

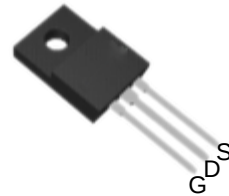
Features

- 800V/7A,
 $R_{DS(ON)} = 1.58\Omega(\text{typ.}) @ V_{GS} = 10V$
 $V_{DS} @ T_j, \text{max} = 750V (\text{typ.})$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Avalanche Rated
- Lead Free and Green Devices Available
(RoHS Compliant)

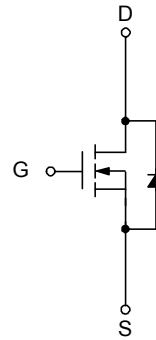
Applications

- AC/DC Power Conversion in Switched Mode Power Supplies (SMPS).
- Uninterruptible Power Supply (UPS),
- Adapter.

Pin Description



TO-220FP



N-Channel MOSFET

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		800	V
V _{GSS}	Gate-Source Voltage		±30	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current		7	A
I _{DP}	Pulse Drain Current Tested	T _C =25°C	21	
I _D	Continuous Drain Current	T _C =25°C	7	
		T _C =100°C	5.3	
P _D	Maximum Power Dissipation for TO-220/TO-252-2/TO-251	T _C =25°C	86	W
		T _C =100°C	34.4	
P _D	Maximum Power Dissipation for TO-220FP	T _C =25°C	27	
		T _C =100°C	10.8	
R _{θJC}	Thermal Resistance-Junction to Case for TO-220/TO-252-2/TO-251		1.45	°C/W
R _{θJC}	Thermal Resistance-Junction to Case for TO-220FP		4.6	
R _{θJA}	Thermal Resistance-Junction to Ambient		62.5	
Drain-Source Avalanche Ratings				
dv/dt ^c	MOSFET dv/dt ruggedness		50	V/ns
E _{AS} ^d	Avalanche Energy, Single Pulsed		52.6	mJ
I _{AR} ^e	Avalanche Current		0.9	A
E _{AR} ^e	Repetitive Avalanche Energy		0.12	mJ

Note a : limited by maximum junction temperature.

Note b : Bond wire current limit.

Note c : V_{DS}=520V, I_D=6A.

Note d : I_D=0.9A, V_{DD}=50V, T_J=25°C.

Note e : Repetitive Rating : Pulse width limited by maximum junction temperature.

