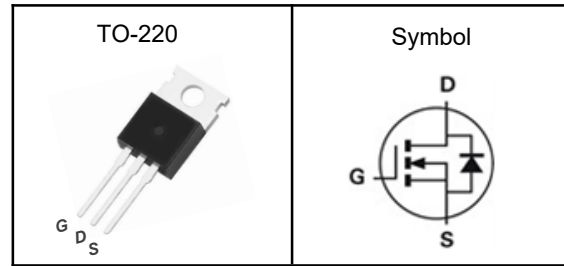


N-Channel Enhancement Mode MOSFET
Features

- 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
$R_{DS(ON)-Typ}$	6.5	m Ω
I_D	70	A

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

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	-55 to 150	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
EAS	Single Pulse Avalanche Energy ^③	80	mJ
I_{AS}	Avalanche Current	40	A
$I_{DM}^{①}$	Pulse Drain Current Tested	280	A
I_D	Continuous Drain Current	$T_C=25^{\circ}C$ 70	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$ 89	W

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	60	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ^①	1.4	$^{\circ}C/W$

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 1in² FR-4 board with 1oz.



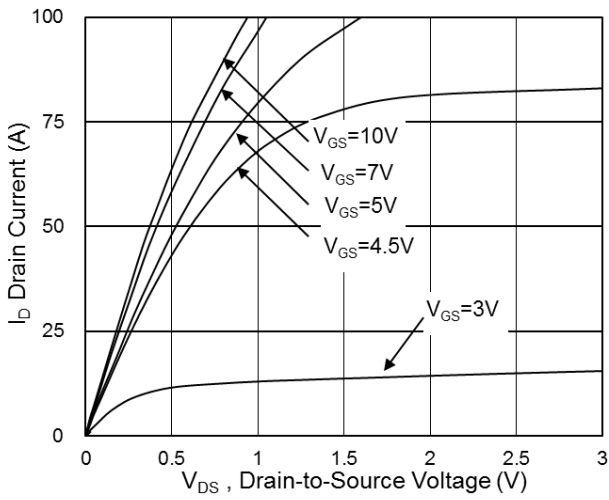
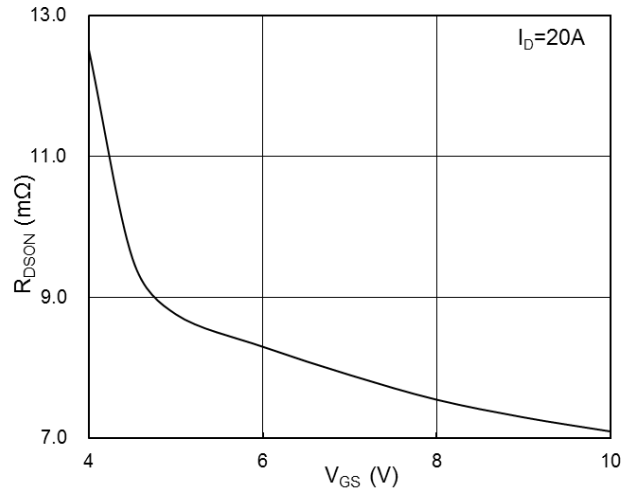
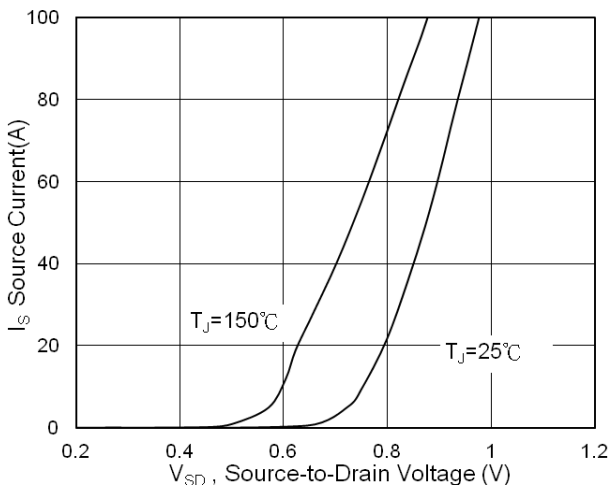
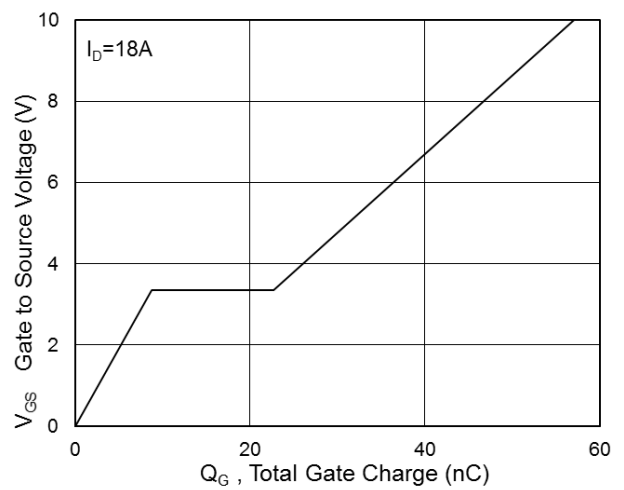
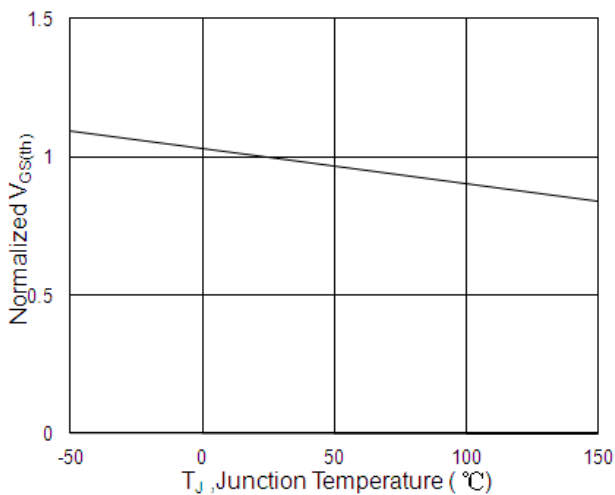
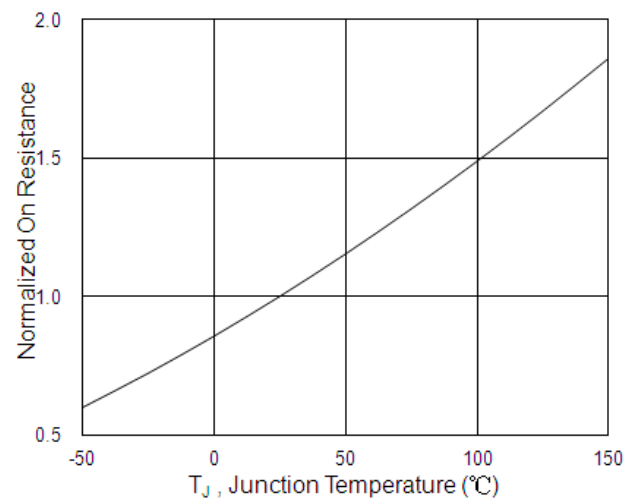
N-Channel Enhancement Mode MOSFET

