

## N-Channel Enhancement Mode MOSFET

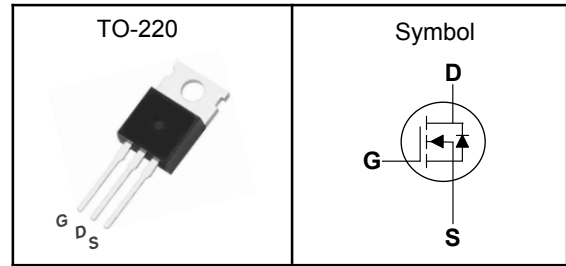
### Features

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

### Applications

- Power Management in Desktop Computer
- DC/DC Converters

### Pin Description



$V_{DSS}$	150	V
$R_{DS(ON)-Typ}$	9	m $\Omega$
$I_D$	90	A

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

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	150	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}C$
$I_{DM}^{①}$	Pulse Drain Current Tested	352	A
$I_D$	Continuous Drain Current	90	A
$P_D$	Maximum Power Dissipation	178.6	W
$E_{AS}$	Avalanche Energy, Single pulse	204.8	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	52	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.7	$^{\circ}C/W$

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

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

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	$V_{GS}=0V, I_D=250\mu A$	150	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=150V, V_{GS}=0V$	---	---	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	$V_{GS}=10V, I_D=20A$	---	9	11.5	m $\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{DS}=75V, V_{GS}=0V, \text{Freq.}=1\text{MHz}$	---	3310	---	pF
$C_{oss}$	Output Capacitance		---	268	---	
$C_{rss}$	Reverse Transfer Capacitance		---	9.4	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=75V, V_{GS}=10V, I_D=20A, R_G=3\Omega$	---	16	---	nS
$T_r$	Turn-on Rise Time		---	12	---	
$T_{d(off)}$	Turn-off Delay Time		---	30	---	
$T_f$	Turn-off Fall Time		---	18	---	
$Q_g$	Total Gate Charge	$V_{DS}=75V, V_{GS}=10V, I_D=20A$	---	45	---	nC
$Q_{gs}$	Gate-Source Charge		---	15	---	
$Q_{gd}$	Gate-Drain Charge		---	8.5	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$I_S=20A, V_{GS}=0V$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=20A, V_{GS}=0V, di_F/dt=100A/\mu s$	---	62	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	182	---	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.

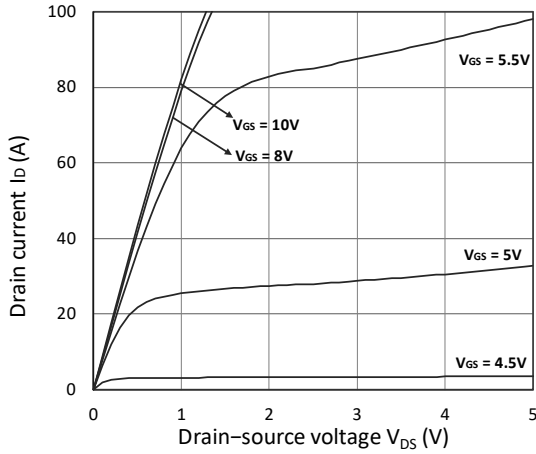
**N-Channel Enhancement Mode MOSFET**
**Typical Characteristics**


