



# MT03N03FAL

## 主要参数 MAIN CHARACTERISTICS

$I_D$	170A
$V_{DSS}$	30V
$R_{dson-max}$ (@ $V_{gs}=10V$ )	2.4m $\Omega$
$Q_g-typ$	49.3nC

### 用途

- 高功率 DC/DC 转换与功率开关
- 直流电机控制
- 不间断电源

### 产品特性

- 低栅极电荷
- 低  $R_{dson}$
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

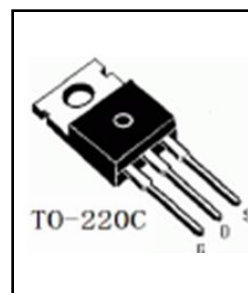
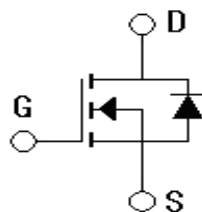
### APPLICATIONS

- High power DC/DC converters and switch mode power supplies
- DC motor control
- Uninterruptible power supply

### FEATURES

- Low gate charge
- Low  $R_{dson}$
- Fast switching
- 100% avalanche tested
- Improved  $dv/dt$  capability
- RoHS product

## 封装 Package



## 订货信息 ORDER MESSAGE

订货型号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
MT03N03FAL-C-B	MT03N03FAL-C-BR	N/A	N/A	MT03N03FAL	TO-220C

绝对最大额定值 ABSOLUTE RATINGS ( $T_c=25^\circ\text{C}$ )

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		MT03N03FAL	
最高漏极-源极直流电压 Drain-Source Voltage	$V_{DSS}$	30	V
连续漏极电流 Drain Current -continuous	$I_D$ $T=25^\circ\text{C}$	170*	A
	$I_D$ $T=100^\circ\text{C}$	120*	A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	$I_{DM}$	680*	A
最高栅源电压 Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	$E_{AS}$	188	mJ
雪崩电流 Avalanche Current	$I_{AS}$	75	A
耗散功率 Power Dissipation	$P_D$ $T_c=25^\circ\text{C}$ -Derate above $25^\circ\text{C}$	125	W
		1.0	W/ $^\circ\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_J, T_{STG}$	$-55 \sim +150$	$^\circ\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	$T_L$	300	$^\circ\text{C}$

\*漏极电流由最高结温限制

\*Drain current limited by maximum junction temperature





## 电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单 位 Units
<b>关态特性 Off –Characteristics</b>						
漏—源击穿电压 Drain-Source Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	30	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V,$ $T_C=100^\circ C$	-	-	150	$\mu A$
正向栅极体漏电流 Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=20V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-20V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	1.0	-	2.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=68A$	-	-	3.2	m $\Omega$
		$V_{GS}=10V, I_D=68A$	-	1.9	2.4	m $\Omega$
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=15V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	3536	-	pF
输出电容 Output capacitance	$C_{oss}$		-	927	-	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	530	-	pF

**电特性 ELECTRICAL CHARACTERISTICS**

开关特性 Switching Characteristics					
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=15V, I_D=68A, R_G=1.8\Omega$ (note 3, 4)	-	22.2	- ns
上升时间 Turn-On rise time	$t_r$		-	118	- ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	65.2	- ns
下降时间 Turn-Off Fall time	$t_f$		-	119	- ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=15V,$ $I_D=68A$ $V_{GS}=4.5V$ (note 3, 4)	-	49.3	- nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	12	- nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	26.4	- nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings					
正向最大连续电流 Maximum Continuous Drain -Source Diode Forward Current		$I_S$	-	-	170 A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	680 A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V,$ $I_S=68A$	-	-	1.2 V
反向恢复时间 Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=20A$ $dI_F/dt=100A/\mu s$ (note 3)	-	39.9	- ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		-	24.8	- nC

**热特性 THERMAL CHARACTERISTIC**

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
		MT03N03FAL	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1.0	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62	$^{\circ}C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $L=0.067mH, V_{DD}=15V, R_G=50\Omega$ , 起始结温  
 $T_J=25^{\circ}C$
- 3: 脉冲测试: 脉冲宽度 $\leq 300\mu s$ , 占空比 $\leq 2\%$
- 4: 基本与工作温度无关

