

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

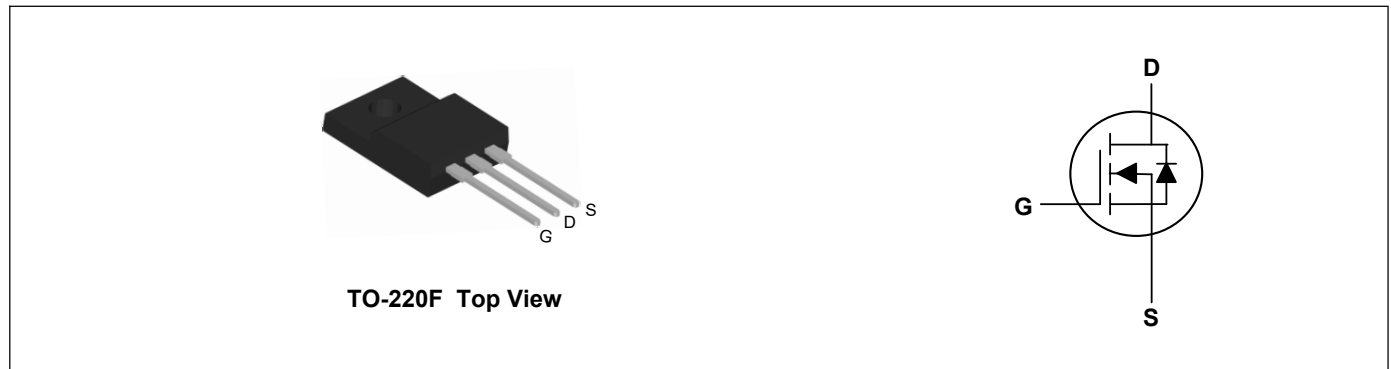
## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- LCD/LED Back Light

## Product Summary



$V_{DS}$	150	V
$I_D$	62	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	11	m $\Omega$



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	62	A
Continuous Drain Current <sup>1</sup>	$I_D$	40	A
$T_C=100^\circ C$			
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	252	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	205	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	96	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$

## Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	62.5	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	---	1.3	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	150	---	---	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	9	11	mΩ
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.0	3.0	4.0	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V	---	---	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A	---	69	---	S
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =75V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	45	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	15	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	8.5	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DS</sub> =75V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω, I <sub>D</sub> =20A	---	16	---	ns
Rise Time	T <sub>r</sub>		---	12	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	30	---	
Fall Time	T <sub>f</sub>		---	78	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz	---	3310	---	pF
Output Capacitance	C <sub>oss</sub>		---	268	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	9.4	---	

**Drain-Source Diode Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>1,5</sup>	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	62	A
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A, T <sub>J</sub> =25°C	---	---	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=100A/μs, T <sub>J</sub> =25°C	---	76	---	nS
Reverse Recovery Charge	Q <sub>rr</sub>		---	182	---	nC

