

Features

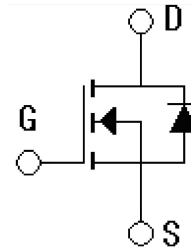
- Low gate charge
- Low C_{rss} (typ 15pF)
- Fast switchin
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

TO-220F



Applications

- High frequency switching mode power supply
- Electronic ballast based on half bridge
- LED power supplies



Absolute Ratings (Tc=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	1000	V
Drain Current-continuous	I_D T=25°C T=100°C	6	A
		3.8	A
Drain Current-pulse (note 1)	I_{DM}	24*	A
Gate-Source Voltage	V_{GS}	±30	V
Single pulse avalanche energy (note 2)	E_{AS}	160	mJ
Avalanche Current (note 1)	I_{AR}	6	A
Repetitive Avalanche Energy(note 1)	E_{AR}	2	mJ
Peak Diode Recovery	dv/dt	0.4	V/ns
Power Dissipation	PD TC=25°C Derate above 25°C	40	W
		0.32	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	T_L	300	°C

*Drain current limited by maximum junction temperature

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

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	1000	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to $25^{\circ}C$	-	0.9	-	$V/^{\circ}C$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=1000V, V_{GS}=0V, T_C=25^{\circ}C$	-	-	1	μA
		$V_{DS}=800V, T_C=125^{\circ}C$	-	-	10	μA
Gate body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3A, T_C=25^{\circ}C$	-	2.6	3.3	Ω
Forward Transconductance	g_{FS}	$V_{DS}=40V, I_D=6A$ (note 4)	-	7.7	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	651	-	pF
Output capacitance	C_{oss}		-	77	-	pF
Reverse transfer capacitance	C_{rss}		-	15	-	pF

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

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Switching-Characteristics						
Turn-On delay time	$t_{d(on)}$	$V_{DD}=500V, I_D=6A, R_{GEN}=25\Omega$ (note 4,5)	-	12.6	-	ns
Turn-On rise time	t_r		-	25	-	ns
Turn-Off delay time	$t_{d(off)}$		-	46.2	-	ns
Turn-Off rise time	t_f		-	31	-	ns
Total Gate Charge	Q_g	$V_{DS}=800V, I_D=6A, V_{GS}=10V$	-	14.7	-	nC
Gate-Source charge	Q_{gs}		-	4	-	nC

Gate-Drain charge	Q_{gd}	(note 4,5)	-	4.53	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Diode Forward Voltage (note 3)	V_{SD}	$V_{GS}=0V, I_S=6A$	-	-	1.4	V
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	-	-	-	24	A
Maximum Continuous Drain Source Diode Forward Current	I_S	-	-	-	6	A
Reverse recovery time	t_{rr}	$V_{GS}=0V,$	-	467	-	ns
Reverse recovery charge	Q_{rr}	$I_S=8A \text{ di}/dt=100A/\mu s$ (note 4)	-	2235	-	μC

Thermal Characteristic

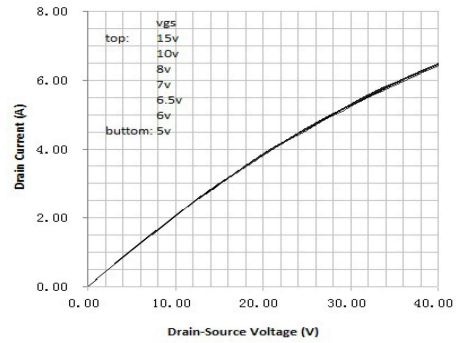
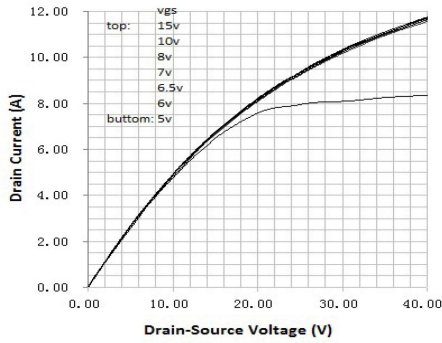
Parameter	Symbol	Value	Unit
Thermal Resistance, junction to Case	$R_{th(j-C)}$	3.17	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	57	$^{\circ}C/W$

Notes:

