

Features:

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

Low Gate Charge

Low C_{oss}

100% Avalanche Capability

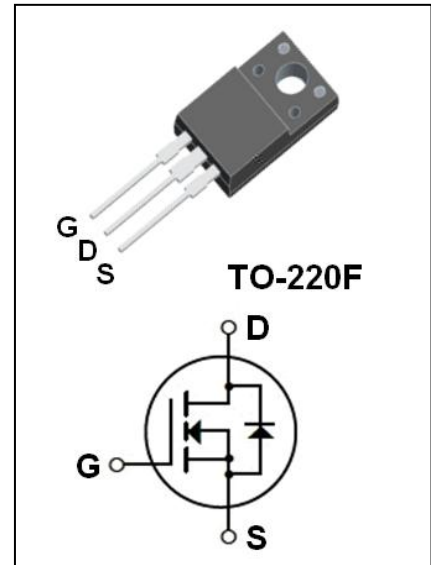
Fast Switching

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

Applications:

High Frequency Switching Mode Power Supply

Automotive Power Factor Correction



Absolute Maximum Ratings (T_c = 25°C)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage (I _D = 0)	650	V
I_D	Drain Current (Continuous, T _c = 25°C)	8.0*	A
	(T _c = 100°C)	5.1*	A
I_{DM}	Drain Current (Pulse)	32*	A
V_{GSS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (N = 2)	600	J
I_{AR}	Average Reverse 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 _c = 25°C)	51	W
	(-D a a 25 C)	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 of the device.

Thermal Characteristics

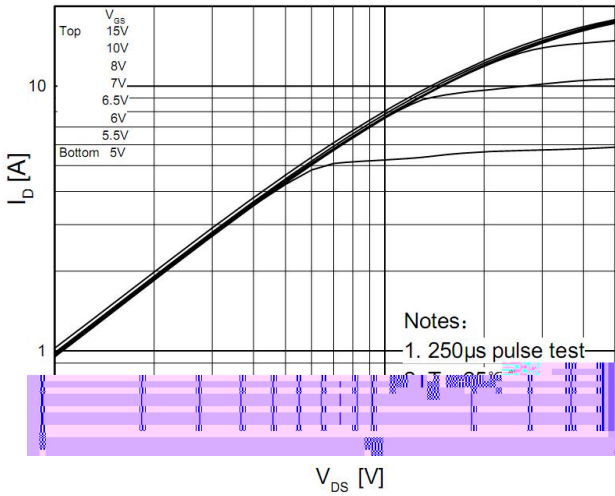
Symbol	Parameter	Value	Unit
R_{JC} <td>Thermal Resistance, Junction to Case</td> <td>2.44</td> <td>°C/W</td>	Thermal Resistance, Junction to Case	2.44	°C/W
R_{JA} <td>Thermal Resistance, Junction to Ambient</td> <td>62.5</td> <td>°C/W</td>	Thermal Resistance, Junction to Ambient	62.5	°C/W

Electrical Characteristics (T_J = 25°C)

