



HIF70R190-P

N-Channel SiC Power MOSFET

● Features:

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

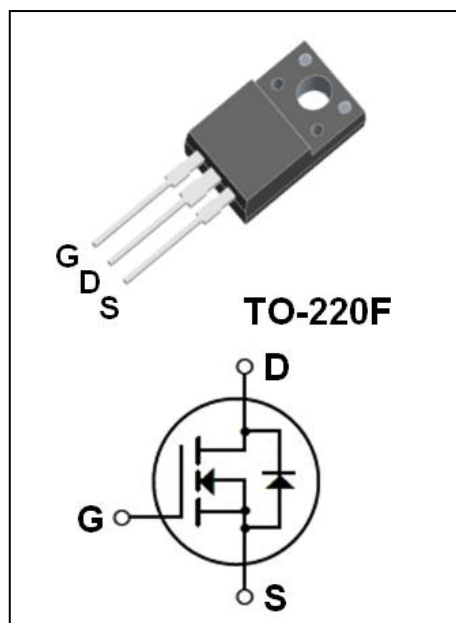
● Benefits:

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

● Applications:

- Renewable Energy
- EV Battery Chargers
- High Voltage DC/DC Converters
- Switch Mode Power Supplies

V_{DSS}	700	V
$R_{DS(on)}(Typ)$	190	mΩ
$I_D@25^{\circ}C$	20	A



Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Value	Unit
V_{DSmax}	Drain-Source Voltage	$V_{GS}=0V$, $I_D=250\mu A$	700	V
V_{GSmax}	Gate-Source Voltage	Absolute maximum values	-8/+20	V
V_{GSop}	Gate-Source Voltage	Recommended operational values	0/+18	V
I_D	Continuous Drain Current	$V_{GS}=18V$, $T_C=25^{\circ}C$	20	A
		$V_{GS}=18V$, $T_C=100^{\circ}C$	14.1	
$I_{D(pulse)}$	Pulsed Drain Current	Pulse width t_p limited by T_{Jmax}	50	A
P_D	Power Dissipation	$T_C=25^{\circ}C$, $T_J=175^{\circ}C$	31.5	W
T_J , T_{STG}	Operating Junction and Storage Temperature	--	-40 to +175	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	4.76	--	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	--	80	

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Electrical Characteristics($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	700	--	--	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=1.8mA$	2.3	3.5	4.8	V
		$V_{DS}=V_{GS}, I_D=1.8mA, T_J=175^{\circ}\text{C}$	--	2.5	--	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=700V, V_{GS}=0V$	--	0.3	20	μA
I_{GSS+}	Gate-Source Leakage Current	$V_{DS}=0V, V_{GS}=20V$	--	20	250	nA
I_{GSS-}	Gate-Source Leakage Current	$V_{DS}=0V, V_{GS}=-8V$	--	-20	-250	nA
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=18V, I_D=6.5A$	--	190	250	m Ω
		$V_{GS}=15V, I_D=6.5A$	--	270	--	m Ω
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=600V,$ $f=1MHz$	--	382	--	pF
C_{oss}	Output Capacitance		--	30	--	
C_{rss}	Reverse Transfer Capacitance		--	2.5	--	
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=400V, V_{GS}=18V,$ $I_D=6.5A, R_{G(ext)}=5\Omega$	--	13.2	--	ns
t_r	Rise Time		--	35.3	--	
$t_{d(off)}$	Turn-Off Delay Time		--	18.8	--	
t_f	Fall Time		--	36.7	--	
Q_G	Total Gate Charge	$V_{DS}=400V$ $V_{GS}=18V$ $I_D=6.5A$	--	25	--	nC
Q_{GS}	Gate to Source Charge		--	10	--	
Q_{GD}	Gate to Drain Charge		--	7	--	

Reverse Diode Characteristics($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=3.3A$	--	3.5	--	V
		$V_{GS}=0V, I_{SD}=3.3A, T_J=175^{\circ}\text{C}$	--	3.1	--	
I_S	Continuous Diode Forward Current	--	--	--	20	A
t_{rr}	Reverse Recover Time	$V_{DD}=400V, I_{SD}=6.5A,$ $dI_F/dt=850A/\mu s$	--	11.8	--	ns
Q_{rr}	Reverse Recovery Charge		--	33.8	--	nC

