

N-Channel Enhancement Mode MOSFET

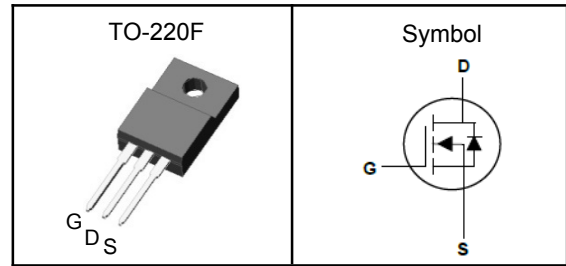
Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant
- 100% UIS and Rg Tested

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC to DC Converters

Pin Description



V_{DSS}	650	V
$R_{DS(ON)-Typ}$	800	m Ω
I_D	10	A

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-Source Voltage	650	V
V_{GSS}	Gate-Source Voltage	± 30	V
T_J	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy ^③	720	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	40	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ₁ (Max)	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ₁	2.07	$^\circ\text{C}/\text{W}$

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150 $^\circ\text{C}$.

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.



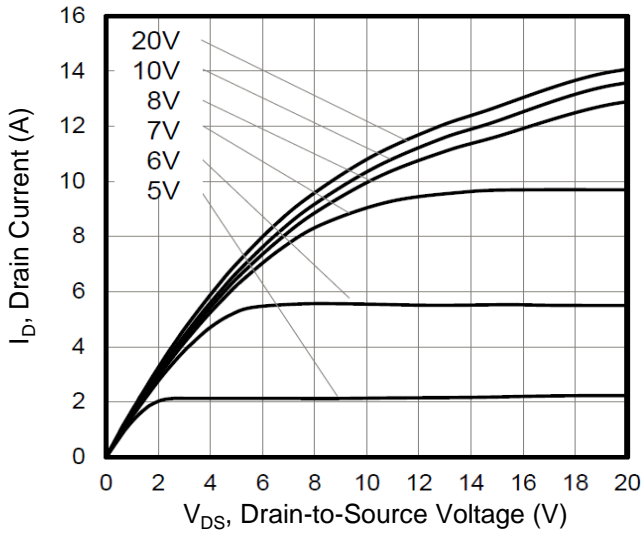
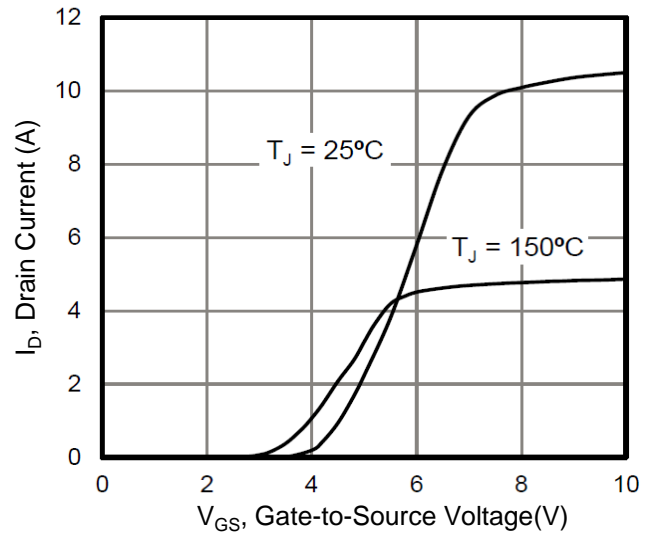
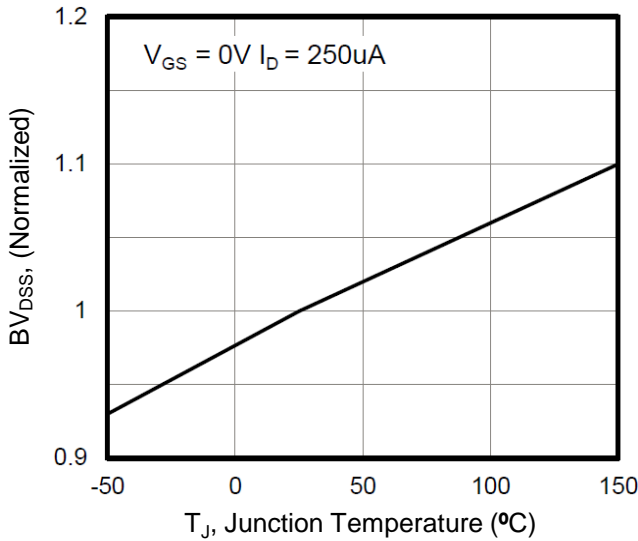
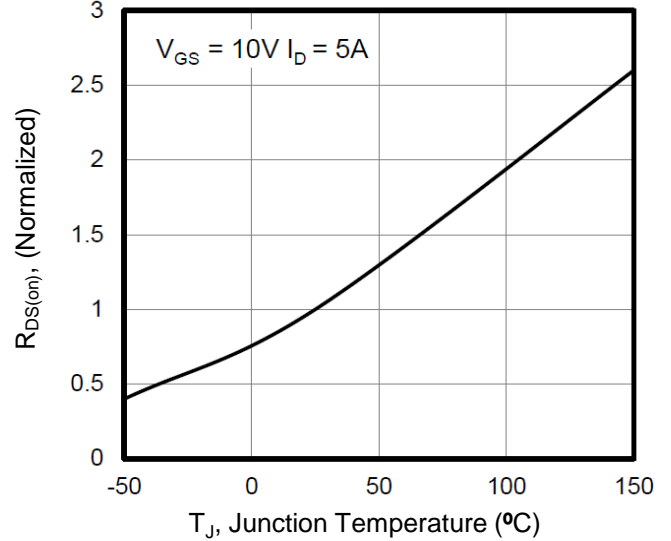
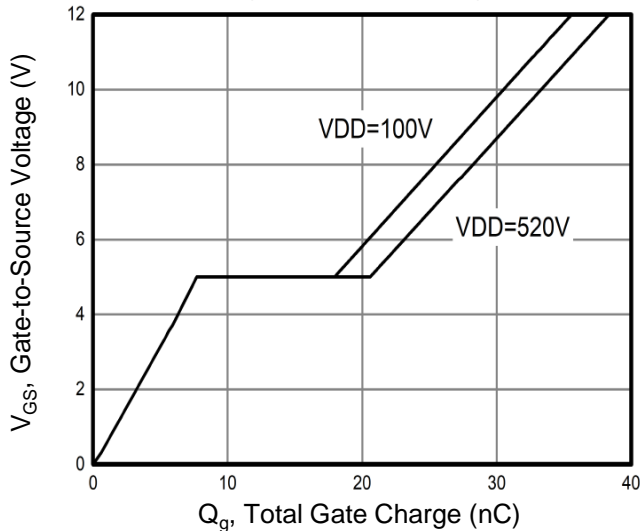
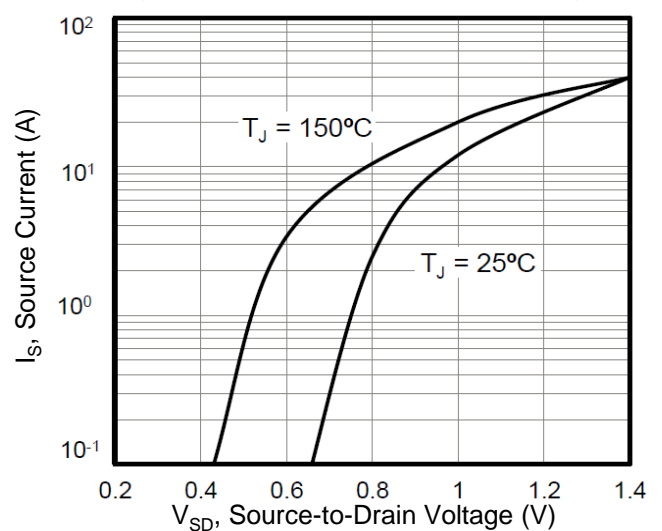
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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	---	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=5A$	---	800	1100	$m\Omega$
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	1573	---	pF
C_{oss}	Output Capacitance		---	138	---	
C_{rss}	Reverse Transfer Capacitance		---	15	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=325V, R_G=25\Omega,$ $I_D=10A$	---	23	---	nS
T_r	Turn-on Rise Time		---	15	---	
$T_{d(off)}$	Turn-off Delay Time		---	90	---	
T_f	Turn-off Fall Time		---	30	---	
Q_g	Total Gate Charge	$V_{DD}=520V,$ $V_{GS}=10V, I_D=10A$	---	44	---	nC
Q_{gs}	Gate-Source Charge		---	33	---	
Q_{gd}	Gate-Drain Charge		---	7	---	
Source-Drain Characteristics ($T_J=25^{\circ}\text{C}$)						
V_{SD}	Diode Forward Voltage ₂	$V_{GS}=0V, I_S=10A, T_J=25^{\circ}\text{C}$	---	---	1.5	V
t_{rr}	Reverse Recovery Time	$I_F=10A, V_{GS}=0V$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	480	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.5	---	nC