Figure 1. Output Characteristics

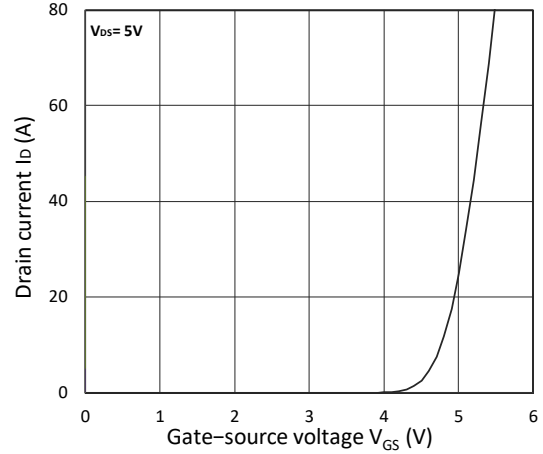


Figure 2. Transfer Characteristics

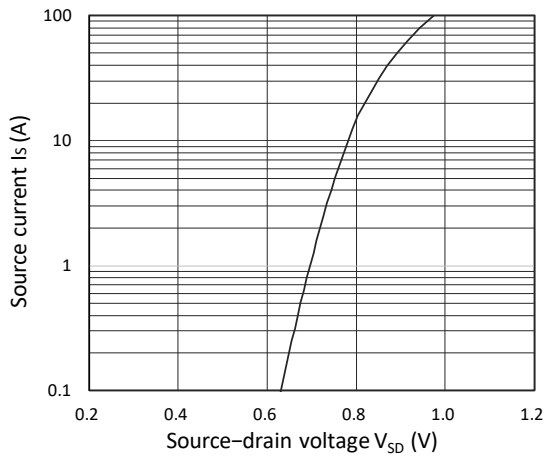
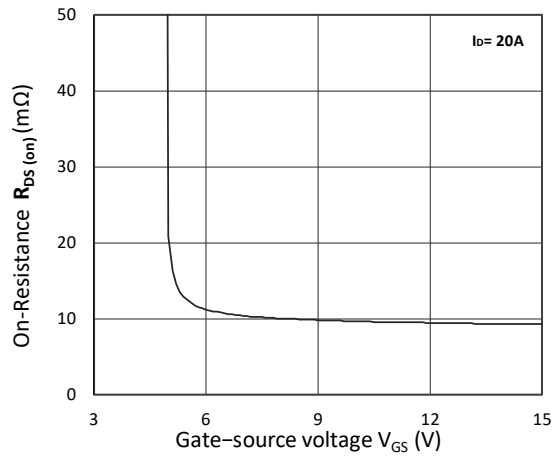
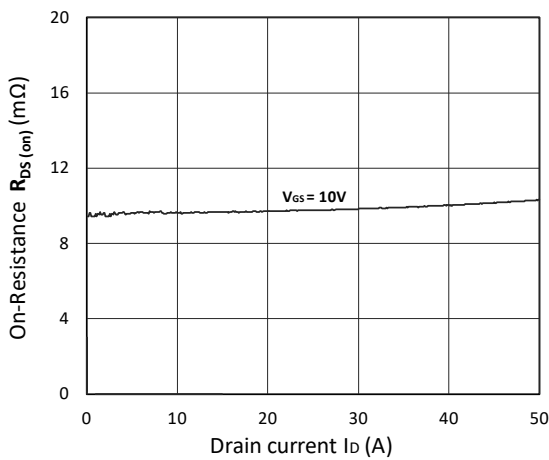
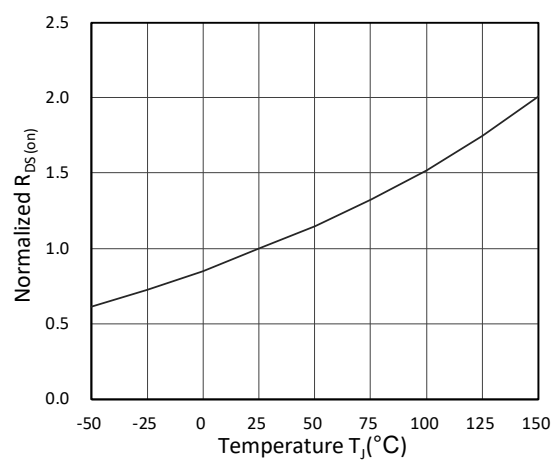