**Note:**

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, L=0.4mH

**Typical Characteristics**

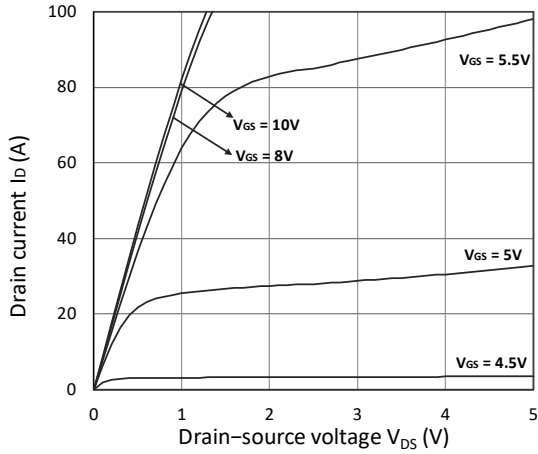


Figure 1. Output Characteristics

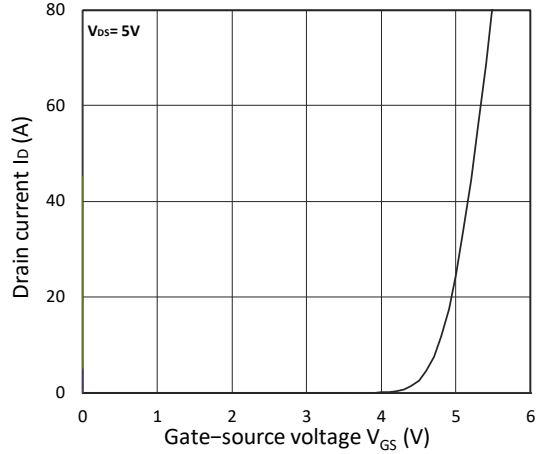


Figure 2. Transfer Characteristics

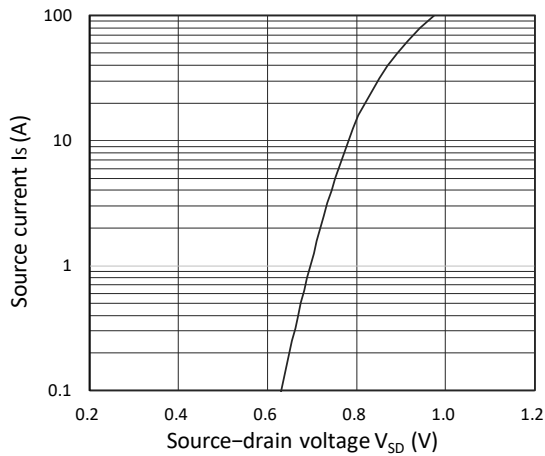


Figure 3. Forward Characteristics of Reverse

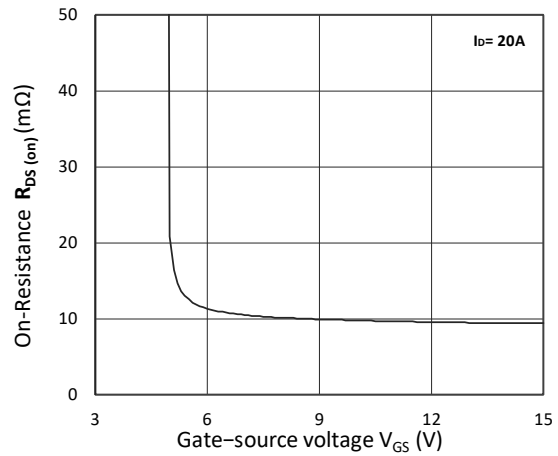