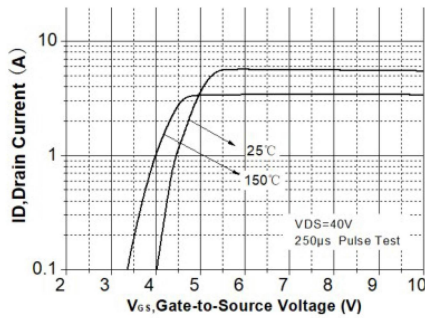
1. Pulse width limited by maximum junction temperature
2. $L=10mH, I_{AS}=6A, V_{DD}=100V, R_G=25 \Omega, \text{Starting } T_J=25^{\circ}C$
3. $I_{SD} \leq 6A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DSS}, \text{Starting } T_J=25^{\circ}C$
4. Pulse Test: Pulse Width $\leq 300\mu s, \text{Duty Cycle} \leq 2\%$
5. Essentially independent of operating temperature

ELECTRICAL CHARACTERISTICS (curves)

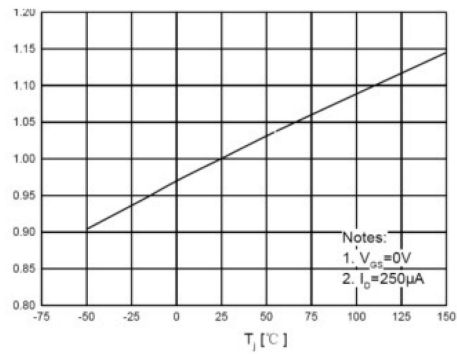
On-Region Characteristics($T_j=25^\circ\text{C}$) On-Region Characteristics($T_j=150^\circ\text{C}$)



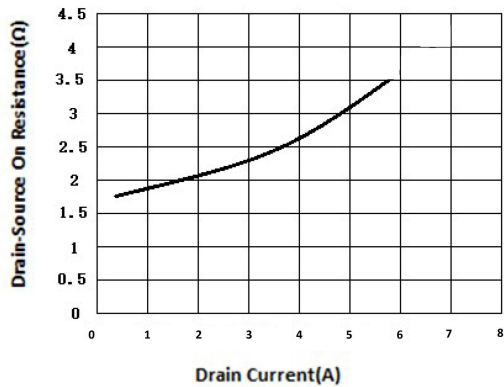
Transfer Characteristics



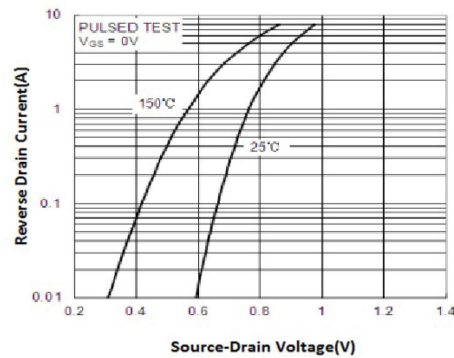
Breakdown Voltage Variation vs. Temperature



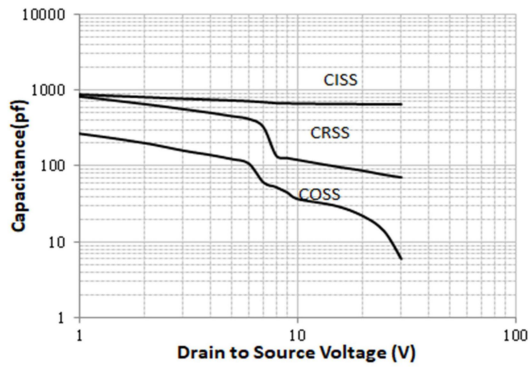
On-Resistance Variation vs. Drain Current and Gate Voltage



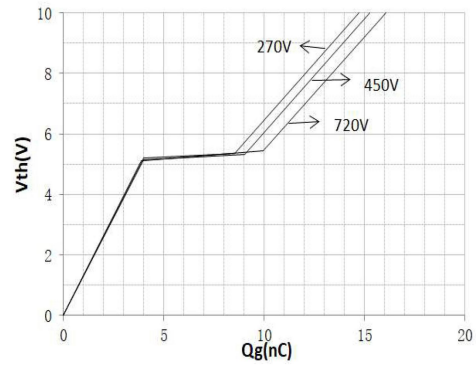
Body Diode Forward Voltage Variation vs. Source current and Temperature



