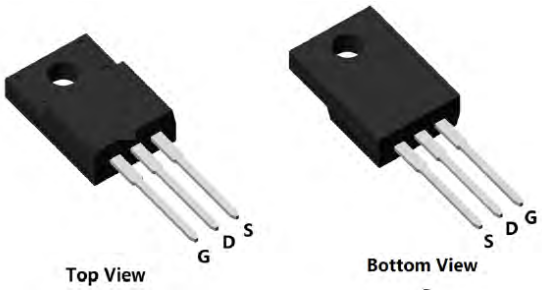
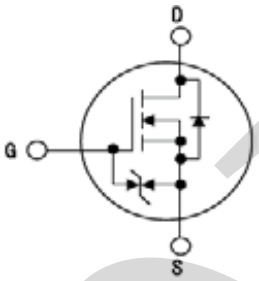
N-Channel Multilayer Epitaxial Super Junction Power MOSFET

MCR60B115CTF

TO-220F





V_{DS}	600	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	100	mΩ
I_D	26.6	A

Features

- New technology for high voltage device
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested
- ROHS compliant
- Built-in ESD Diode

Application

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		600	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current @VGS=10V	T_C =25°C	26.6	A
		T_C =100°C	16.8	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	80	A
E_{AS}	Avalanche energy, single pulsed②		492	mJ
I_{AR}	Avalanche Current		3.2	A
P_D	Maximum power dissipation	T_C =25°C	34	W
$V_{ESD(G-S)}$	Gate source ESD(HBM-C=100pF, R=1.5KΩ)		2000	V
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.65	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	80	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	600	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V,V_{GS}=0V	--	--	2	μA
		V_{DS}=600V,V_{GS}=0V, Tc=150°C	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=1.1mA	2.0	--	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=11.3A	--	100	115	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=400V, V_{GS}=0V, f=1.0MHz	--	2840	--	pF
C_{oss}	Output Capacitance		--	62	--	pF
C_{rss}	Reverse Transfer Capacitance		--	3.2	--	pF
Q_g (10V)	Total Gate Charge	V_{DS}=480V, I_D=14.3 A , V_{GS}=10V	--	65	--	nC
Q_{gs}	Gate-Source Charge		--	12	--	nC
Q_{gd}	Gate-Drain Charge		--	19	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=300V, I_D=14.3A, R_G=25Ω	--	56	--	ns
Tr	Turn-on Rise Time		--	31	--	ns
Td(off)	Turn-Off Delay Time		--	250	--	ns
Tf	Turn-Off Fall Time		--	20	--	ns

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

V_{SD}	Forward on voltage	I_{SD}=14.3A,V_{GS}=0V	--	--	1.3	V
I_S	Maximum Continuous Diode Forward Current		--	--	26.6	A
I_{SM}	Maximum Pulsed Diode Forward Current		--	--	80	A
Trr	Reverse Recovery Time	V_{DD}=400V , I_{SD}=14.3A di/dt=100A/μs	--	400	--	ns
Qrr	Reverse Recovery Charge		--	6.2	--	nC

NOTE:

①Repetitive rating: pulse-width limited by maximum junction temperature.

②I_{AS}=3.2A V_{DD}=100V, R_G=25Ω, Starting T_J =25℃.

③Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

④Essentially Independent of Operating Temperature.

