

**Features:**

8.0A, 650V,  $R_{DS(on)}(T_c) = 1.1 \text{ @ } V_{GS}=10V$

Low Gate Charge

Low  $C_{oss}$

100% Avalanche T

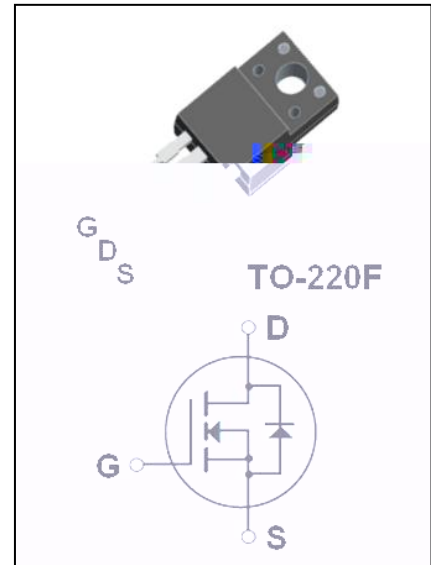
Fast

Low  $r_{DS(on)}$  /  $C_{iss}$

**Applications:**

High Frequency Switching MOSFET

Automotive Power Factor Correction



**Absolute Maximum Ratings (T<sub>c</sub> = 25°C)**

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-Source Voltage (I <sub>D</sub> = 0)	650	V
$I_D$	Drain Current (Continuous, T <sub>c</sub> = 25°C)	8.0*	A
		5.1*	A
$I_{DM}$	Drain Current (Pulse, N = 1)	32*	A
$V_{GSS}$	Gate-Source Voltage	±30	V
$E_{AS}$	Switching Energy (N = 2)	600	J
$I_{AR}$	Average Rectifier Current (N = 1)	8.0	A
$E_{AR}$	Reverse Avalanche Energy (N = 1)	15.0	J
/	Power Dissipation (N = 3)	4.5	W
$P_D$	Power Dissipation (T <sub>c</sub> = 25°C)	51	W
		0.41	W/°C
$T_J$	Operating Junction Temperature	150	°C
$T_{STG}$	Storage Temperature Range	-55 ~ +150	°C

\* Data in parentheses are limited by the maximum power dissipation.

**Thermal Characteristics**

Symbol	Parameter	Value	Unit
$R_{JC}$ <td>Thermal Resistance, Junction to Case</td> <td>2.44</td> <td>°C/W</td>	Thermal Resistance, Junction to Case	2.44	°C/W
$R_{JA}$ <td>Thermal Resistance, Junction to Ambient</td> <td>62.5</td> <td>°C/W</td>	Thermal Resistance, Junction to Ambient	62.5	°C/W

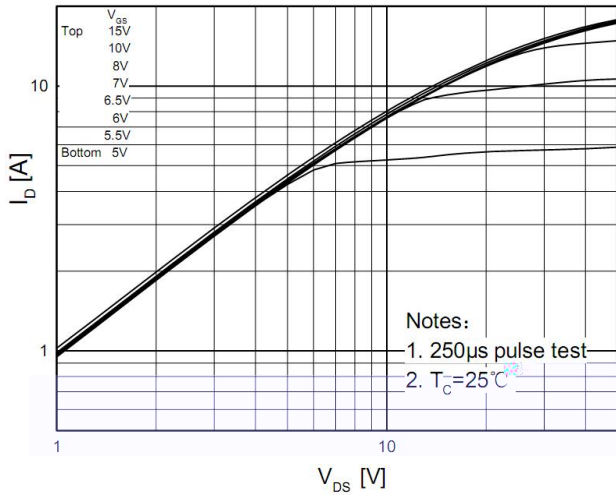
**Electrical Characteristics (T<sub>J</sub> = 25°C)**

