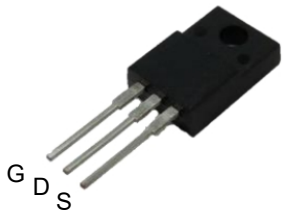
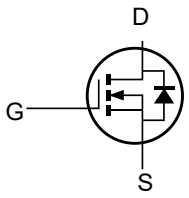
N-Channel Super Junction MOSFET

TO-220F

MCR65T160CTF





Features

- Low $R_{DS(on)}$
- Improved dv/dt Capability
- Intrinsic Fast-Recovery Body Diode
- 100% Avalanche Tested
- RoHS compliant

Application

- Switching Mode Power Supplies (SMPS)
- PWM Motor Controls
- LED Lighting
- Adapter

Table 1. Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	MCR65T160CTF	Unit
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current at T_C =25°C	I_D	22 *	A
Continuous Drain Current at T_C =100°C	I_D	14*	A
Pulsed drain current (Note 1)	I_{DM}	66*	A
Power Dissipation(T_C=25℃)	P_D	28.4	W
Single pulse avalanche energy (Note2)	E_{AS}	405	mJ
Repetitive Avalanche Energy	E_{AR}	40	mJ
MOSFET dv/dt ruggedness, V_{DS} =0...480V	dv/dt	50	V/ns
Reverse diode dv/dt, VDS=0…400V, I_{SD}≤I_D	dv/dt	15	V/ns
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55~+150	°C

* limited by maximum junction temperature

Note: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.L=40mH,I_{AS}=4.5A V_{DD}=100V,R_G=25Ω,Starting T_J=25℃

Table 2. Thermal Characteristic

Parameter	Symbol	MCR65T160CTF	Unit
Thermal Resistance，Junction-to-Case（Maximum）	R_{thJC}	4.4	°C /W
Thermal Resistance，Junction-to-Ambient （Maximum）	R_{thJA}	65	°C /W

Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=1mA	650	--	--	V
Zero Gate Voltage Drain Current(Tc=25℃)	I_{DSS}	V_{DS}=650V,V_{GS}=0V	--	--	10	μA
Zero Gate Voltage Drain Current(Tc=125℃)	I_{DSS}	V_{DS}=520V,V_{GS}=0V	--	100	--	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V	--	--	±100	nA
Gate Threshold Voltage	$V_{GS\ (th)}$	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=10A	--	130	160	mΩ
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=200V,V_{GS}=0V, F=1.0MHz	--	1571	--	pF
Output Capacitance	C_{oss}		--	51	--	pF
Reverse Transfer Capacitance	C_{rss}		--	3	--	pF
Total Gate Charge	Q_g	V_{DS}=520V,I_D=22A, V_{GS}=10V,I_G=3mΩ	--	34	--	nC
Gate-Source Charge	Q_{gs}		--	10	--	nC
Gate-Drain Charge	Q_{gd}		--	14	--	nC
Switching times						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=325V,I_D=22A, V_{GS}=10V,R_G=10Ω	--	25	--	nS
Turn-on Rise Time	t_r		--	52	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	43	--	nS
Turn-Off Fall Time	t_f		--	42	--	nS
Source- Drain Diode Characteristics						
Forward on voltage	V_{SD}	I_S=22A,V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S=22A, di_F/dt=100A/μs	--	163	--	nS
Reverse Recovery Charge	Q_{rr}		--	980	--	nC

Typical Characteristics)

