

General Description

The QM14N65F is the highest performance N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The QM14N65F meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	14	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	10.8	A
I_{DM}	Pulsed Drain Current ²	28	A
EAS	Single Pulse Avalanche Energy ³	35	mJ
I_{AS}	Avalanche Current	8	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	30	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	---	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	4.2	$^{\circ}C/W$

Product Summary

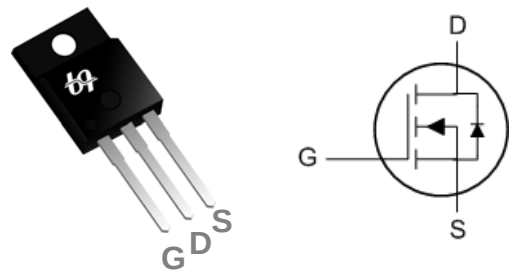


BVDSS	RDSON	ID
650V	0.65 Ω	14A

Applications

- High efficient switched mode power supplies
- Electronic lamp ballast
- LCD TV/ Monitor
- Adapter

TO220F Pin Configuration



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	650	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.66	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=3.5A$	---	0.55	0.65	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2	---	5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-8.7	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=15V$, $I_D=3.5A$	---	15	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	3.3	6.6	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=520V$, $V_{GS}=10V$, $I_D=1A$	---	53.5	75	nC
Q_{gs}	Gate-Source Charge		---	14.3	20	
Q_{gd}	Gate-Drain Charge		---	15.6	21.8	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=300V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=1A$	---	28.4	56.8	ns
T_r	Rise Time		---	19.8	36	
$T_{d(off)}$	Turn-Off Delay Time		---	89	178	
T_f	Fall Time		---	51	102	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $F=1MHz$	---	3094	4332	pF
C_{oss}	Output Capacitance		---	157	220	
C_{rss}	Reverse Transfer Capacitance		---	13	18	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy ⁵	$V_{DD}=50V$, $L=1mH$, $I_{AS}=4A$	8.5	---	---	mJ

