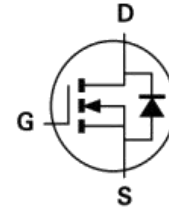


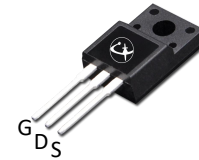
MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	650V
$R_{DS(on)}$ -typ (@ $V_{GS}=10V$ $T_c=25^{\circ}C$)	165m Ω



FEATURES

- Ultra low $R_{DS(on)}$
- Ultra low gate charge (typ. $Q_g=38.4nC$)
- 100% UIS tested



TO-220F

APPLICATIONS

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

MECHANICAL DATA

- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275 $^{\circ}C$ maximum, 10s per JESD 22-B106

Product specification classification

Part Number	Package	Mode Name	Pack
LC65R190F	TO-220F	LC65R190F	Tube

Maximum Ratings at Tc=25°C unless otherwise specified

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continue Drain Current	I_D	20	A
Pulsed Drain Current (Note1)	I_{DM}	60	A
Power Dissipation	P_D	180	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	600	mJ
Operating Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.7	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62	°C/W

Note1:Pulse test: 300 μ s pulse width, 2 % duty cycle

Electrical Characteristics at Tc=25°C unless otherwise specified

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650 \text{ V}, V_{GS} = 0 \text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	$V_{GS(th)}$	2.5	-	4.5	V
Drain-Source On-State Resistance	$V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$	$R_{DS(on)}$	-	165	180	m Ω
Forward Transconductance	$V_{DS} = 40 \text{ V}, I_D = 10 \text{ A}$	g_{fs}	-	17	-	S
Input Capacitance	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, f = 100 \text{ KHz}$	C_{iss}	-	1832	-	pF
Output Capacitance		C_{oss}	-	72.2	-	pF
Reverse Transfer Capacitance		C_{rss}	-	0.72	-	pF
Turn-on Delay Time(Note2)	$V_{DD} = 400 \text{ V}, I_D = 10 \text{ A}, V_{GS} = 10 \text{ V}, R_G = 10 \Omega$	$t_{d(ON)}$	-	77	-	ns
Rise Time(Note2)		t_r	-	14.6	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	64.4	-	ns
Fall Time(Note2)		t_f	-	6.2	-	ns
Total Gate Charge(Note2)	$V_{DS} = 520 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$	Q_G	-	38.4	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	10.2	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	14.6	-	nC

Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximum Continuous Drain -Source Diode Forward Current		I_S	-	-	20	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	60	A
Drain-Source Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 10 \text{ A}, T_J = 25^\circ\text{C}$	V_{SD}	-	-	1.1	V
Reverse recovery time	$T_J = 25^\circ\text{C}, I_F = 10 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$	t_{rr}	-	302	-	ns
Reverse recovery charge		Q_{rr}	-	3616	-	nC

