

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	SPP11N60C3
▶ Overseas	Part Number	SPP11N60C3
▶ Equivalent	Part Number	SPP11N60C3

EV is the abbreviation of name EVVO

650V N-Channel Enhancement Mode MOSFET

Features

- Fast Switching
- Improved dv/dt Capability

Application

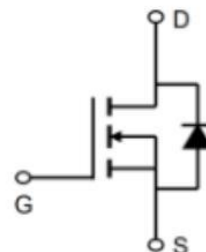
- Load Switch
- PWM Application
- Power management

General Features

$V_{DS} = 650V, I_D = 20 A$

$R_{DS(ON)} = 0.37\Omega @ V_{GS} = 10V$

TO-220GF Pin Configuration



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		650	V
V_{GSS}	Gate-Source Voltage		± 30	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	20	A
		$T_C = 100^\circ C$	13	A
I_{DM}	Pulsed Drain Current ^{note1}		80	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}		845	mJ
P_D	Power Dissipation	$T_C = 25^\circ C$	104	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.2	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62.5	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ C$

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Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V, T _J =25℃	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±30V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =10A	-	0.37	0.44	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	2709	-	pF
C _{oss}	Output Capacitance		-	252	-	pF
C _{rss}	Reverse Transfer Capacitance		-	24	-	pF
Q _g	Total Gate Charge	V _{DD} =520V, I _D =20A, V _{GS} =10V	-	67	-	nC
Q _{gs}	Gate-Source Charge		-	11	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	30	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =325V, I _D =20A, R _G =25Ω	-	33	-	ns
t _r	Turn-on Rise Time		-	59	-	ns
t _{d(off)}	Turn-off Delay Time		-	167	-	ns
t _f	Turn-off Fall Time		-	76	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _{SD} =20A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =20A, di/dt=100A/μs	-	420	-	ns
Q _{rr}	Reverse Recovery Charge		-	6.4	-	μC

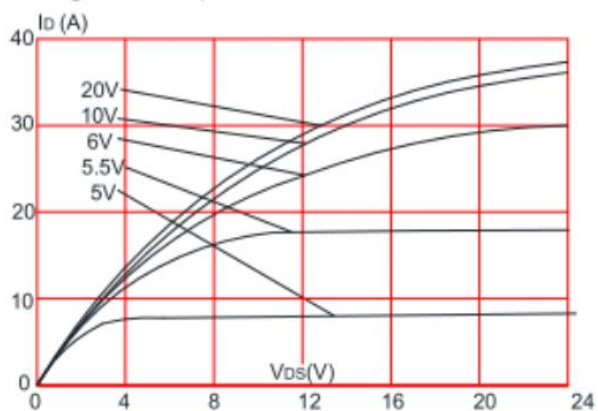
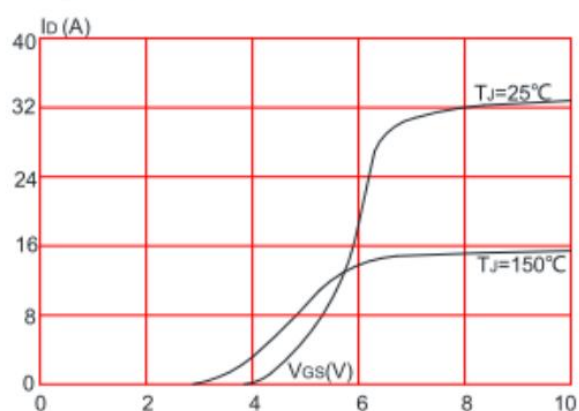
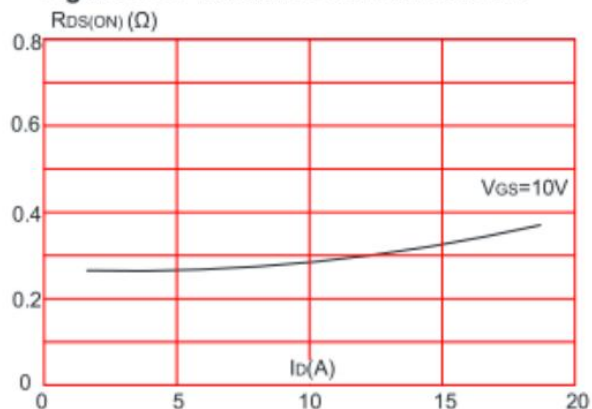
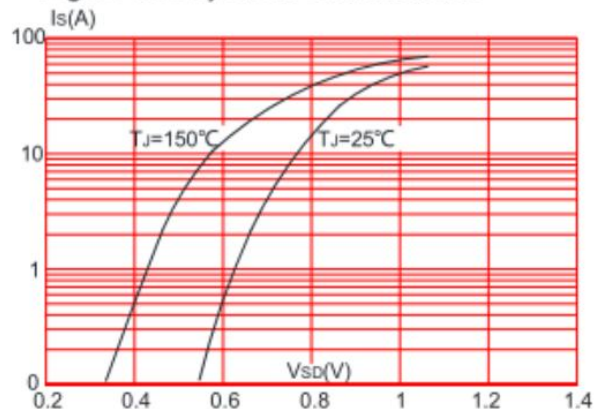
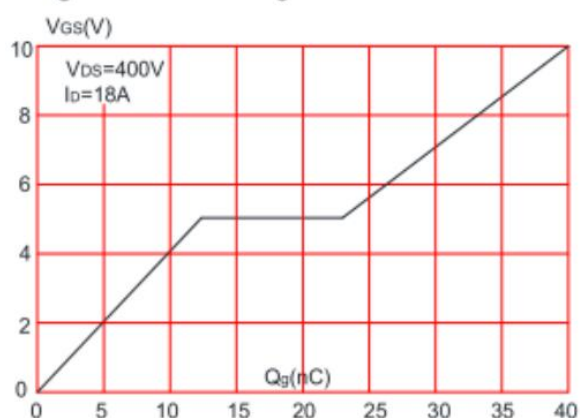
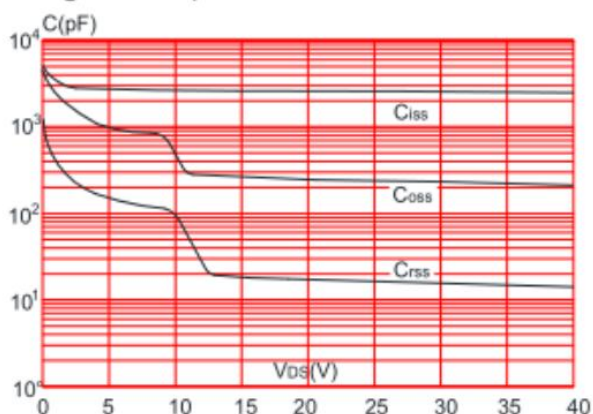
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. EAS condition: $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 10mH$, $I_{AS} = 13A$

