

190N04

主要参数

Main Characteristics

I_D	190A
V_{DS}	40 V
$R_{DS(on)}$	5m Ω

用途

电机控制
开关电源
逆变器

Applications

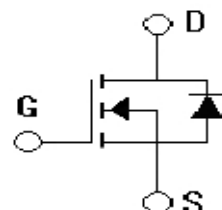
Motor controls
Switching power supplies
Inverters

产品特性

产品全部经过雪崩测试
RoHS 产品

Features

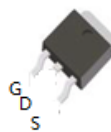
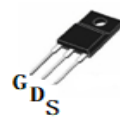
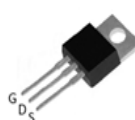
100% avalanche tested
RoHS product



TO-220

TO-220F

TO-252



绝对最大额定值 **Absolute Ratings** (Tc=25℃)

项 目 Parameter	符 号 Symbol	数 值 Value	单位 Unit
最高漏极-源极直流电压 Drain-Source Voltage	V _{DSS}	40	V
连续漏极电流 Drain Current -continuous	I _D Tc=25℃	190	A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	I _{DM}	760	A
最高栅源电压 Gate-Source Voltage	V _{GSS}	±20	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E _{AS}	1980	mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I _{AR}	95	A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	E _{AR}	1188	mJ
二极管反向恢复最大电压变化速率 (注 1) Peak Diode Recovery dv/dt (note 1)	dv/dt	5.0	V/ns
耗散功率 Power Dissipation	P _D	171	W
最高结温 Operating Junction Temperature	T _J	+150	℃
存储温度 Storage Temperature Range	T _{STG}	-55~+150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L	300	℃

*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
关态特性 Off –Characteristics						
漏—源击穿电压 Drain-Source Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	40	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V, T _C =25°C	—	-	20	μA
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V, T _C =125°C	—	-	250	μA
正向栅极体漏电流 Forward Gate-body leakage current	I _{GSSF}	V _{DS} =0V, V _{GS} =+20V	-	-	200	nA
反向栅极体漏电流 Reverse Gate-body leakage current	I _{GSSR}	V _{DS} =0V, V _{GS} =-20V	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =80A	-	5.0	6.0	mΩ
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f=1.0MHz	-	3840	-	pF
输出电容 Output capacitance	C _{oss}		-	1710	-	pF
反向传输电容 Reverse transfer capacitance	C _{rss}		-	470	-	pF
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DD} =20V I _D =160A V _{GS} =10V R _G =10 Ω (note4)	-	32	-	ns
上升时间 Turn-On rise time	t _r		-	92	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	101	-	ns
下降时间 Turn-Off Fall time	t _f		-	69	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DD} =20V I _D =160A V _{GS} =10V(note4)	-	96	-	nC
栅—源电荷 Gate-Source charge	Q _{gs}		-	19	-	nC
栅—漏电荷 Gate-Drain charge	Q _{gd}		-	46	-	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	I_S		-	-	190	A
正向最大脉冲电流 Maximum Pulsed Drain-Source	I_{SM}		-	-	760	A
正向压降 Drain-Source Diode Forward	V_{FSD}	$V_{GS}=0V, I_S=60A$	-	-	1.4	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=160A$ $di/dt=100A/\mu s$	-	78	-	ns
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	200	-	μC

热特性 Thermal Characteristics

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.73	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	$^{\circ}C/W$

注释:

1: 脉冲宽度由最高结温限制

Pulse width limited by maximum junction temperature

2: 起始结温 $T_J=25^{\circ}C$, $L=1mH$, $V_{DD}=20V$ Starting $T_J=25^{\circ}C$, $L=1mH$, $V_{DD}=20V$ 3: $I_{SD} \leq 95A$, $di/dt \leq 150A/\mu s$, $V_{DD} \leq BV_{DSS}$, $I_{SD} \leq 95A$, $di/dt \leq 150A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=150^{\circ}C$ 起始结温 $T_J=150^{\circ}C$ 4: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$ Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

