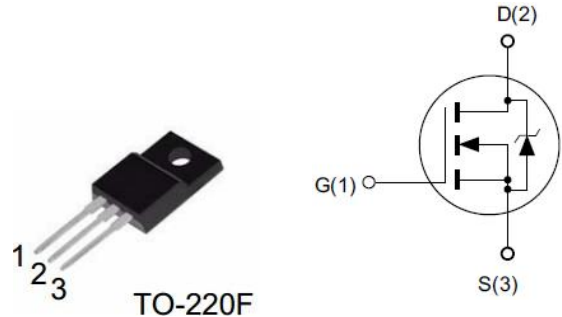


Features

- ◆ 650V, 20A, $R_{DS(ON)}(Typ.) = 0.19\Omega @ V_{GS} = 10V$
- ◆ Advanced Super Junction Technology
- ◆ Easy To Control Gate Switching
- ◆ Enhancement Mode: $V_{GS(th)} = 2.8$ to $4.2 V$

Application

- ◆ LED Lighting
- ◆ LCD & PDP TV
- ◆ Power, Adaptor
- ◆ Boost PFC Switch
- ◆ HB Or AHB Or LLC Topologies



Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	650	V
V_{GS}	Gate-Source Voltage	± 30	
I_D	Drain Current-Continuous, $T_c = 25^\circ C$	20	A
I_{DM}	Drain Current-Pulsed ^b	60	
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$	33	W
dv/dt	Peak Diode Recovery dv/dt ^c	15	V/ns
E_{AS}	Single Pulsed Avalanche Energy ^d	605	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.8	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	80	

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 10mA$	655	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.8	-	4.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 10A$	-	0.19	0.22	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$f = 1.0MHz$	-	11	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 50V,$ $V_{GS} = 0V,$ $f = 10kHz$	-	1547	-	pF
C_{oss}	Output Capacitance		-	134	-	
C_{rss}	Reverse Transfer Capacitance		-	5.28	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 400V,$ $V_{GS} = 13V,$ $I_D = 8A,$ $R_G = 3.4\Omega$	-	12.4	-	ns
t_r	Turn-On Rise Time		-	21.6	-	
$t_{d(off)}$	Turn-Off Delay Time		-	52	-	
t_f	Turn-Off Fall Time		-	18.8	-	
Q_g	Total Gate Charge	$V_{DD} = 400V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 8A$	-	32.23	-	nC
Q_{gs}	Gate-Source Charge		-	8.24	-	
Q_{gd}	Gate-Drain Charge		-	10.85	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_F = 1A$	-	0.72	-	V
T_{rr}	Body Diode Reverse Recovery Time	$V_R = 400V, I_F = 8A$ $di_F/dt = 100A/\mu s$	-	275	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$V_R = 400V, I_F = 8A$ $di_F/dt = 100A/\mu s$	-	3.81	-	μC
I_{rrm}	Peak reverse recovery current	$V_R = 400V, I_F = 8A$ $di_F/dt = 100A/\mu s$	-	25.6	-	A

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- $L = 10mH, V_{DD} = 50V, I_{AS} = 11A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.

