

Features

- Low drain-source on-resistance: $R_{DS(ON)}=0.115\Omega(\text{typ})$
- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- 100% avalanche tested
- RoHS compliant

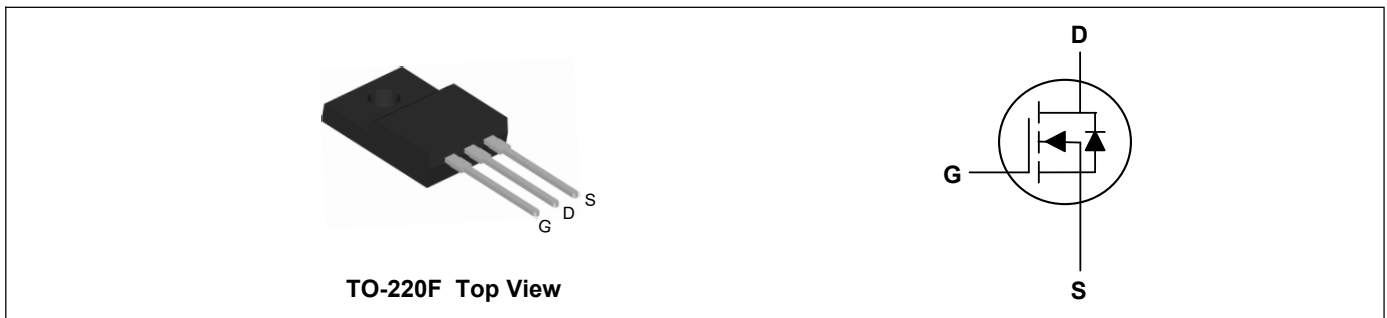
Key Performance Parameters



Parameter	Value	Unit
$V_{DS} @ T_{j,max}$	650	V
$R_{DS(ON),max}$	130	m Ω
I_D	26	A
$Q_{g,typ}$	43	nC
I_{DM}	80	A

Applications

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



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ¹	$I_D @ T_C=25^\circ\text{C}$	26	A
Continuous Drain Current ¹	$I_D @ T_C=100^\circ\text{C}$	16.5	A
Pulsed Drain Current ²	I_{DM}	80	A
Single Pulse Avalanche Energy ³	E_{AS}	960	mJ
Total Power Dissipation ⁴	P_D	36	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)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	2.9	$^\circ\text{C/W}$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13A$	---	115	130	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}	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
Gate Resistance	R_g	$f=1\text{MHz}$	---	3.8	---	Ω
Total Gate Charge	Q_g	$V_{DS}=400V, V_{GS}=10V, I_D=13A$	---	43	---	nC
Gate-Source Charge	Q_{gs}		---	9.9	---	
Gate-Drain Charge	Q_{gd}		---	17	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=400V, V_{GS}=10V, R_G=15\Omega, I_D=13A$	---	32	---	ns
Rise Time	T_r		---	24	---	
Turn-Off Delay Time	$T_{d(off)}$		---	97	---	
Fall Time	T_f		---	20	---	
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V, f=1\text{MHz}$	---	1950	---	pF
Output Capacitance	C_{oss}		---	85	---	
Reverse Transfer Capacitance	C_{rss}		---	1.7	---	

Drain-Source Diode Characteristics

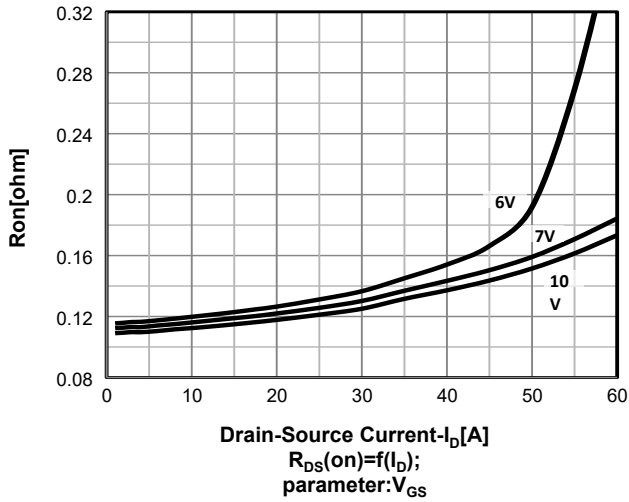
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	$T_C=25^\circ\text{C}$	---	---	26	A
Pulsed Source Current	I_{SM}		---	---	80	A
Diode Forward Voltage	V_{SD}	$V_G=0V, I_S=26A, T_J=25^\circ\text{C}$	---	0.9	1.4	V
Reverse Recovery Time	t_{rr}	$V_{DD}=400V, I_S=13A, di_f/dt=100A/\mu s$	---	360	---	ns
Reverse Recovery Charge	Q_{rr}		---	5	---	μC
Peak Reverse Recovery Current	I_{rrm}		---	28	---	A

