

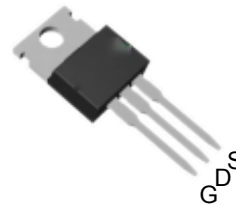
Features

- 650V/7A,
 $R_{DS(ON)} = 1.2\Omega(\text{typ.}) @ V_{GS} = 10V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Avalanche Rated
- Lead Free and Green Devices Available
(RoHS Compliant)

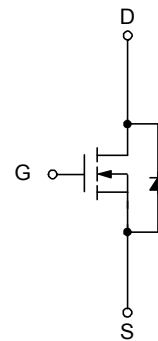
Applications

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

Pin Description



Top View of TO-220



N-Channel MOSFET

Absolute Maximum Ratings ($T_A = 25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		650	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		6 ^a	A
I _{DP}	Pulse Drain Current Tested	T _C =25°C	15 ^b	
I _D	Continuous Drain Current	T _C =25°C	7 ^a	
		T _C =100°C	4.2 ^a	
P _D	Maximum Power Dissipation	T _C =25°C	86	W
		T _C =100°C	34.4	
R _{θJC}	Thermal Resistance-Junction to Case		1.45	°C/W
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		356	mJ

Note a : limited by maximum junction temperature.

Note b : Bond wire current limit.

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

Note d : $I_D=0.9\text{A}$, $V_{DD}=50\text{V}$, $T_J=25^{\circ}\text{C}$.

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

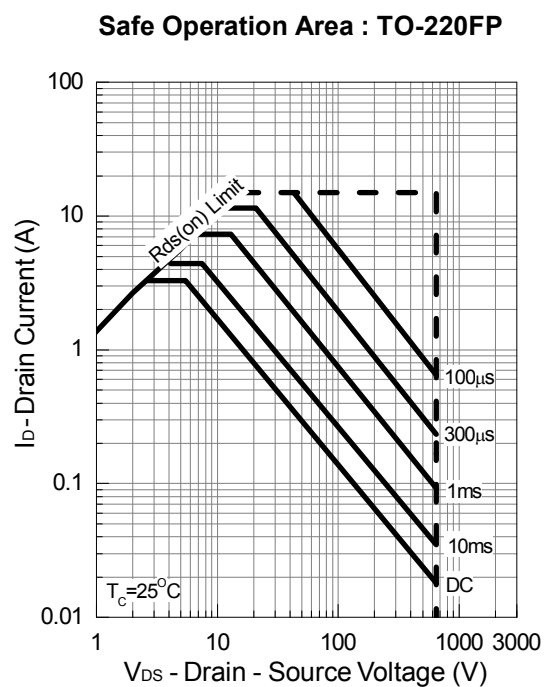
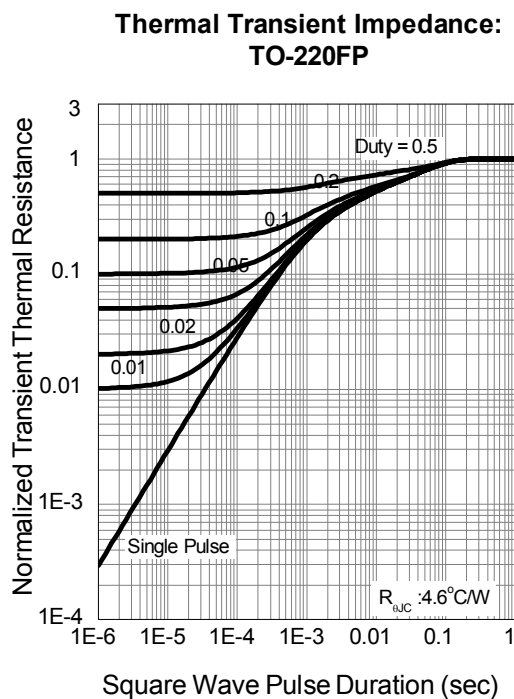
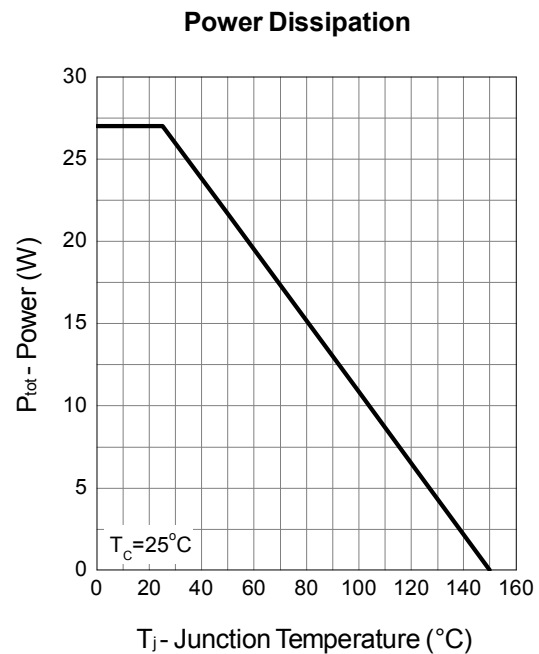
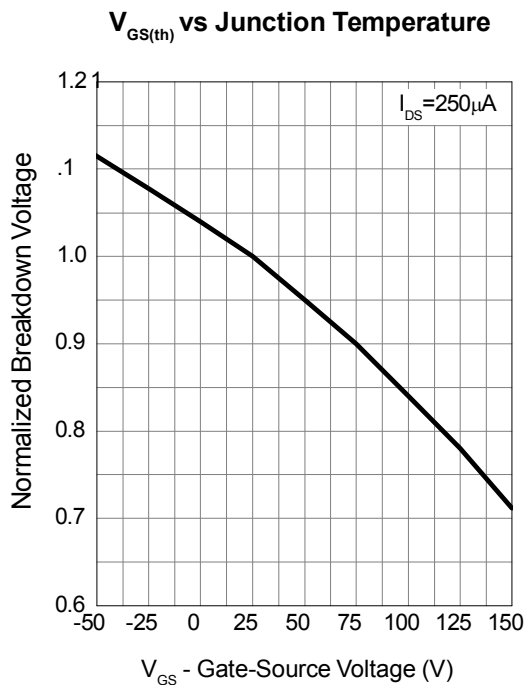
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