S	Parameter	Test Conditions	M	T	Max	Unit
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Body Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250 A	650	--	--	V
ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	Drain-Body Voltage Temperature Coefficient	I <sub>D</sub> =250 A (R <sub>θJC</sub> = 25°C)	--	0.7	--	V/°C
I <sub>DSS</sub>	Zener Voltage	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V	--	--	1	A
		V <sub>DS</sub> =520V, T <sub>J</sub> = 125°C	--	--	10	A
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V	--	--	100	A
I <sub>GSSR</sub>	Gate-Body Leakage Current, Reverse	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	--	--	-100	A
<b>On Characteristics</b>						
V <sub>GS(ON)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 A	2.0	--	4.0	V
R <sub>DS(ON)</sub>	Source-Drain On-Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.0 A	--	1.1	1.3	
f <sub>FS</sub>	Frequency	V <sub>DS</sub> = 40 V, I <sub>D</sub> = 4.0 A (N = 4)	--	7	--	S
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, = 1.0MH	--	1400	--	F
C <sub>oss</sub>	Output Capacitance		--	175	--	F
C <sub>rss</sub>	Reverse Transfer Capacitance		--	16	--	F
<b>Switching Characteristics</b>						
t <sub>ON</sub> ( <sub>10-90%</sub> )	Turn-On Delay Time	V <sub>DD</sub> = 325 V, I <sub>D</sub> = 8.0 A, R <sub>G</sub> = 25 (N = 4,5)	--	13.5	--	
t <sub>OFF</sub> ( <sub>90-10%</sub> )	Turn-Off Delay Time		--	105	--	
t <sub>ON</sub> ( <sub>10-90%</sub> )	Turn-On Delay Time		--	128	--	
t <sub>OFF</sub> ( <sub>90-10%</sub> )	Turn-Off Delay Time		--	49	--	
Q <sub>on</sub>	Turn-On Energy	V <sub>DS</sub> = 520 V, I <sub>D</sub> = 8.0 A, V <sub>GS</sub> = 10 V (N = 4,5)	--	31	--	C
Q <sub>off</sub>	Turn-Off Energy		--	6.5	--	C
Q <sub>sw</sub>	Switching Energy		--	14.7	--	C
<b>Thermal Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Source Current	D F a C	--	--	8.0	A
I <sub>SM</sub>	Maximum Pulsed Source Current	D F a C	--	--	32	A
V <sub>SD</sub>	Source-Drain Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 8.0A	--	--	1.4	V
Q	Thermal Resistance	V <sub>GS</sub> = 0V, I <sub>S</sub> = 8.0A,	--	325	--	
		I <sub>F</sub> / = 100A/ (N = 4)	--	2.7	--	C

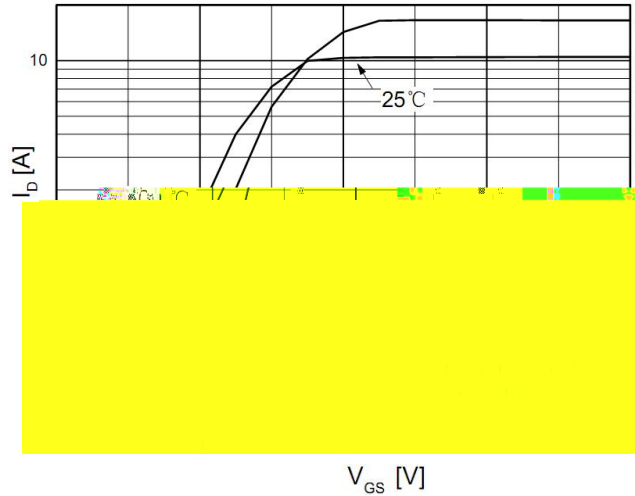
Note:

- R<sub>θJC</sub> = 1.8°C/W, R<sub>θJA</sub> = 3.0°C/W, R<sub>θJA</sub> = 3.0°C/W, R<sub>θJA</sub> = 3.0°C/W.
- L = 18.5 nH, I<sub>AS</sub> = 8.0A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25 Ω, S a T<sub>J</sub> = 25°C.
- I<sub>SD</sub> 8.0A, / 200A/ , V<sub>DD</sub> BV<sub>DSS</sub>, S a T<sub>J</sub> = 25°C.
- P<sub>T</sub> : P<sub>W</sub> 300 W, D C 2%.
- Electrical Characteristics are typical values.