Note:

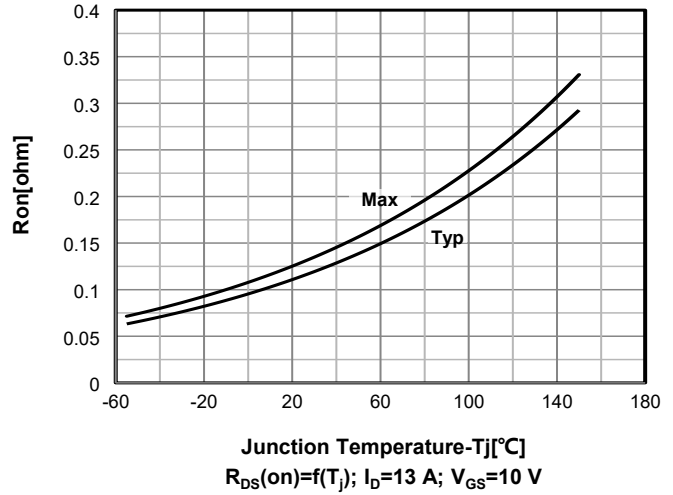
- Limited by $T_{j,max}$. Maximum Duty Cycle $D = 0.50$
- Pulse width t_p limited by $T_{j,max}$
- Identical low side and high side switch with identical R_G
- $V_{DD}=100V, I_{AS}=I_D$, Starting $T_J=25^\circ\text{C}$