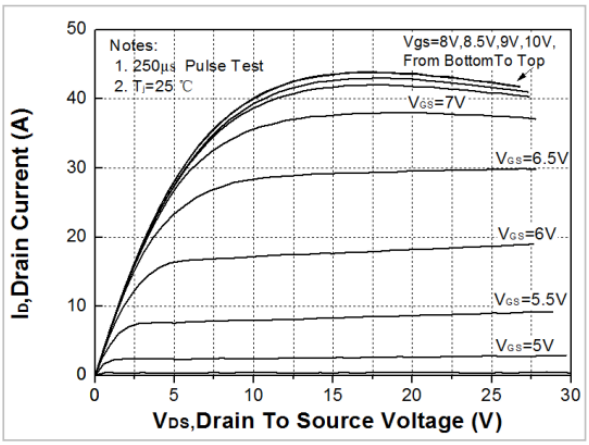


Fig1. Output characteristics

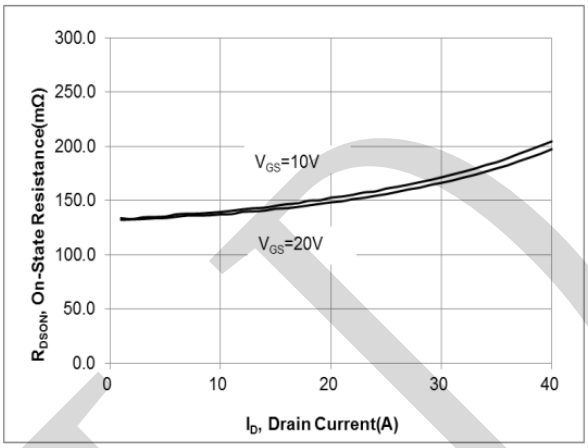


Fig2. Drain-source on-state resistance

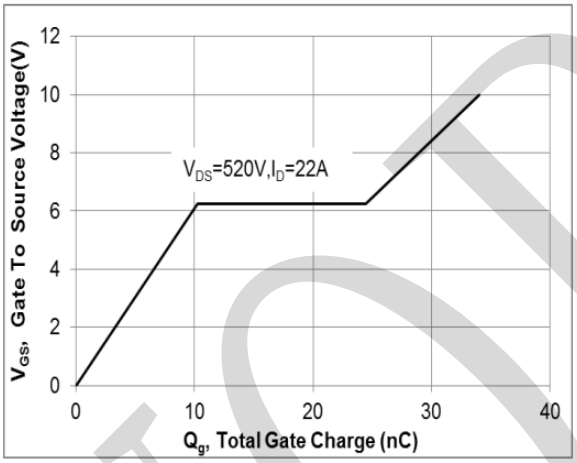


Fig3. Gate charge characteristics

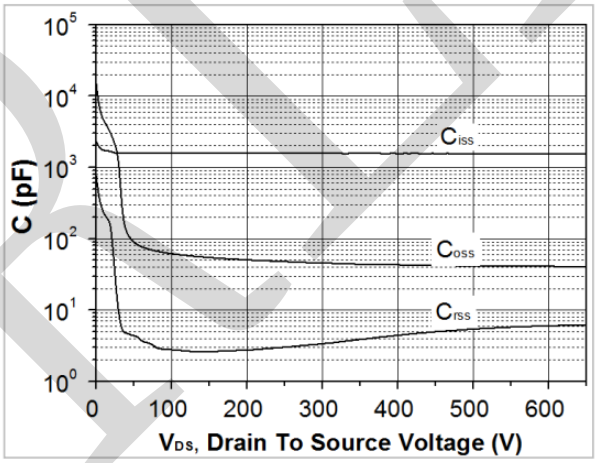


Fig 4. Capacitance Characteristics

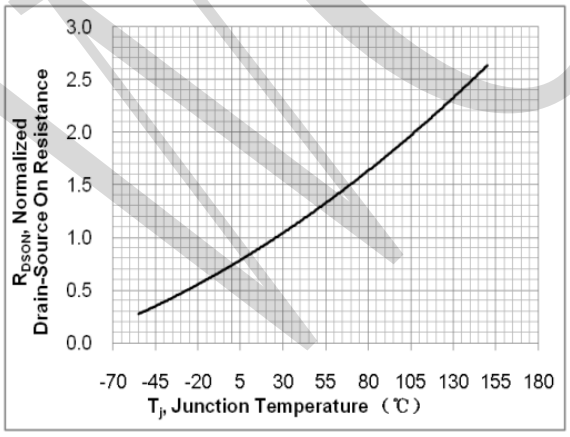


Fig 5. $R_{DS(ON)}$ vs junction temperature

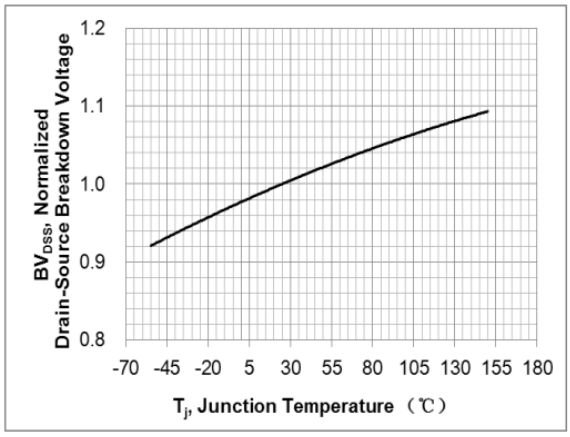


Fig 6. BV_{DSS} vs junction temperature

Typical Characteristics

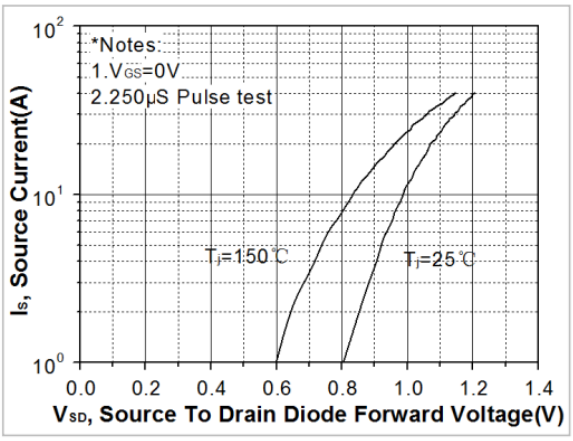


