

# N-Channel Enhancement Mode MOSFET

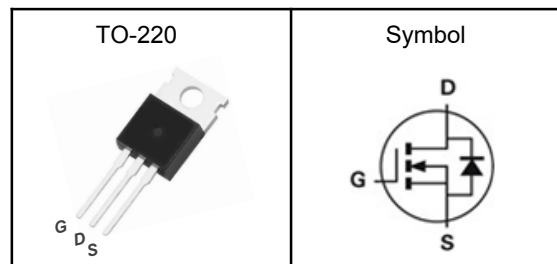
## Features

- High Speed Power Switching
- Reliable and Rugged
- ROHS Compliant
- 100% Avalanche Tested

## Applications

- Power Management in Desktop Computer
- DC/DC Converters

## Pin Description



$V_{DSS}$	120	V
$R_{DS(ON)-Typ}$	8.5	m $\Omega$
$I_D$	70	A

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

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	120	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	260	A
$I_D$	Continuous Drain Current	70	A
$P_D$	Maximum Power Dissipation	140	W
$E_{AS}$	Avalanche Energy, Single pulse	320	mJ

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.89	$^\circ\text{C/W}$

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

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

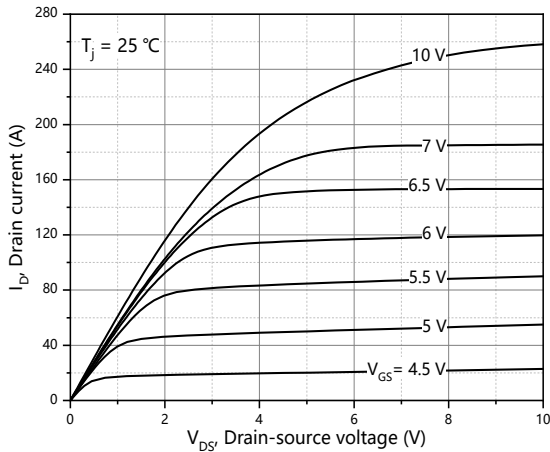
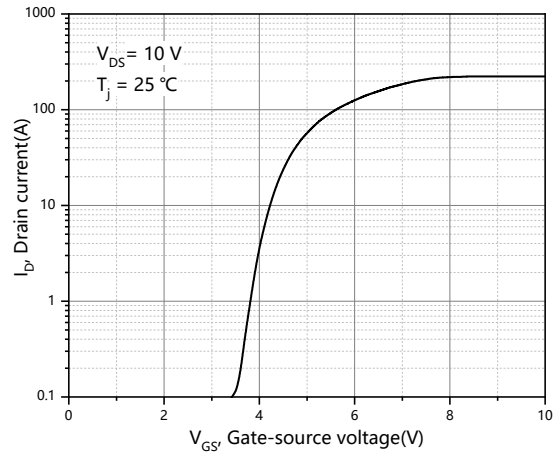
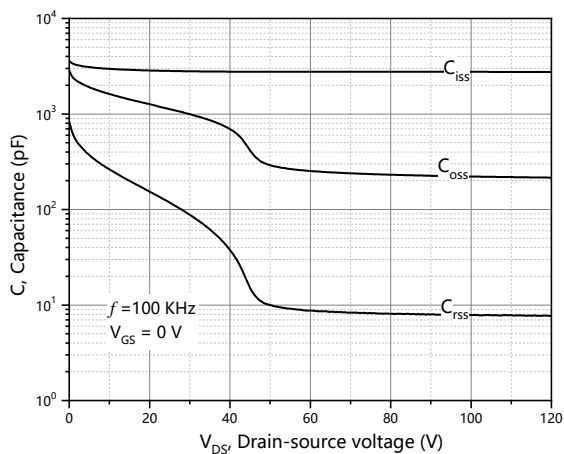
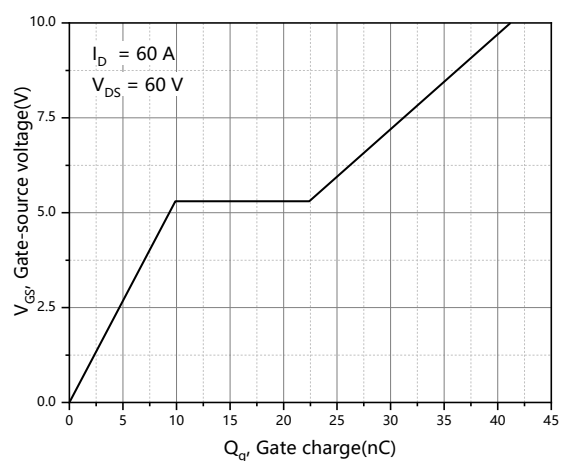
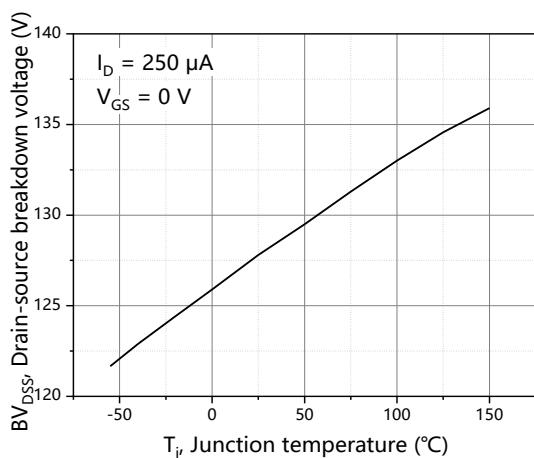
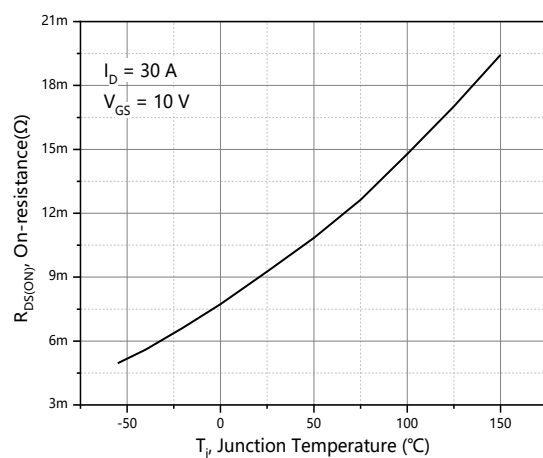
Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.

