QFS12N65FB

650V 12A 0.8Ω Si Planal MOSFET

General description

Symbol	Value
V_{DSS} @ T_C=25℃	Min 650V
I_D @ T_C=25℃	12.0A
$R_{DS(on)}$	Max 0.8Ω
Q_G	Typ 43nC

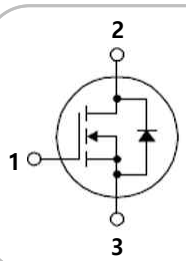
Package

TO-220F-3L

10.0 x 15.9 x 4.7 mm

Features

- Gate Charge(Typ. Q_G=43nC)
- High Voltage (Min. V_{DSS}=650V)
- 100% Avalanche Tested



1 : Gate
2 : Drain
3 : Source

Maximum Ratings (T_C = 25℃)

Parameter	Symbol	Test Condition	Value	Units
Drain-source voltage	V_{DSS}	V_{GS}=0V, I_D=250uA	650	V
Drain current (DC)	I_D	T_C=25℃	12.0	A
		T_C=100℃	7.58	A
Drain current (Pulsed)	I_{DM}	Pulse width limited by junction temperature	48	A
Gate-source voltage	V_{GS}	-	±30	V
Single pulsed avalanche energy	E_{AS}	I_{AS}=12.0A , R_G=25Ω, V_{DD}=50V, L=1.8mH	140	mJ
Power dissipation	P_D	T_C=25℃	45	W
Operating junction	T_j	-	-55 to 150	℃
Storage temperature	T_{stg}	-	-55 to 150	℃

Electrical Characteristics (T_j = 25℃)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	650	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1.0	uA
Gate-source leakage current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	-	4.0	V
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=6.0A	-	0.68	0.80	Ω
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V f =1MHz	-	2162	2882	pF
Output capacitance	C_{oss}		-	183	244	
Reverse transfer capacitance	C_{rss}		-	14.6	19.4	
Total gate charge	Q_G	V_{DS}=520V, V_{GS}=10V, I_D=12A	-	43.0	65.0	nC
Gate-source charge	Q_{GS}		-	13.0	-	
Gate-drain charge	Q_{GD}		-	10.5	-	
Turn on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=12A, R_G=25Ω	-	30	-	ns
Rise time	t_r		-	85	-	
Turn off delay time	$t_{d(off)}$		-	140	-	
Fall time	t_f		-	90	-	

Body Diode(Source – Drain) Electrical Characteristics (Tj = 25℃)

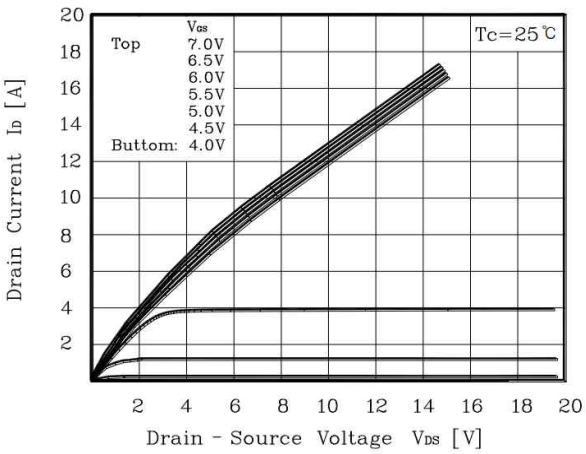
Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Continuous diode forward current	I_S	-	-	-	12.0	A
Maximum pulsed drain to source diode forward current	I_{SM}	-	-	-	48.0	A
Forward voltage	V_{SD}	I_{SD}=12A, V_{GS}=0V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_{SD}=12A, V_{GS}=0V di/dt=100A/μs	-	500.0	-	ns
Reverse recovery charge	Q_{rr}		-	4.3	-	uC

Thermal Characteristics(T_C = 25℃)

