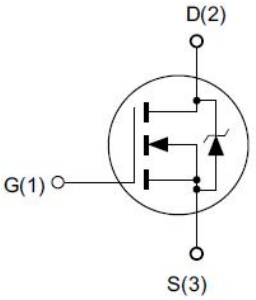
SUPER semiconductor

SPF10N65M

N-Channel Power MOSFET

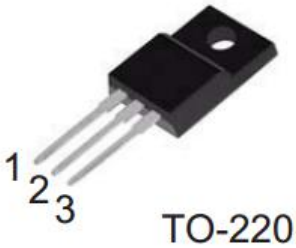
Features

- 650V, 10A, $R_{DS(ON)}$(Max.) = 0.95Ω@VGS = 10V.
- Low Crss
- Fast Switching
- 100% Avalanche Tested



Application

- Adapter
- LCD/PDP Adapter
- E-Bike Charger



TO-220F

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Limit	Unit
		TO-220F	
V_{DS}	Drain-Source Voltage [a]	650	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, T_C =25°C	10	A
	Drain Current-Continuous, T_C =100°C	5.5	A
I_{DM}	Drain Current-Pulsed [b]	40	A
P_D	Maximum Power Dissipation @ T_J =25°C	40	W
EAS	Single Pulsed Avalanche Energy [d]	540	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta}J_C$	Thermal Resistance, Junction-Case Max	2.5	°C/W
$R_{\theta}J_A$	Thermal Resistance Junction-Ambient Max	63	°C/W

Electrical Characteristics T_J = 25°C unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{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	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±30V	-	-	±100	nA

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS}(th)$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D =250μA	2	-	4	V
$R_{DS}(on)$	Static Drain-Source On-Resistance[c]	V_{GS} = 10V, I_D =5A	-	0.78	0.95	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	1595	-	pF
Coss	Output Capacitance		-	134	-	pF
Crss	Reverse Transfer Capacitance		-	5.6	-	pF

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 325V, I_D =10A, R_G = 25Ω,V_{GS}=10V	-	25	-	ns
t_r	Turn-On Rise Time		-	21	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	50	-	ns
t_f	Turn-Off Fall Time		-	23	-	ns
Qg	Total Gate Charge	V_{DS} = 325V, I_D =10A, V_{GS} = 10V	-	30.2		nC
Qgs	Gate-Source Charge		-	8.1	-	nC
Qgd	Gate-Drain Charge		-	11.2	-	nC

Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	V_{GS} = 0V	-	-	10	A
I_{SM}	Maximum Pulsed Current	V_{GS} = 0V	-	-	40	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 10A	-		1.4	V

Notes:

a. T_J=+25 ℃ to +150 ℃

b. Repetitive rating; pulse width limited by maximum junction temperature.