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	650 -	- 750	- -	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =520V, 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} =2A	-	1.2	1.45	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	-	365	475	pF
C _{oss}	Output Capacitance		-	370	-	
C _{rss}	Reverse Transfer Capacitance		-	7	-	
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	-	

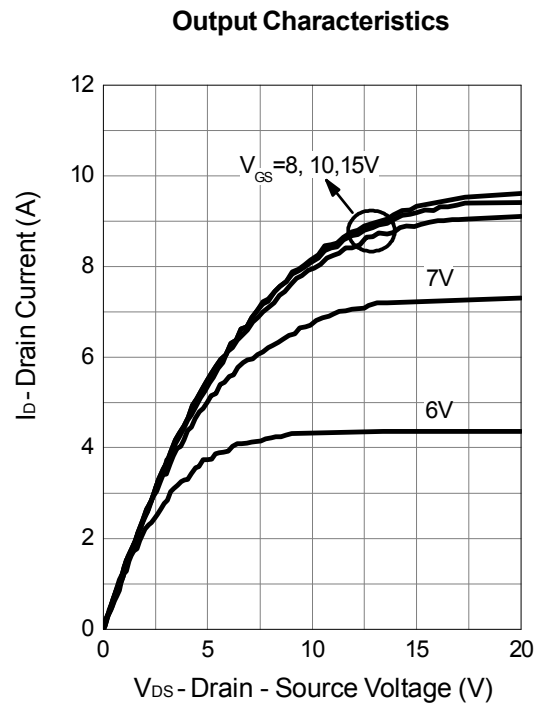
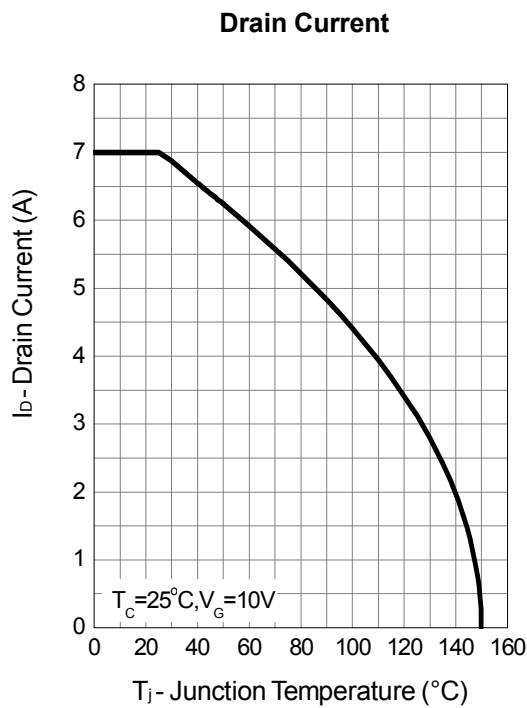
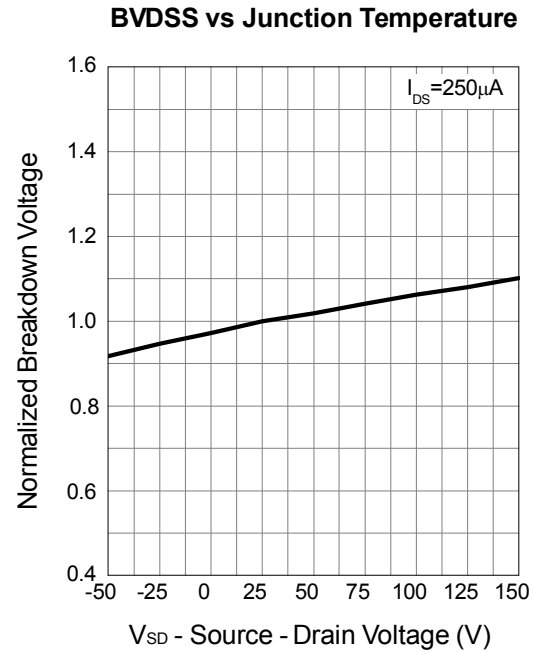
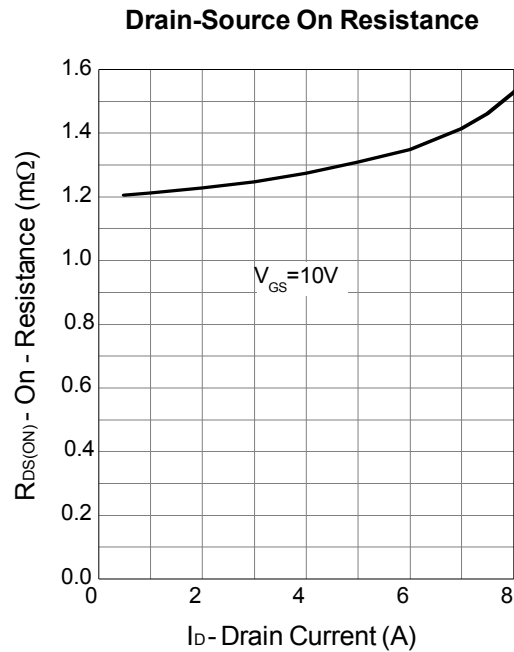
Note f : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

