

N-Channel Enhancement Mode MOSFET

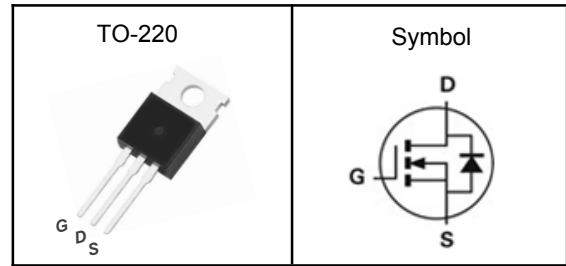
Features

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

Applications

- Power Management in Desktop Computer
- DC/DC Converters

Pin Description



V _{DSS}	60	V
R _{DS(ON)-Typ}	4.2	mΩ
I _D	180	A

Absolute Maximum Ratings (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		±20	V
T _J	Maximum Junction Temperature		-55 to 175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
EAS	Single Pulse Avalanche Energy ^③		330	mJ
I _{DM} ^①	Pulse Drain Current Tested		540	A
I _D	Continuous Drain Current	T _C =25°C	180	A
P _D	Maximum Power Dissipation	T _C =25°C	140	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJA}	Thermal Resistance-Junction to Ambient	62.5	°C/W
R _{θJC}	Thermal Resistance Junction-Case ₁	0.9	°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°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	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	---	4.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=50A$	---	4.2	5.5	$m\Omega$
Dynamic Characteristics^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=50V,$ Freq.=1MHz	---	3450	---	pF
C_{oss}	Output Capacitance		---	90	---	
C_{rss}	Reverse Transfer Capacitance		---	470	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=50V, I_D=50A, V_{GS}=10V,$ $R_G=1\Omega$	---	16	---	nS
T_r	Turn-on Rise Time		---	80	---	
$T_{d(off)}$	Turn-off Delay Time		---	26	---	
T_f	Turn-off Fall Time		---	15	---	
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=50A$	---	55	---	S
Q_g	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V,$ $I_D=50A$	---	60	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	28	---	
Source-Drain Characteristics						
$V_{SD}^{④}$	Diode Forward Voltage	$I_S=50A, V_{GS}=0V$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=50A$	---	62	---	nS
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	124	---	nC

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

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



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Capacitance (pF)

V_{ds} Drain-Source Voltage (V)
Figure 7 Capacitance vs V_{ds}

Power Dissipation (W)

T_J-Junction Temperature ()
Figure 9 Power De-rating

I_D- Drain Current (A)

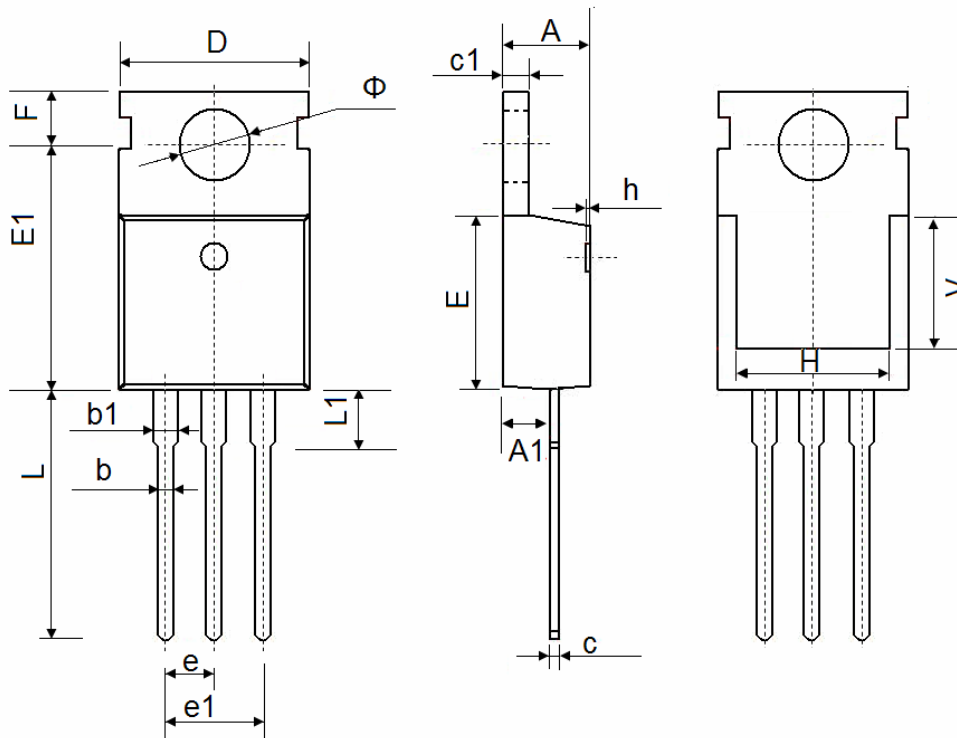
V_{ds} Drain-Source Voltage (V)
Figure 8 Safe Operation Area

I_D- Drain Current (A)

T_J-Junction Temperature ()
Figure 10 Current De-rating

r(t), Normalized Effective
Transient Thermal Impedance

Square Wave Pluse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

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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