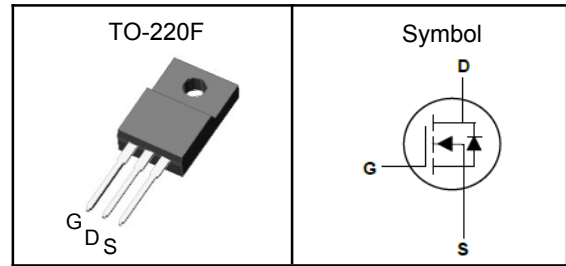


## N-Channel Enhancement Mode MOSFET

### Features

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

### Pin Description



### Applications

- High Efficiency Switch Mode Power Supplies
- Electronic Lamp Ballasts
- UPS

$V_{DSS}$	500	V
$R_{DS(ON)-Typ}$	520	m $\Omega$
$I_D$	12	A

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

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	500	V
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	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 <sup>③</sup>	415	mJ
$I_{DM}^{①}$	Pulse Drain Current Tested	50	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 <sup>①</sup>	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>①</sup>	0.64	$^\circ\text{C}/\text{W}$

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

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

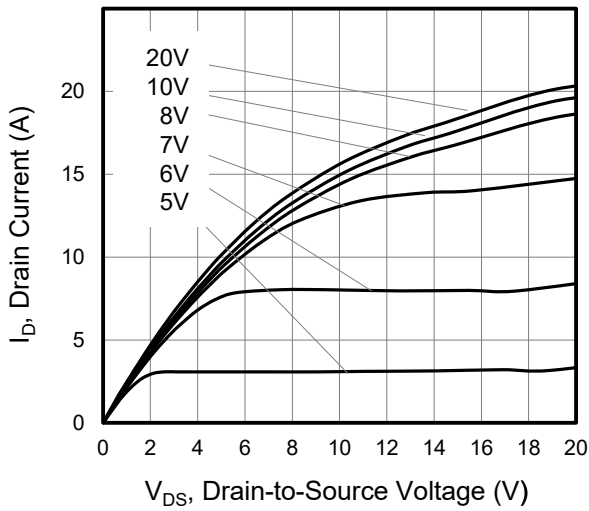
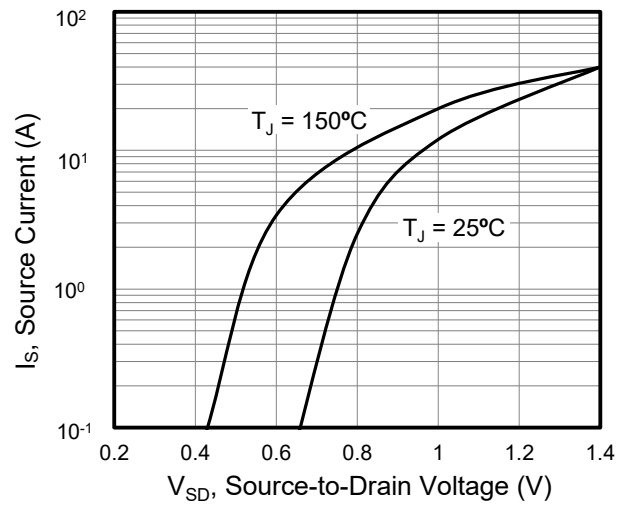
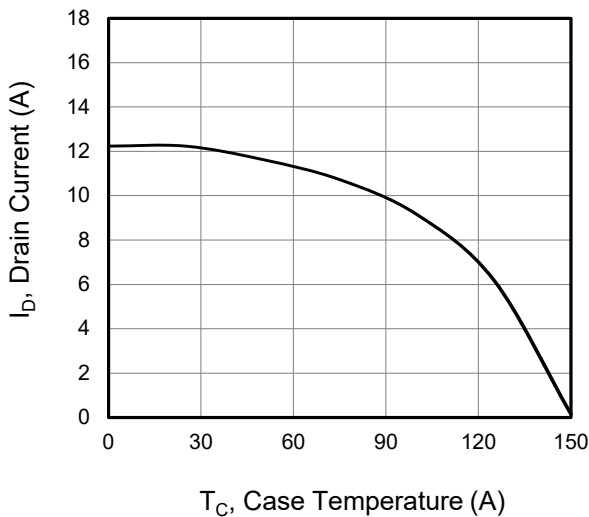
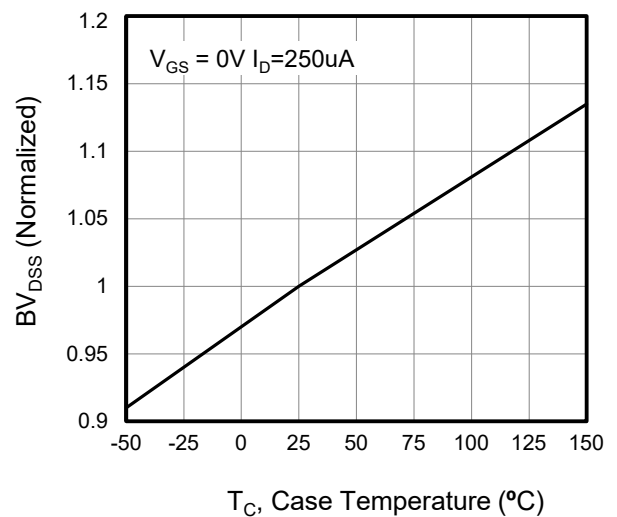
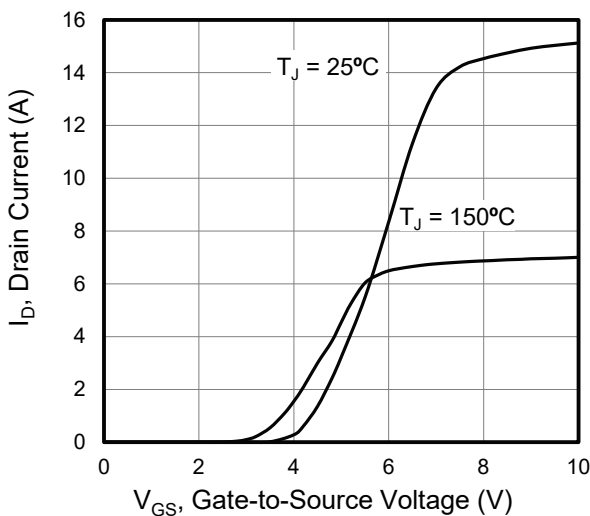
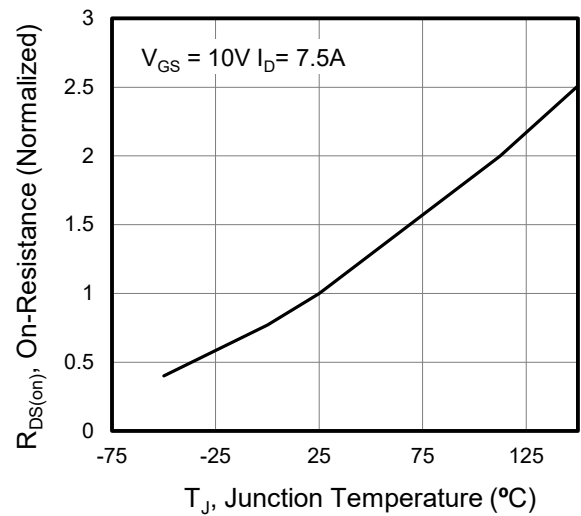
Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.