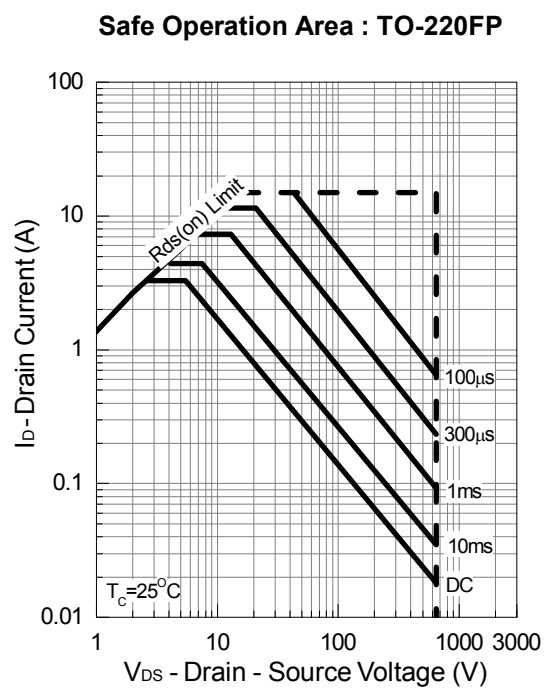
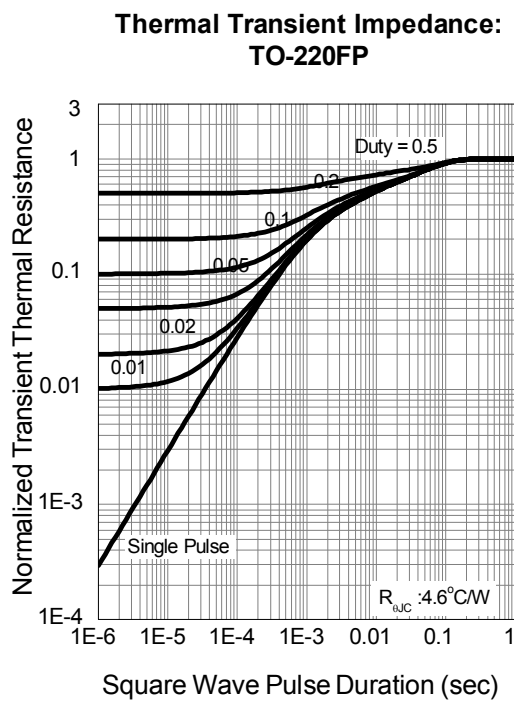
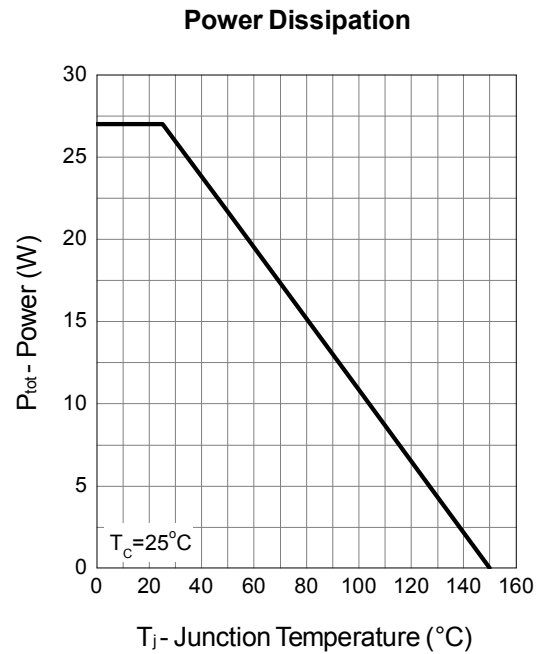
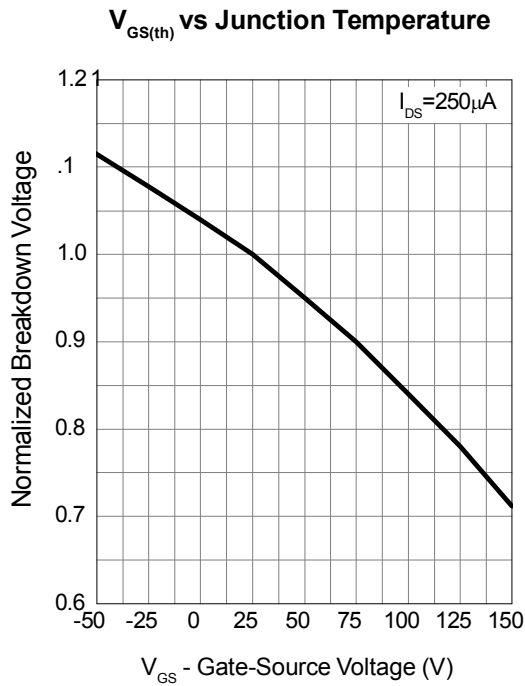
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA T _J =150°C	800 -	- 900	- -	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =640V, V _{GS} =0V T _J =150°C	- -	- -	1 200	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2.5	3.5	4.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^f	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =4A	-	1.58	1.8	Ω
Diode Characteristics						
V _{SD} ^f	Diode Forward Voltage	I _{SD} =6A, V _{GS} =0V	-	0.95	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =6A, V _R =390V dI _{SD} /dt= 100A/μs	-	190	-	ns
Q _{rr}	Reverse Recovery Charge		-	1.6	-	μC
I _{rm}	Peak Reverse Recovery Current		-	14.5	-	A
Dynamic Characteristics ^g						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.7	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz	-	1365	1775	pF
C _{oss}	Output Capacitance		-	110	-	
C _{rss}	Reverse Transfer Capacitance		-	13	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =400V, I _{DS} =6A, V _{GEN} =10V, R _G =6Ω	-	9.5	-	ns
T _r	Turn-on Rise Time		-	5.5	-	
t _{d(OFF)}	Turn-off Delay Time		-	14	-	
T _f	Turn-off Fall Time		-	3.5	-	
Gate Charge Characteristics ^g						
Q _g	Total Gate Charge	V _{DS} =520V, V _{GS} =10V, I _{DS} =2A	-	14	18.2	nC
Q _{gs}	Gate-Source Charge		-	3.3	-	
Q _{gd}	Gate-Drain Charge		-	6.5	-	