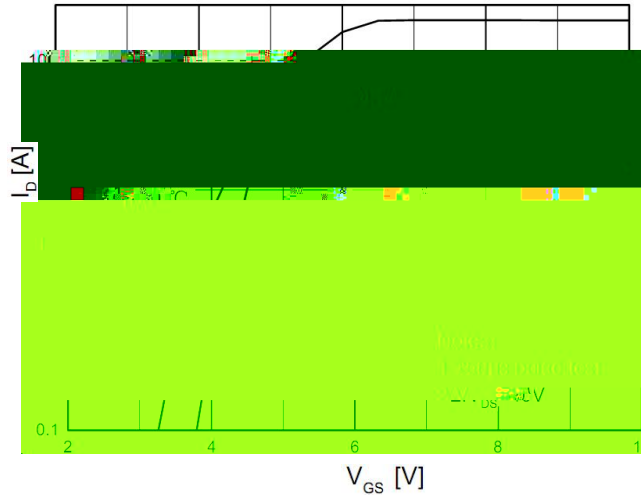
S	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 A	650	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250 A (R _{θJC} = 25°C)	--	0.7	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	--	--	1	A
		V _{DS} =520V, T _J =125°C	--	--	10	A
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} =+30V, V _{DS} =0V	--	--	100	A
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	--	--	-100	A
On Characteristics						
V _{GS(on)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 A	2.0	--	4.0	V
R _{DS(on)}	Source-Drain On-Resistance	V _{GS} =10V, I _D =4.0A	--	1.1	1.3	Ω
f _{FS}	Fall Time	V _{DS} =40V, I _D =4.0A (N=4)	--	7	--	ns
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	1400	--	pF
C _{oss}	Output Capacitance		--	175	--	pF
C _{rss}	Reverse Transfer Capacitance		--	16	--	pF
Switching Characteristics						
t _{TO}	Turn-On Delay Time	V _{DD} = 325V, I _D = 8.0A, R _G = 25Ω (N=4,5)	--	13.5	--	ns
t _{TR}	Turn-On Rise Time		--	105	--	ns
t _{TO}	Turn-Off Delay Time		--	128	--	ns
t _{TF}	Turn-Off Fall Time		--	49	--	ns
Q _g	Gate Charge	V _{DS} = 520V, I _D = 8.0A, V _{GS} = 10V (N=4,5)	--	31	--	nC
Q _g	Gate Charge		--	6.5	--	nC
Q _g	Gate Charge		--	14.7	--	nC
Thermal Resistance and Maximum Ratings						
I _S	Maximum Collector-Diode Forward Current		--	--	8.0	A
I _{SM}	Maximum Pulsed Diode Forward Current		--	--	32	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = 8.0A	--	--	1.4	V
Q _g	Reverse Recovery Charge	V _{GS} = 0V, I _S = 8.0A,	--	325	--	ns
		I _F / I _R = 100A/ (N=4)	--	2.7	--	nC

- Notes:
- R_{θJC} = 25°C, P_W = 100W, I_D = 8.0A, T_J = 25°C.
 - L = 18.5 nH, I_{AS} = 8.0A, V_{DD} = 50V, R_G = 25Ω, S_a = 100%, T_J = 25°C.
 - I_{SD} = 8.0A, I_F = 200A, V_{DD} = BV_{DSS}, S_a = 100%, T_J = 25°C.
 - P_W = 300μs, I_D = 8.0A, R_{θJC} = 25°C.
 - Electrical characteristics are guaranteed by design.