 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

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Typical Performance Characteristics

Figure 1: Output Characteristics

Figure 2: Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

Figure 6: Capacitance Characteristics


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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

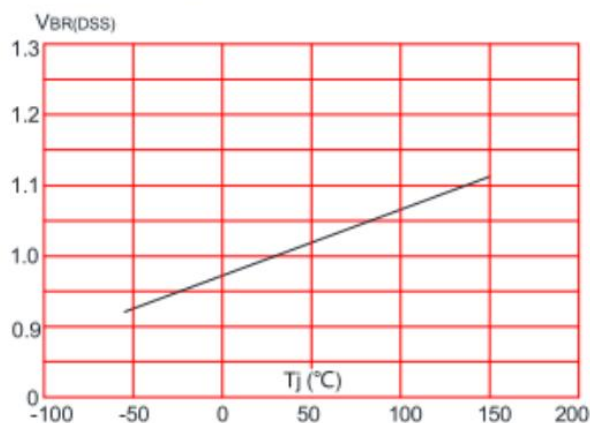


Figure 8: Normalized on Resistance vs. Junction Temperature

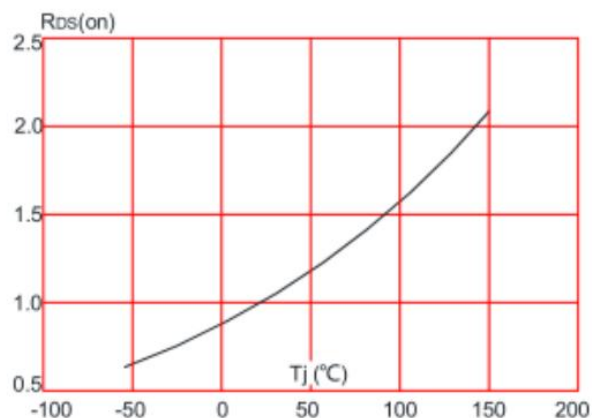


Figure 9: Maximum Safe Operating Area

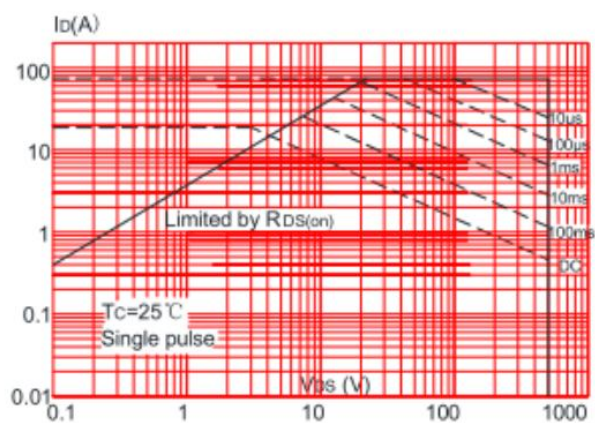


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

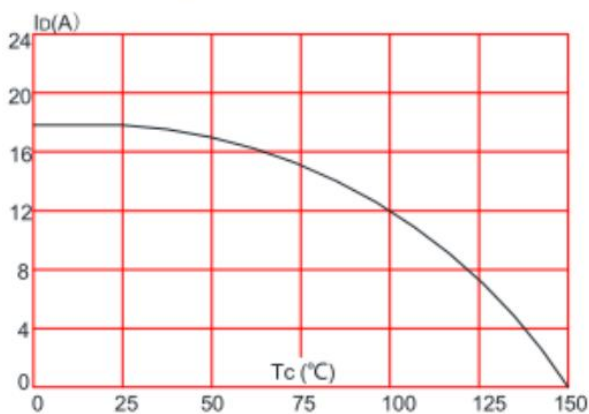
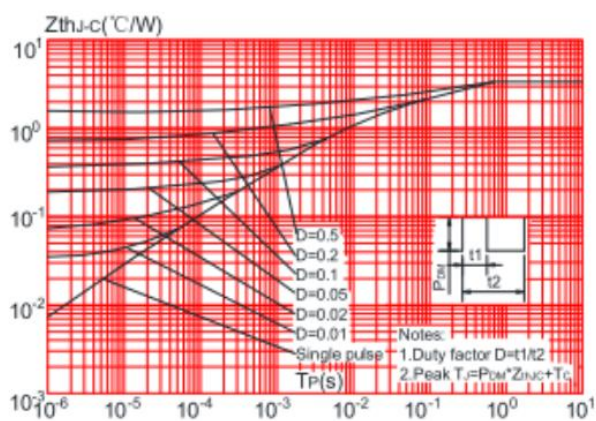


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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Test Circuit