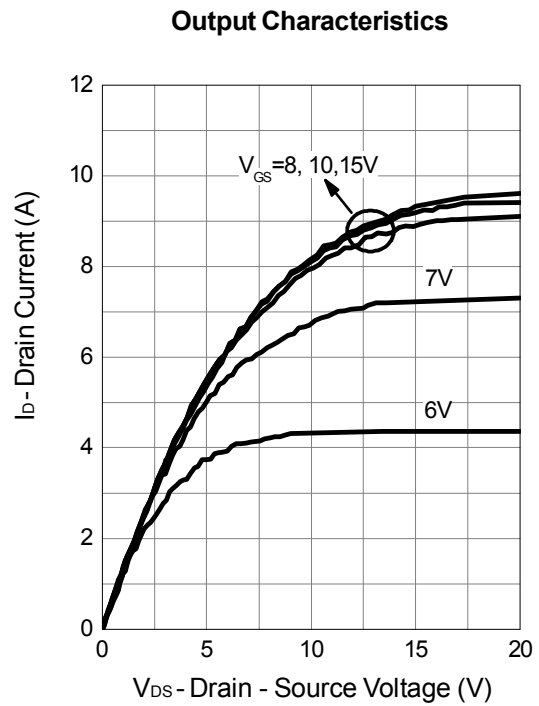
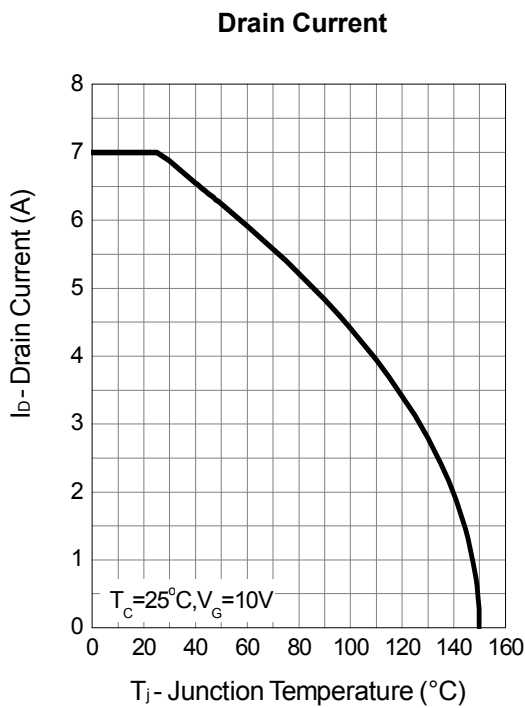
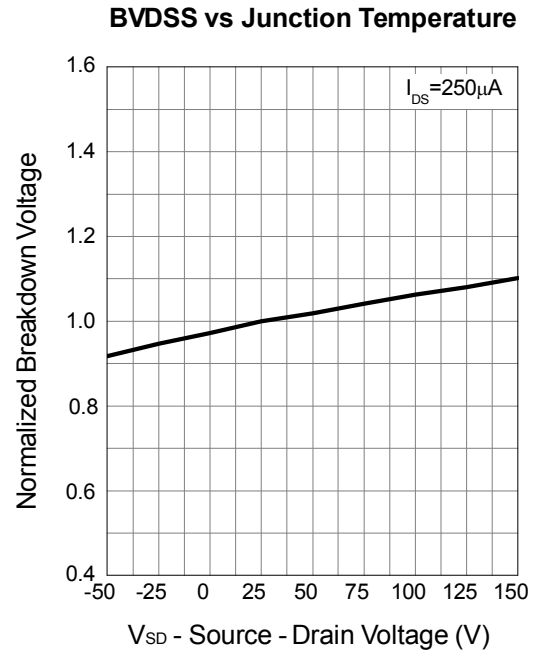
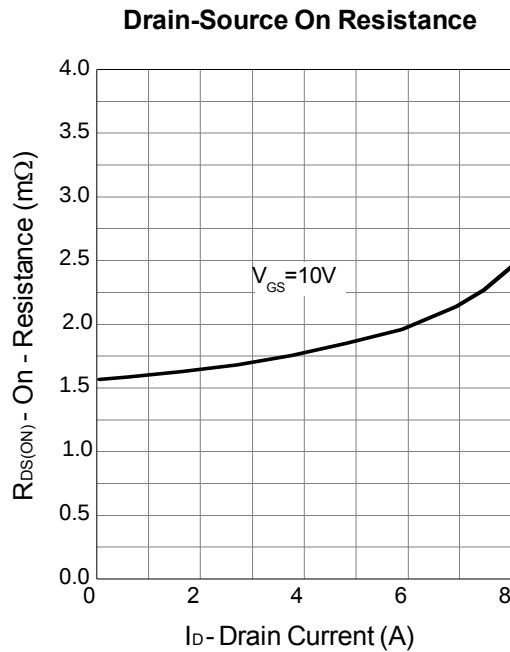
Note f : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note g : Guaranteed by design, not subject to production testing.