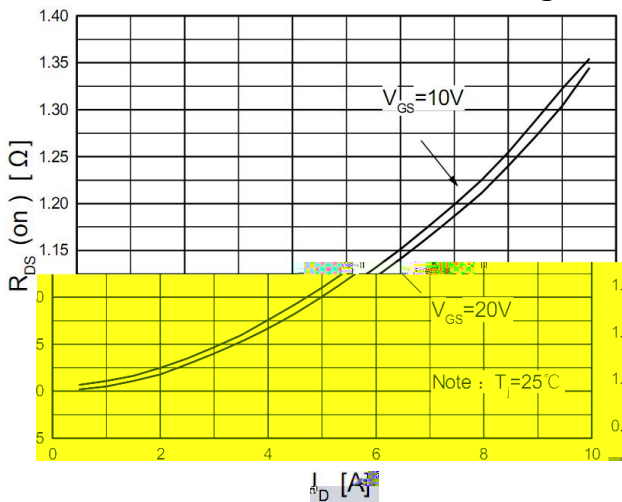
O -Regi Cha ac e i ic



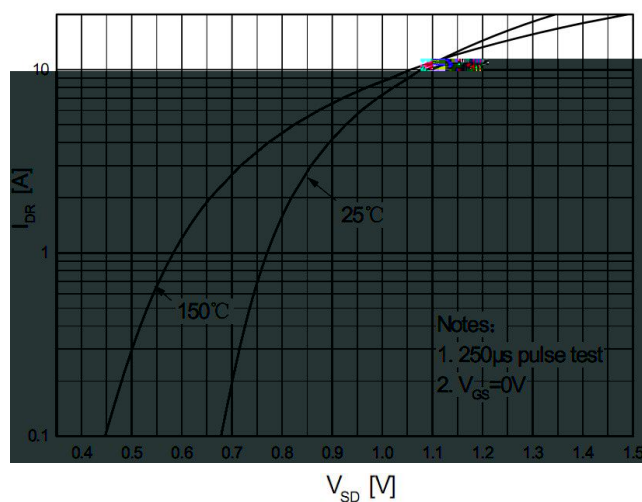
T a f e Cha ac e i ic



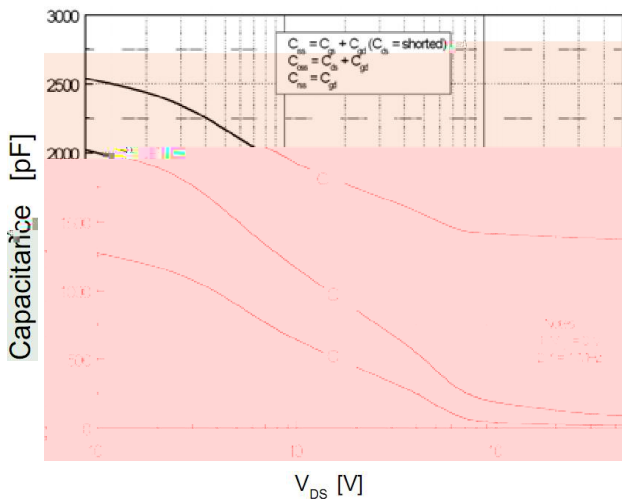
**O -Re i a ce Va i a i .
D a i C e a d G a e V l a g e**



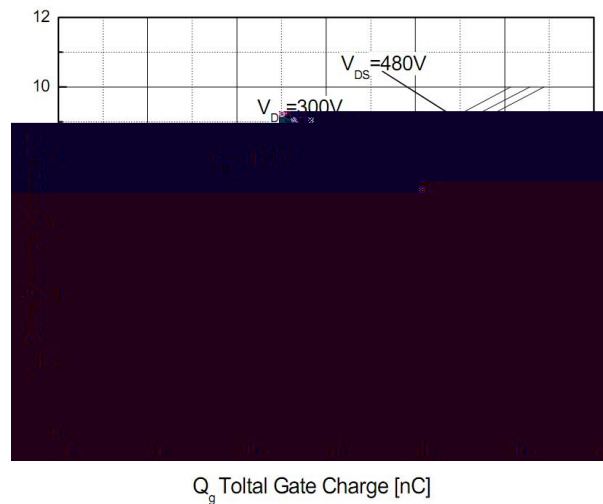
**B d D i d e F a d V l a g e V a i a i .
. S c e C e a d T e m e a e**



