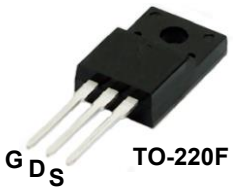
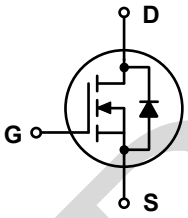
N-Channel Super Junction MOSFET

V_{DS}	650	V
$R_{DS(on),TYP}$	380	mΩ
I_D	9.6	A

MCR65B380CTF

TO-220F





Features

1.Reduced Switching & Conduction Losses
2.Lower Gate Resistance
3.100% Avalanche Tested
4.Pb-free, Halogen Free, and RoHS Compliant

Applications

1.PFC, Hard & Soft Switching Topologies
2.Industrial & Consumer Power Supplies

Maximum ratings, at T_A =25°C, unless otherwise specified

Absolute Maximum Ratings

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS
Drain-Source Voltage	V_{DS}	650	V
Drain Current –continuous @25°C	I_D	9.6	A
Drain Current –continuous @100°C		6.1	
Pulsed Drain Current[1]	I_{DM}	28.8	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche[2]	E_{AS}	40	mJ
Operating and Storage Temperature Range	T_j , T_{stg}	-55 to 150	°C
Maximum Lead Temperature for Soldering, 1/8” from Case for 10 Seconds	T_L	260	°C

Note:

1. Pulse width limited by maximum junction temperature.

2. I_{AS} = 2.5A, R_G = 25Ω ,starting TJ = 25℃.

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit

Electrical Characteristics (T_C = 2 5 ˚C unless otherwise noted)

$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±30V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=0.8mA	2.5	--	4.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=4.0A	--	--	380	mΩ

Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)

C_{iss}	Input Capacitance	V_{DS}=400V,V_{GS}= 0 V , f=250KHz	--	628	--	pF
C_{oss}	Output Capacitance		--	20	--	pF
C_{rss}	Reverse Transfer Capacitance		--	4.4	--	pF
Q_g	Total Gate Charge	V_{DS}=400V,I_D=4.0A , V_{GS}=10V	--	15.5	--	nC
Q_{gs}	Gate-Source Charge		--	3.0	--	nC
Q_{gd}	Gate-Drain Charge		--	7.9	--	nC

Switching Characteristics

$T_{d(on)}$	Turn-on Delay Time	V_{DS}=400V, I_D=4.0A, R_G=10Ω, V_{GS}=10V	--	8	--	ns
T_r	Turn-on Rise Time		--	7	--	ns
$T_{d(off)}$	Turn-Off Delay Time		--	30	--	ns
T_r	Turn-Off Fall Time		--	8	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

I_S	Continuous Current		--	--	9.6	A
I_{Sm}	Maximum pulsed drain to source diode forward current		--	--	28.8	A
V_{SD}	Forward Voltage	V_{GS} = 0V, I_{SD} = 4.0A	--	--	1.2	V
T_{rr}	Reverse Recovery Time	V_R= 400 V, I_{SD} = 4.0A, dI_F/dt = 100 A/μs	--	221	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.8	--	μC
I_{mm}	Reverse recovery current		--	7	--	A
T_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