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

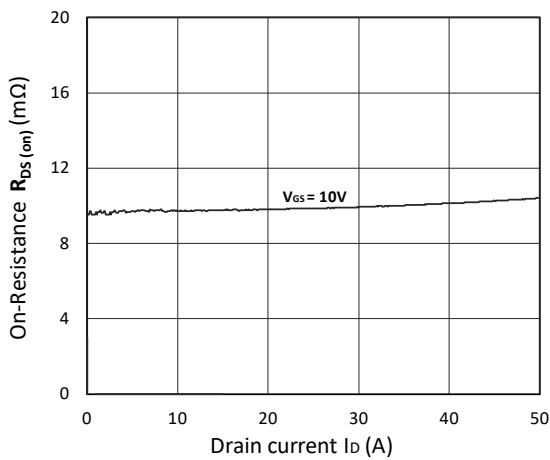


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

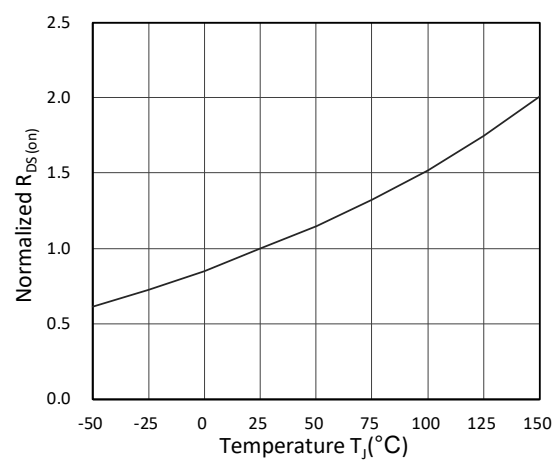


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

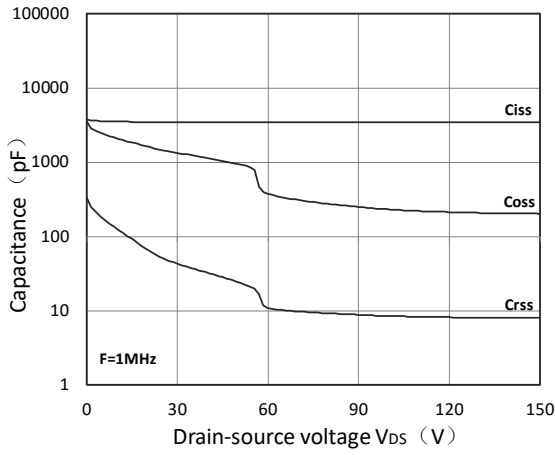


Figure 7. Capacitance Characteristics

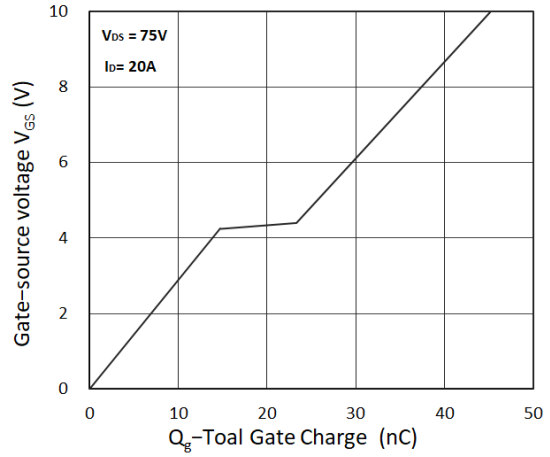


Figure 8. Gate Charge Characteristics