特性曲线 Typical Characteristics

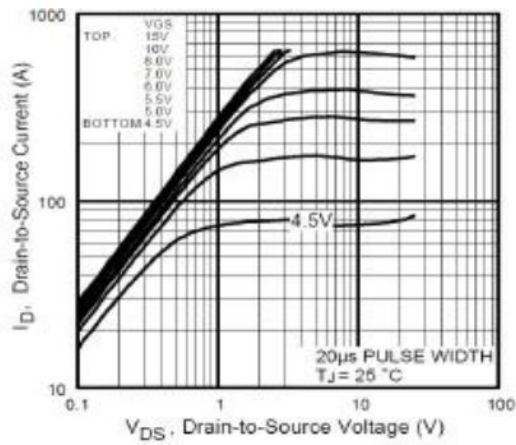


Fig 1. Typical Output Characteristics

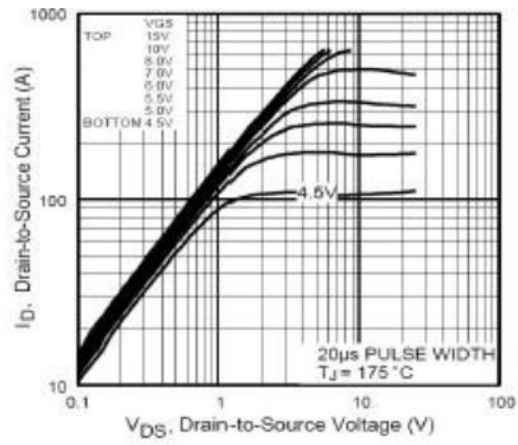


Fig 2. Typical Output Characteristics

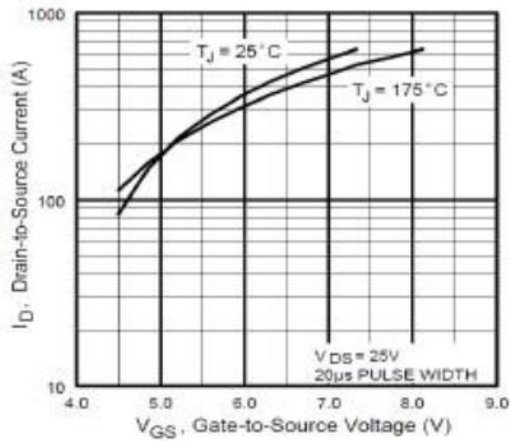


Fig 3. Typical Transfer Characteristics

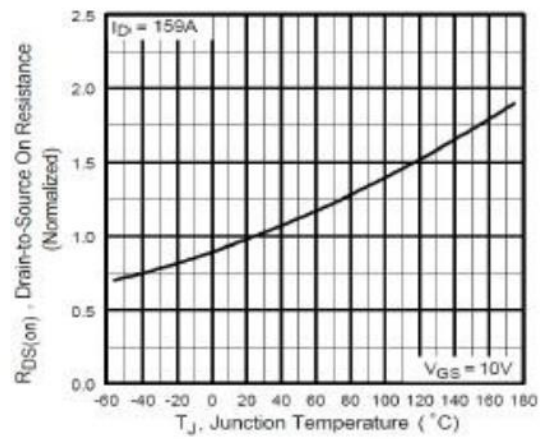


Fig 4. Normalized On-Resistance Vs. Temperature