Fig 7 . Forward characteristics of reverse diode

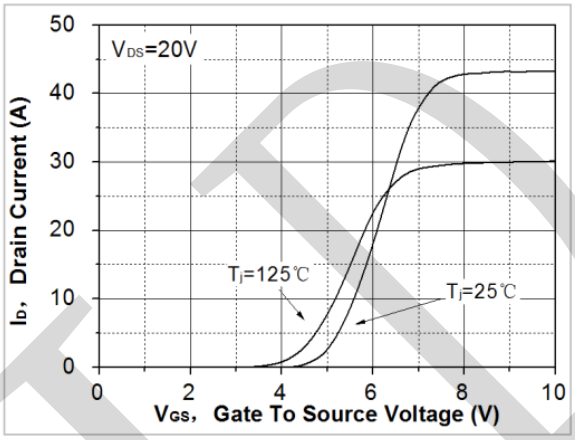


Fig 8 . Transfer characteristics

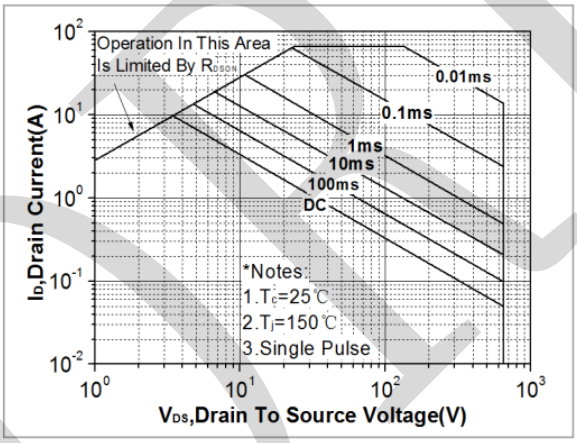


Fig 9. Safe operating area(TO220F)

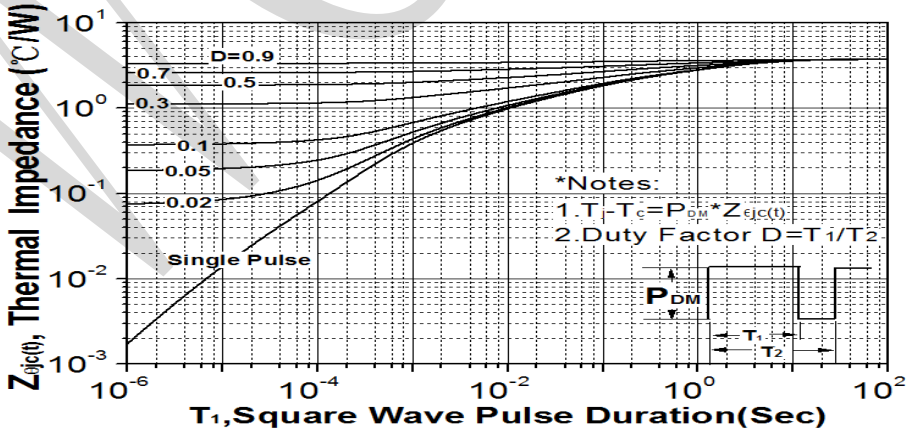
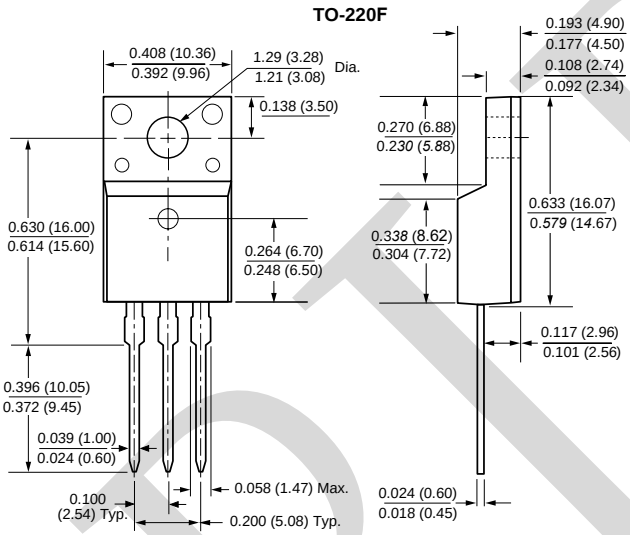


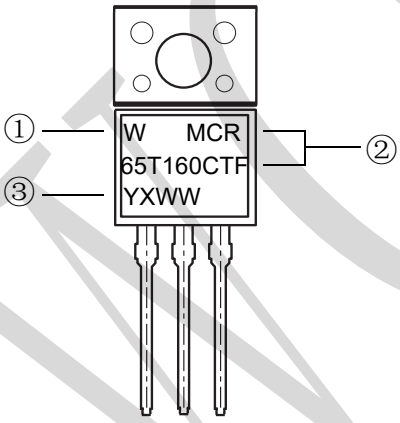
Fig 10. Transient thermal impedance (TO220F)

PACKAGE OUTLINE DIMENSIONS

TO-220F Package Information



Marking Information



①W : Company's trademark

②Product model : MCR65T160CTF

③PDC information：

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)