

## N-Channel Enhancement Mode MOSFET

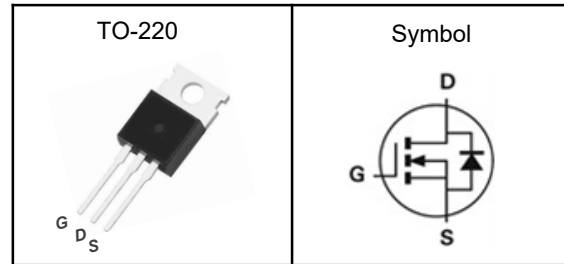
### Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Applications

- Power Management in Desktop Computer
- DC/DC Converters

### Pin Description



$V_{DSS}$	120	V
$R_{DS(ON)-Typ}$	4	m $\Omega$
$I_D$	125	A

### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ , 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	$^\circ\text{C}$	
$E_{AS}$	Single Pulse Avalanche Energy	375	mJ	
$I_{DM}^{①}$	Pulse Drain Current Tested	500	A	
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	125	A
	Continuous Drain Current	$T_C=100^\circ\text{C}$	88	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	200	W

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.63	$^\circ\text{C/W}$

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  $1\text{in}^2$  FR-4 board with 1oz.



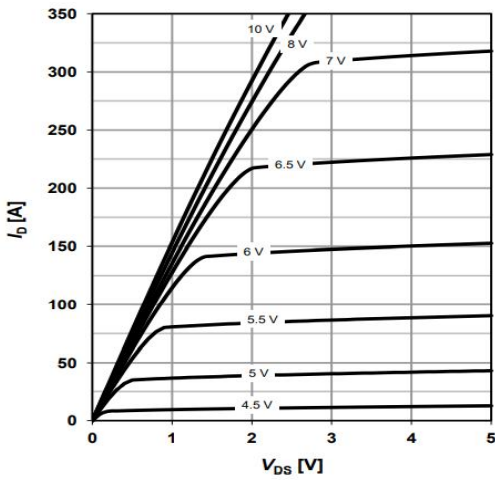
**N-Channel Enhancement Mode MOSFET**

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

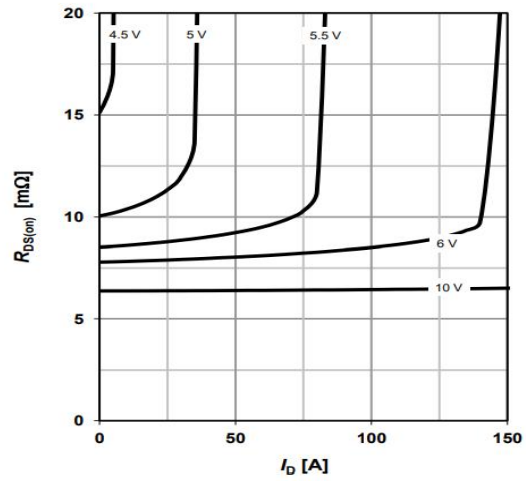
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	120	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=120V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	1.8	2.2	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=20A$	---	4	4.8	$m\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=60V,$ Freq.=1MHz	---	4282	---	pF
$C_{oss}$	Output Capacitance		---	429	---	
$C_{rss}$	Reverse Transfer Capacitance		---	17	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=60V, I_D=20A,$ $V_{GS}=10V, R_G=5\Omega$	---	20	---	nS
$T_r$	Turn-on Rise Time		---	11	---	
$T_{d(off)}$	Turn-off Delay Time		---	55	---	
$T_f$	Turn-off Fall Time		---	28	---	
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=20A$	---	30	---	S
$Q_g$	Total Gate Charge	$V_{DS}=60V, V_{GS}=10V,$ $I_D=20A$	---	61	---	nC
$Q_{gs}$	Gate-Source Charge		---	18	---	
$Q_{gd}$	Gate-Drain Charge		---	14	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^{\circ}\text{C}$ )						
$V_{SD}$ <sup>④</sup>	Diode Forward Voltage	$I_F=20A, V_{GS}=0V$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=20A, di/dt=100A\mu s,$ $T_J=25^{\circ}\text{C}$	---	100	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	250	---	nC

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

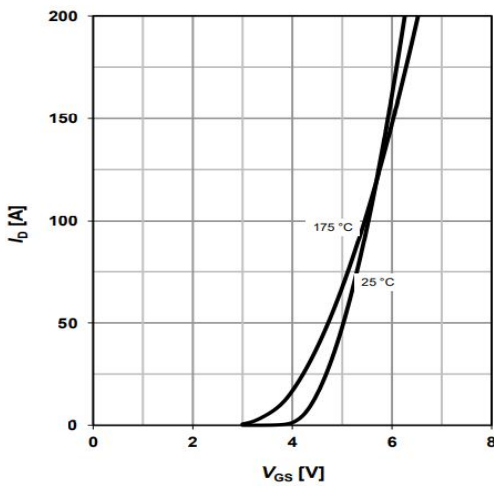
Note ⑤ : Guaranteed by design, not subject to production testing.