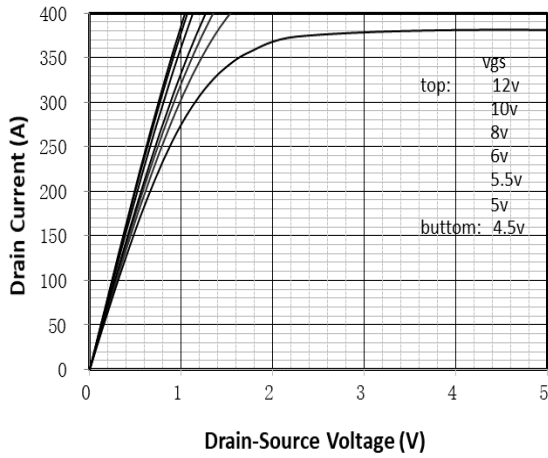
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2:  $L=0.067mH, V_{DD}=15V, R_G=50\Omega$ , Starting  $T_J=25^{\circ}C$
- 3: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
- 4: Essentially independent of operating temperature

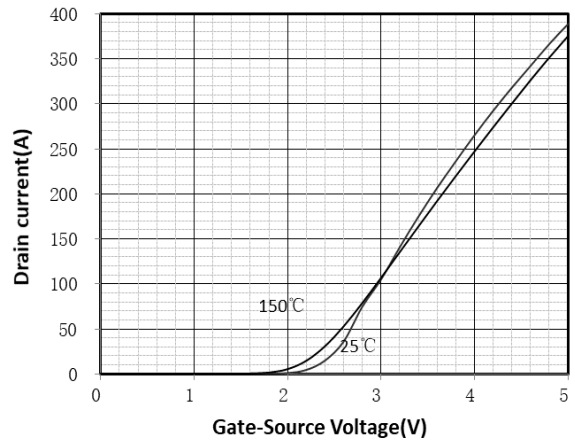


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

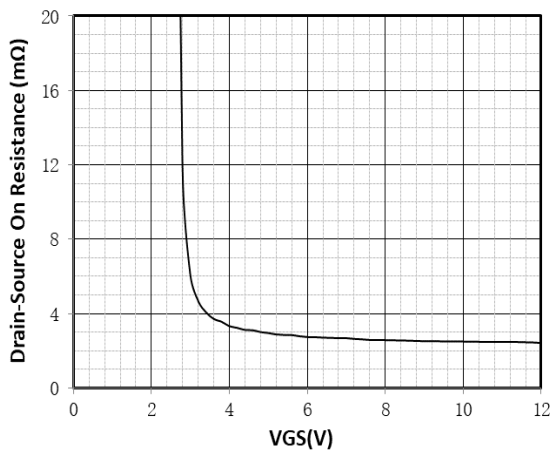
On-Region Characteristics



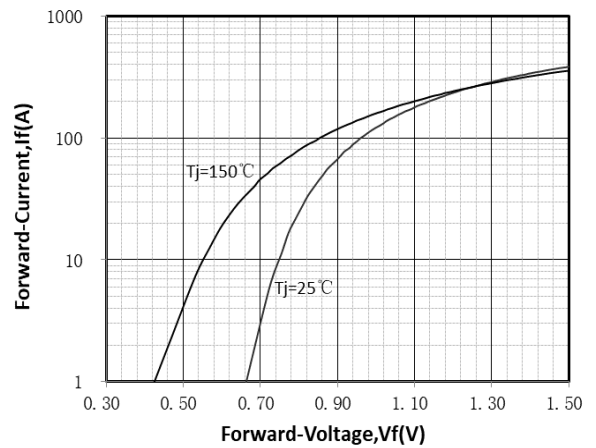
Transfer Characteristics



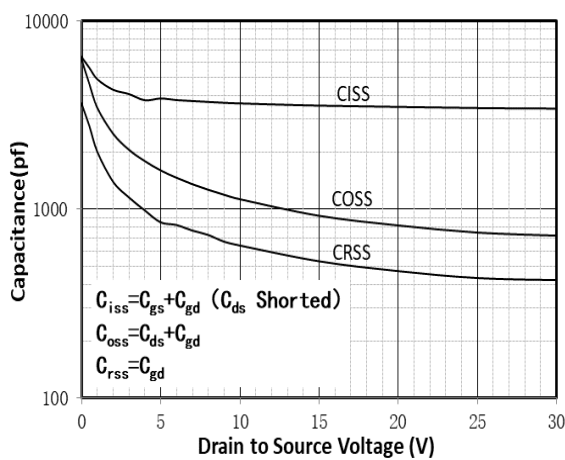
On-Resistance Variation vs. Drain Current and Gate Voltage