Figure 3. Forward Characteristics of Reverse


 Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$ 

 Figure 5.  $R_{DS(ON)}$  vs.  $I_D$ 

 Figure 6. Normalized  $R_{DS(ON)}$  vs. Temperature

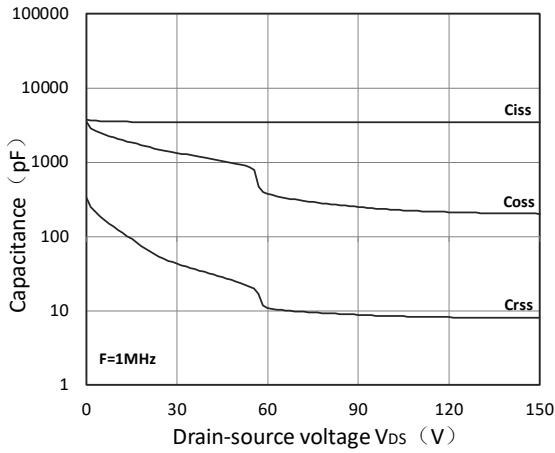
**N-Channel Enhancement Mode MOSFET**


Figure 7. Capacitance Characteristics

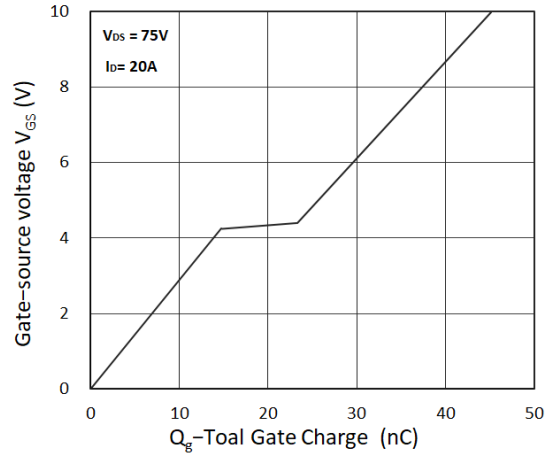