■ Characteristic Curve

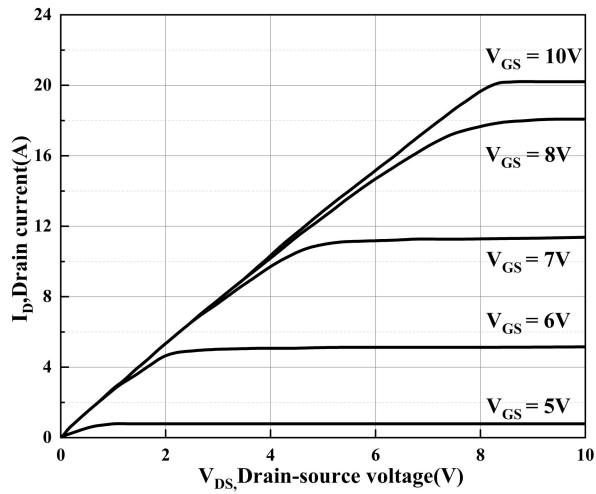


Figure 1. Typical Output Characteristics

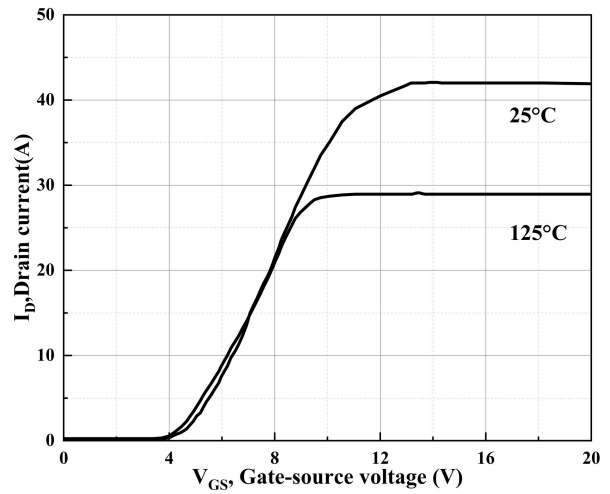


Figure 2. Typical Transfer Characteristics

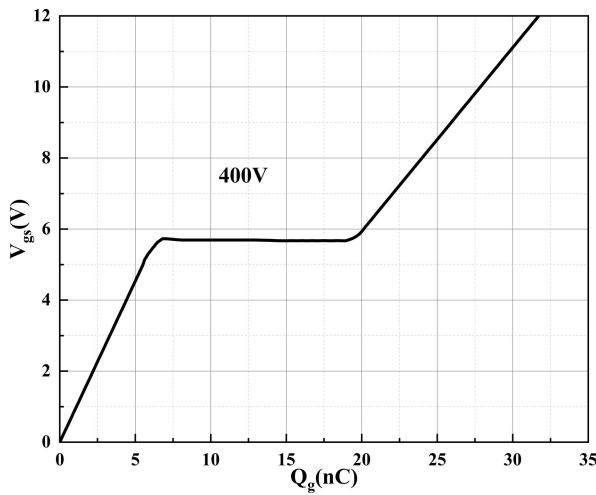


Figure 3. Typical Gate Charge

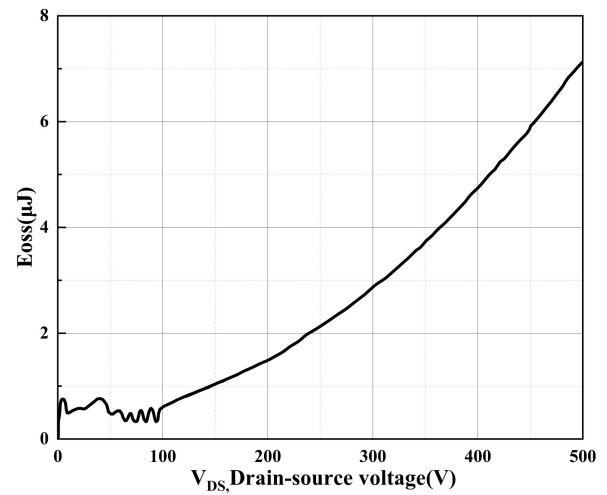


Figure 4. Typical C_{oss} Stored Energy

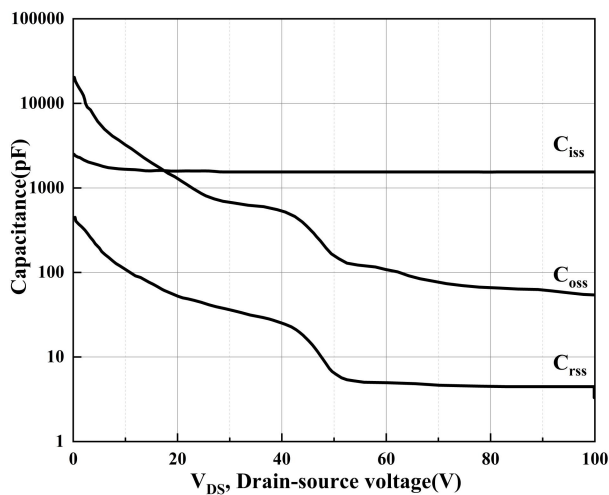


Figure 5. Typical Capacitance

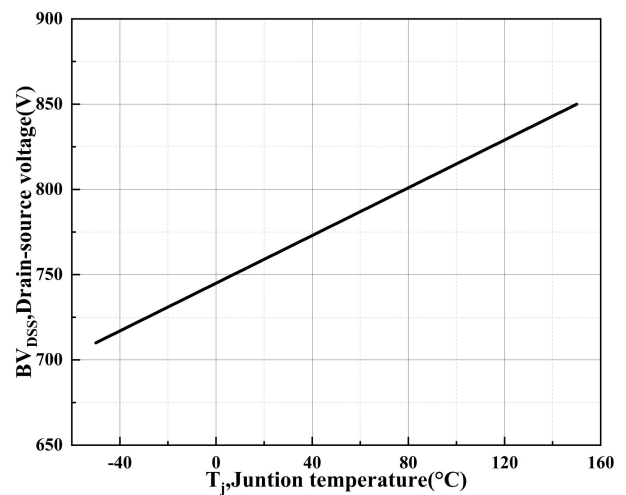


Figure 6. Drain-source Breakdown Voltage

■ Package Information