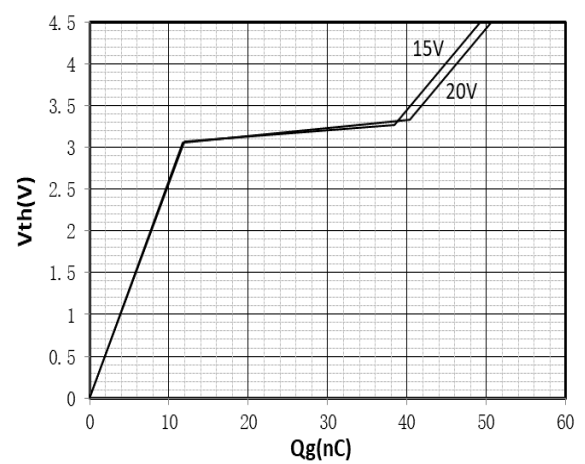
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics



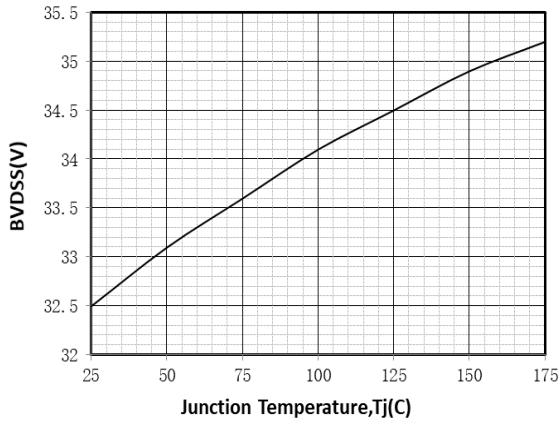
Gate Charge Characteristics



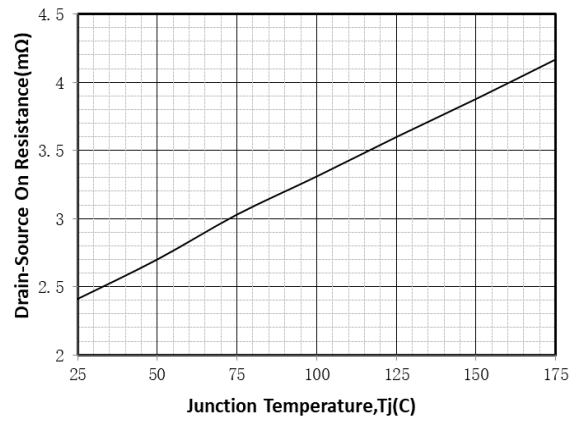


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

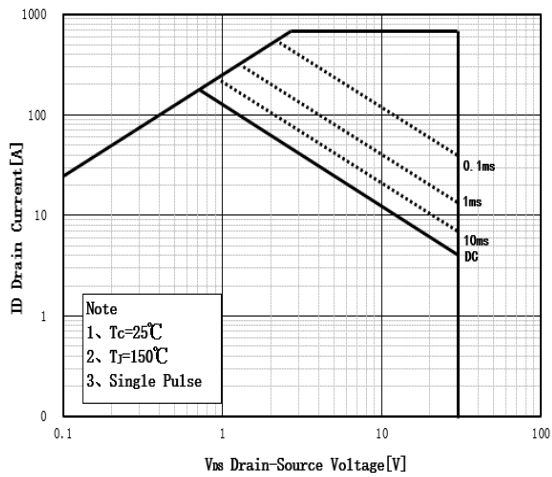
**Breakdown Voltage Variation vs. Temperature**