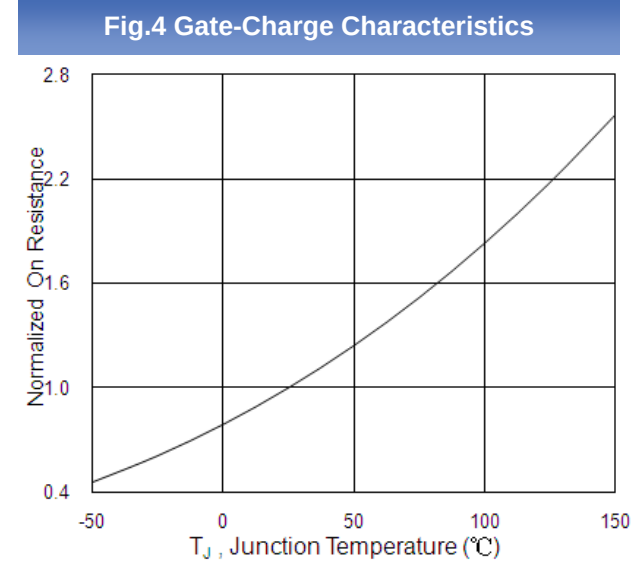
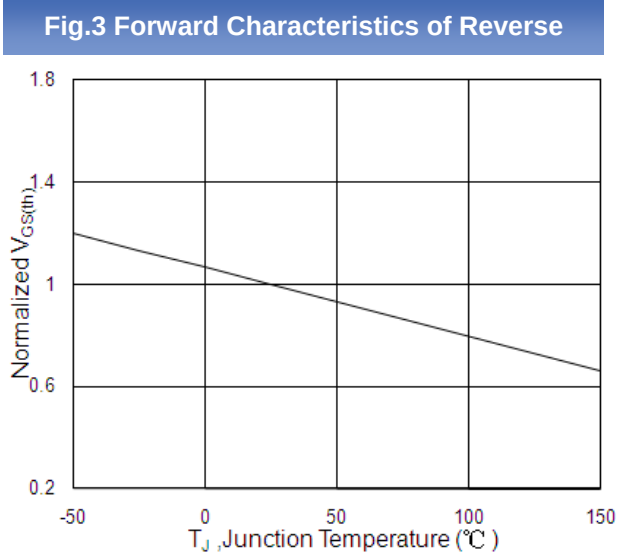
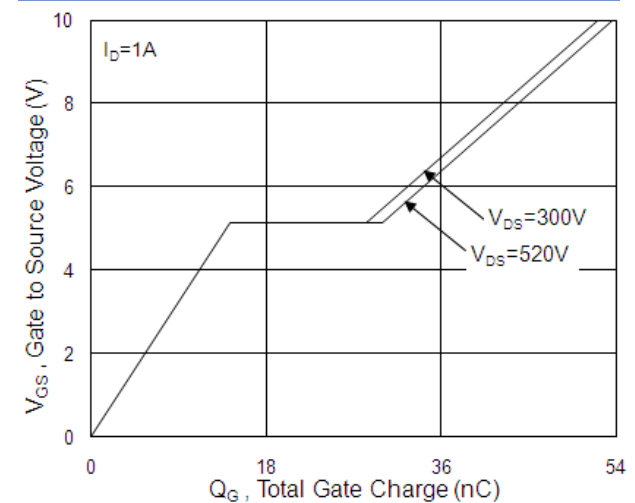
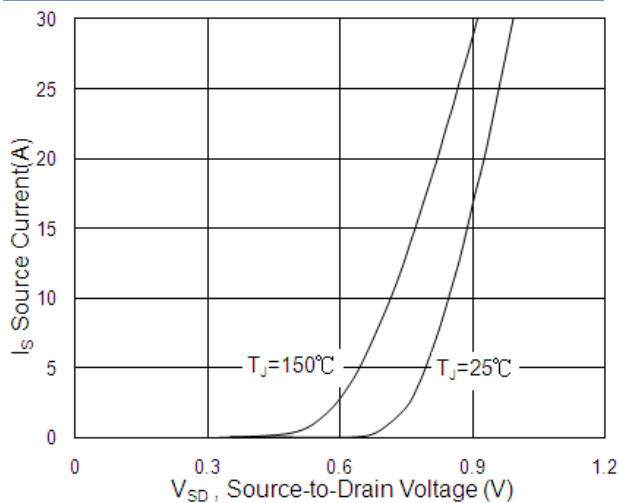
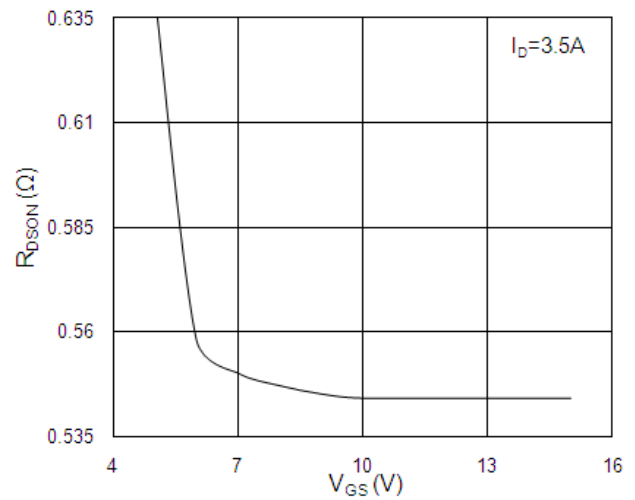
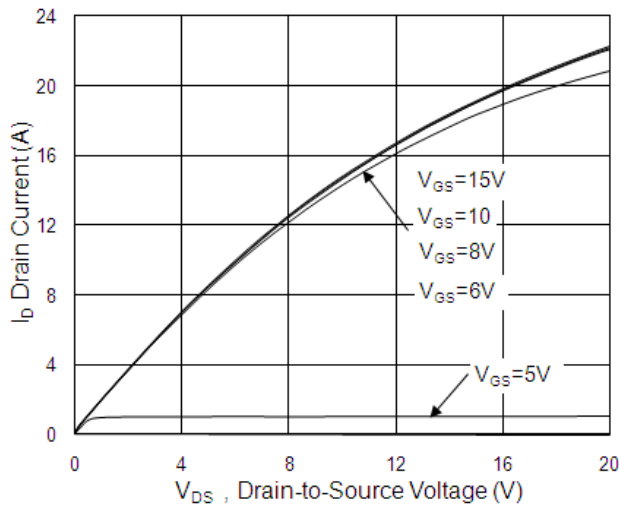
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	14	A
I_{SM}	Pulsed Source Current ^{2,6}		---	---	28	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$IF=1A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	204	---	nS
Q_{rr}	Reverse Recovery Charge		---	920	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=50V$, $V_{GS}=10V$, $L=1mH$, $I_{AS}=8A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The Min. value is 100% EAS tested guarantee.
- 6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics