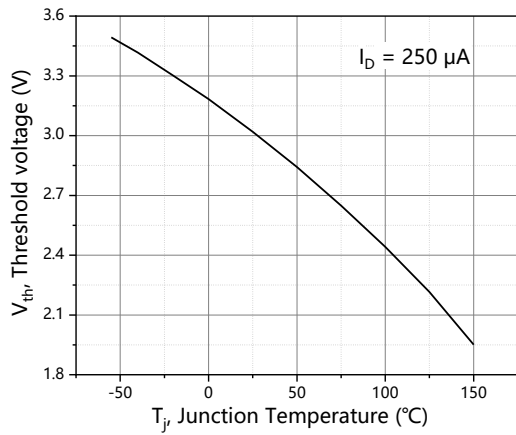
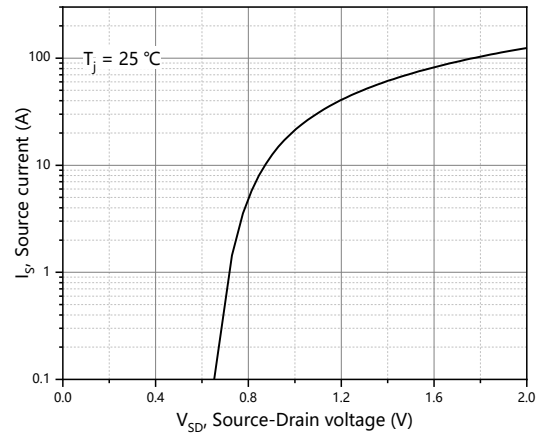
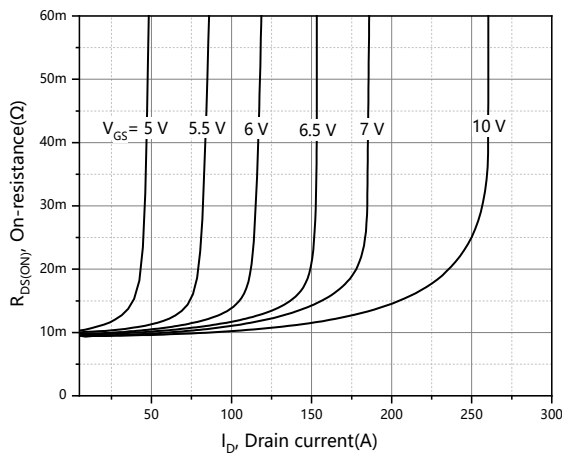
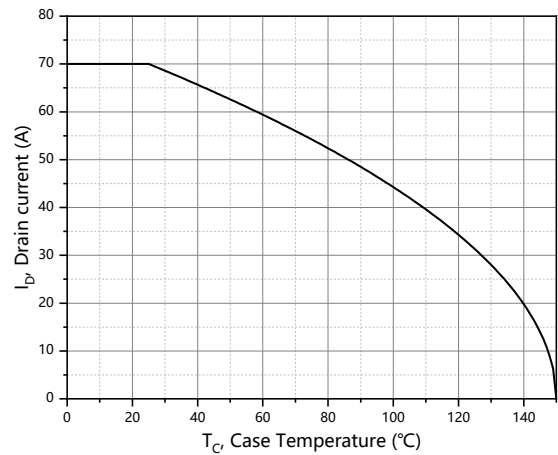
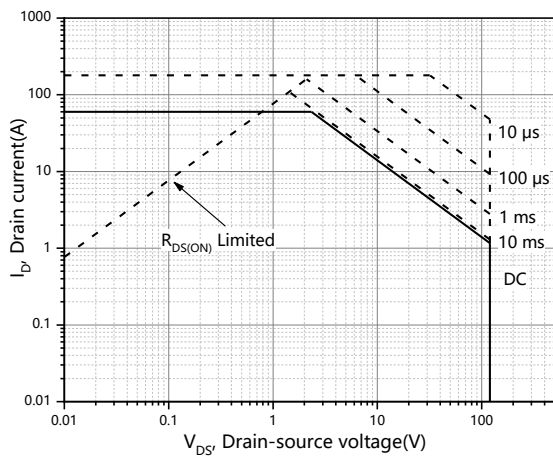
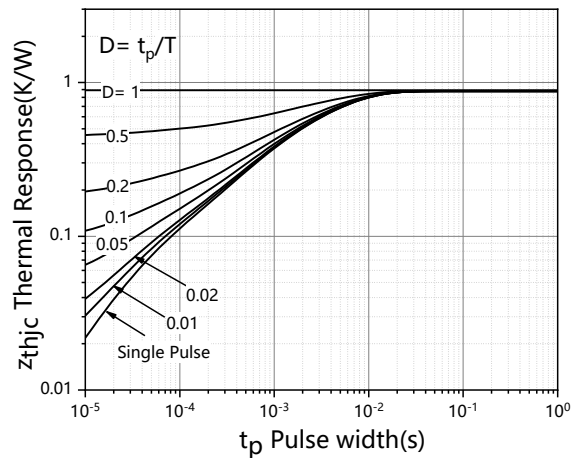
**N-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