Typical Performance Characteristics

Figure 1. On-Region Characteristics

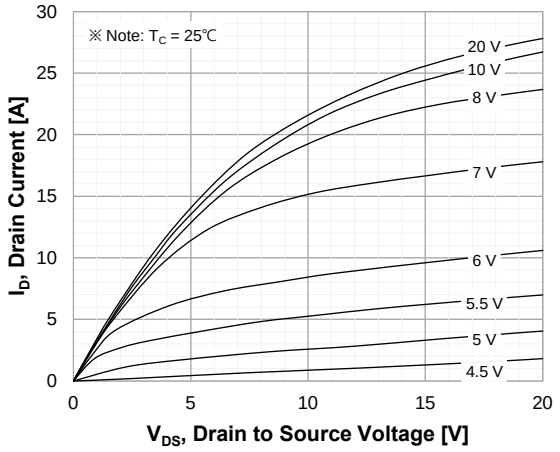


Figure 2. Transfer Characteristics

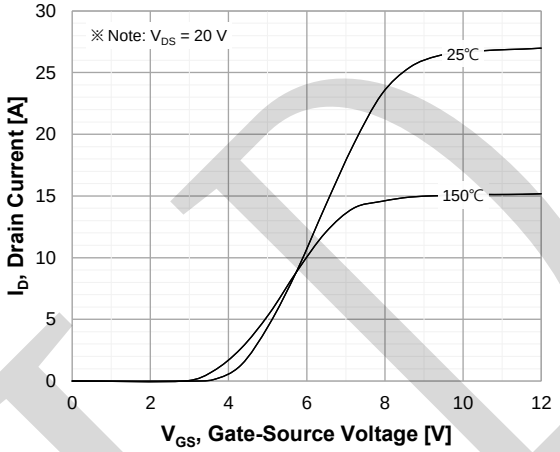


Figure 3. On-Resistance Characteristics vs. Drain Current and Gate Voltage

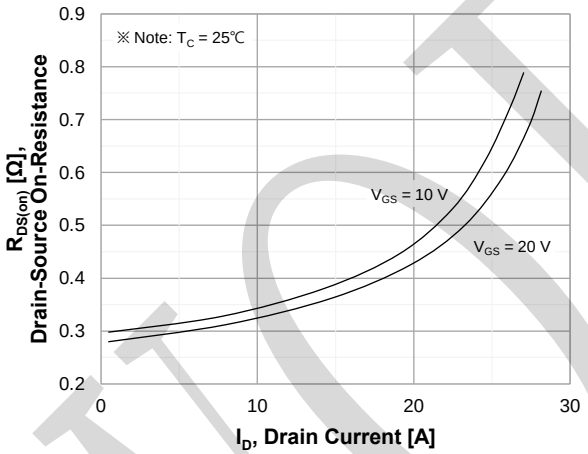


Figure 4. Diode Forward Voltage Characteristics vs. Source-Drain Current and Temperature

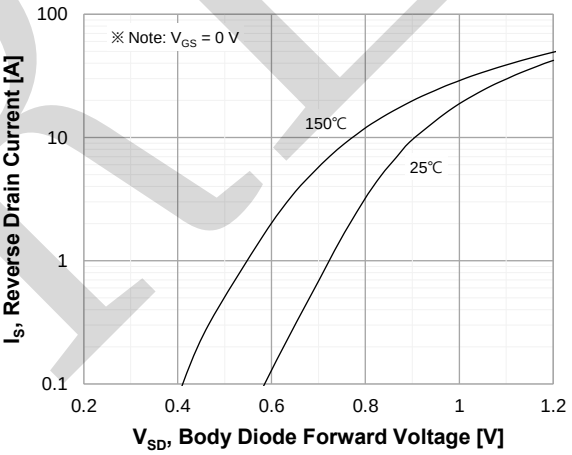


Figure 5. Capacitance Characteristics

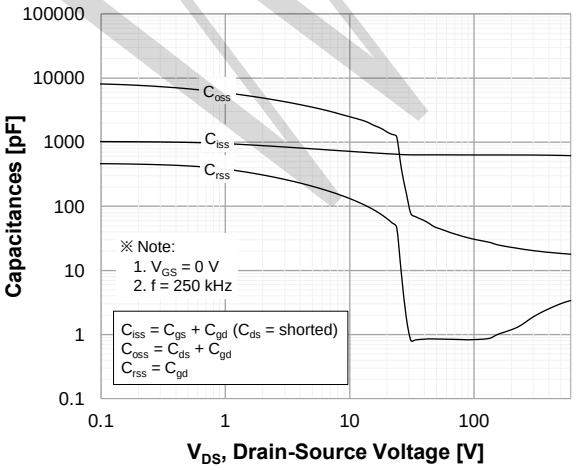
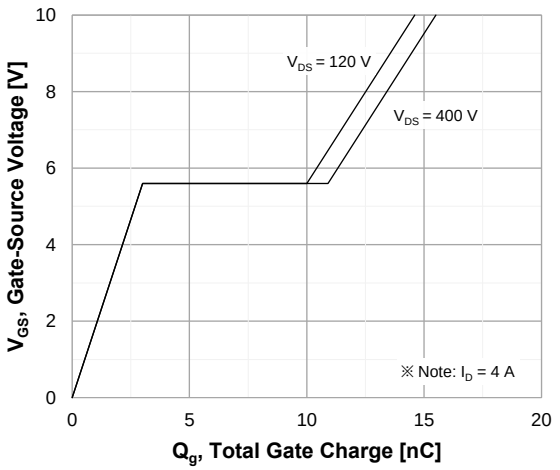