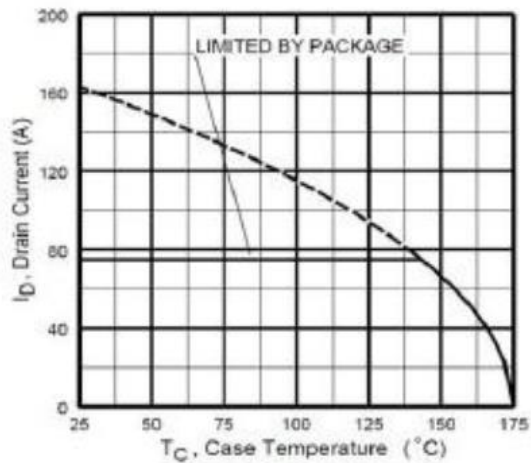


Fig 5. Maximum Drain Current Vs. Case Temperature

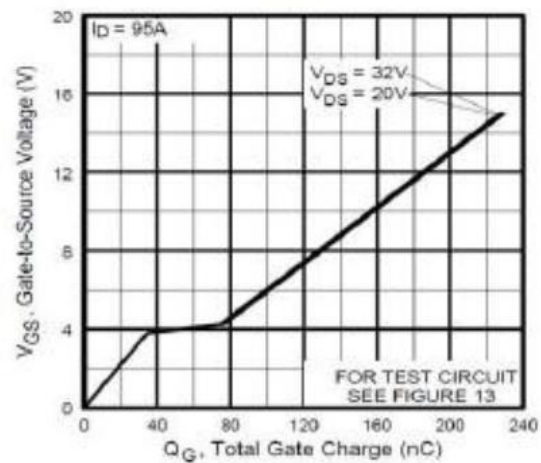


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

特性曲线 Typical Characteristics

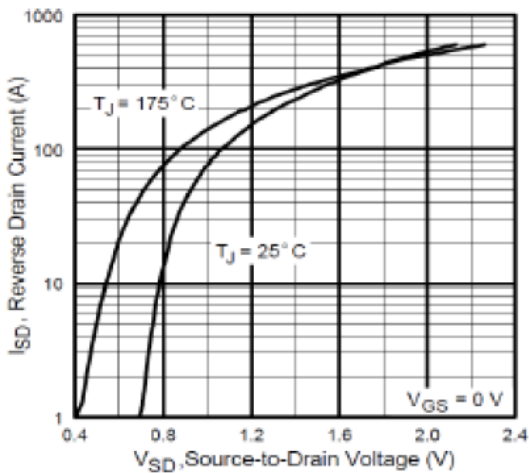


Fig 7. Typical Source-Drain Diode Forward Voltage

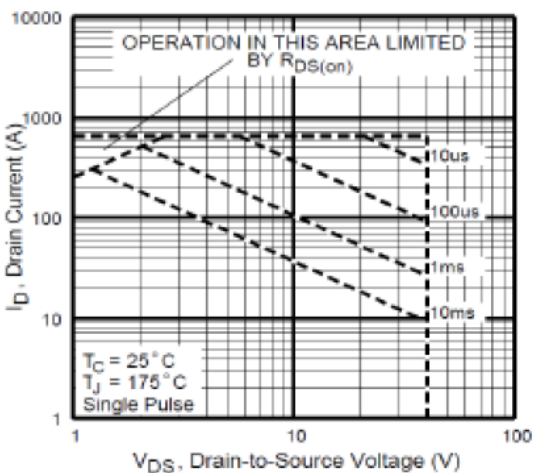
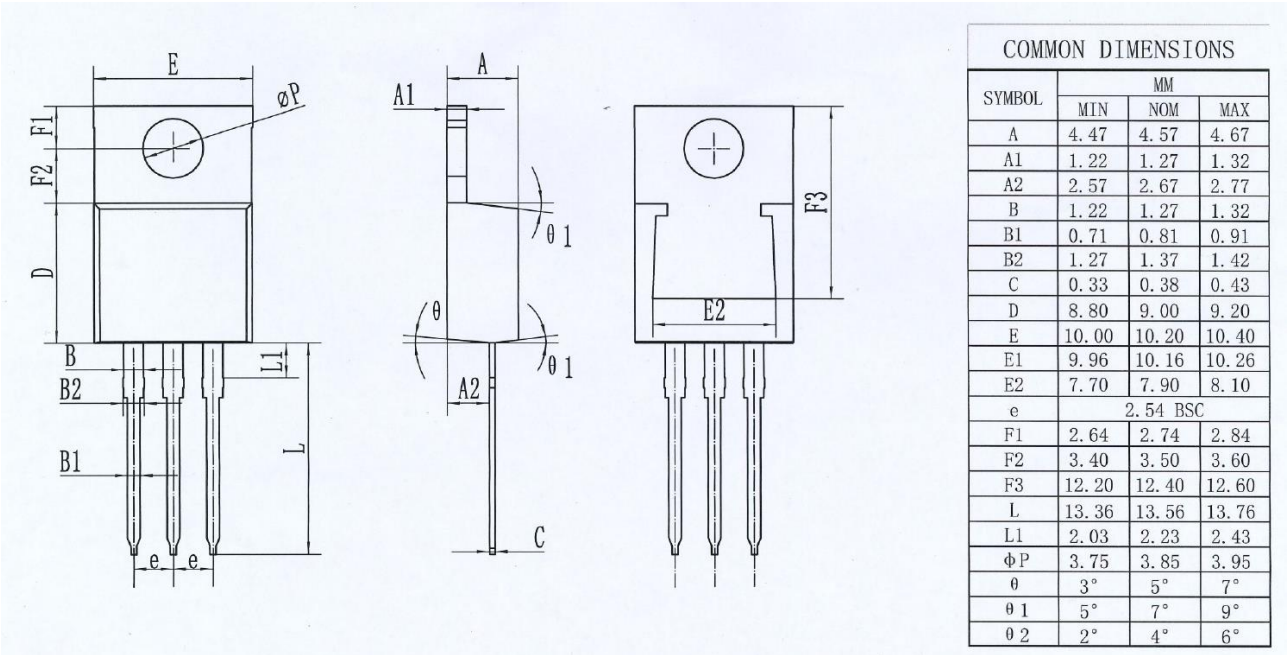