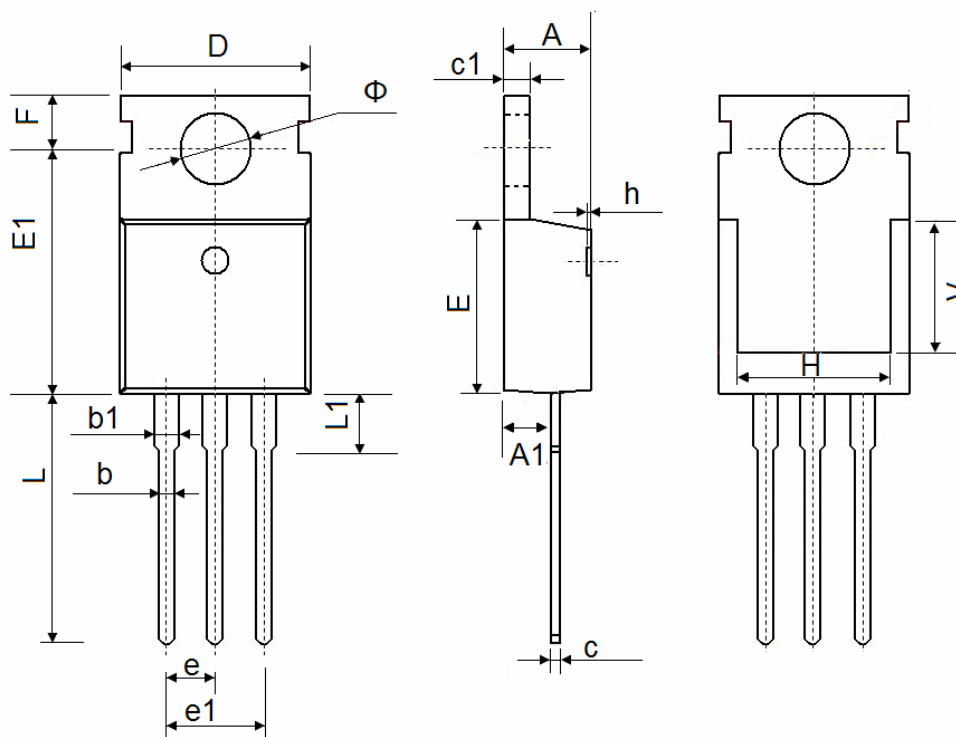
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	120	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=120V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	---	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=30A$	---	8.5	11	m $\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, \text{Freq.}=1\text{MHz}$	---	2780	---	pF
$C_{oss}$	Output Capacitance		---	1114	---	
$C_{rss}$	Reverse Transfer Capacitance		---	115	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=60V, V_{GS}=10V, I_D=60A, R_G=2\Omega$	---	25	---	nS
$T_r$	Turn-on Rise Time		---	6.6	---	
$T_{d(off)}$	Turn-off Delay Time		---	46.2	---	
$T_f$	Turn-off Fall Time		---	10	---	
$Q_g$	Total Gate Charge	$V_{DS}=60V, V_{GS}=10V, I_D=60A$	---	42	---	nC
$Q_{gs}$	Gate-Source Charge		---	9.9	---	
$Q_{gd}$	Gate-Drain Charge		---	12.5	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$I_S=12A, V_{GS}=0V$	---	---	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S=60A, di_F/dt=100A/\mu s$	---	75	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	146	---	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.

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

**Figure 1. Typ. output characteristics**

**Figure 2. Typ. transfer characteristics**

**Figure 3. Typ. capacitances**

**Figure 4. Typ. gate charge**

**Figure 5. Drain-source breakdown voltage**

**Figure 6. Drain-source on-state resistance**

**N-Channel Enhancement Mode MOSFET**

**Figure 7. Threshold voltage**

**Figure 8. Forward characteristic of body diode**

**Figure 9. Drain-source on-state resistance**

**Figure 10. Drain current**

**Figure 11. Safe operation area  $T_C=25\text{ }^\circ\text{C}$** 

**Figure 12. Max. transient thermal impedance**

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


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.350	4.650
A1	2.250	2.550
b	0.710	0.910
b1	1.170	1.400
c	0.330	0.650
c1	1.200	1.400
D	9.910	10.250
E	8.9500	9.750
E1	12.650	12.950
e	2.540 TYP.	
e1	4.980	5.180
F	2.650	2.950
H	7.900	8.100
h	0.000	0.300
L	12.700	13.500
L1	2.850	3.250
V	7.500 REF.	
$\Phi$	3.400	3.800