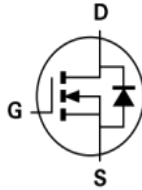


TO-220F



FEATURES

- Fast Switching
- Low ON Resistance
- Low Gate Charge
- 100% Single Pulse avalanche energy Test

APPLICATIONS

- Power switch circuit of adaptor and charger.

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°C maximum, 10s per JESD 22-B106

MAIN CHARACTERISTICS

I_D	10A
V_{DSS}	650V
$R_{DS(on)-typ}$ (@ $V_{GS}=10V$)	0.75Ω

Maximum Ratings at $T_c=25^{\circ}C$ unless otherwise specified

Characteristics	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continue Drain Current	I_D	10	A
Pulsed Drain Current (Note1)	I_{DM}	40	A
Power Dissipation	P_D	50	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	600	mJ
Operating Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta_{JC}}$	3.13	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta_{JA}}$	62.5	°C/W

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

Electrical Characteristics at Tc=25°C unless otherwise specified

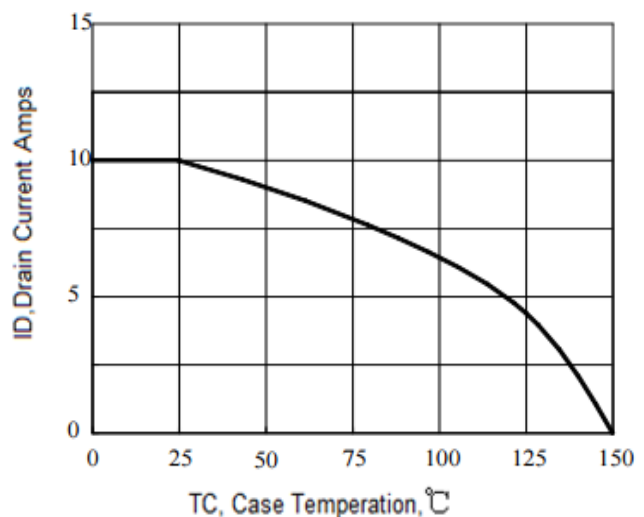
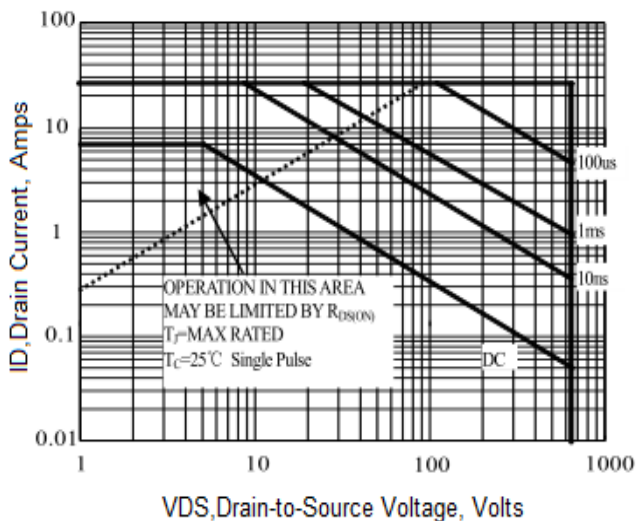
Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	$R_{DS(on)}$	-	0.75	0.9	Ω
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 5\text{ A}$	g_{fs}	-	9.5	-	S
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V},$ $f = 1\text{ MHz}$	C_{iss}	-	1294	-	pF
Output Capacitance		C_{oss}	-	128	-	pF
Reverse Transfer Capacitance		C_{rss}	-	7	-	pF
Turn-on Delay Time(Note2)	$I_D = 10\text{ A}, V_{DD} = 325\text{ V},$ $R_G = 10\text{ }\Omega$	$t_{d(ON)}$	-	27	-	ns
Rise Time(Note2)		t_r	-	22	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	53	-	ns
Fall Time(Note2)		t_f	-	24	-	ns
Total Gate Charge(Note2)	$I_D = 10\text{ A}, V_{DD} = 520\text{ V},$ $V_{GS} = 10\text{ V}$	Q_G	-	35	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	8	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	12	-	nC