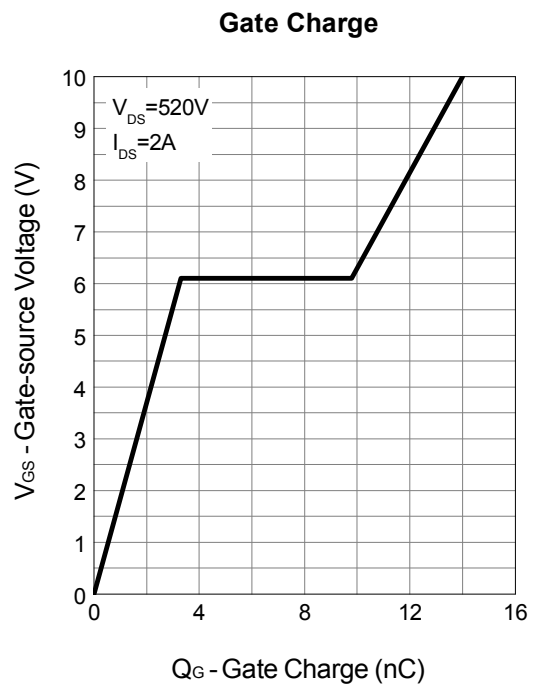
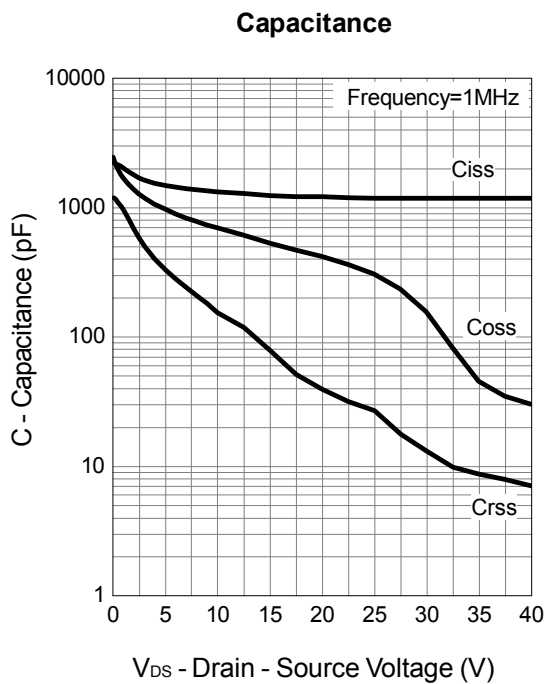
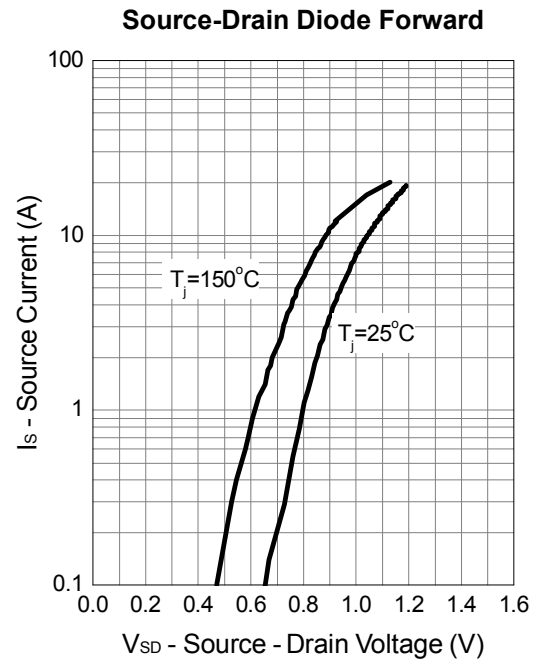
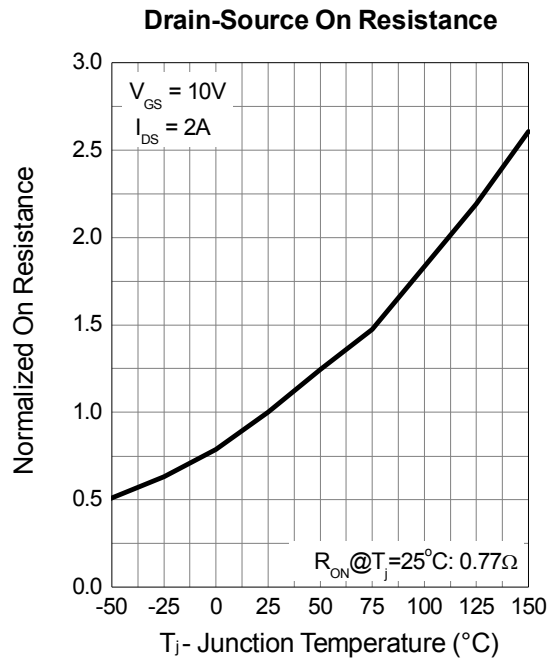
Typical Operating Characteristics