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Typical Characteristics

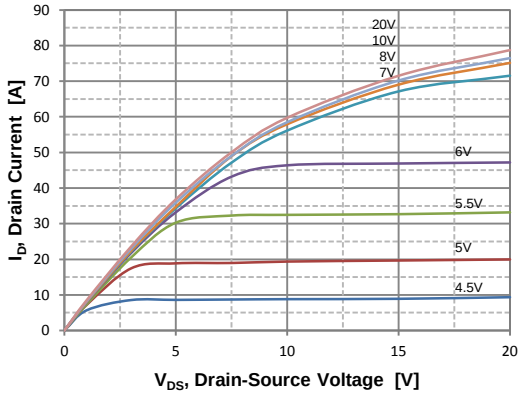

Figure 1. On Region Characteristics

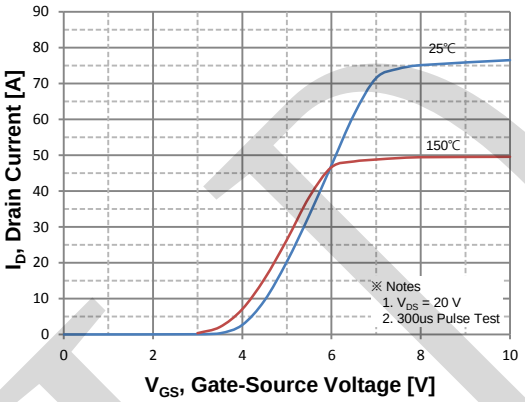

Figure 2. Transfer Characteristics

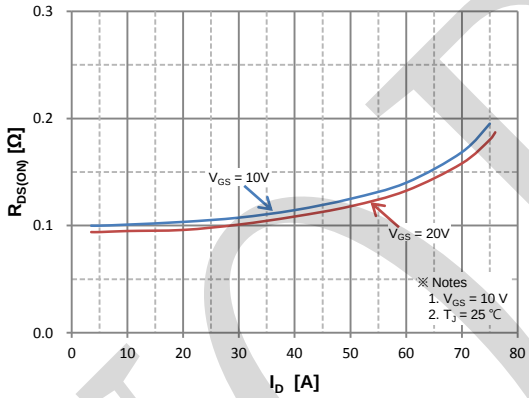

Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

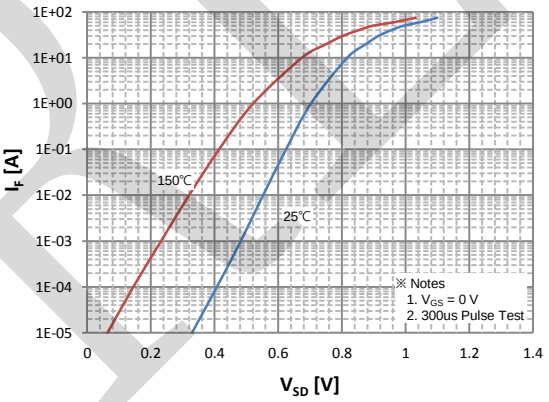

Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

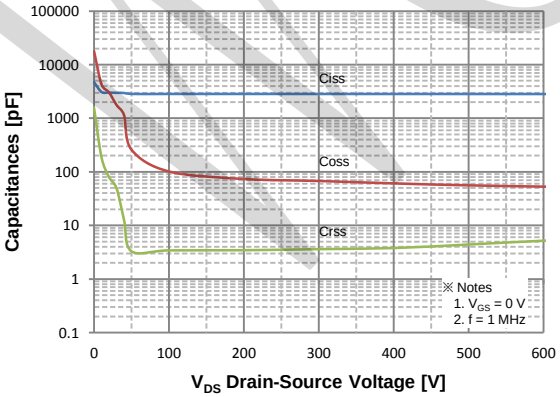

Figure 5. Capacitance Characteristics

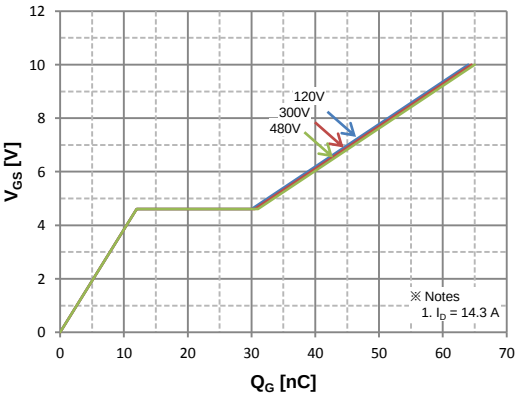

Figure 6. Gate Charge Characteristics

Typical Characteristics

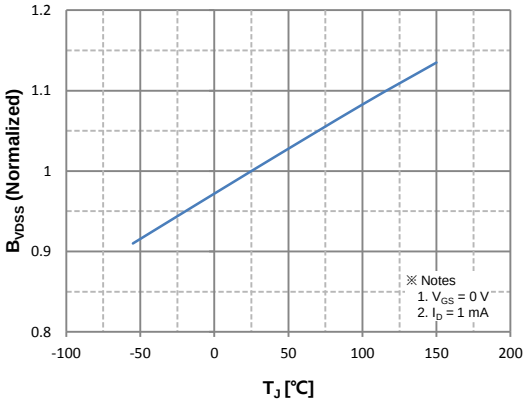