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


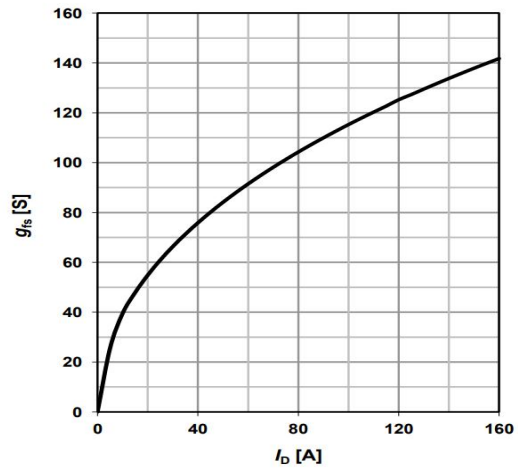
**Typ. output characteristics**  
 $I_D = f(V_{DS})$



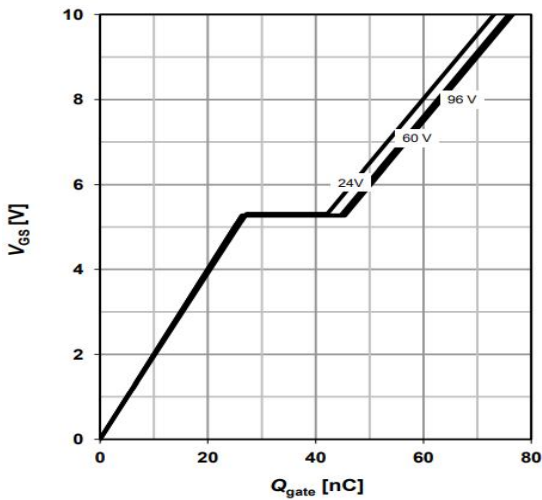
**Typ. drain-source on resistance**  
 $R_{DS(on)} = f(I_D)$



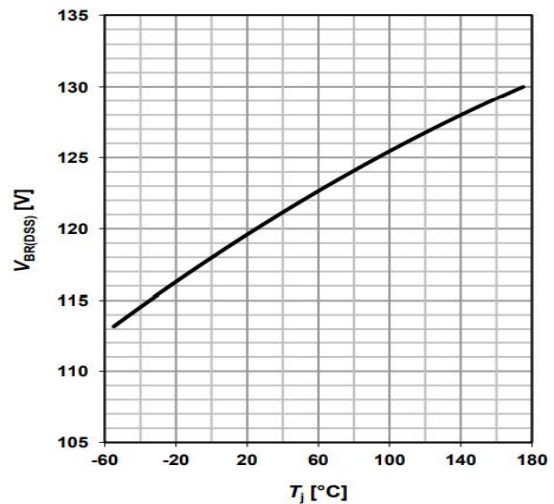
**Typ. transfer characteristics**  
 $I_D = f(V_{GS})$



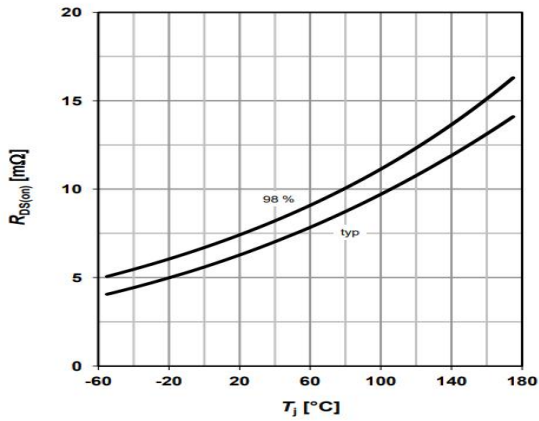
**Typ. forward transconductance**  
 $g_{fs} = f(I_D)$



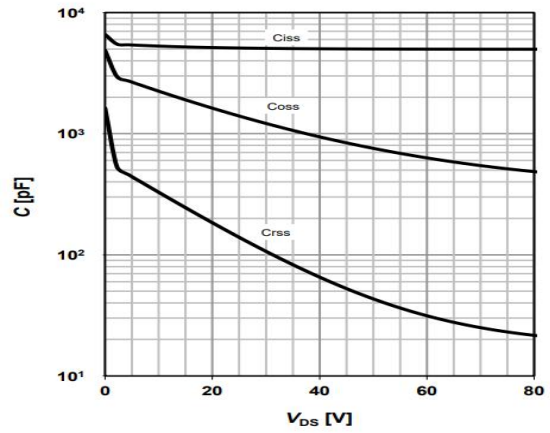
**Typ. gate charge**  
 $V_{GS} = f(Q_{gate})$