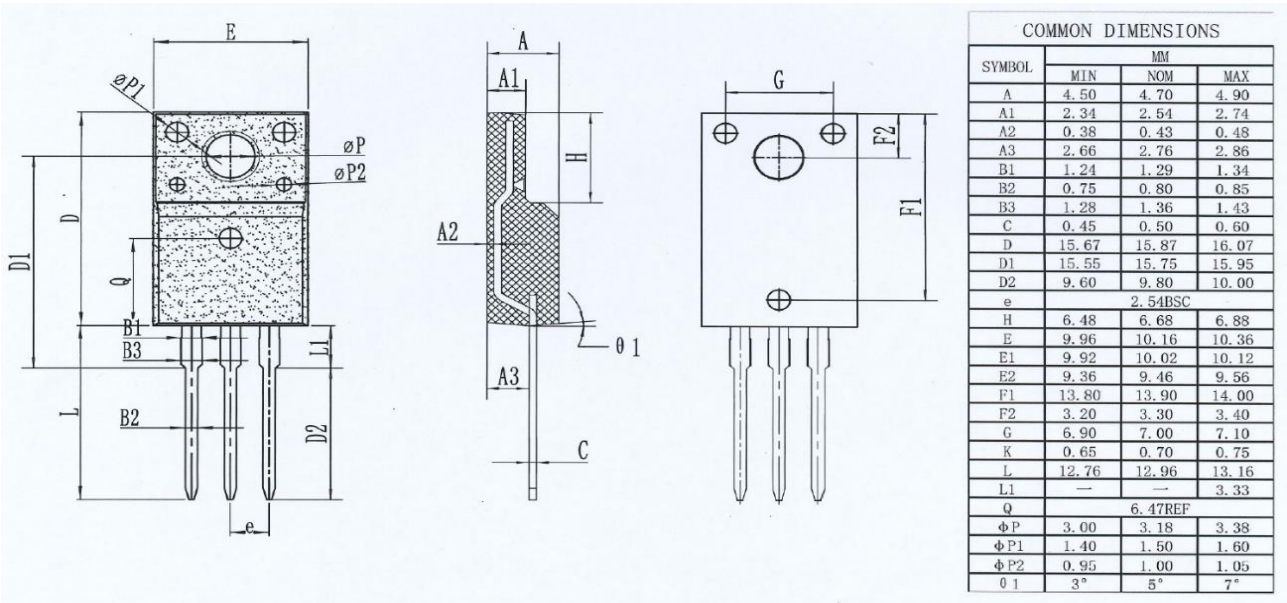
Fig 8. Maximum Safe Operating Area

外形尺寸 PACKAGE MECHANICAL DATA

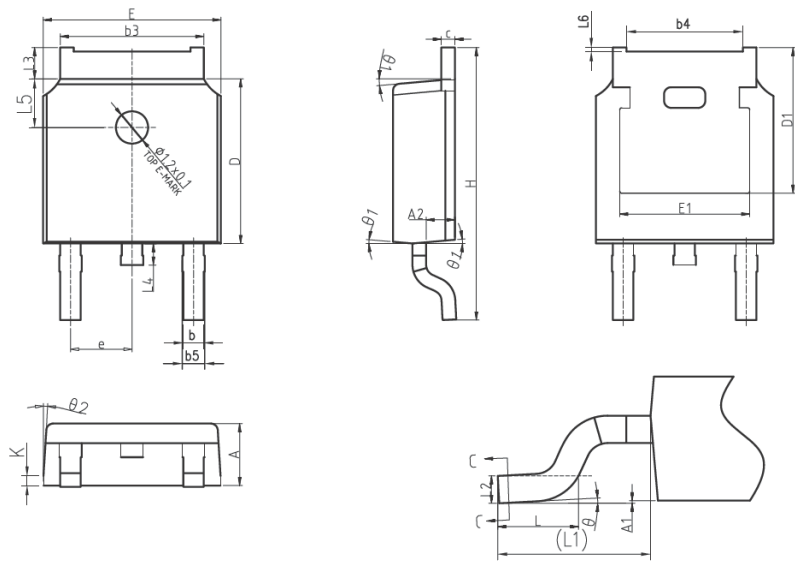
TO-220



TO-220F



TO-252



SYMBOL	mm		
	MIN	NOM	MAX
*A	2.20	2.30	2.38
*A1	0.00	-	0.10
A2	0.97	1.07	1.17
*b	0.72	0.78	0.85
b1	0.71	0.76	0.81
*b3	5.23	5.33	5.46
b4	4.27	4.32	4.37
b5	0.72	0.88	0.93
*c	0.47	0.53	0.58
c1	0.46	0.51	0.56
*D	6.00	6.10	6.20
D1	5.30REF		
*E	6.50	6.60	6.70
E1	4.70	4.83	4.92
*e	2.286BSC		
*H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
*L3	0.90	-	1.25
*L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
L6	0	0.047	0.123
theta	0°	-	8°
*theta 1	5°	7°	9°
theta 2	5°	7°	9°
K	0.40REF		