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

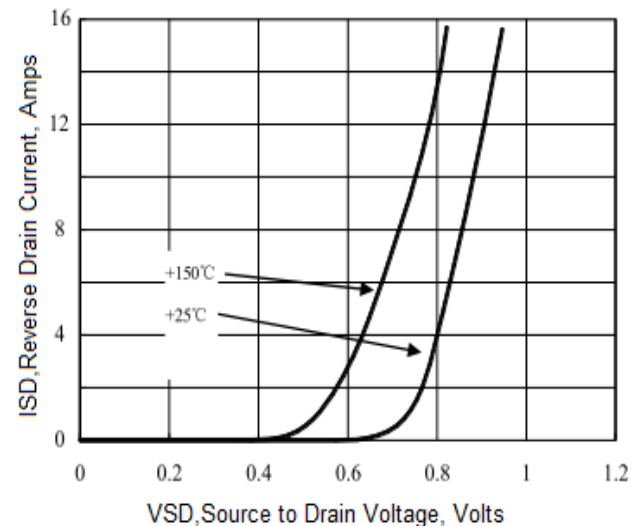
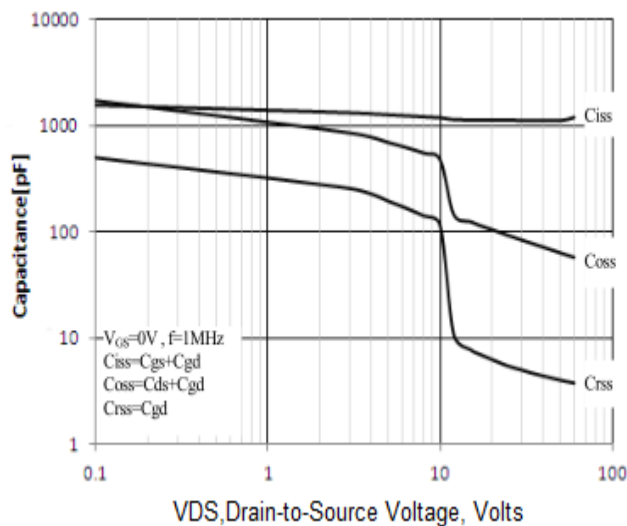
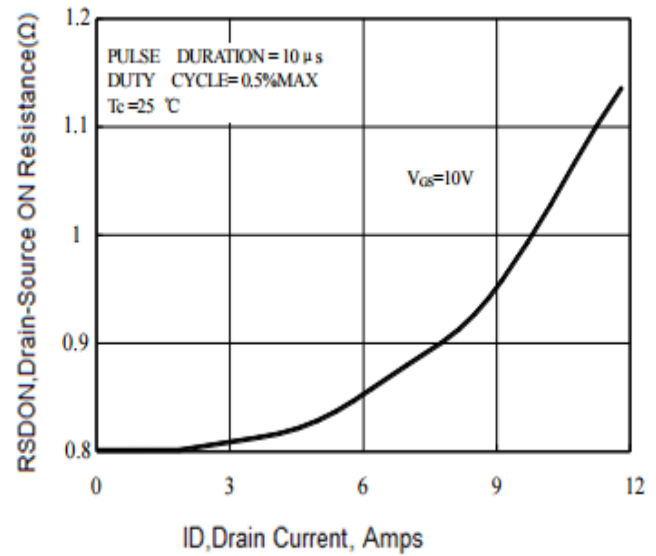
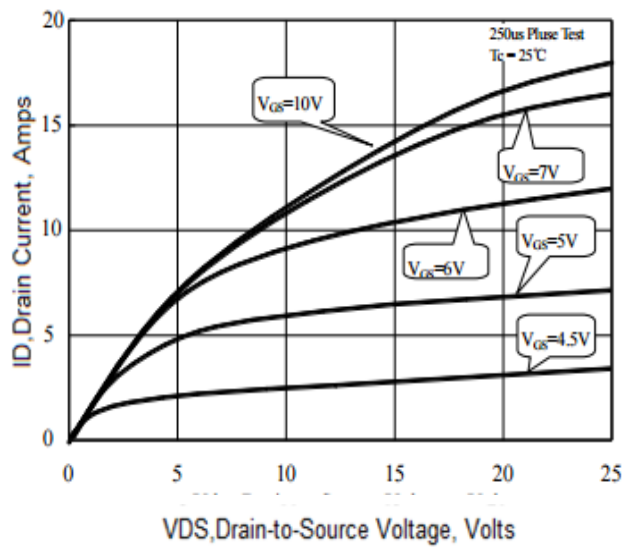
Characteristics	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current		I_S	-	-	10	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	40	A
Drain-Source Diode Forward Voltage	$I_{SD} = 10\text{ A}$	V_{SD}	-	-	1.5	V
Reverse Recovery Time(Note2)	$I_{SD} = 10\text{ A}, V_{GS} = 0\text{ V},$ $di_F / dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	528	-	ns
Reverse Recovery Charge(Note2)		Q_{rr}	-	3.22	-	μC

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

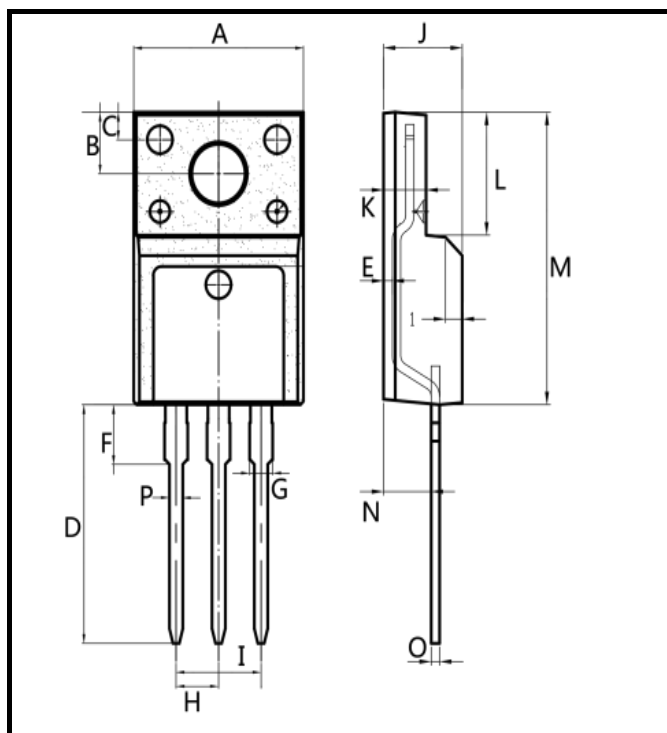
RATINGS AND CHARACTERISTIC CURVES



RATINGS AND CHARACTERISTIC CURVES



Package Outline Dimensions millimeters **TO220F**



Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2.7
L	6.35	6.75
M	15	16
N	2.75	3.15
O	0.45	0.6
P	0.7	0.9
All Dimensions in millimeter		