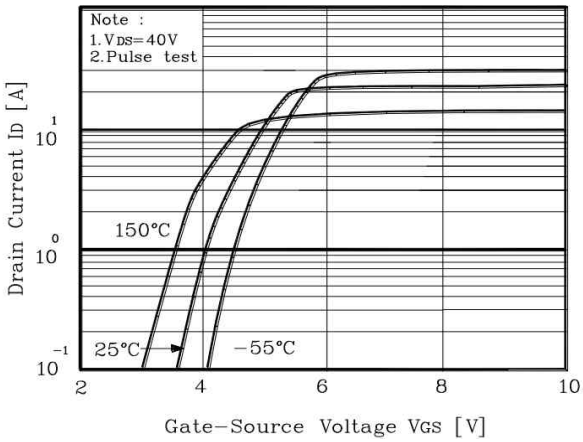
Symbol	Parameter	Typ	Max	Units
$R_{th(j-c)}$	Junction to case	-	2.7	℃/W

Typical Electrical Characteristics Curves (T_j = 25℃)

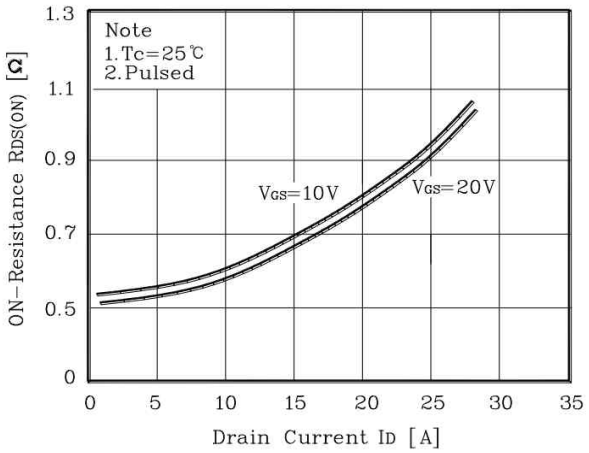
V_{DS} – I_D Characteristics



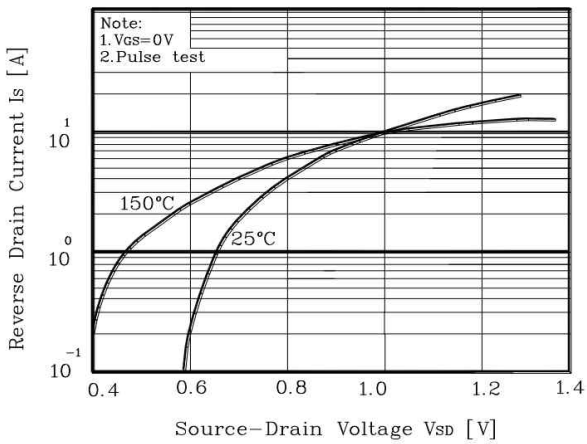
V_{GS} – I_D Characteristics



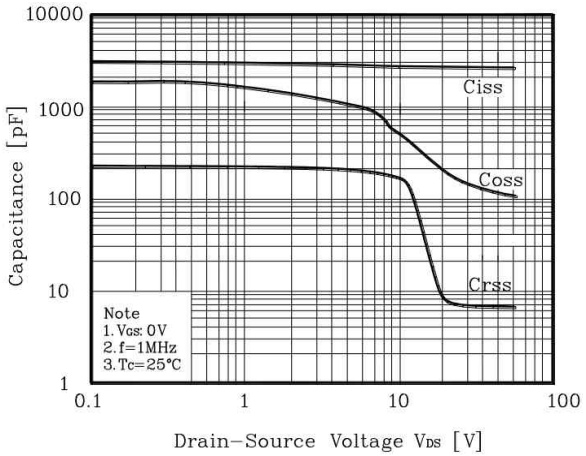
I_D – $R_{DS(on)}$ Characteristics



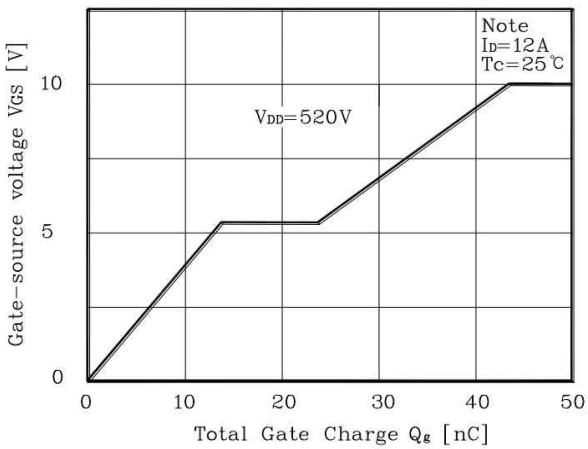