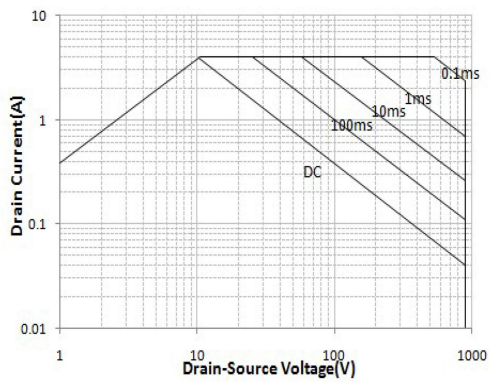
Capacitance Characteristics



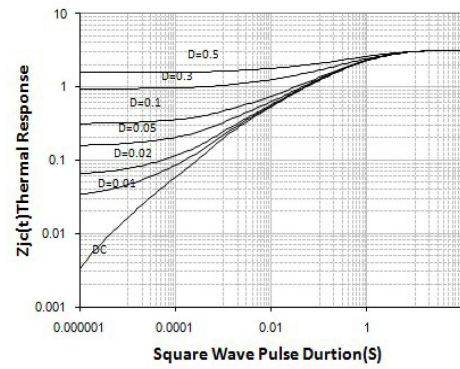
Gate Charge Characteristics



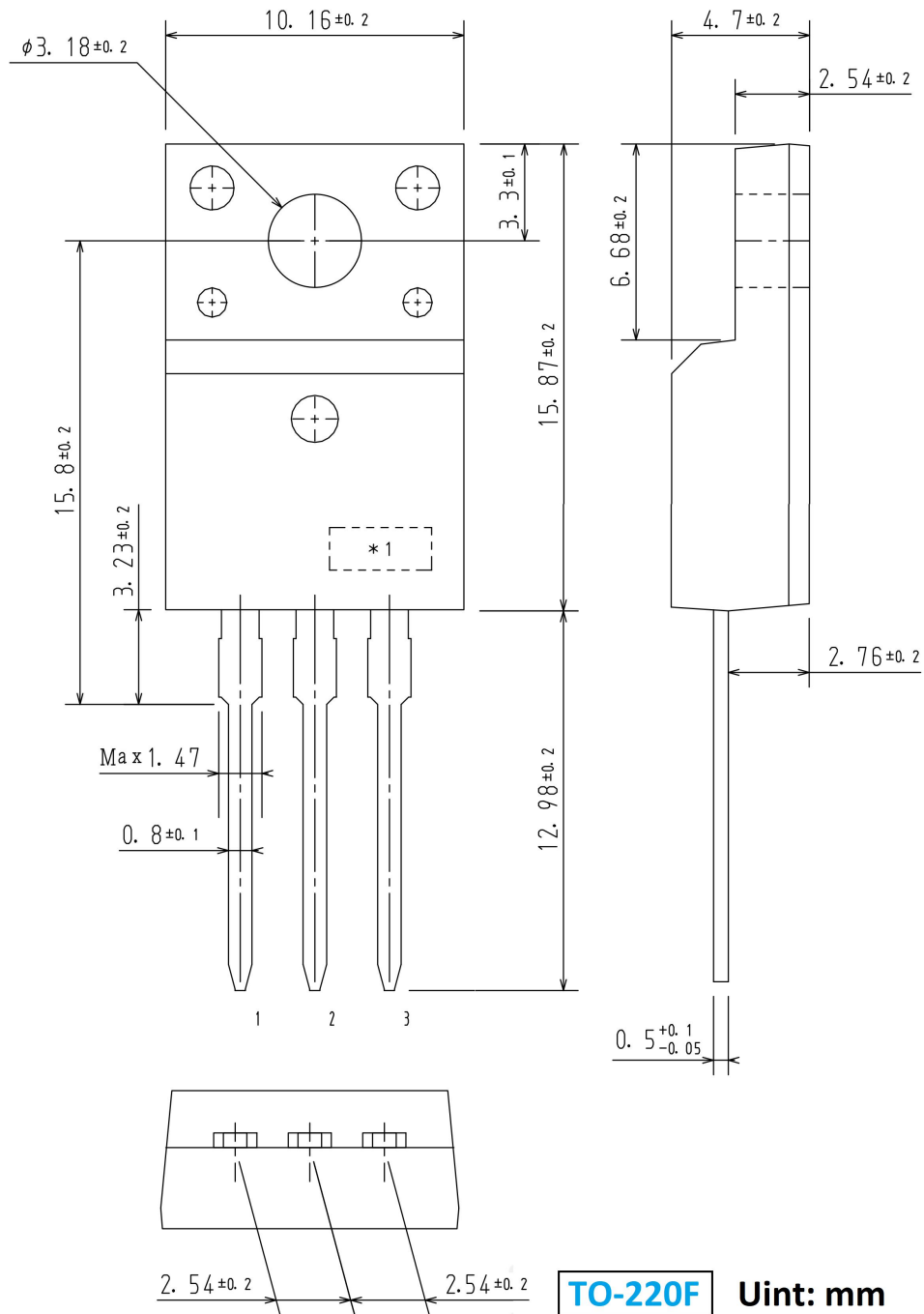
Maximum safe operating area



Transient Thermal Response Curve



PACKAGE MECHANICAL DATA



TO-220F **Unit: mm**