Figure 7. Breakdown Voltage Variation vs. Temperature

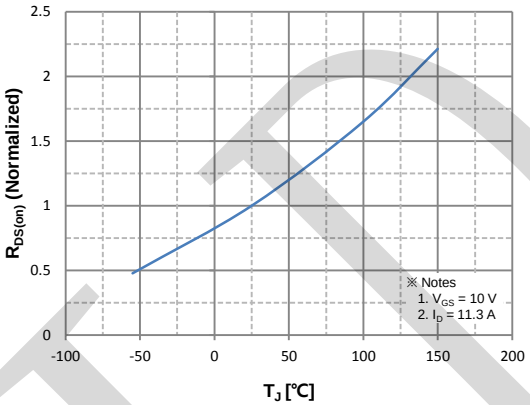

Figure 8. On-Resistance Variation vs. Temperature

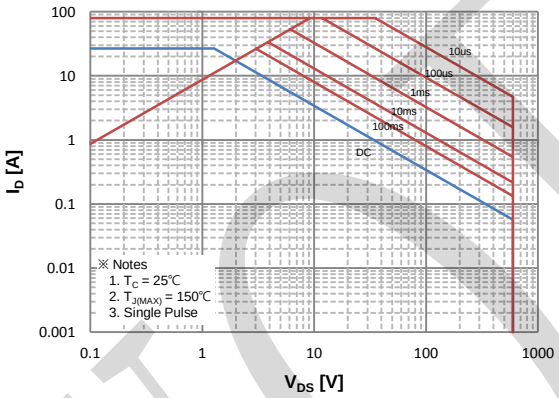

Figure 9. Maximum Safe Operating Area

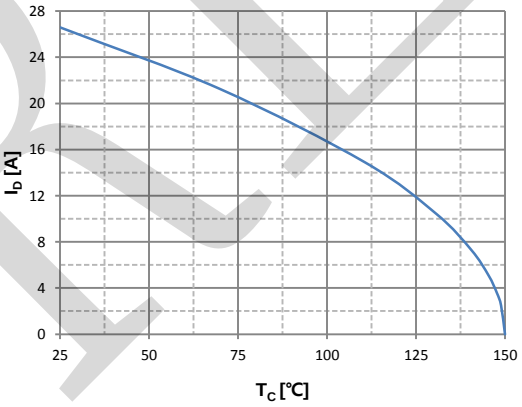

Figure 10. Maximum Drain Current vs. Case Temperature

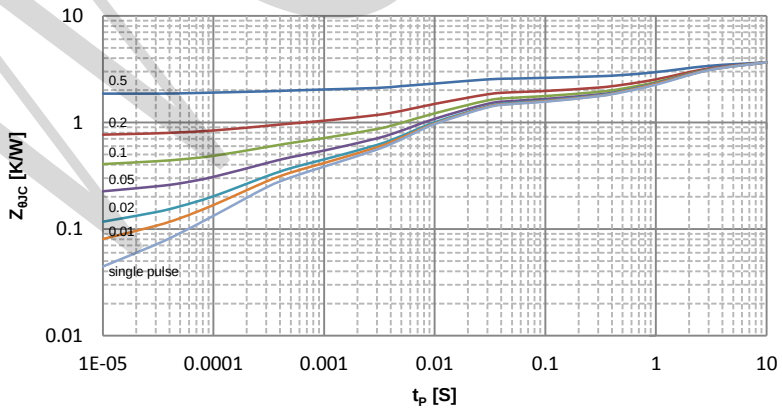

Figure 11. Transient Thermal Response Curve

PACKAGE OUTLINE DIMENSIONS

Note:unit mm

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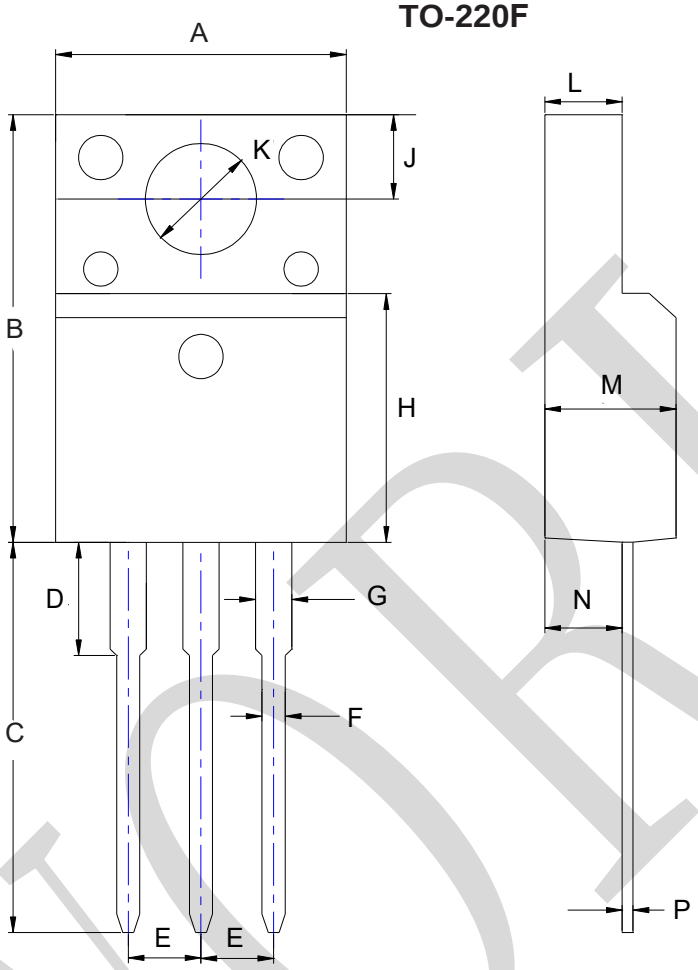

TO-220F mechanical data

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

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