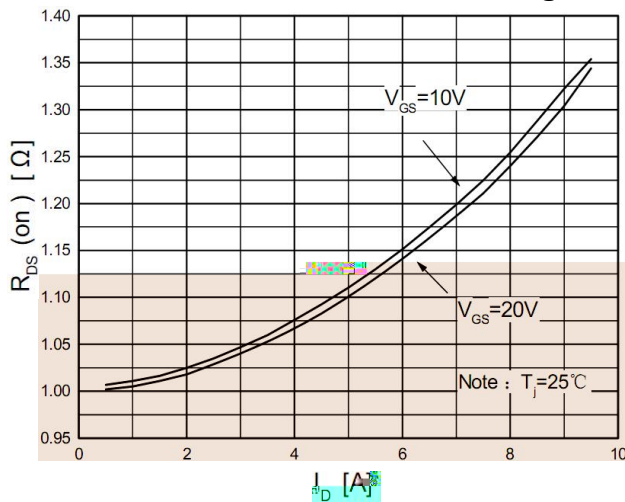
**O -Regi Cha ac e i ic**



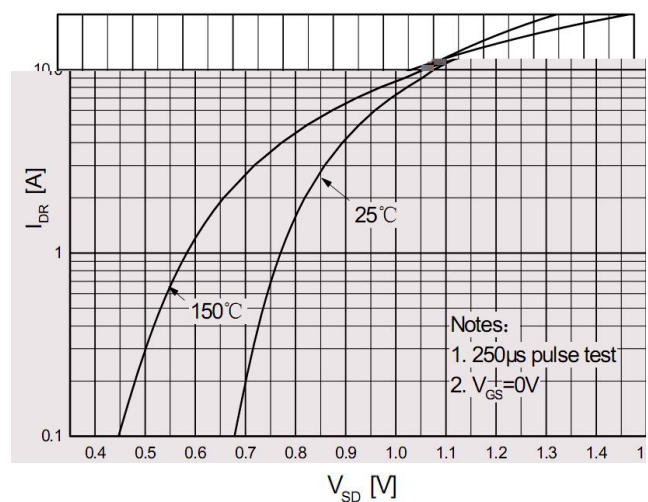
**T a fe Cha ac e i ic**



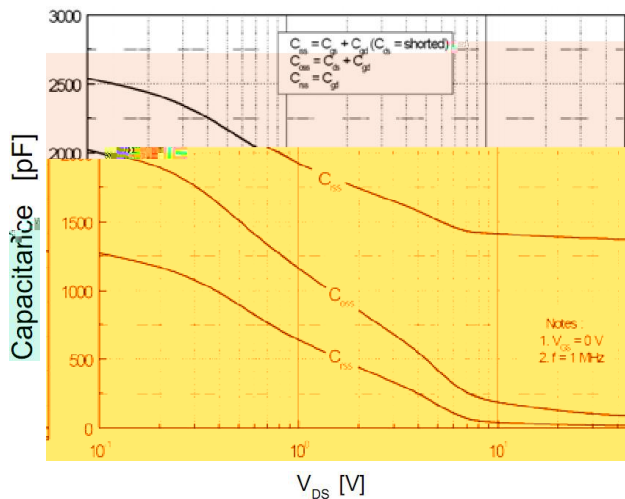
**O -Re i a ce Va ia i .  
D ai C e a d Ga e V I age**



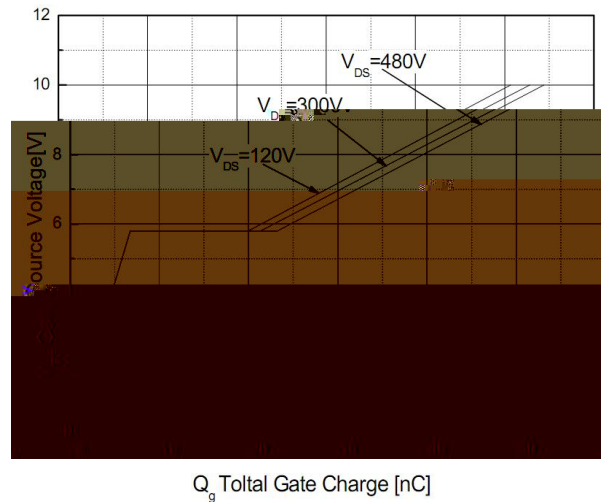
**B d Di de F a d V I age Va ia i .  
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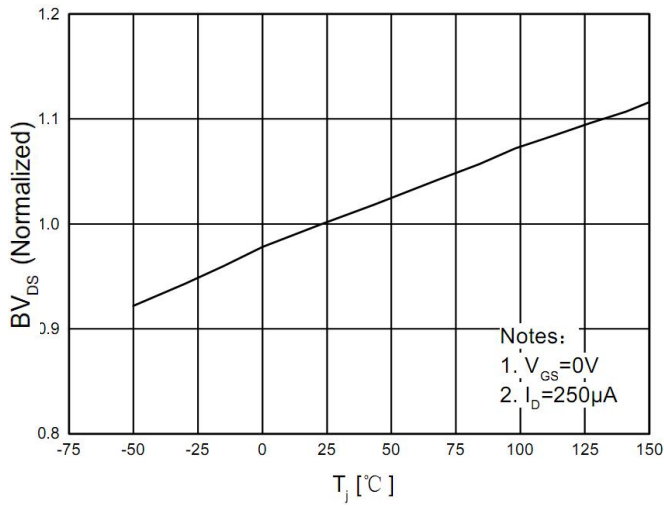
**Ca aci a ce Cha ac e i ic**