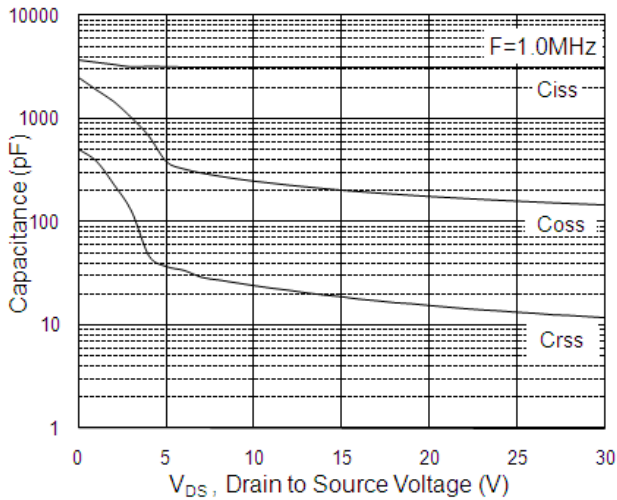


Fig.7 Capacitance

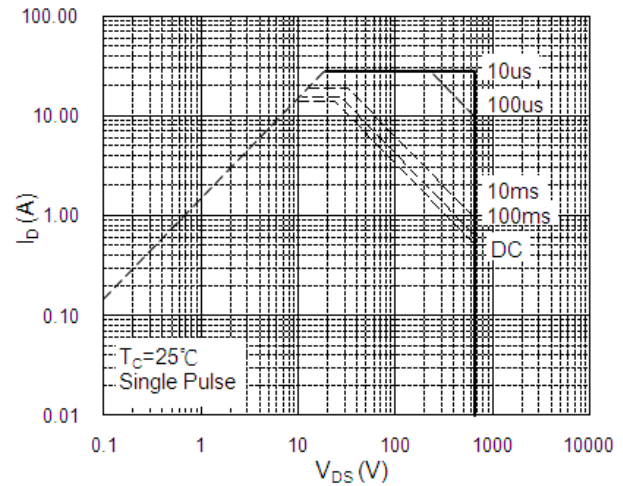


Fig.8 Safe Operating Area

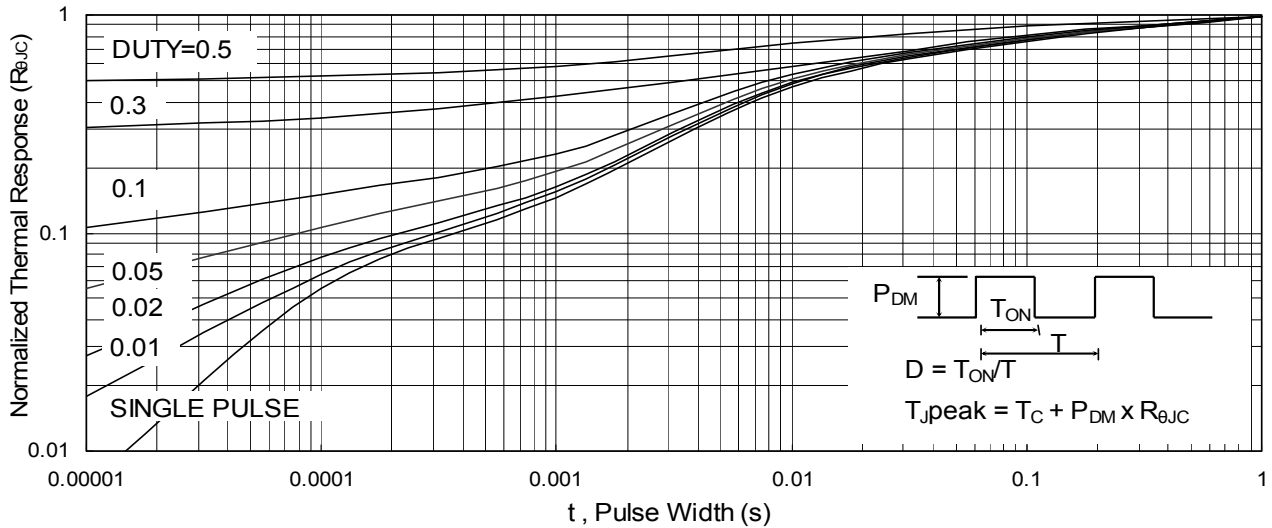


Fig.9 Normalized Maximum Transient Thermal Impedance

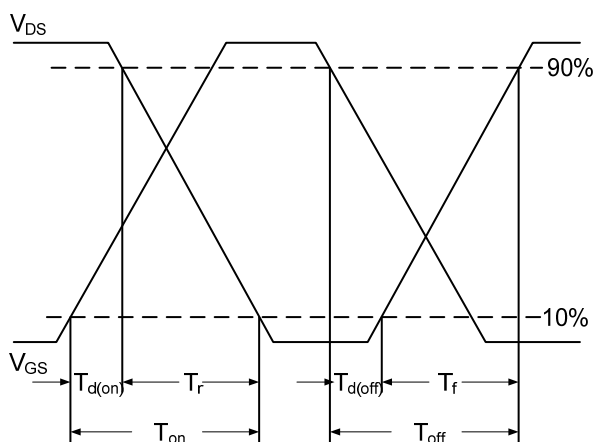


Fig.10 Switching Time Waveform

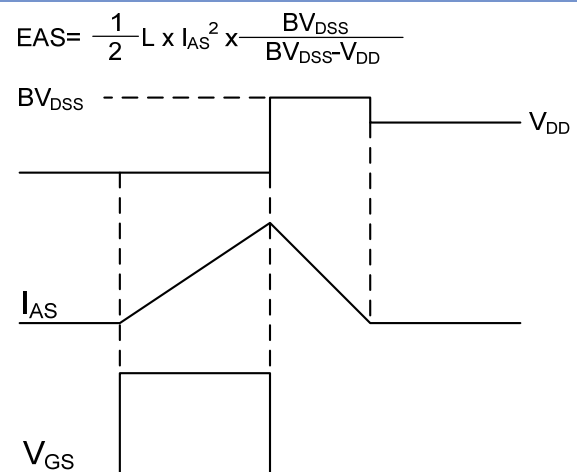


Fig.11 Unclamped Inductive Switching Waveform