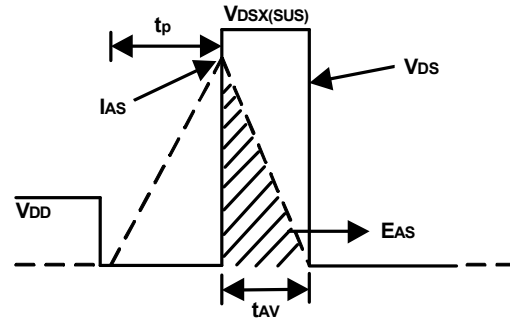
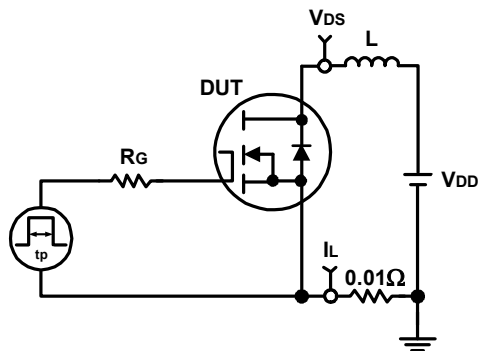
Typical Operating Characteristics (Cont.)



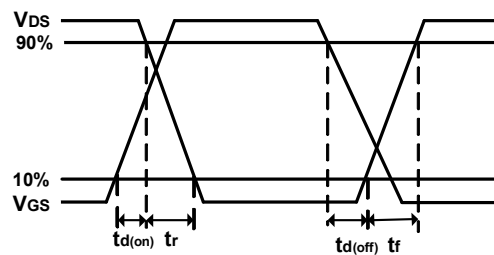
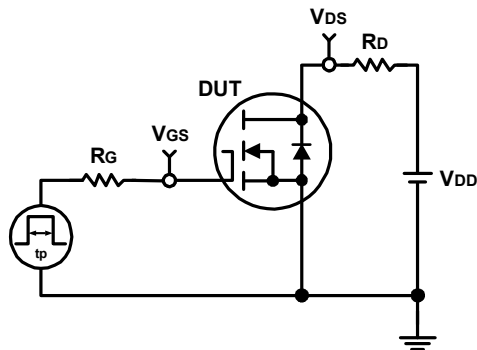
Typical Operating Characteristics (Cont.)



Avalanche Test Circuit and Waveforms

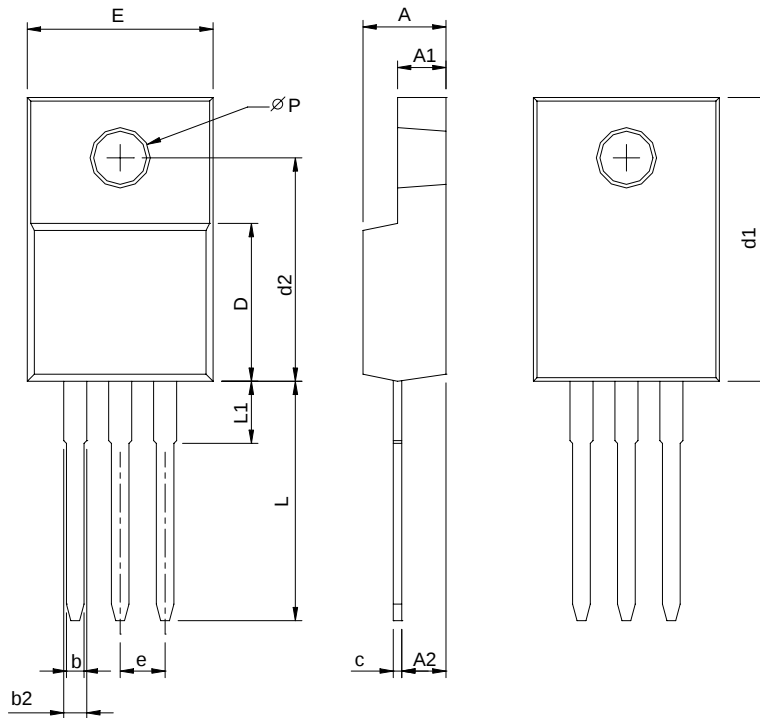


Switching Time Test Circuit and Waveforms



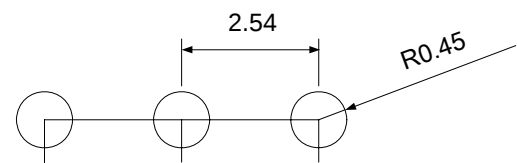
Package Information

TO-220F



SYMBOL	TO-220FP			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.20	4.80	0.165	0.189
A1	2.34	3.20	0.092	0.126
A2	2.10	2.90	0.083	0.114
b	0.50	0.90	0.020	0.035
b2	0.91	1.90	0.035	0.075
c	0.30	0.80	0.012	0.031
D	8.10	9.40	0.319	0.370
d1	14.50	16.50	0.571	0.650
d2	12.10	12.90	0.476	0.508
E	9.70	10.70	0.382	0.421
e	2.54 BSC		0.100 BSC	
L	13.00	14.50	0.512	0.570
L1	1.60	4.00	0.063	0.157
P	3.00	3.60	0.118	0.142

RECOMMENDED LAND PATTERN



UNIT: mm