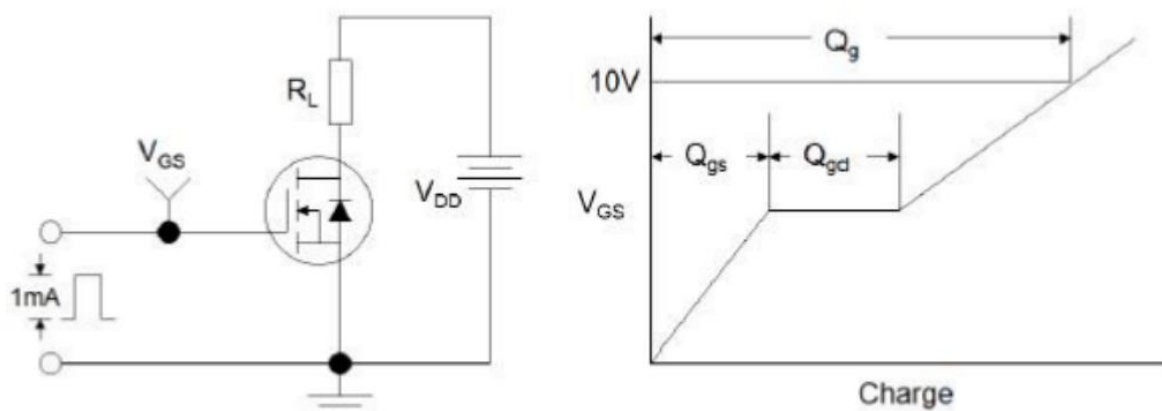


Figure1:Gate Charge Test Circuit & Waveform

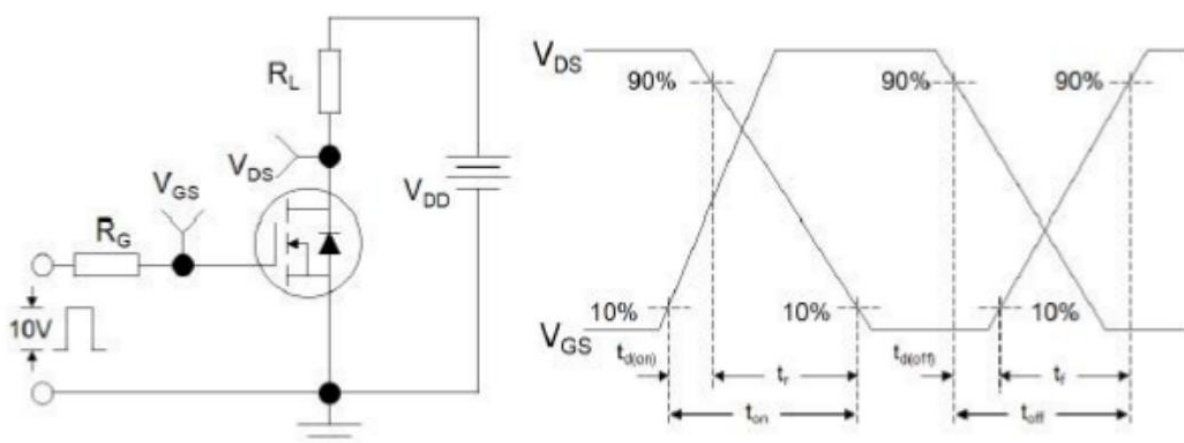


Figure 2: Resistive Switching Test Circuit & Waveforms

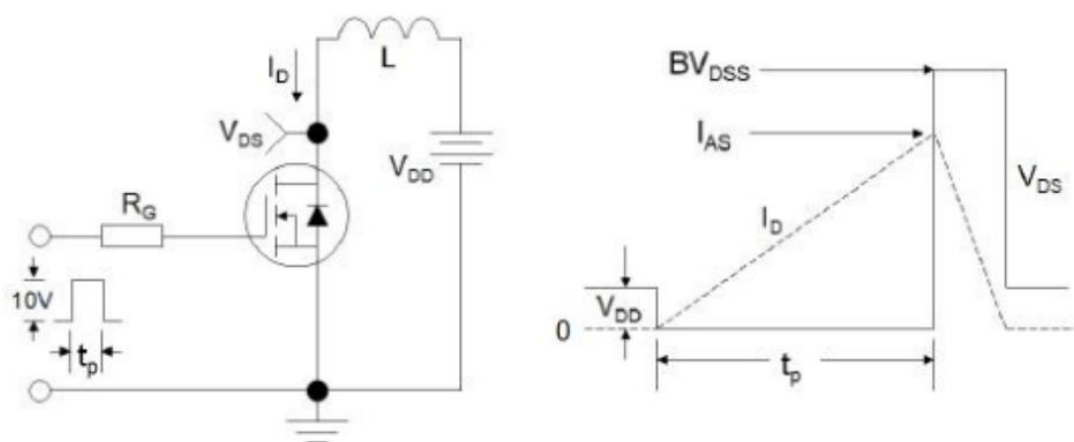
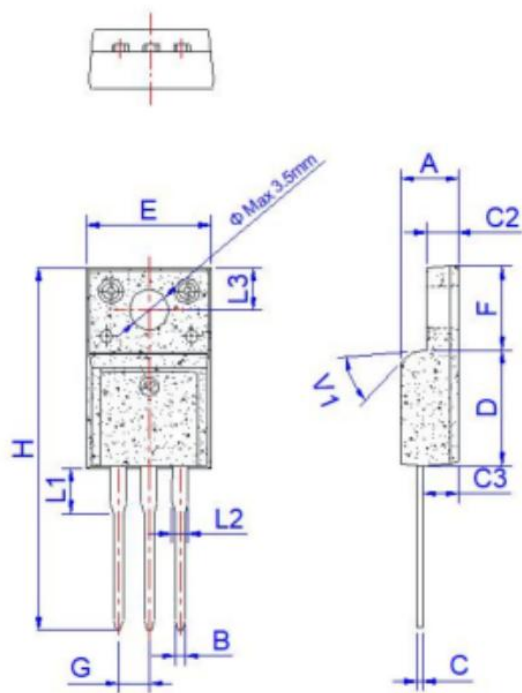


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

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Package Mechanical Data-TO-220GF



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

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