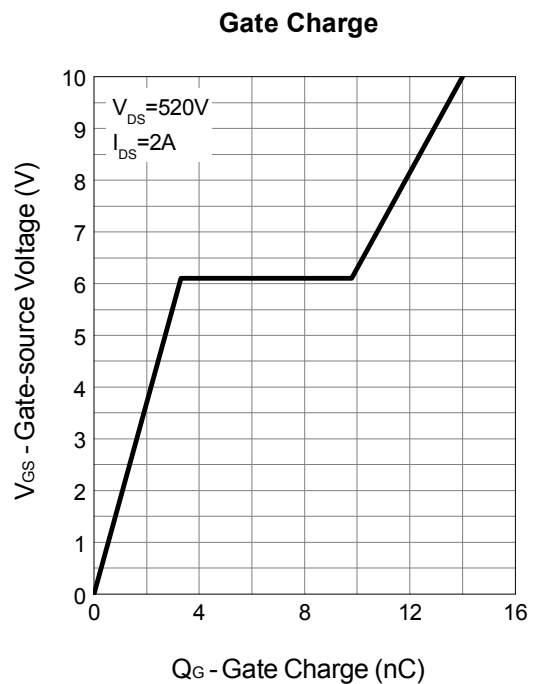
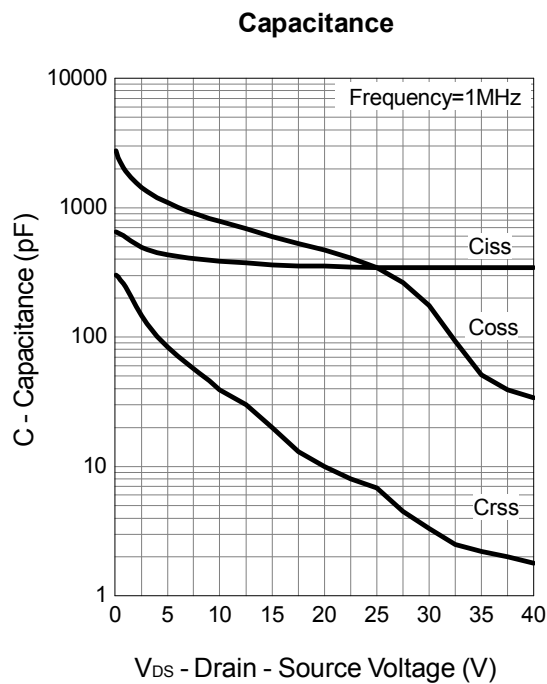
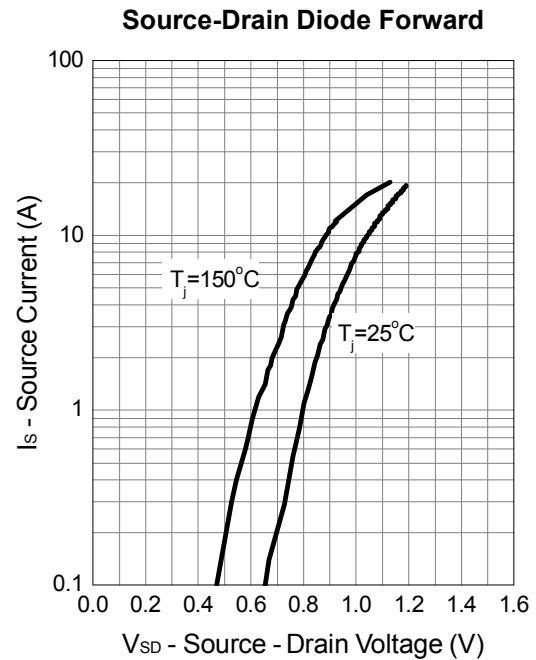
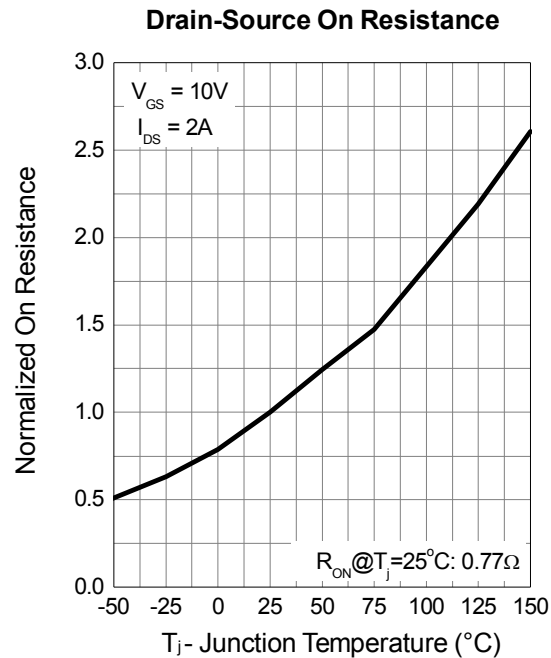
Typical Operating Characteristics



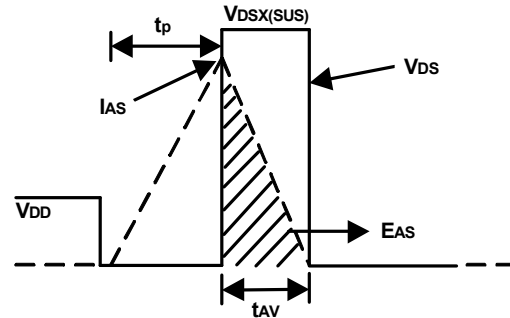
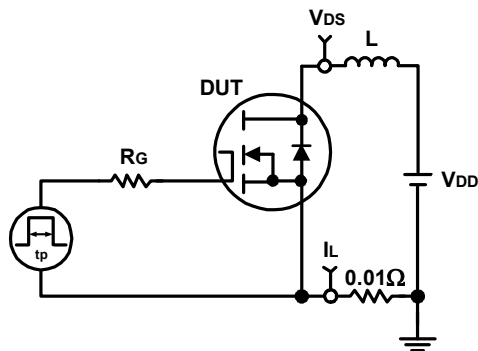
Typical Operating Characteristics (Cont.)