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics

Figure 7. Breakdown Voltage Characteristics vs. Temperature

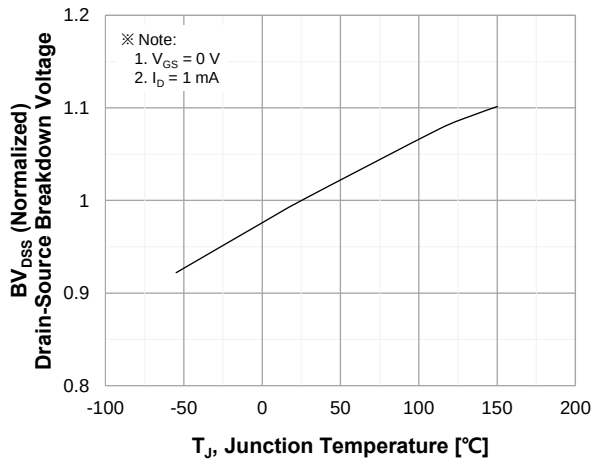


Figure 8. On-Resistance Characteristics vs. Temperature

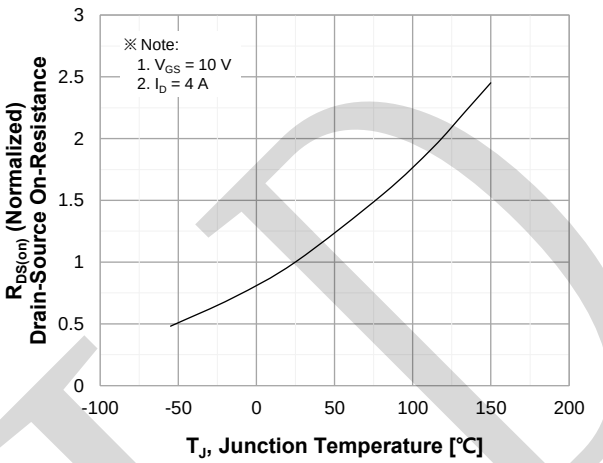


Figure 9. Maximum Safe Operating Area

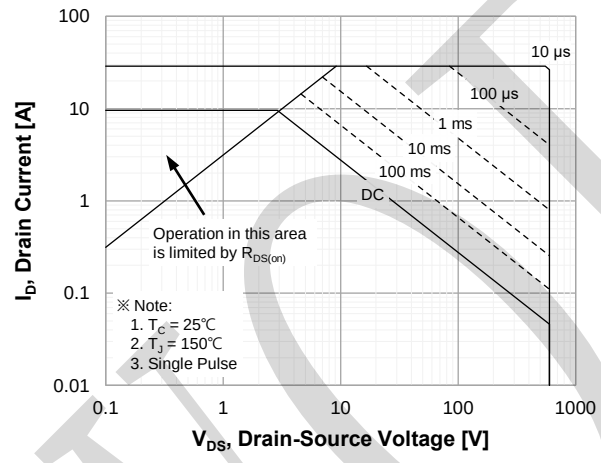


Figure 10. Maximum Drain Current vs. Case Temperature

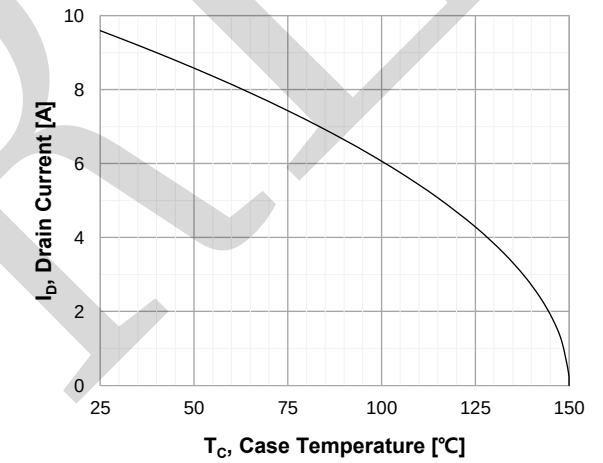


Figure 11. E_{oss} vs. Drain to Source Voltage

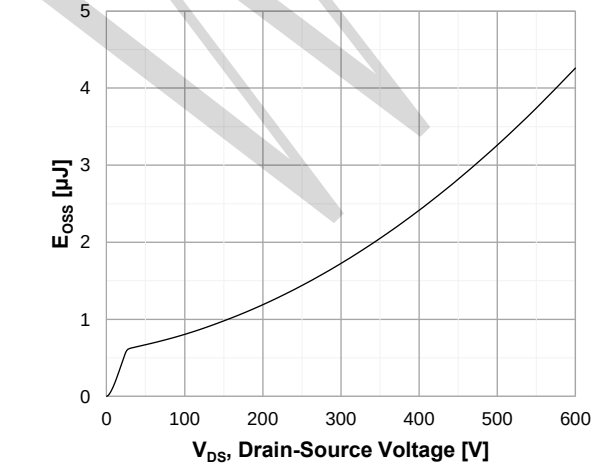