V_{SD} – I_S Characteristics



V_{DS} – C_T Characteristics

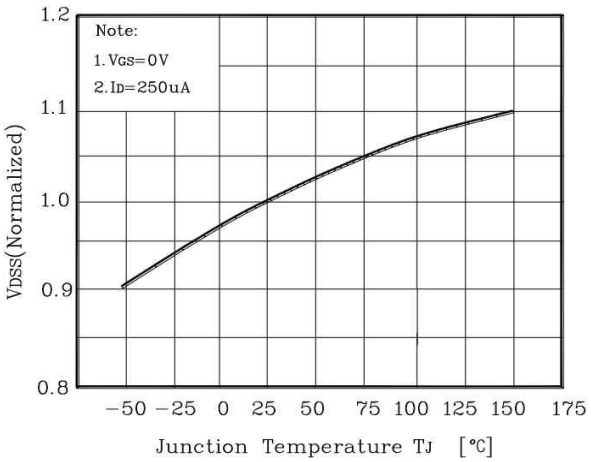


Q_g – V_{GS} Characteristics

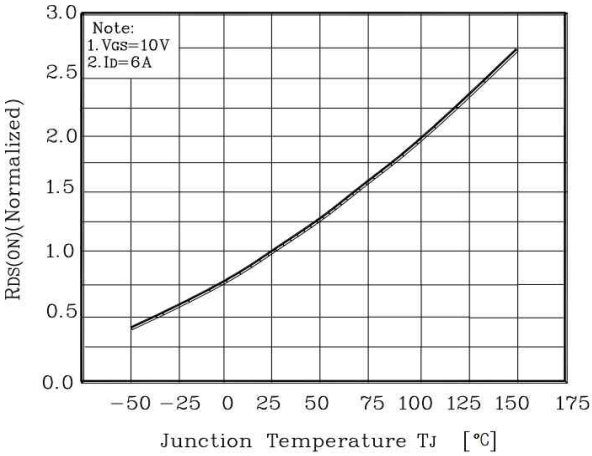


Typical Electrical Characteristics Curves (T_j = 25℃)

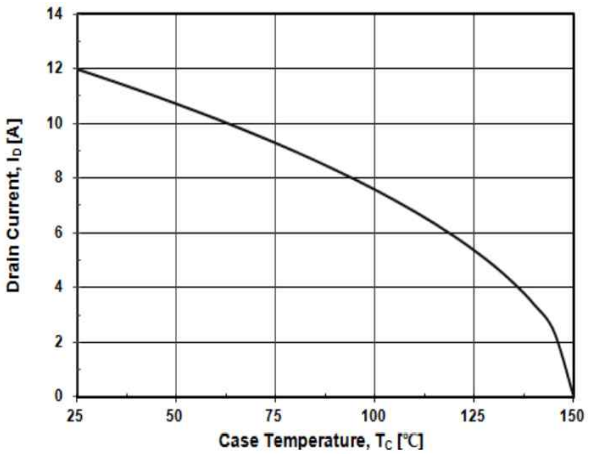
T_j – $V_{DSS(Normalized)}$ Characteristics



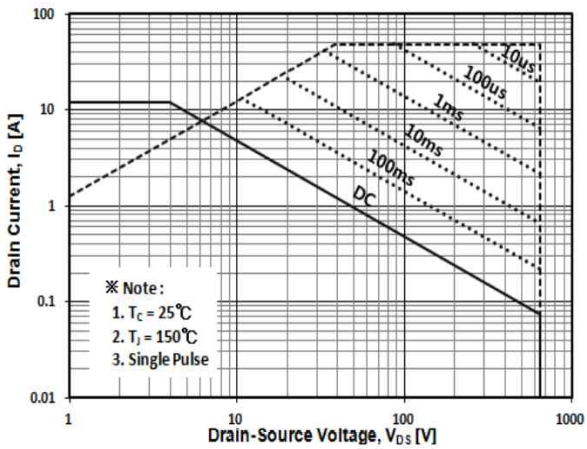
T_j – $R_{DS(on)(Normalized)}$ Characteristics