Typical Characteristics

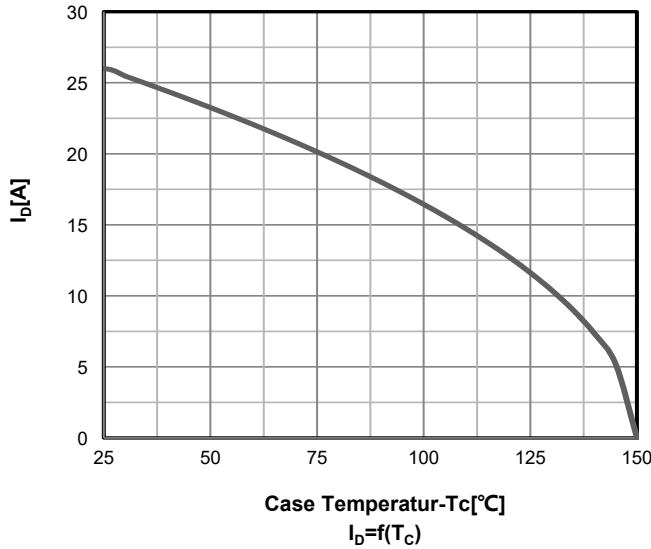
Typ. drain-source on-state resistance



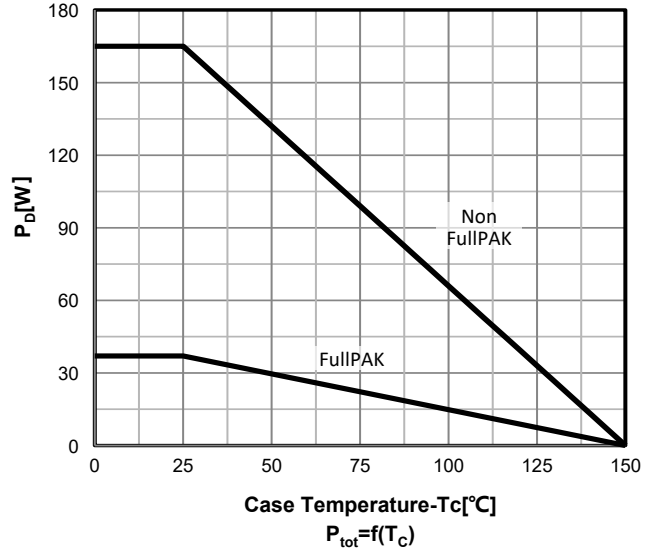
On-resistance vs temperature



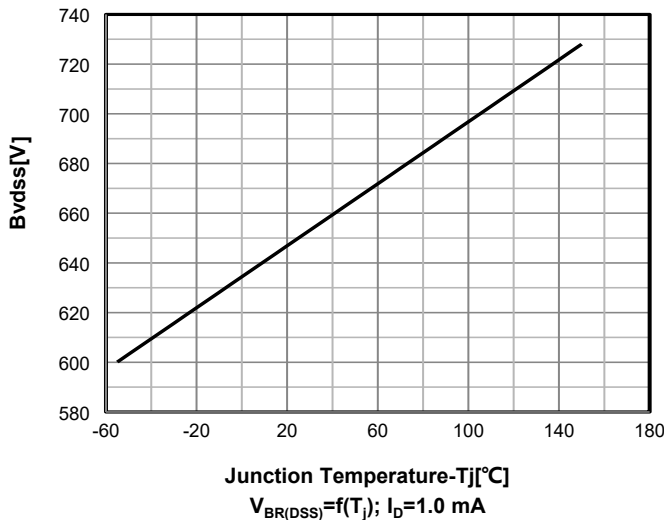
Drain current vs temperature



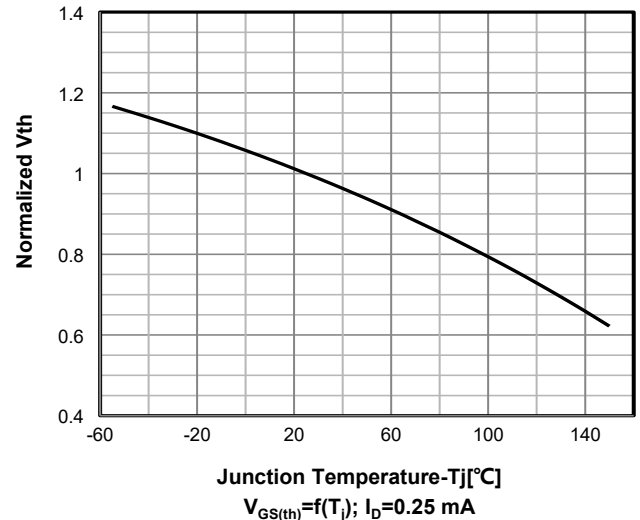
Power dissipation



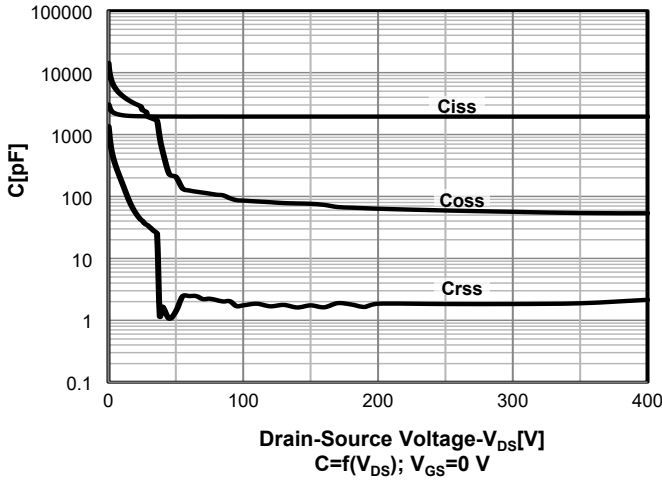