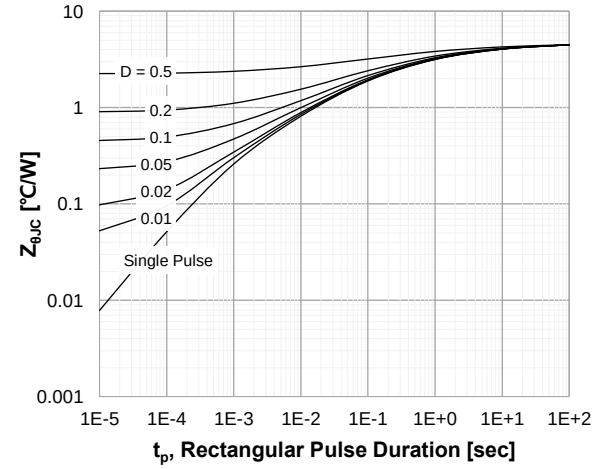


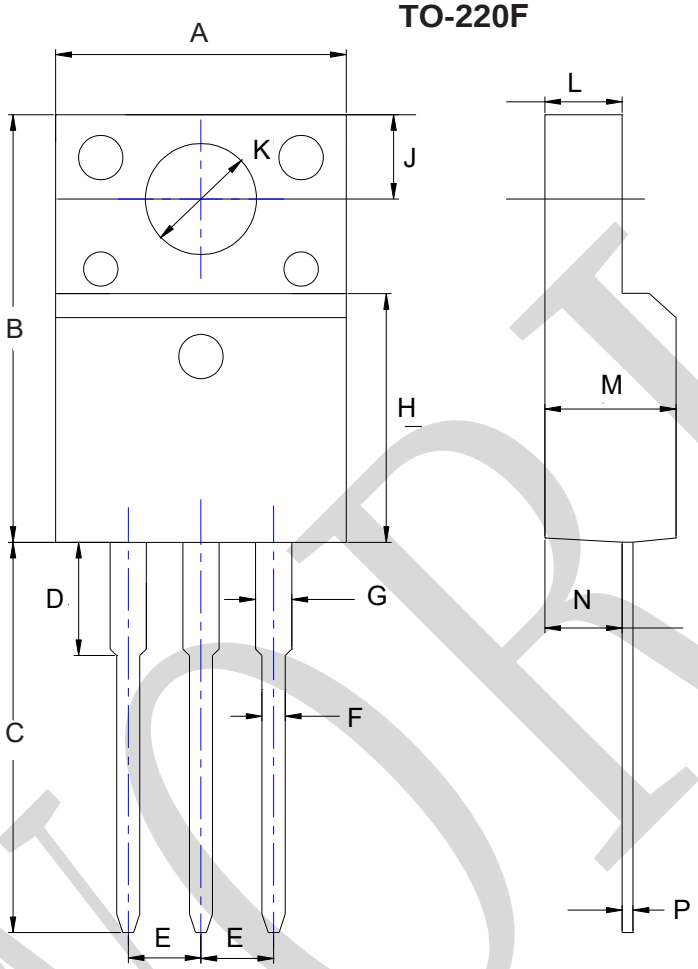
Figure 12. Transient Thermal Response Curve



PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-220F



TO-220F mechanical data

UNIT		A	B	C	D	E	F	G	H	J	K	L	M	N	P
mm	min	9.7	15.5	12.6	2.7	2.3	0.4	1.1	8.9	3.1	3.0	2.3	4.5	2.6	0.4
	max	10.3	16.2	13.6	3.2	2.8	0.6	1.5	9.4	3.6	3.3	2.8	4.9	3.0	0.6
mil	min	381.8	610.2	496.1	106.3	90.5	15.7	43.3	350.4	122.0	118.1	90.5	177.1	102.4	15.7
	max	405.5	637.8	535.5	126.0	110.2	23.7	59.1	370.1	141.7	129.9	110.2	192.9	118.1	23.7