T_C – I_D Characteristics

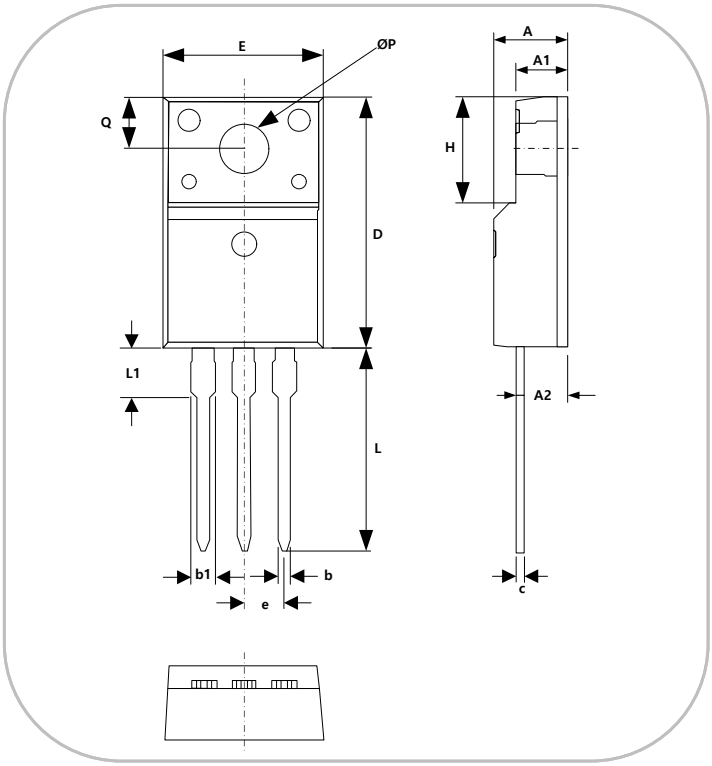


SOA Characteristics



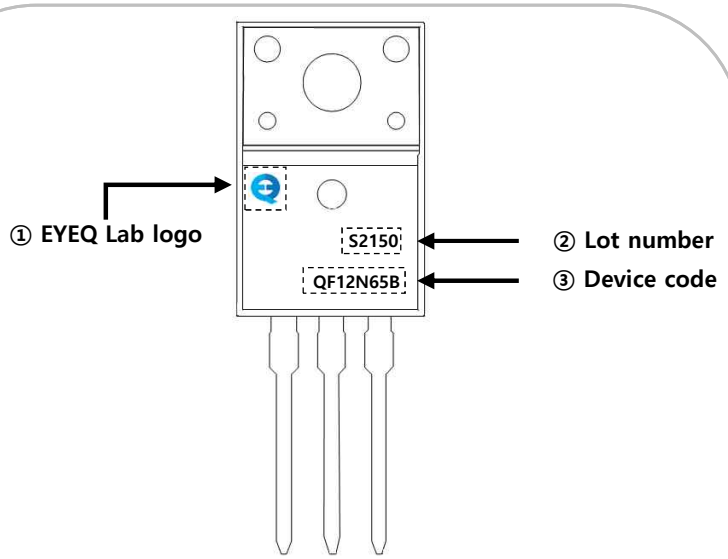
Package Dimensions(TO-220F-3L)

[Unit : mm]



SYMBOL	MIN	MAX
A	4.50	4.90
A1	2.34	2.74
A2	2.56	2.96
b	0.70	0.90
b1	1.27	1.47
c	0.45	0.60
D	15.67	16.07
E	9.96	10.36
e	2.54 BSC	
H	6.48	6.88
L	12.68	13.28
L1	3.03	3.43
ϕP	3.08	3.28
Q	3.20	3.40

Marking Information



① Company Logo

② Lot Number : 21 – 2021 Year , 50 – 50 Week

③ Device Code : Q – EYEQ Lab, F – MOSFET,
12 – 12A, N – NPN Type, 65 – 650V