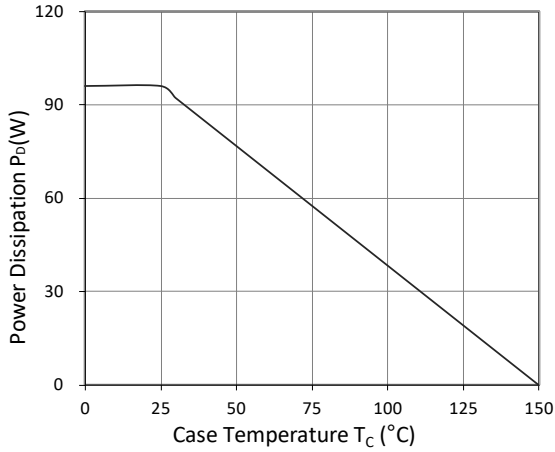


Figure 9. Power Dissipation

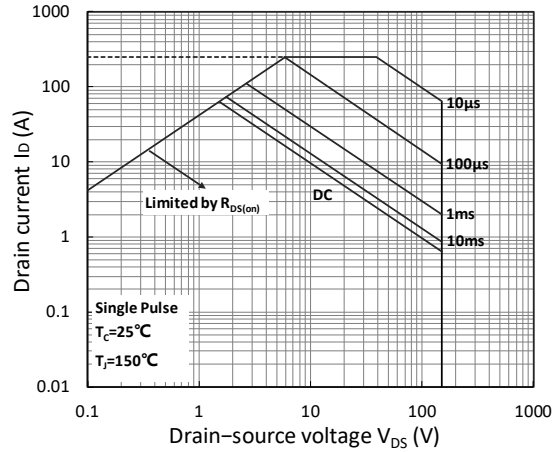


Figure 10. Safe Operating Area

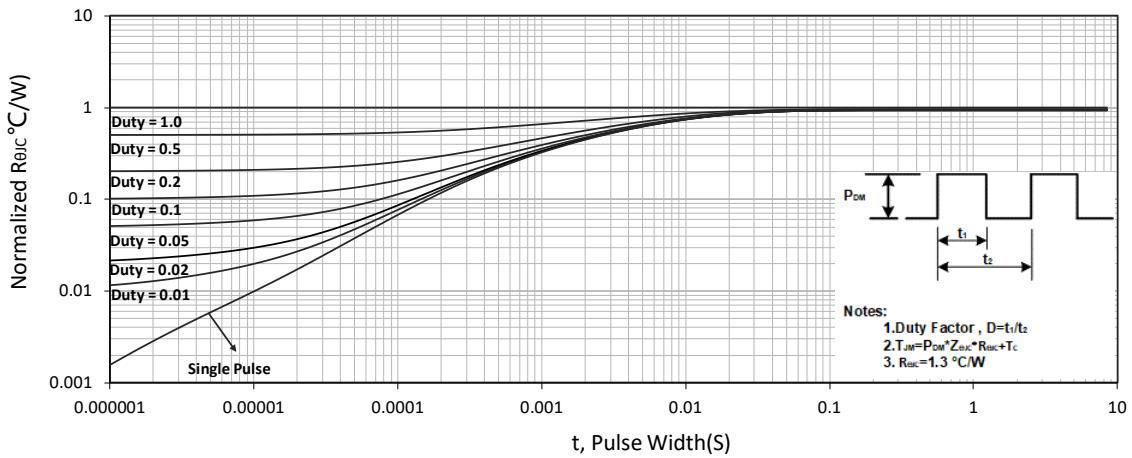
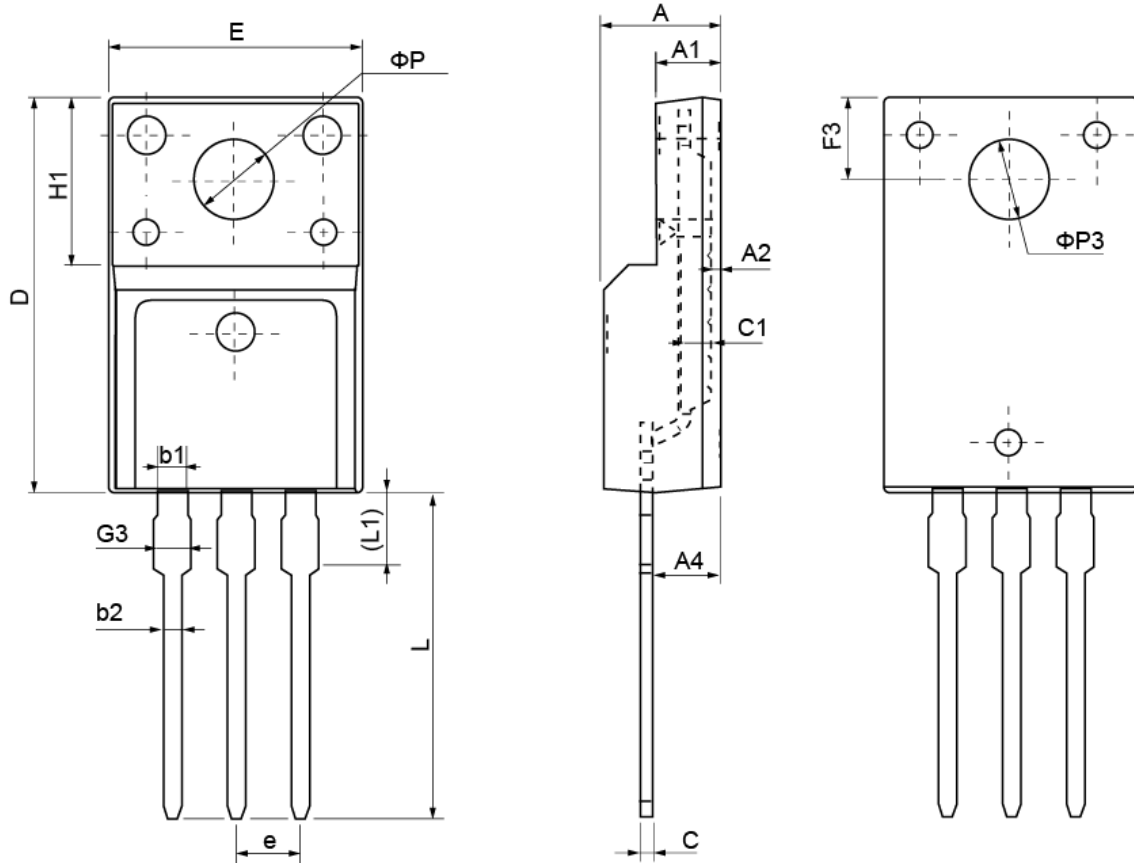


Figure 11. Normalized Maximum Transient Thermal Impedance

**TO-220F Package Outline Dimensions**



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