c. Pulse width≦300us; duty cycle≦2%

d. L=30mH, V_{DD}=50V,I_{as}=6A,R_G=25Ω Starting T_J=25 ℃

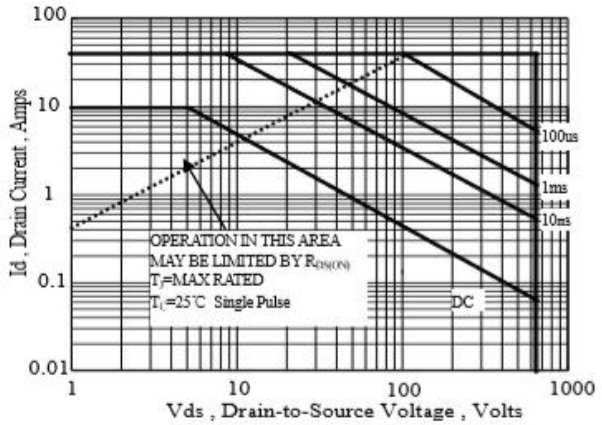


Figure 1 Maximum Safe Operating Area

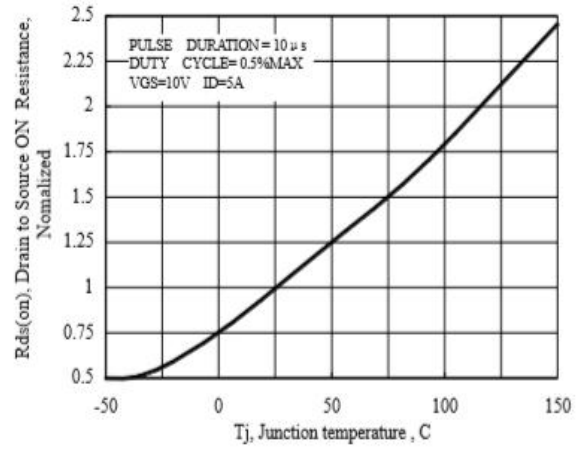


Figure 2 Normalized On-Resistance Variation with Temperature

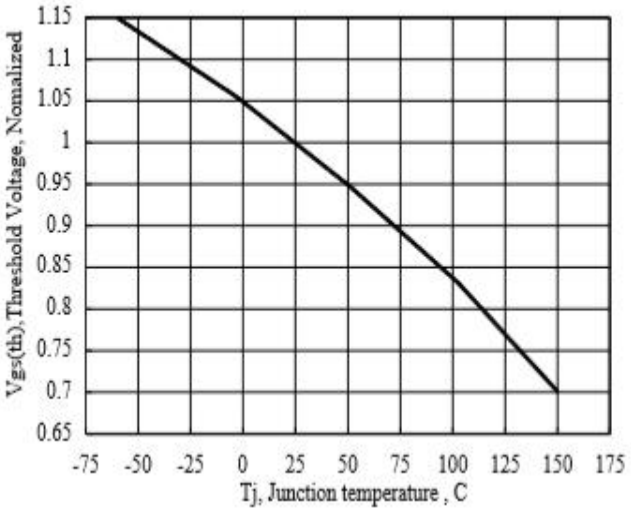


Figure 3. Gate Threshold Variation with Temperature

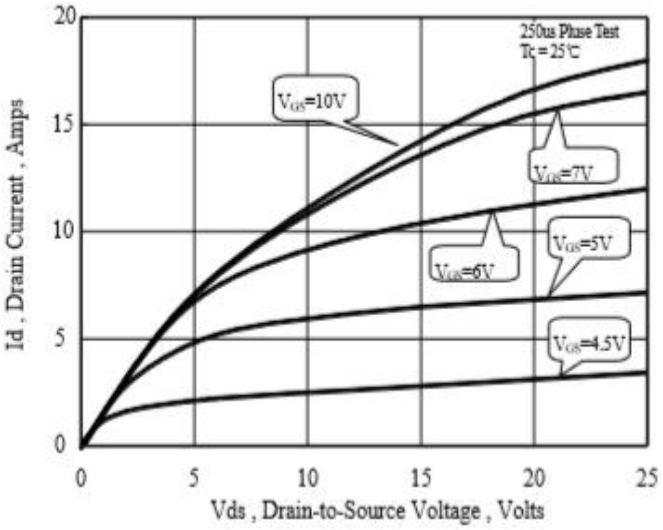