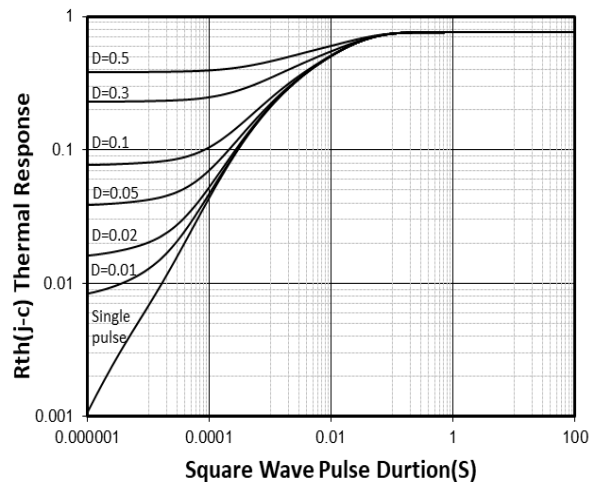
**On-Resistance Variation vs. Temperature**



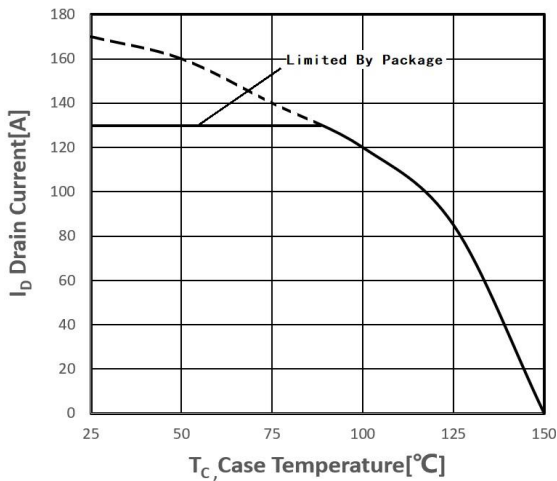
**Maximum Safe Operating Area**



**Transient Thermal Response Curve**



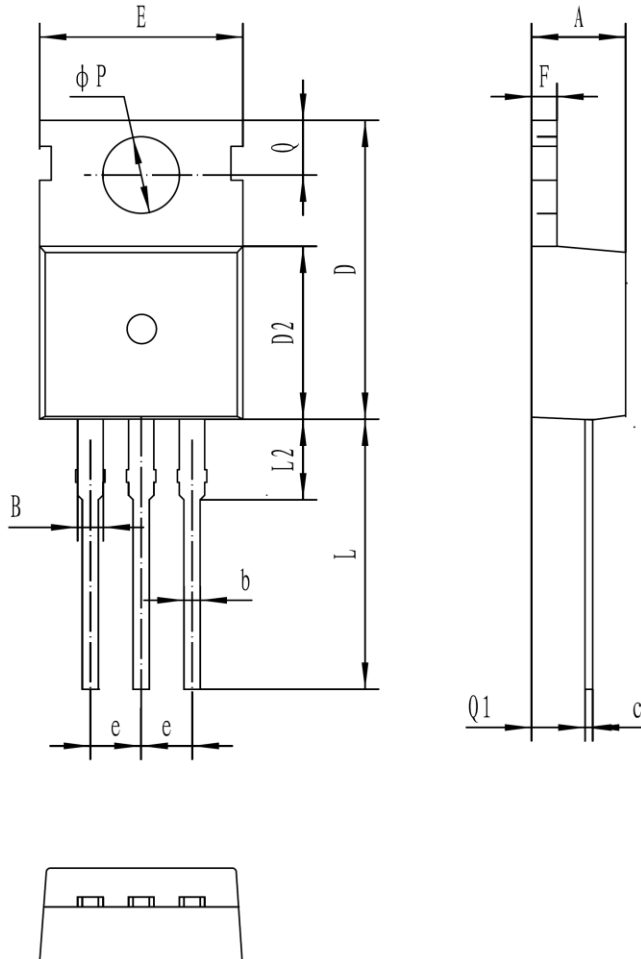
**Maximum Drain Current vs. Case Temperature**





TO-220C

单位 Unit: mm



符号 symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80



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