

Features

- Low drain-source on-resistance: $R_{DS(ON)}=0.22\Omega(\text{typ})$
- Easy to control gate switching
- Enhancement mode: $V_{th} = 2.0$ to $4.0V$
- 100% avalanche tested
- RoHS compliant

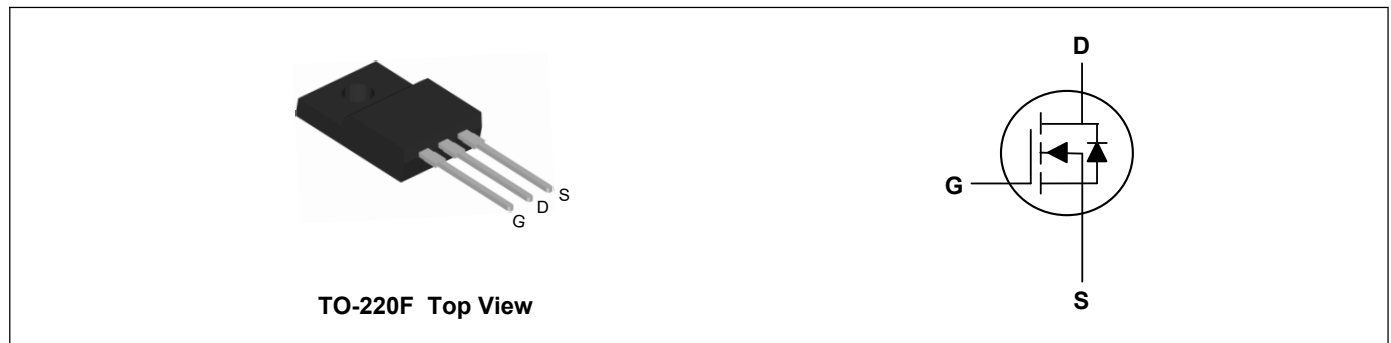
Key Performance Parameters



Parameter	Value	Unit
$V_{DS} @ T_{j,max}$	600	V
$R_{DS(ON),max}$	240	m Ω
I_D	15	A
$Q_{g,typ}$	27	nC
I_{DM}	45	A

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charger, Lighting



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ¹	I_D	15	A
Pulsed Drain Current ²	I_{DM}	45	A
Single Pulse Avalanche Energy ⁴	EAS	300	mJ
Avalanche Current	I_{AS}	2.4	A
Repetitive Avalanche energy, t_{AR} limited by T_{Jmax}	E_{AR}	0.44	mJ
MOSFET dv/dt ruggedness, $V_{DS} = 0 \dots 400V$	dv/dt	50	V/ns
Reverse diode dv/dt ³ $V_{DS}=0 \dots 400V, I_{SD} \leq I_D$		15	
Total Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	32	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient (Max)	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	3.9	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7.5A$	---	220	240	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	---	4.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=600V, V_{GS}=0V, T_J=150^{\circ}\text{C}$	---	---	100	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 1	μA
Gate Resistance	R_G	$f = 1.0\text{MHz}$, open drain	---	12	---	Ω
Total Gate Charge	Q_g	$V_{DD}=400V, V_{GS}=10V, I_D=15A$	---	27	---	nC
Gate-Source Charge	Q_{gs}		---	4	---	
Gate-Drain Charge	Q_{gd}		---	11	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=400V, V_{GS}=10V, R_G=25\Omega, I_D=15A$	---	23	---	ns
Rise Time	T_r		---	65	---	
Turn-Off Delay Time	$T_{d(off)}$		---	105	---	
Fall Time	T_f		---	50	---	
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V, f=1\text{MHz}$	---	1507	---	pF
Output Capacitance	C_{oss}		---	72	---	
Reverse Transfer Capacitance	C_{rss}		---	11	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	$T_C=25^{\circ}\text{C}$	---	---	15	A
Pulsed Source Current	I_{SM}		---	---	45	A
Diode Forward Voltage	V_{SD}	$V_G=0V, I_S=15A, T_J=25^{\circ}\text{C}$	---	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$V_R=400V, I_F=15A, di_F/dt=100A/\mu s$	---	410	---	ns
Reverse Recovery Charge	Q_{rr}		---	4	---	μC
Peak Reverse Recovery Current	I_{rrm}		---	20	---	A

Note:

- Limited by $T_{J,max}$. Maximum Duty Cycle $D = 0.50$
- Pulse width t_p limited by $T_{J,max}$
- Identical low side and high side switch with identical R_G
- $V_{DD}=50V, R_G=25\Omega, I_{AS}=2.5A$