Figure 4. Capacitance Characteristics

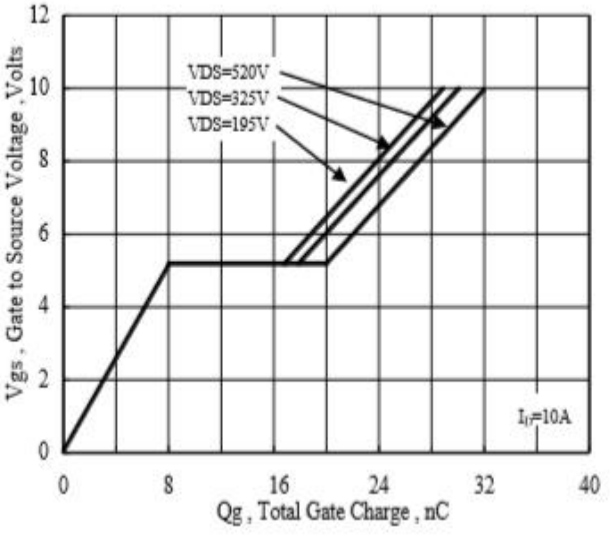


Figure 5. Gate Charge Characteristics

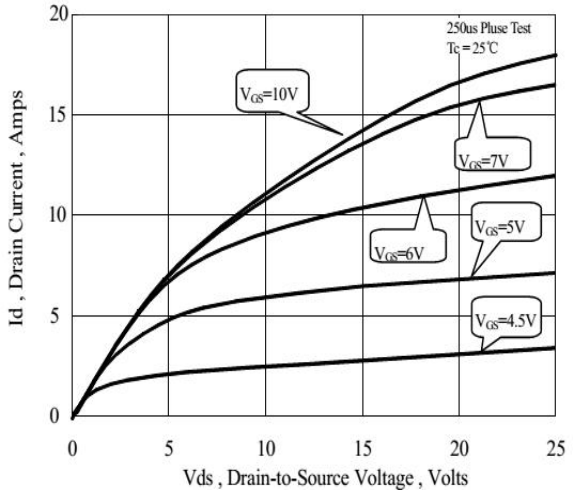


Figure 6. On-State Characteristics

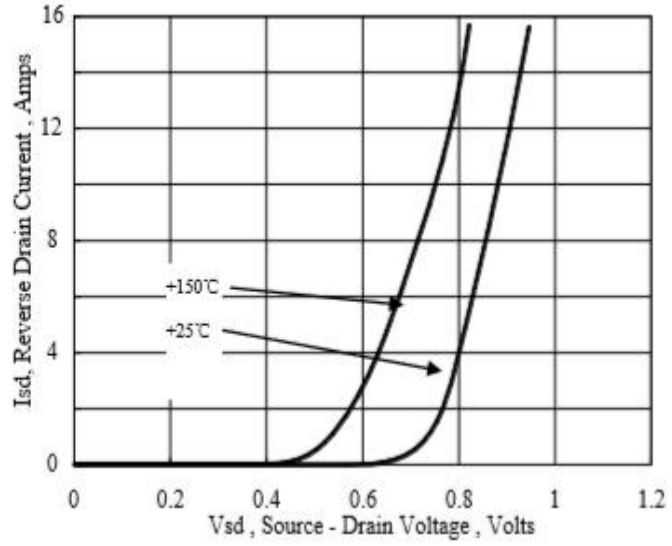


Figure 7. **Body Diode Forward Voltage Variation with Source Current**

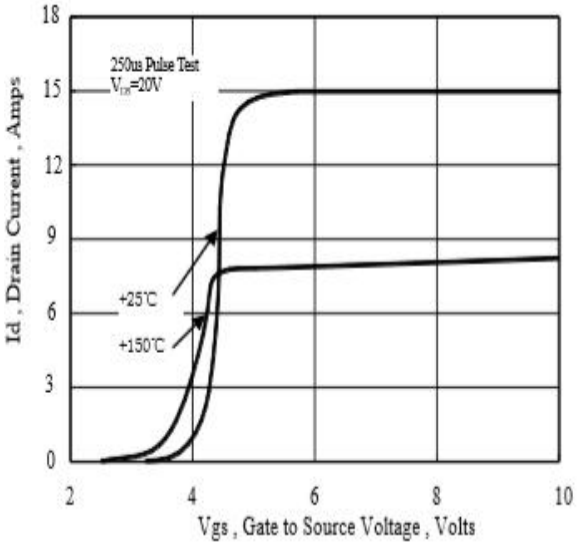


Figure 8. Transfer Characteristics Variation with Source Current