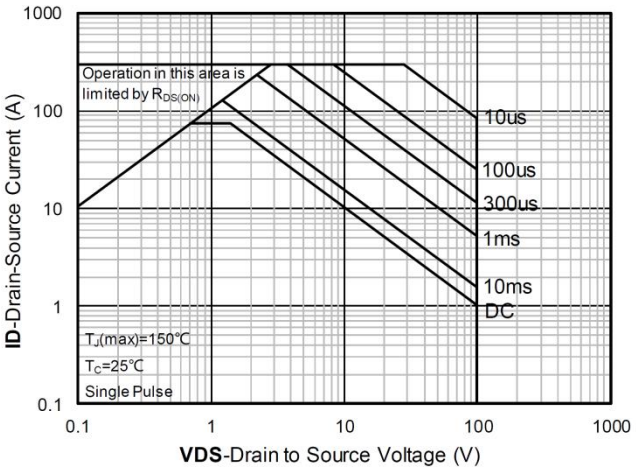
Current dissipation



Power dissipation

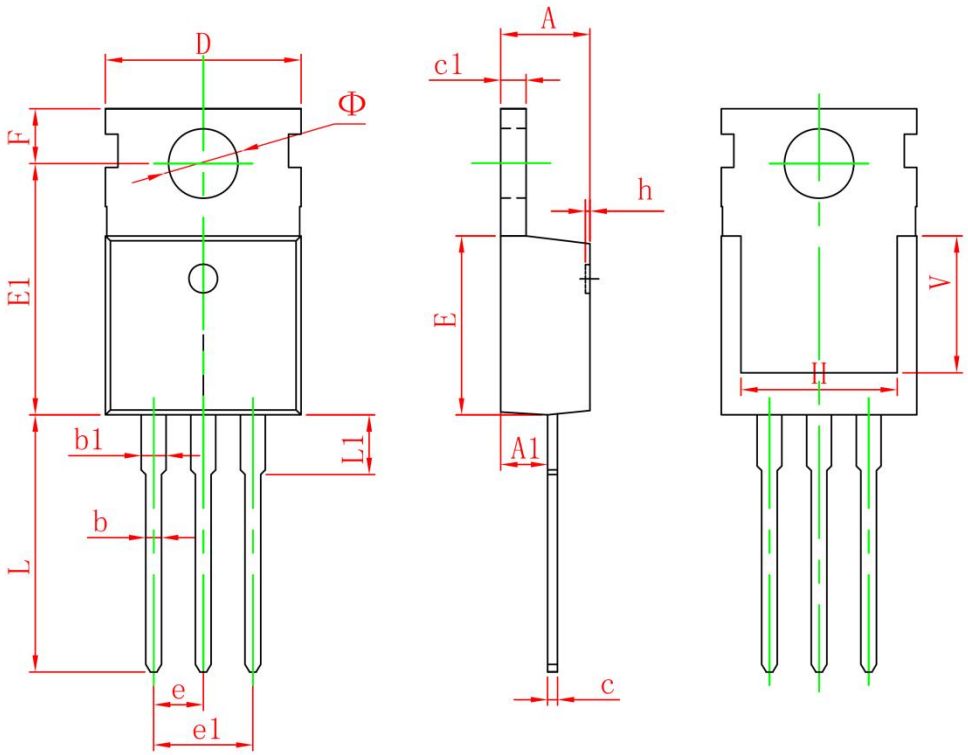


Maximum Transient Thermal Impedance



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