Typical Characteristics

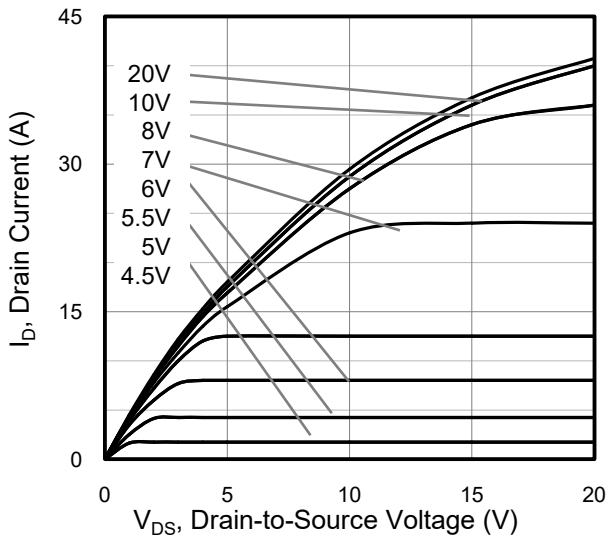


Figure 1. Output Characteristics

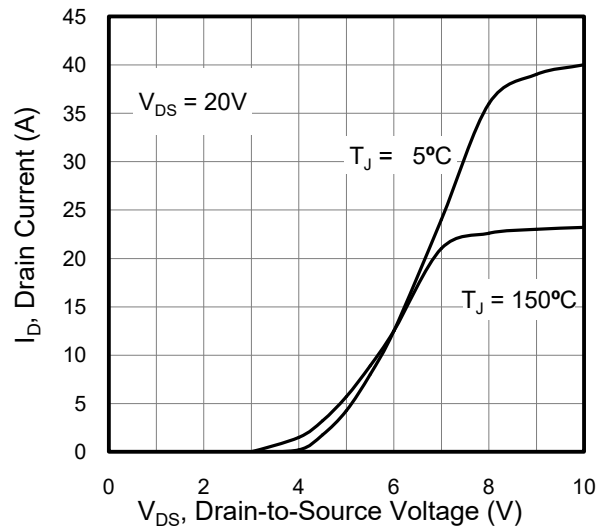


Figure 2. Transfer Characteristics

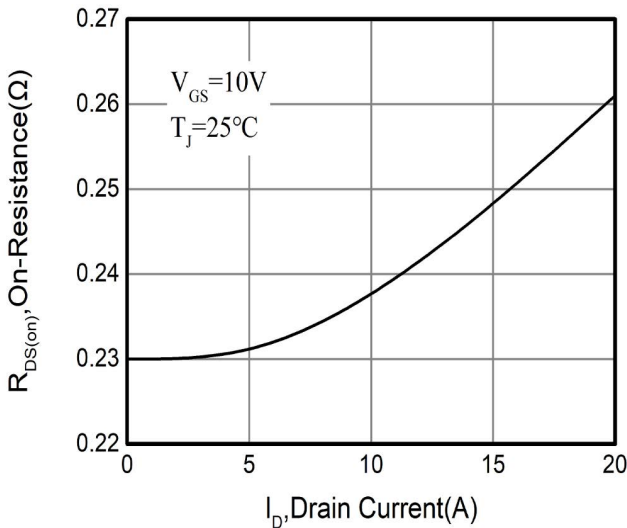


Figure 3. On-Resistance vs. Drain Current

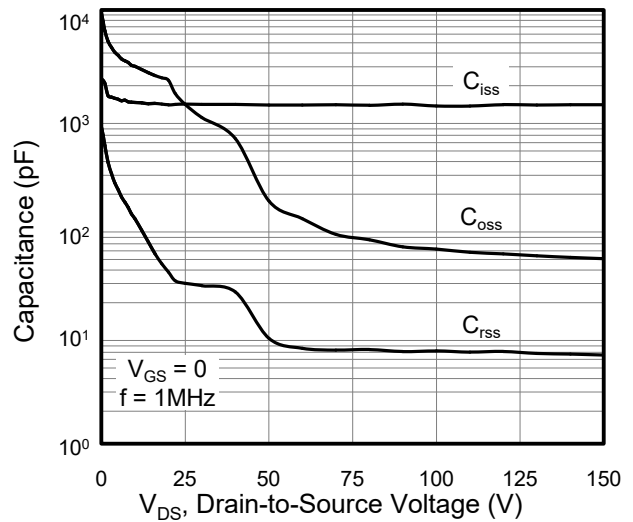


Figure 4. Capacitance

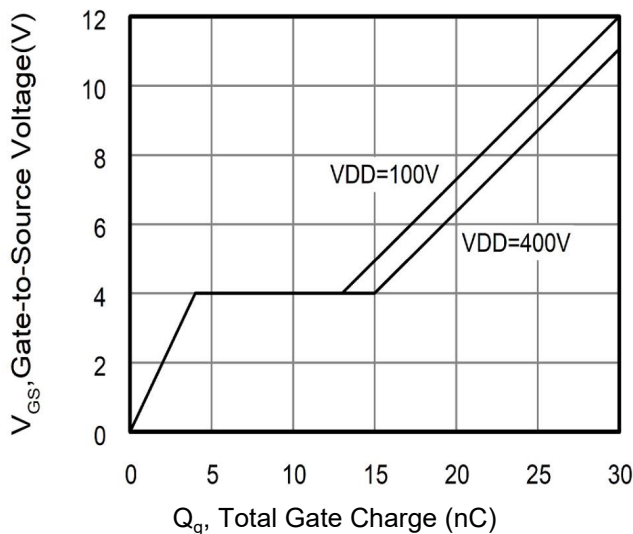


Figure 5. Gate Charge