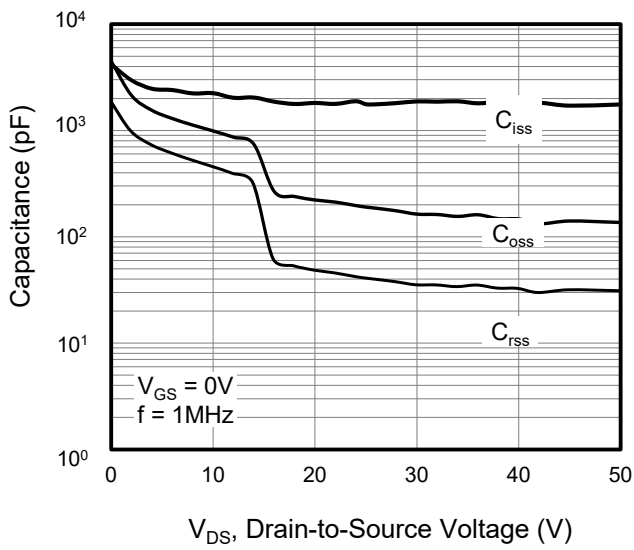
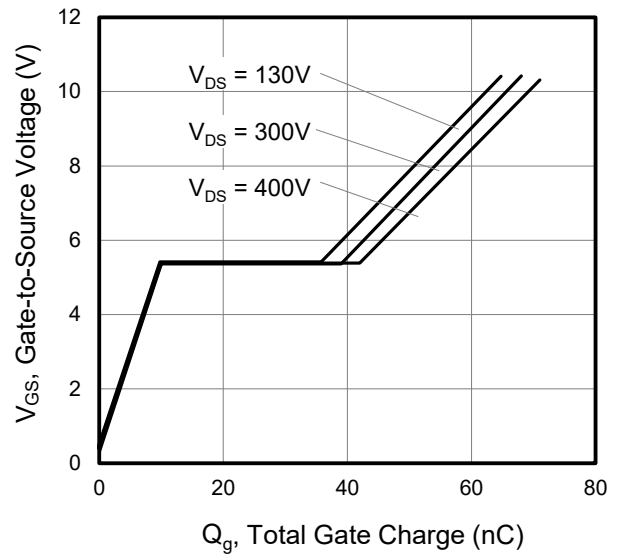
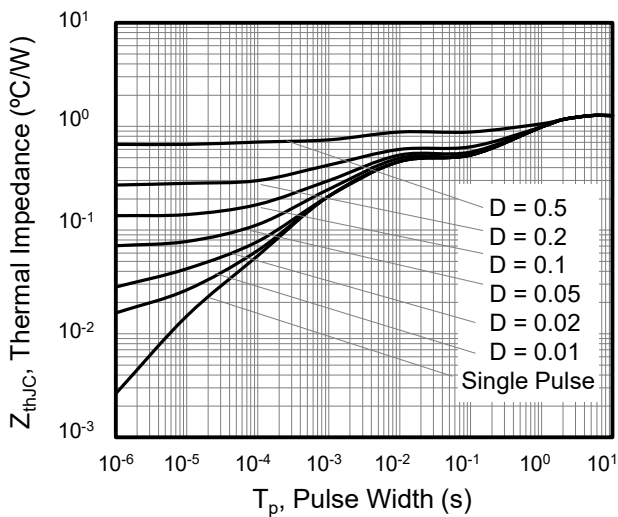
**N-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	500	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	---	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=6A$	---	520	580	$m\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	1740	---	pF
$C_{oss}$	Output Capacitance		---	175	---	
$C_{rss}$	Reverse Transfer Capacitance		---	20	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=250V, V_{GS}=10V$ , $R_G=25\Omega, I_D=13A$	---	26	---	nS
$T_r$	Turn-on Rise Time		---	49	---	
$T_{d(off)}$	Turn-off Delay Time		---	106	---	
$T_f$	Turn-off Fall Time		---	47	---	
$Q_g$	Total Gate Charge	$V_{DD}=400V,$ $V_{GS}=10V, I_D=13A$	---	46	---	nC
$Q_{gs}$	Gate-Source Charge		---	9.6	---	
$Q_{gd}$	Gate-Drain Charge		---	18.7	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=13A, T_J=25^{\circ}\text{C}$	---	---	1.3	V
$I_S$	Continuous Source Current <sup>1</sup>	$T_C=25^{\circ}\text{C}$	---	---	13	A
$I_{SM}$	Pulsed Source Current <sup>2</sup>		---	---	48	A

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

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

**N-Channel Enhancement Mode MOSFET**
**Typical Characteristics**

**Figure 1. Output Characteristics**

**Figure 2. Body Diode Forward Voltage**

**Figure 3. Drain Current vs. Temperature**

**Figure 4.  $BV_{DS}$  Variation vs. Temperature**

**Figure 5. Transfer Characteristics**

**Figure 6. On-Resistance vs. Temperature**

**N-Channel Enhancement Mode MOSFET**

**Figure 7. Capacitance**

**Figure 8. Gate Charge**

**Figure 9. Transient Thermal Impedance**

**N-Channel Enhancement Mode MOSFET**
**TO-220F Package Outline Data**