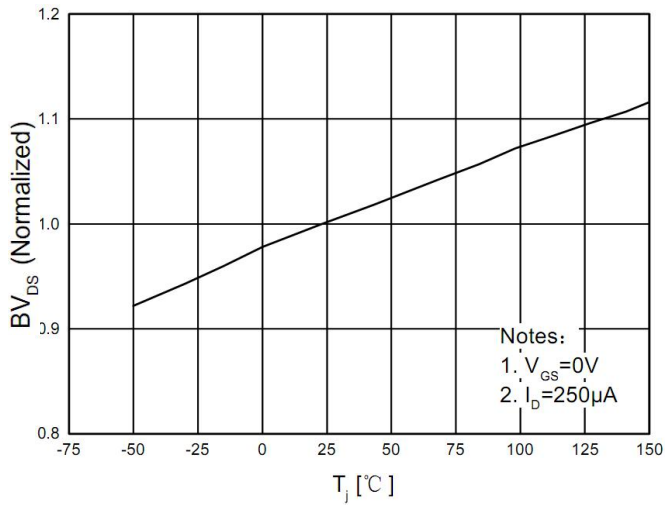
Ca a c i a ce Cha ac e i ic



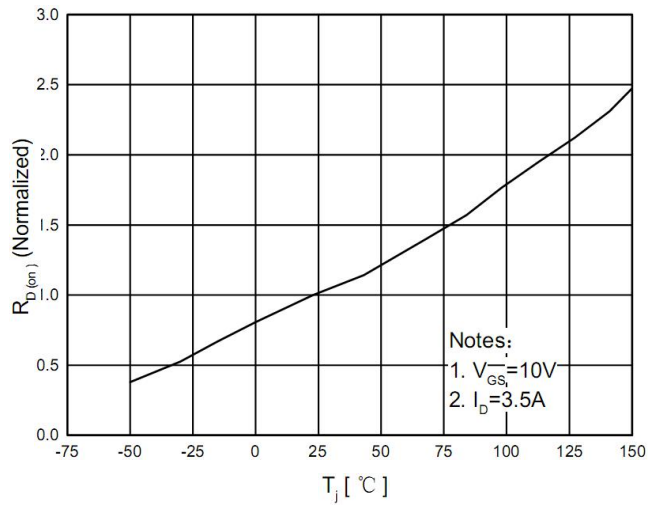
G a e Cha g e Cha ac e i ic



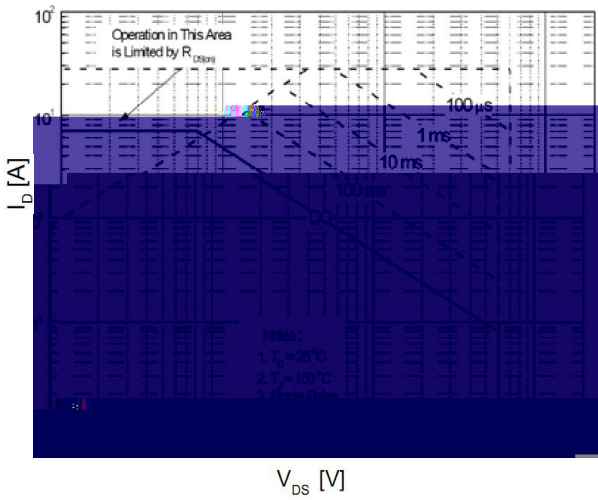
Breakdown Voltage Variation with Temperature



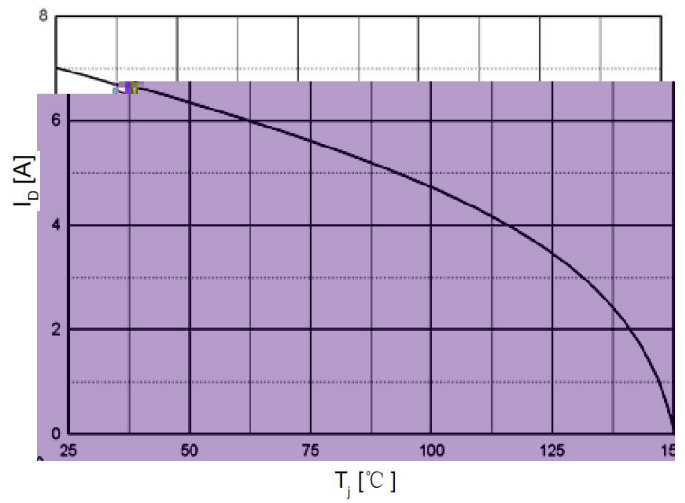
On-Resistance Variation with Temperature



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



TO-220F Package Dimension

UNIT: a

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		1.0 × 45°
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°