Note2:Pulse test: 300 μ s pulse width, 2 % duty cycle

RATINGS AND CHARACTERISTIC CURVES

Fig 1: Output Characteristics

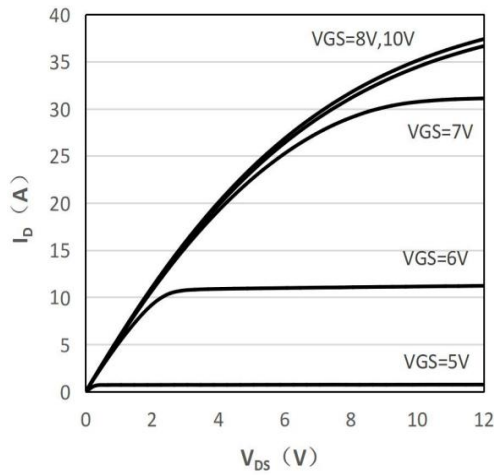


Fig 2: Transfer Characteristics

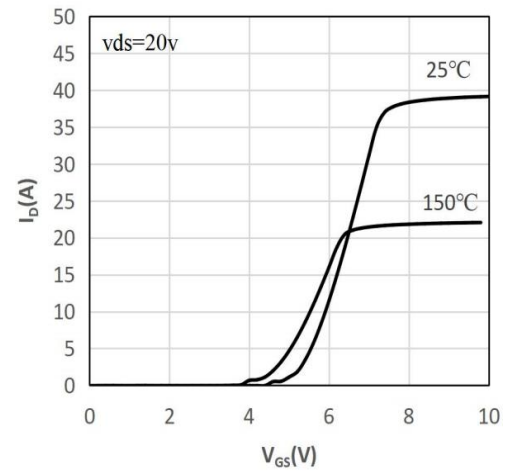


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

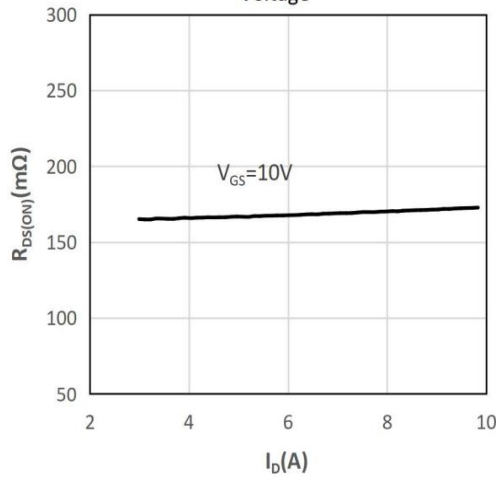


Fig 4: $R_{DS(on)}$ vs. Temperature

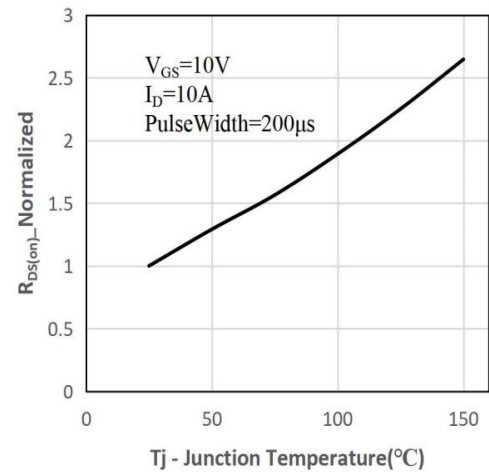


Fig 5: Breakdown Voltage vs. Temperature

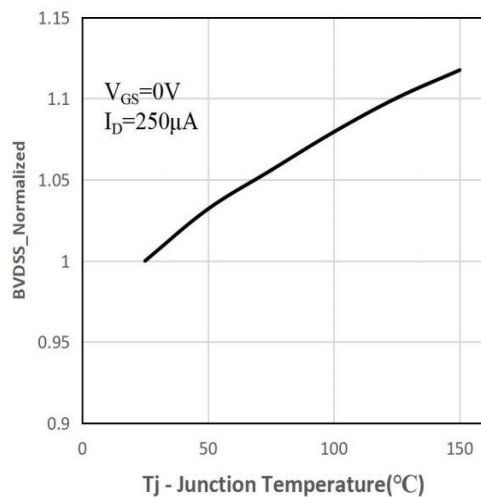
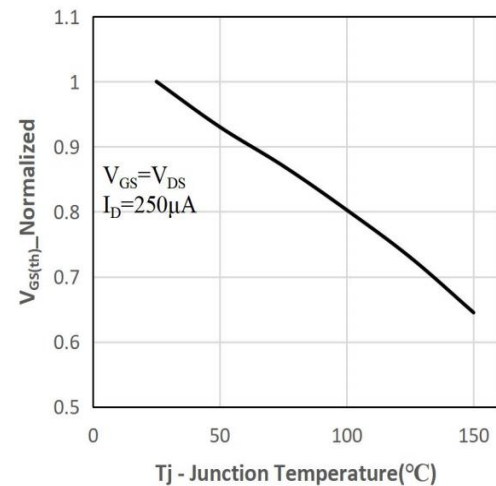