Figure 8. Gate Charge Characteristics

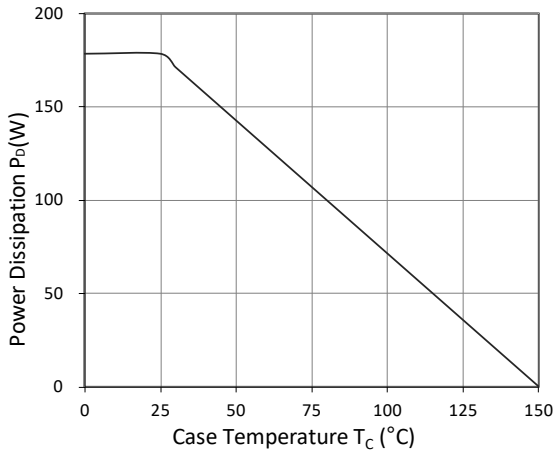


Figure 9. Power Dissipation

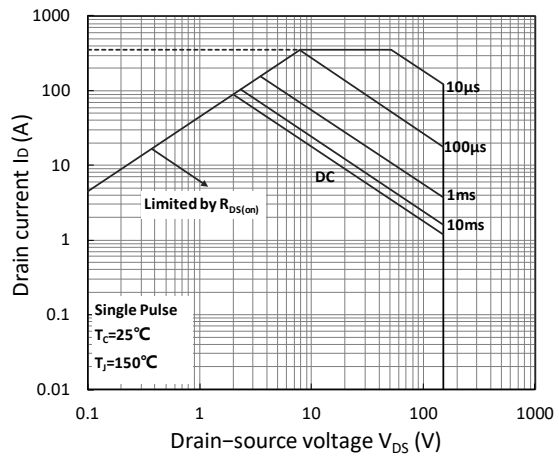


Figure 10. Safe Operating Area

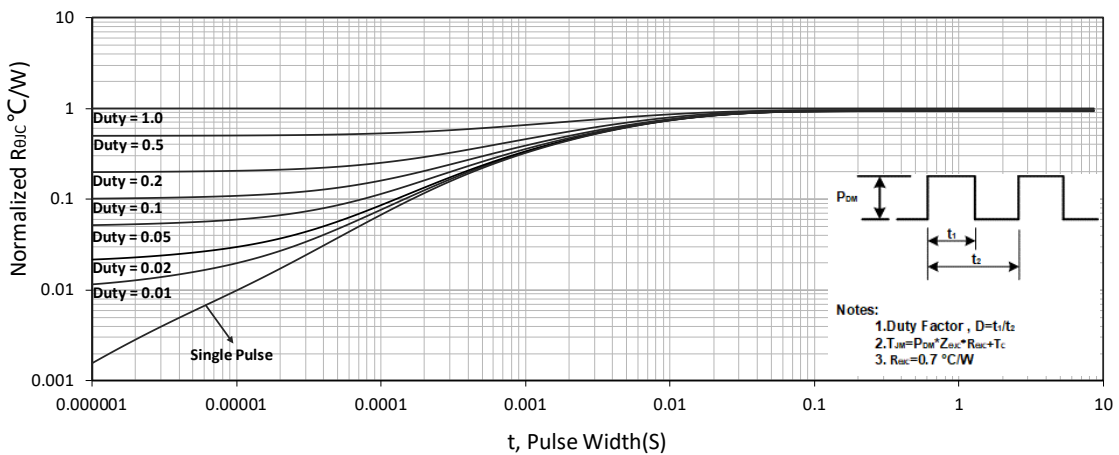
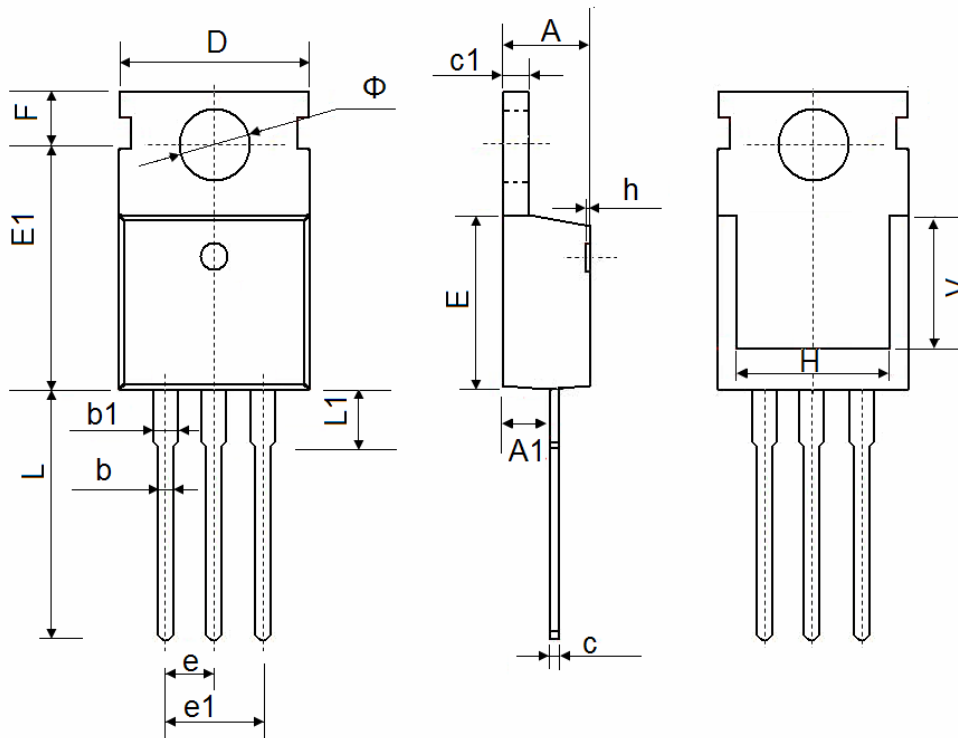


Figure 11. Normalized Maximum Transient Thermal Impedance

**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.	
Φ	3.400	3.800