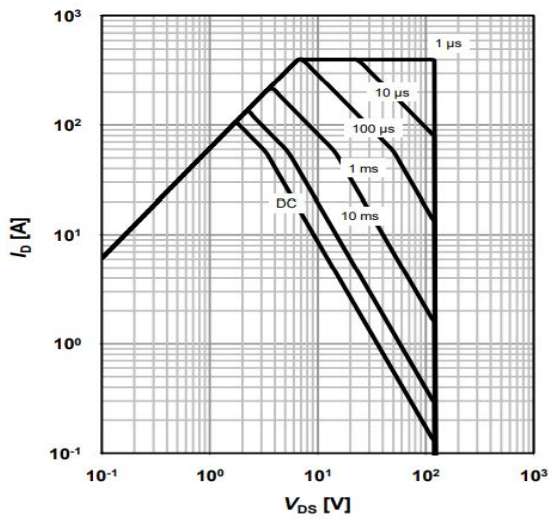
**Drain-source breakdown voltage**  
 $V_{BR(DSS)} = f(T_j); I_D = 250\mu A$

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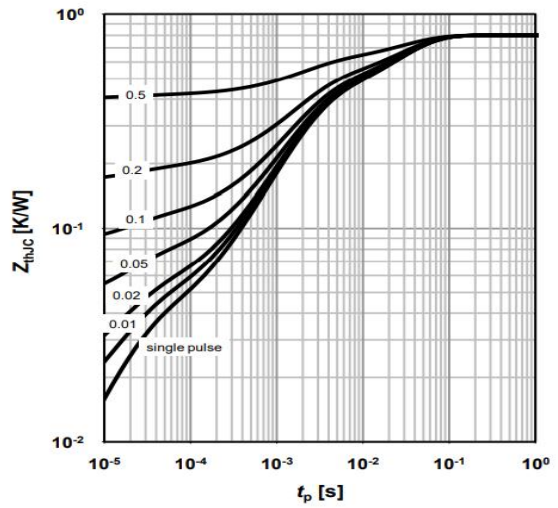
**Drain-source on-state resistance**  
 $R_{DS(on)} = f(T_j)$ ;  $I_D = 50A$ ;  $V_{GS} = 10V$



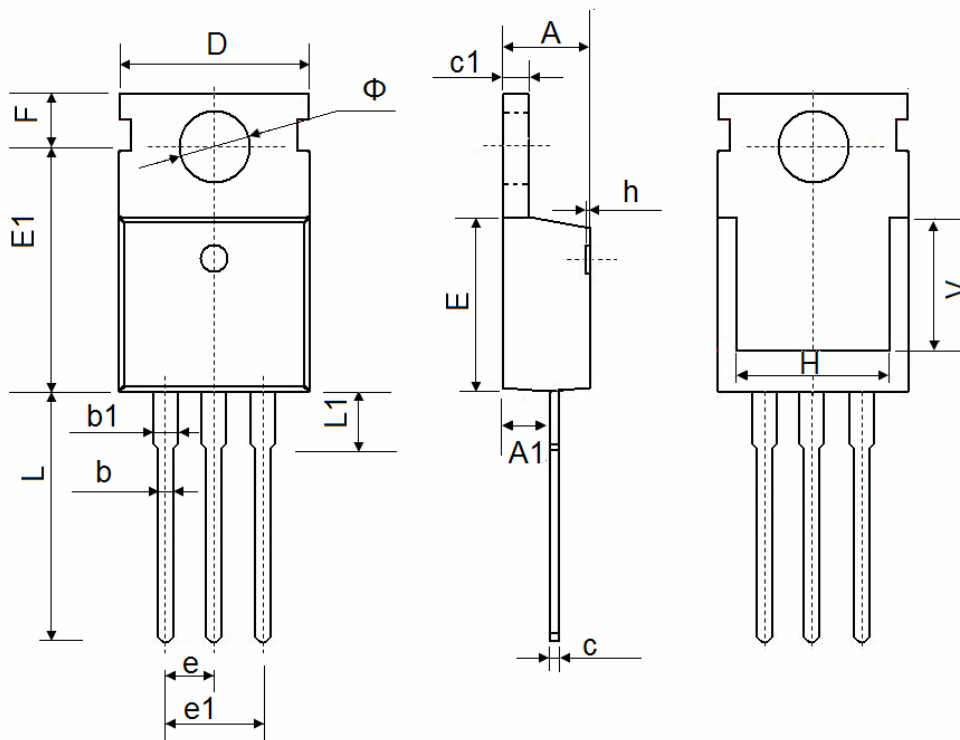
**Typ. capacitances**  
 $C = f(V_{DS})$ ;  $V_{GS} = 0V$ ;  $f = 1MHz$



**Safe operating area**  
 $I_D = f(V_{DS})$



**Max. transient thermal impedance**  
 $Z_{thJC} = f(t_p)$

**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