Typical Performance Characteristics

Fig 1. Output Characteristics $T_j = 25^\circ\text{C}$

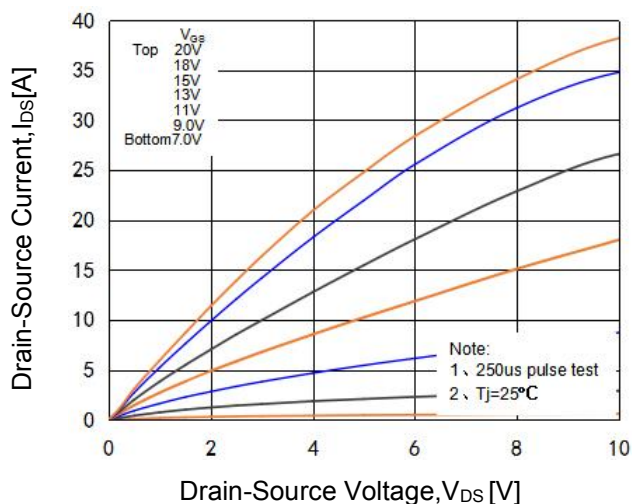


Fig 2. Transfer Characteristic for Various Junction Temperature

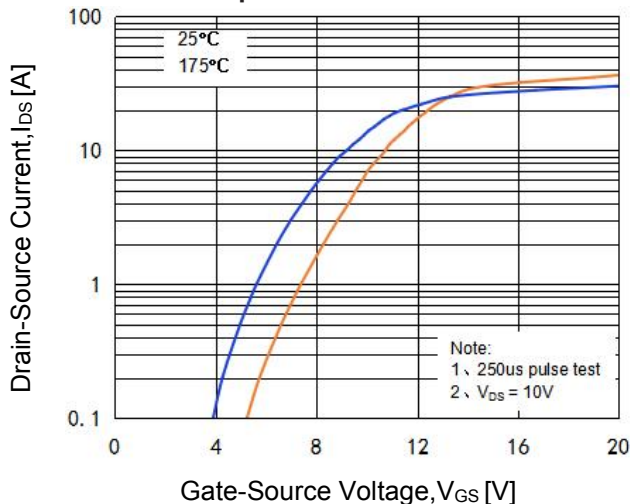


Fig 3. On-Resistance vs. Drain Current For Various Temperature