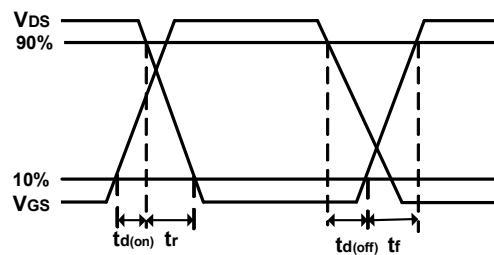
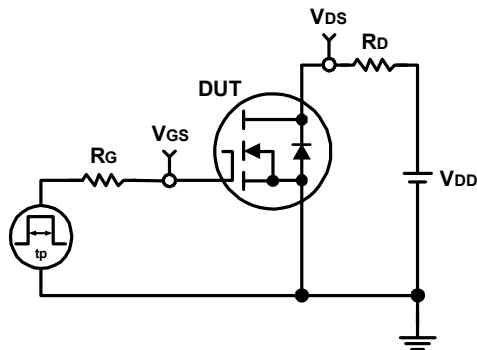
Typical Operating Characteristics (Cont.)



Avalanche Test Circuit and Waveforms

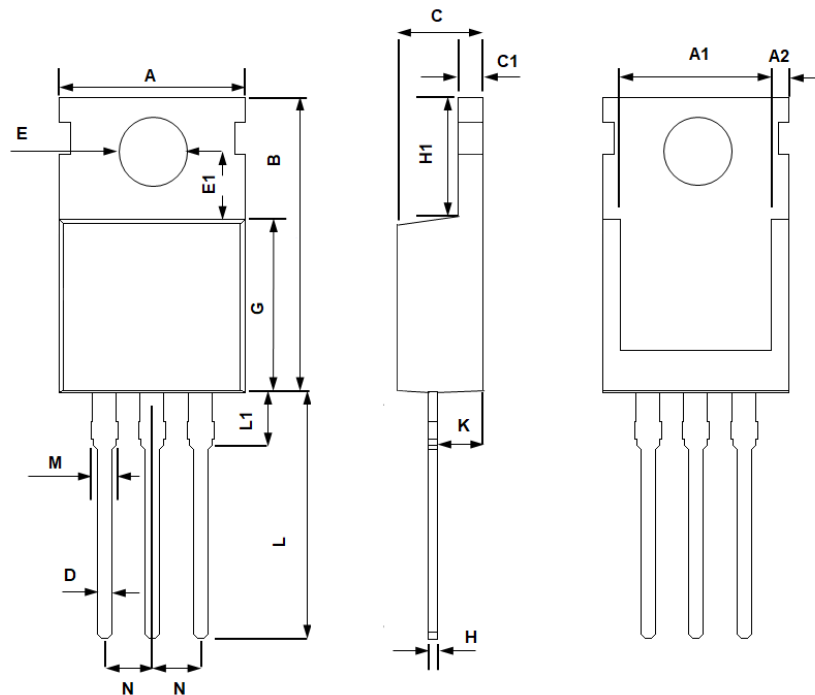


Switching Time Test Circuit and Waveforms



Package Information

TO-220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.400	9.700	0.409	0.382
A1	8.900	7.400	0.350	0.291
A2	1.400	0.800	0.055	0.031
B	16.500	14.500	0.650	0.571
C	4.750	4.200	0.187	0.165
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	4.000	3.300	0.157	0.130
E1	3.800	3.400	0.150	0.134
G	9.400	8.400	0.370	0.331
H	0.600	0.200	0.024	0.008
H1	6.850	6.200	0.270	0.244
K	2.850	2.100	0.112	0.083
L	14.000	12.500	0.551	0.492
L1	4.000	2.700	0.157	0.106
M	1.750	1.100	0.069	0.043
N	2.640	2.440	0.104	0.096