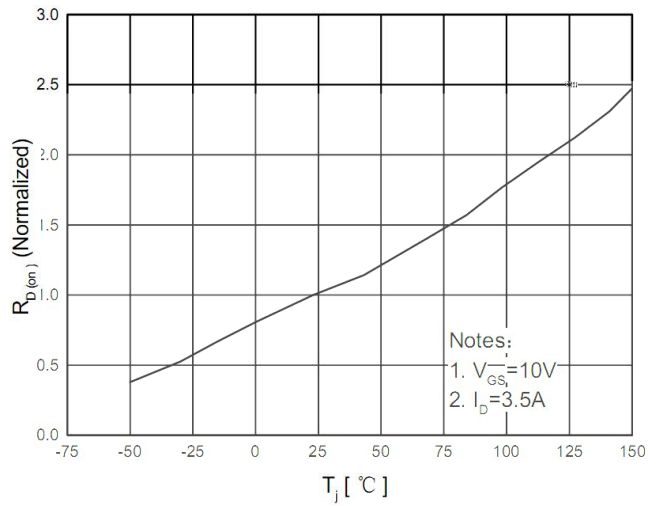
**Ga e Cha ge Cha ac e i ic**



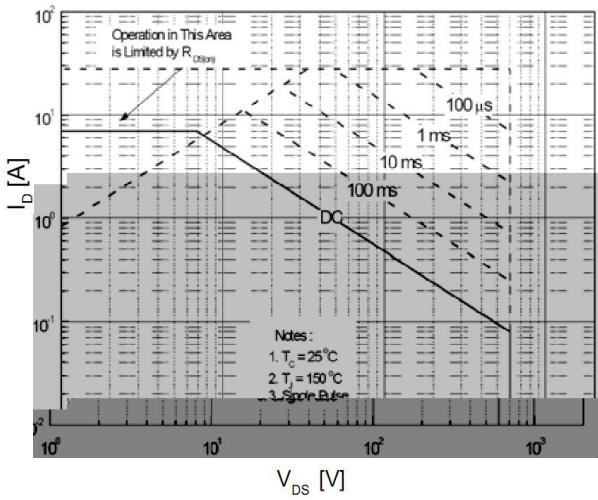
**Breakdown Voltage Variation with Temperature**



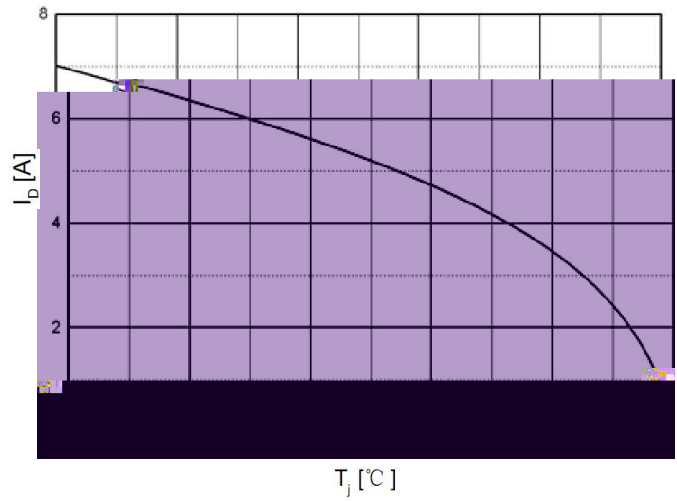
**On-Resistance Variation with Temperature**



**Maximum Safe Operating Area**



**Maximum Drain Current vs. Case Temperature**



## TO-220F Package Dimension

UNIT:

SYMBOL		a	SYMBOL		a
A	9.80	10.60	D	2.54	
A1	7.00		D1	1.15	1.55
A2	2.90	3.40	D2	0.60	1.00
A3	9.10	9.90	D3	0.20	0.50
B1	15.40	16.40	E	2.24	2.84
B2	4.35	4.95	E1		0.70
B3	6.00	7.40	E2		1.00
C	3.00	3.70	E3	0.35	0.65
C1	15.00	17.00	E4	2.30	3.30
C2	8.80	10.80			30