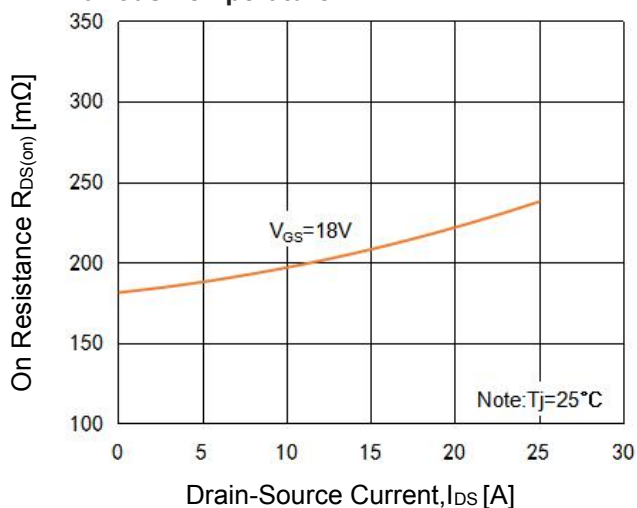


Fig 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

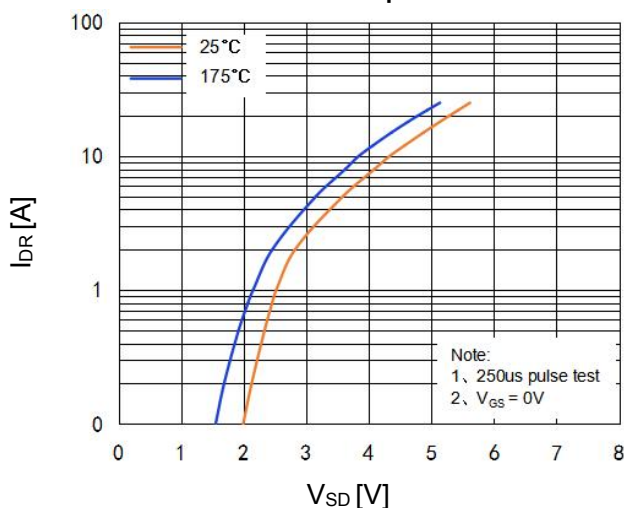


Fig 5. Capacitance vs. Drain-Source Voltage

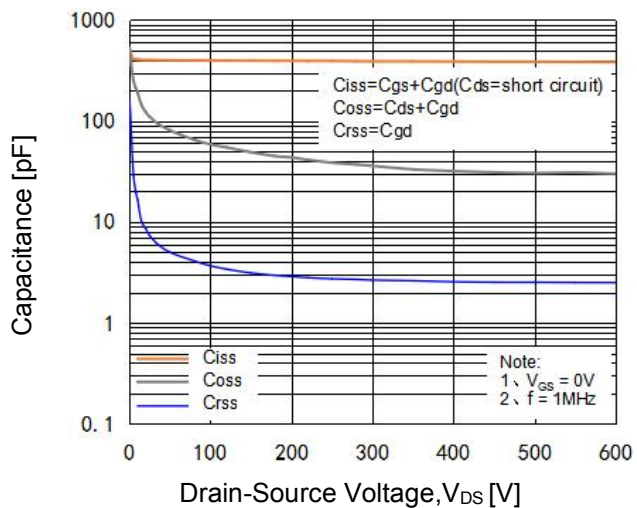


Fig 6. Gate Charge Characteristics

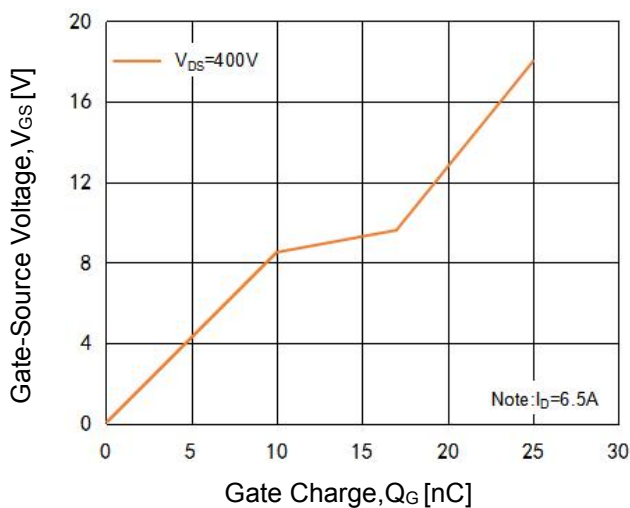