Drain-source breakdown voltage



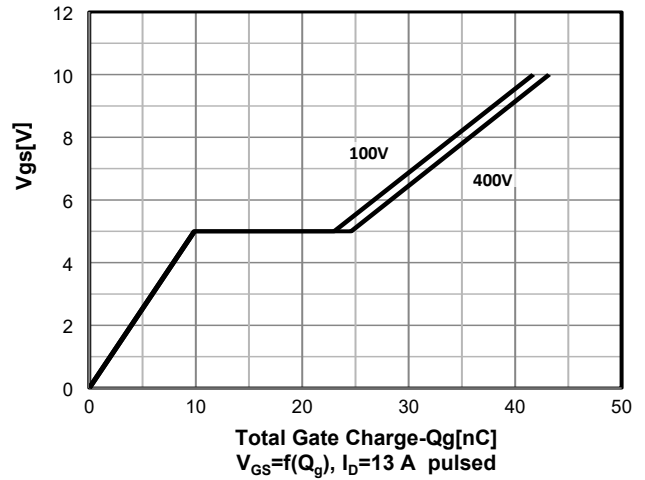
Normalized $V_{GS(th)}$ characteristics



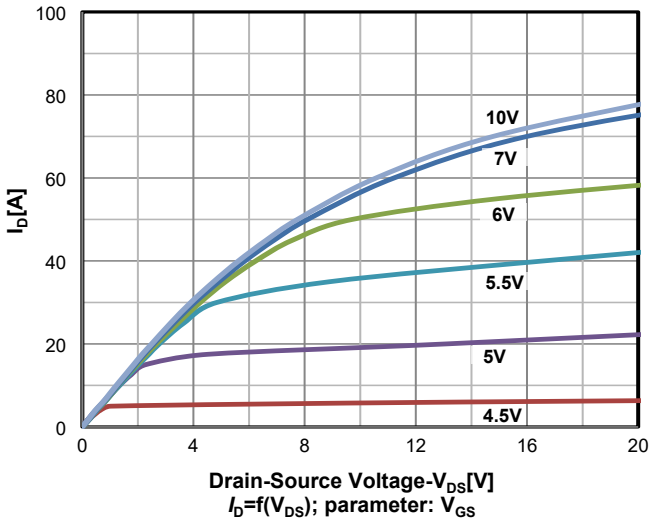
Typ. capacitances



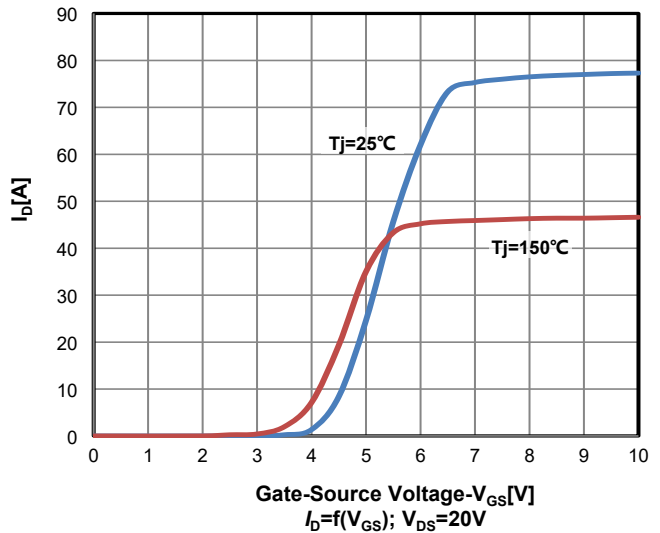
Typ. gate charge characteristics



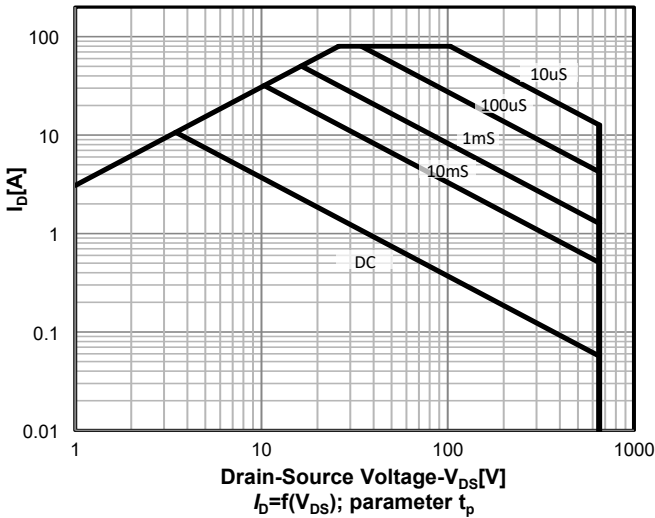
Typ. output characteristics $T_j=25^\circ C$