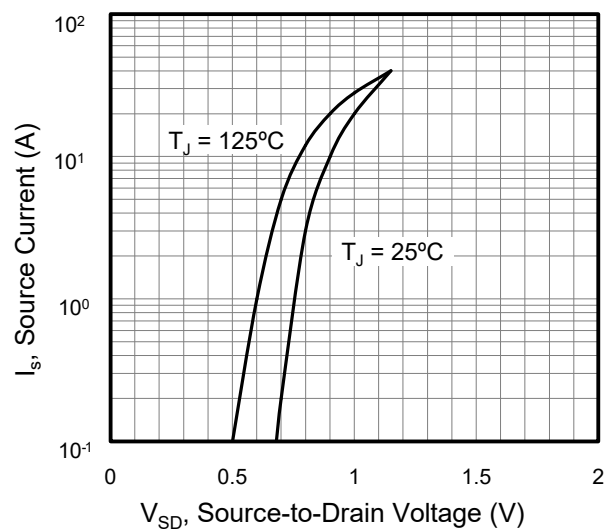


Figure 6. Body Diode Forward Voltage

600V Super Junction Power MOSFET

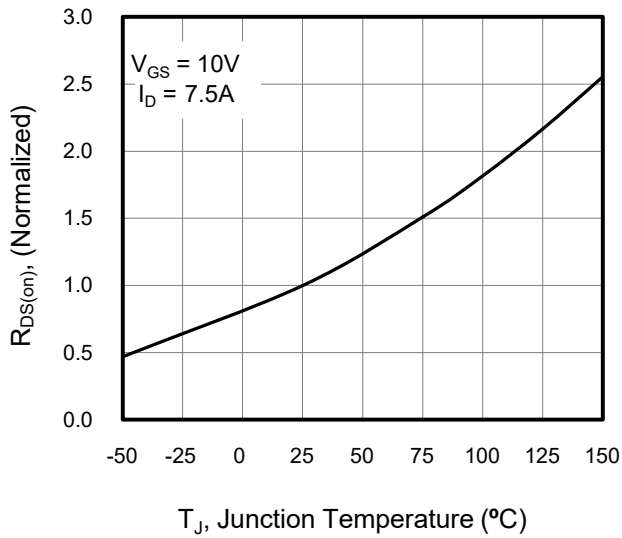


Figure 7. On-Resistance vs. Junction Temperature

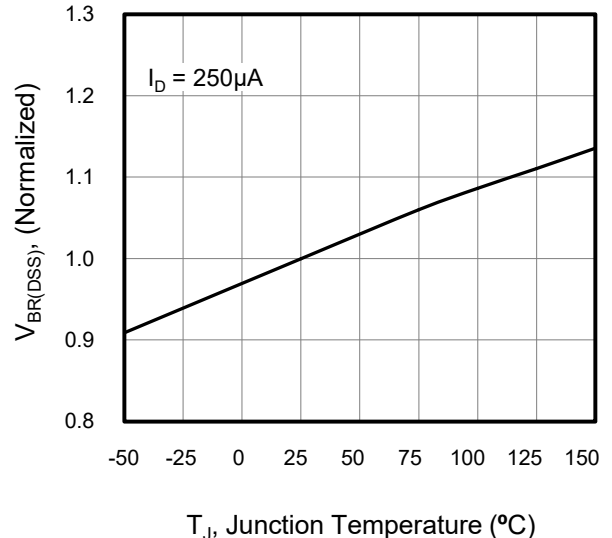


Figure 8. Breakdown voltage vs. Junction Temperature

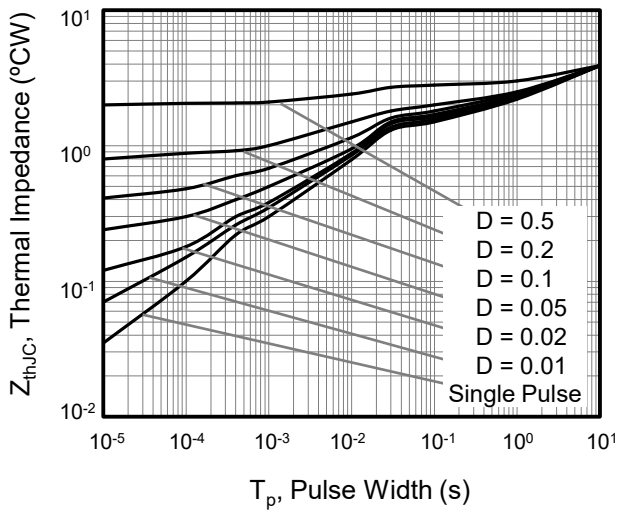
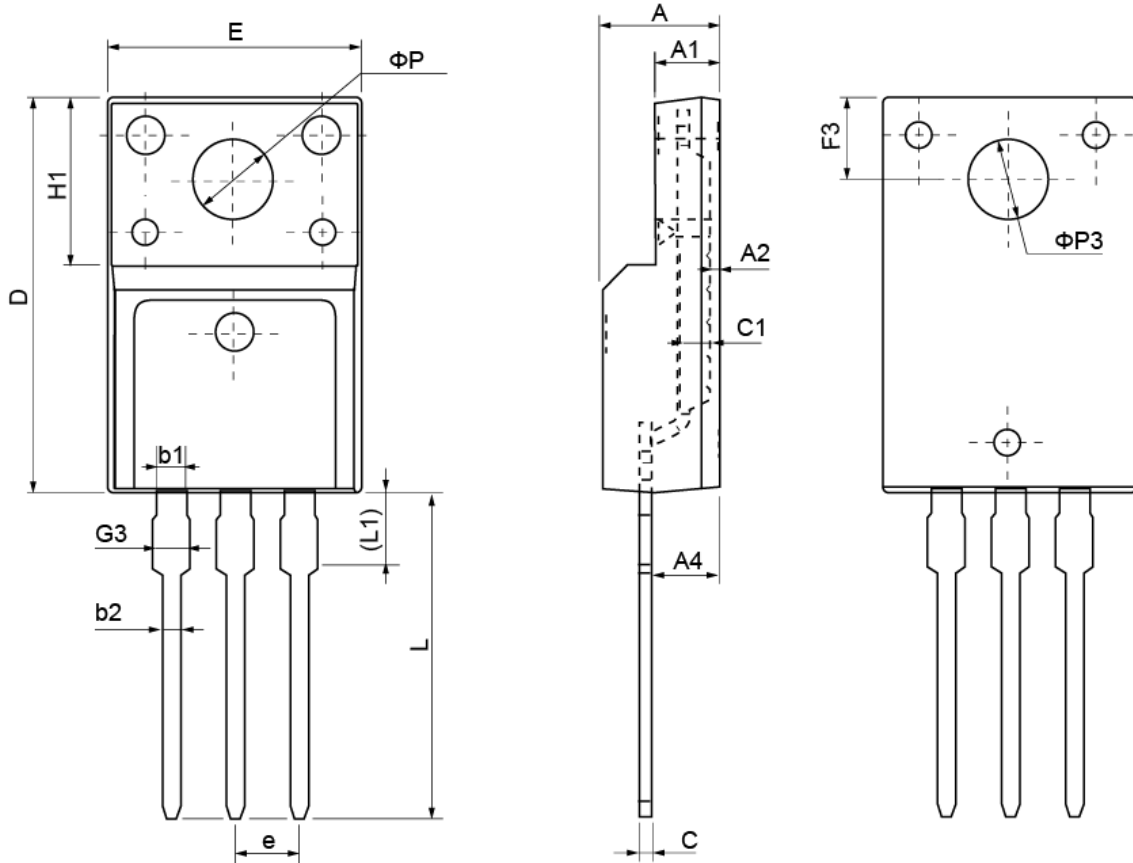


Figure 9. Transient Thermal Impedance

TO-220F Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.40	4.70	5.00	H1	6.70 REF		
A1	2.30	2.55	2.80	L	12.30	12.98	13.30
A2	0.30	0.50	0.70	L1	2.95	3.10	3.50
A4	2.45	2.80	3.05	phi P	3.03	3.20	3.50
c	0.30	0.50	0.70	phi P3	3.15	3.45	3.65
c1	1.20	1.30	1.40	b1	1.10	1.30	1.45
D	15.40	15.90	16.40	b2	0.60	0.80	1.00
E	9.86	10.16	10.46	F3	3.05	3.30	3.55
e	2.54 BSC			G3	1.15	1.35	1.55