Fig 7. Threshold Voltage vs. Temperature

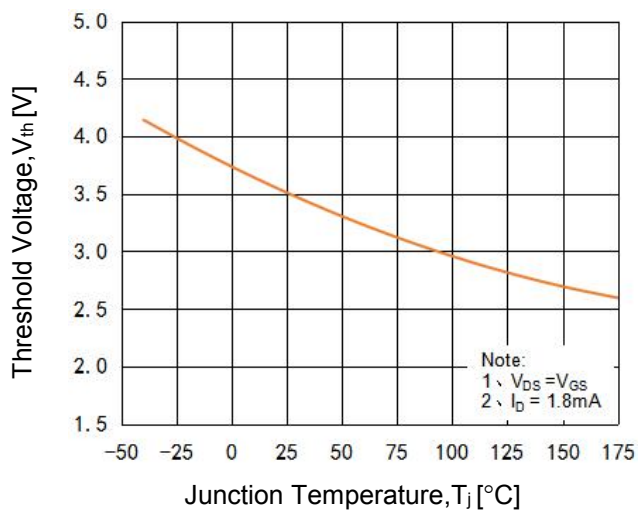


Fig 8. Normalized On-Resistance vs. Temperature

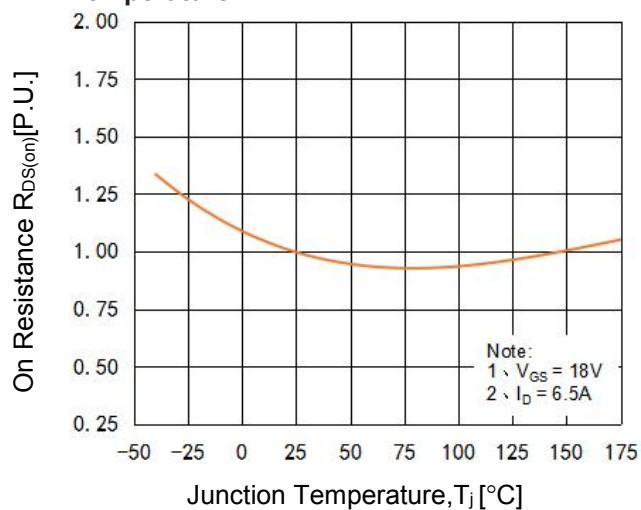


Fig 9. Maximum Power Dissipation Derating vs. Case Temperature

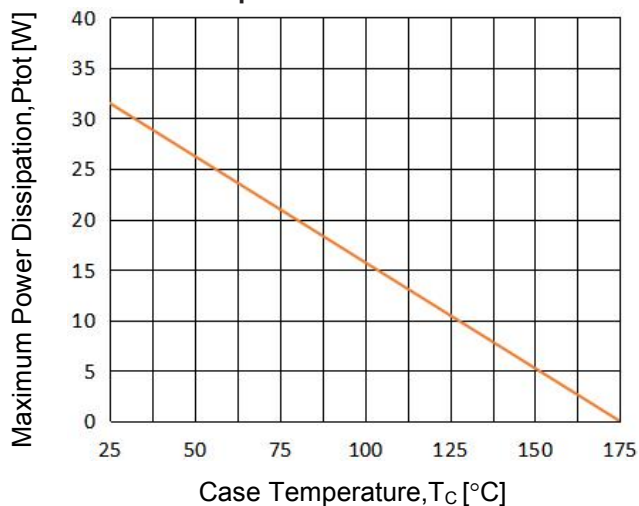
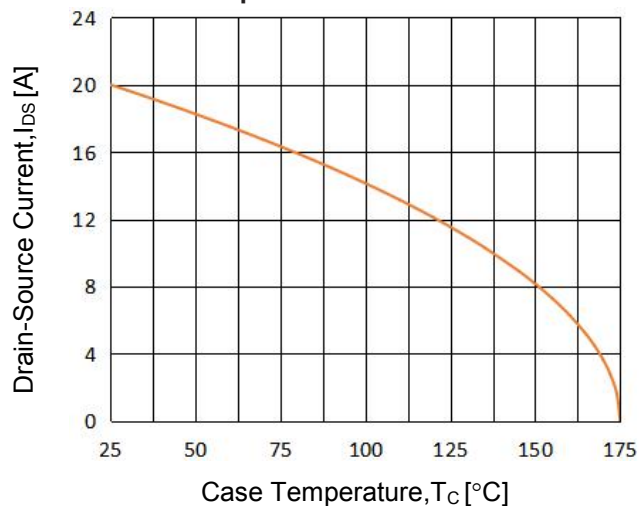