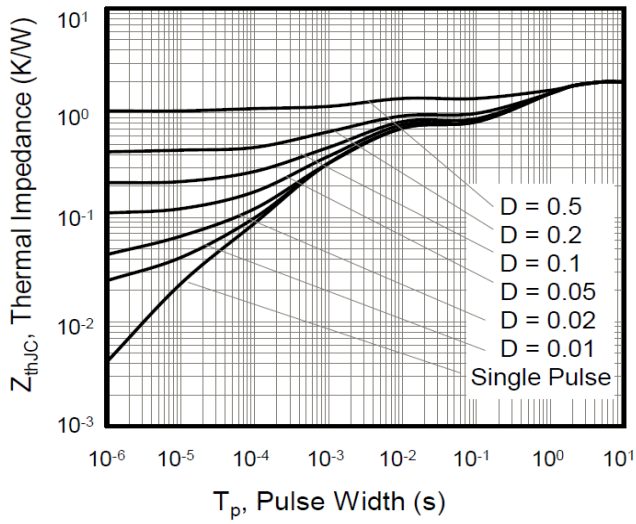
Note ④ : Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).

Note ⑤ : Guaranteed by design, not subject to production testing.

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Typical Characteristics
Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. BV_{DSS} vs. Temperature

Figure 4. On-Resistance vs. Temperature

Figure 5. Gate Charge

Figure 6. Body Diode Forward Voltage


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**Figure 7. Transient Thermal Impedance
(TO-220F)**



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TO-220F Package Outline Data