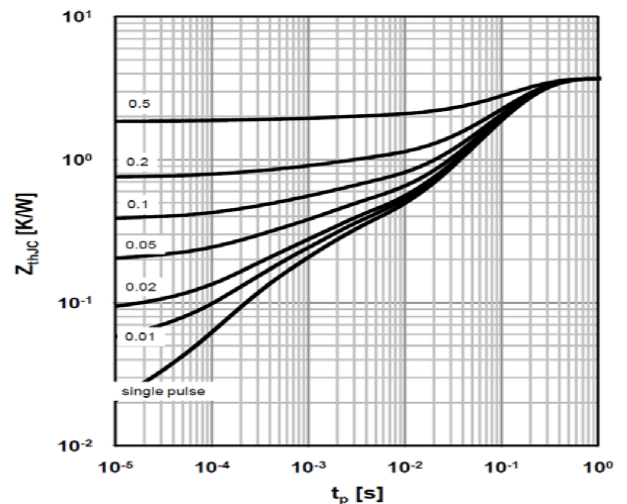
Transfer characteristics



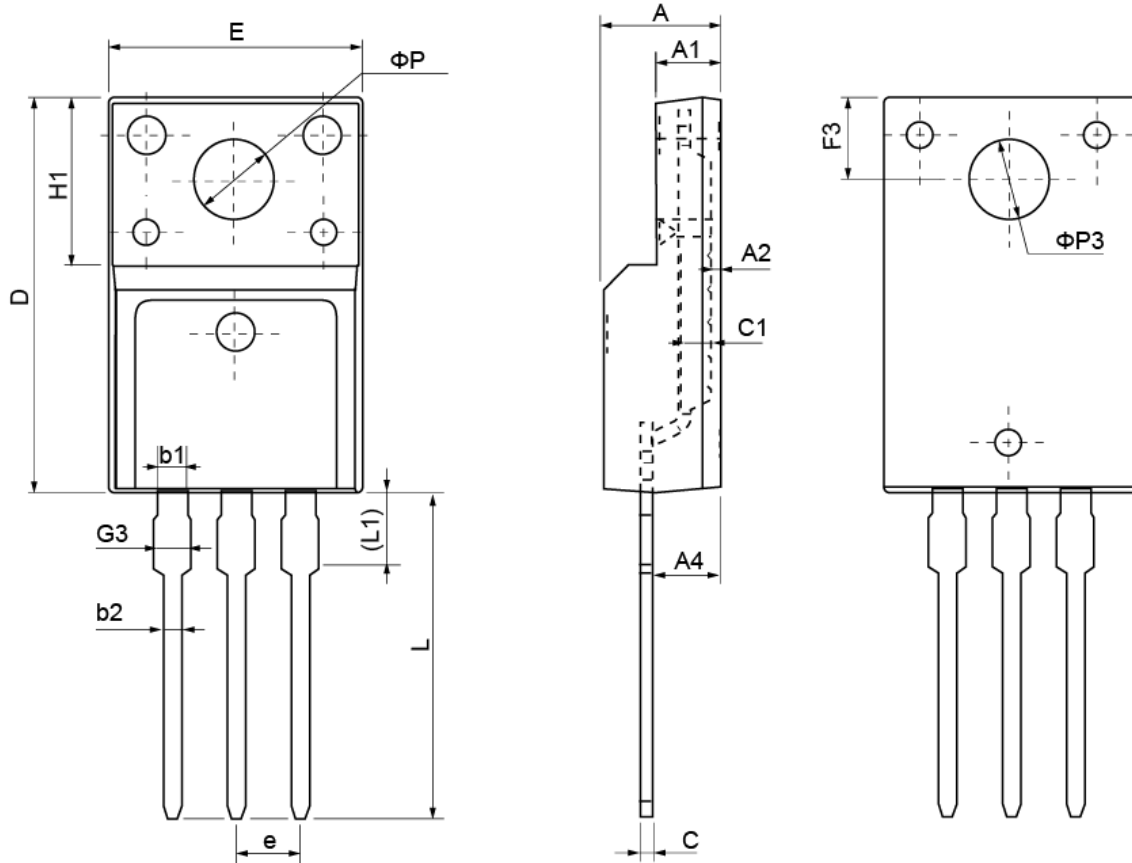
Safe operating area $TC=25^\circ C$



Max. 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	φ P	3.03	3.20	3.50
c	0.30	0.50	0.70	φ 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