Fig 6: Threshold voltage vs. Temperature



RATINGS AND CHARACTERISTIC CURVES

Fig 7: Body-Diode Characteristics

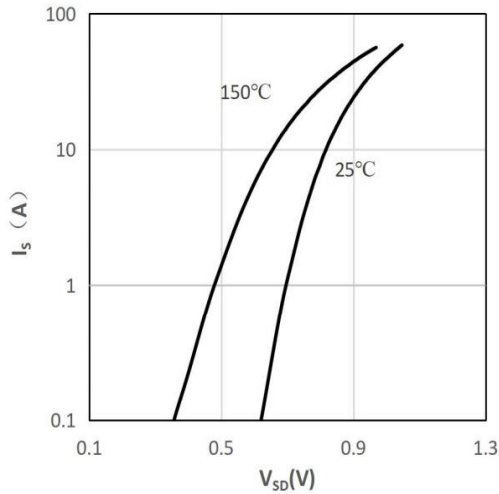


Fig 8: Capacitance Characteristics

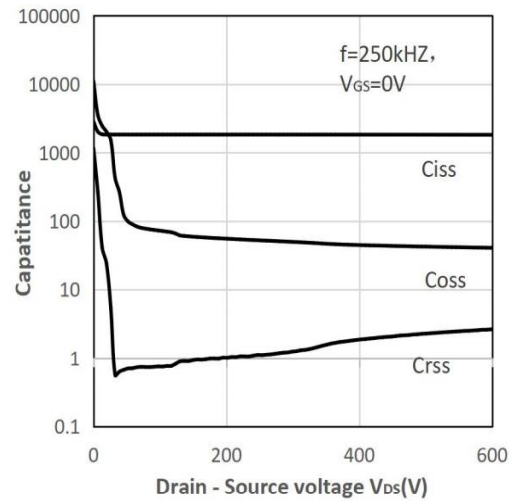


Fig 9: Gate Quantity of electric charge vs. Gate Voltage

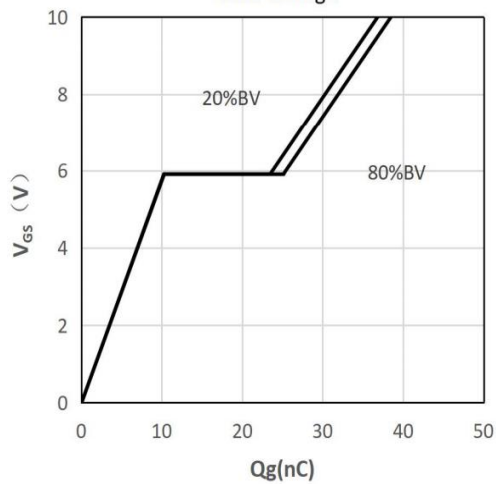


Fig 10: Drain Current Derating

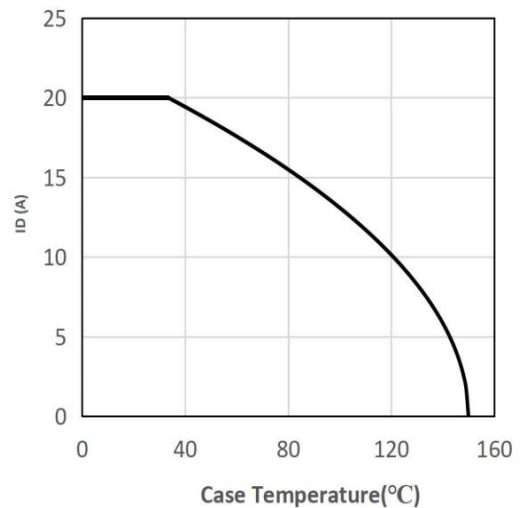


Fig 11: Power Dissipation vs. Temperature

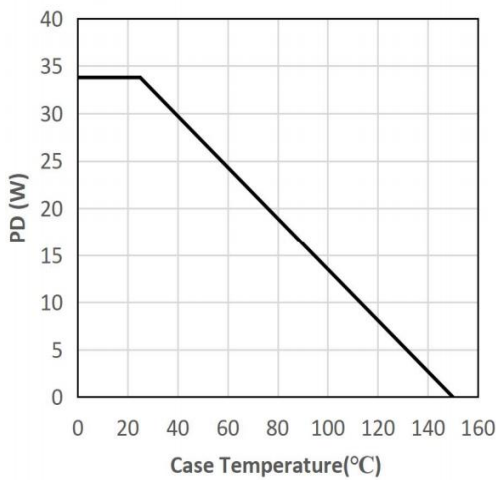
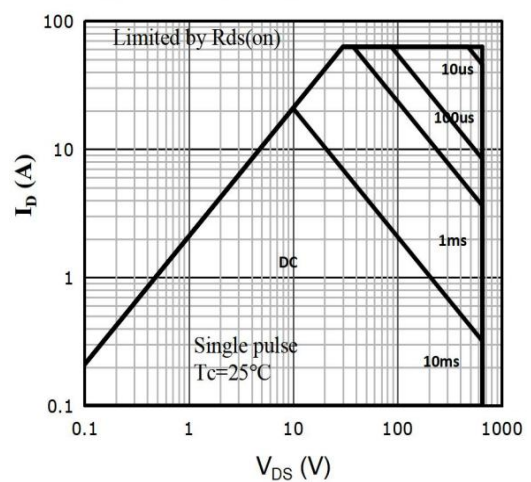
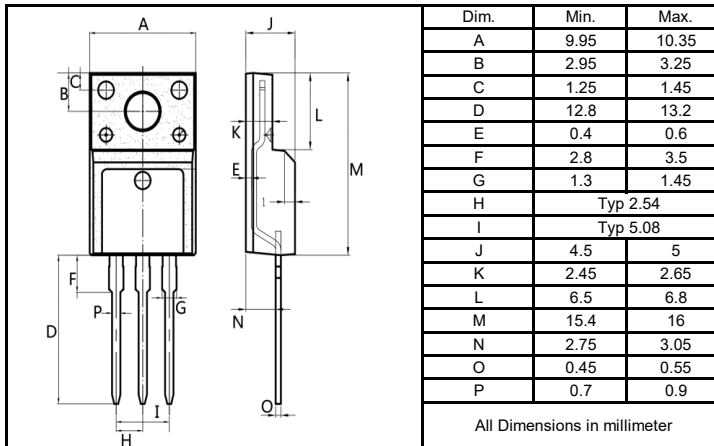


Fig 12. Safe Operating Area

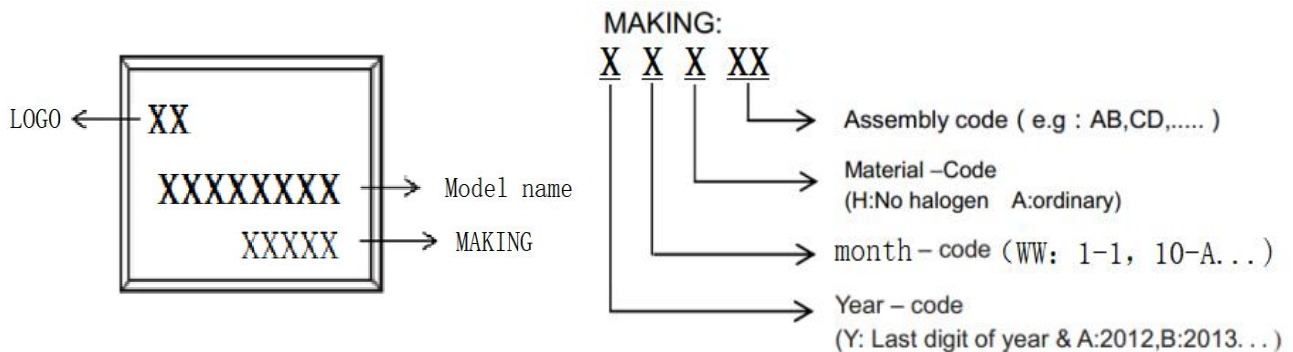


Package Outline Dimensions millimeters

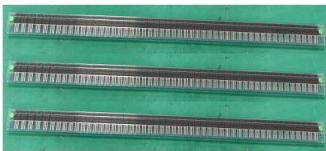
TO-220F



Marking on the body



packing instruction

PKG	Minimal Package	Mini Box	Box
TO-220F			
	50pcs/pdpe	1000pcs/box	5000pcs/box

Notice

All product, product specifications and data are subject to change without notice to improve. The right to explain is owned by LINGXUN electronics company.

Confirm that operation temperature is within the specified range described in the product specification. Avoid applying power exceeding normal rated

power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

LINGXUN electronics shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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Revision History

Rev	Changes	Date
1.0	First version	2025-5-30