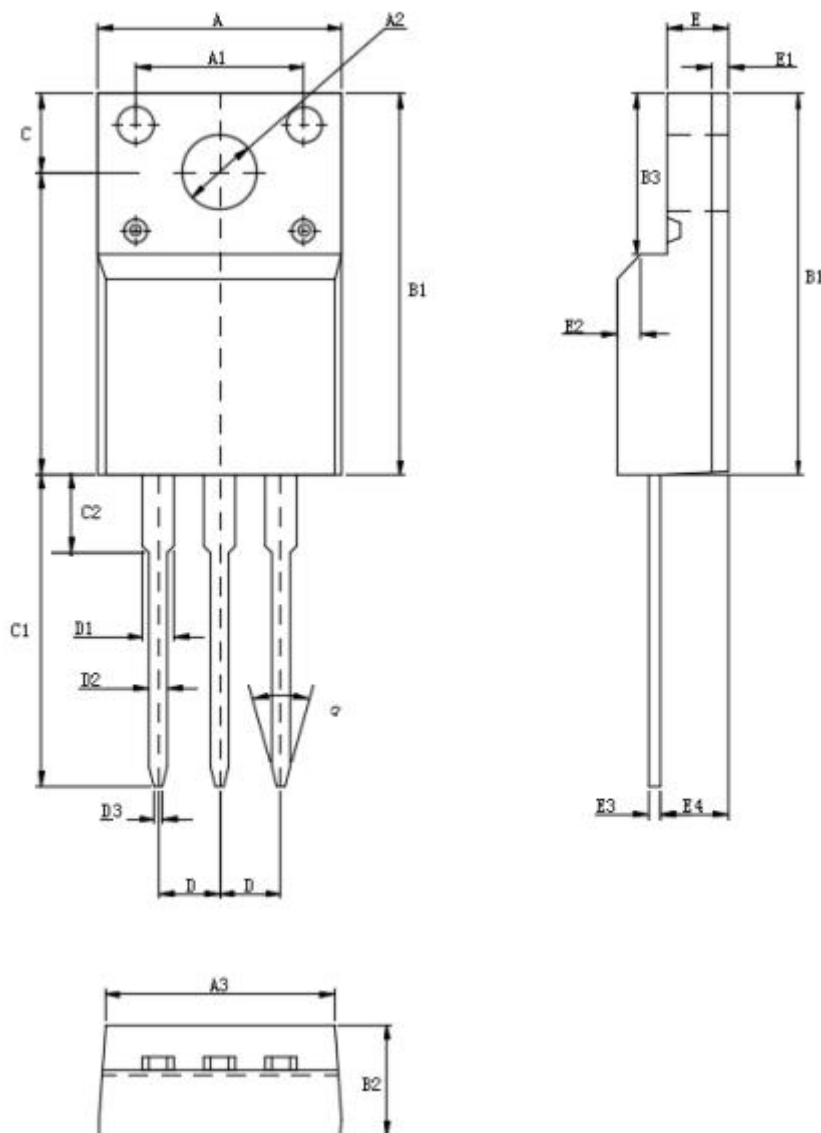
Fig 10. Continuous Drain Current Derating vs. Case Temperature



TO-220F Package Dimensions

UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.76	10.16	10.56	D	-	2.54	-
A1	-	7.00	-	D1	1.15	-	1.47
A2	2.93	3.18	3.43	D2	0.65	0.80	0.90
A3	9.10	9.50	9.90	D3	0.20	-	0.50
B1	15.37	15.87	16.37	E	2.24	2.54	2.84
B2	4.40	4.70	5.00	E1	-	0.70	-
B3	6.00	6.70	7.40	E2	-	1.0 × 45°	-
C	3.00	3.35	3.70	E3	0.40	0.50	0.60
C1	11.98	12.98	13.98	E4	2.30	2.80	3.30
C2	2.60	-	3.60	α (度)	-	30°	-



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- 注意事项：
- 1、在电路设计时请不要超过器件的最大额定值，否则会影响整机的可靠性。
 - 2、MOSFET产品为静电敏感型器件，使用时应注意采取防静电保护措施，如佩戴防静电手环、设备接地等。
 - 3、如需安装散热片，请注意控制扭力大小及散热片的平整度。
 - 4、该规格书由华科公司制作，并可能不定期更改，恕不另行通知。
 - 5、如有疑问，请及时联系我司销售代表。

版本履历表：

序号	版本号	修改时间	修改记录
1	V1.0	2025-5-15	首次发行