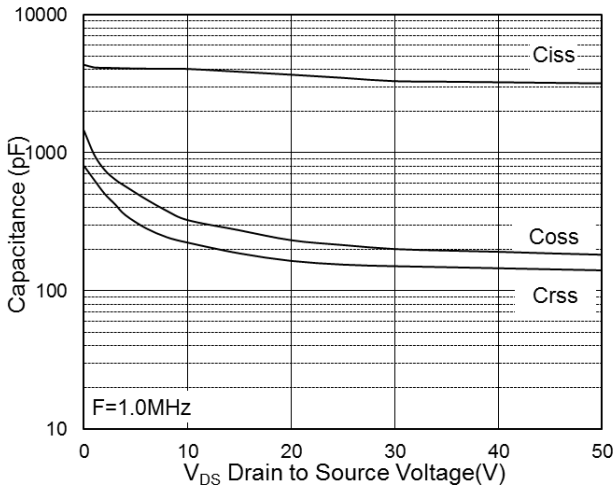
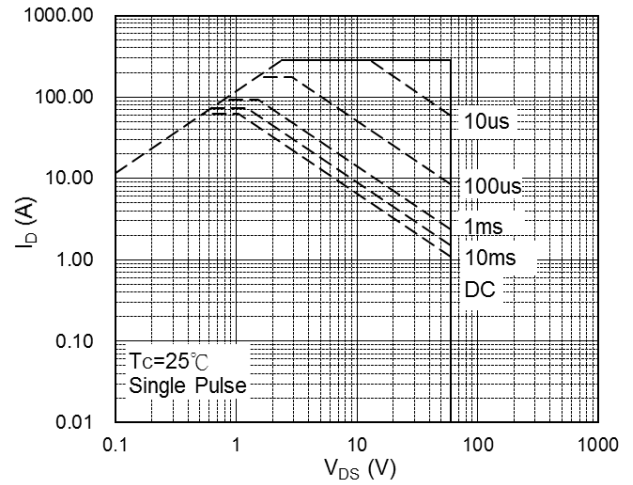
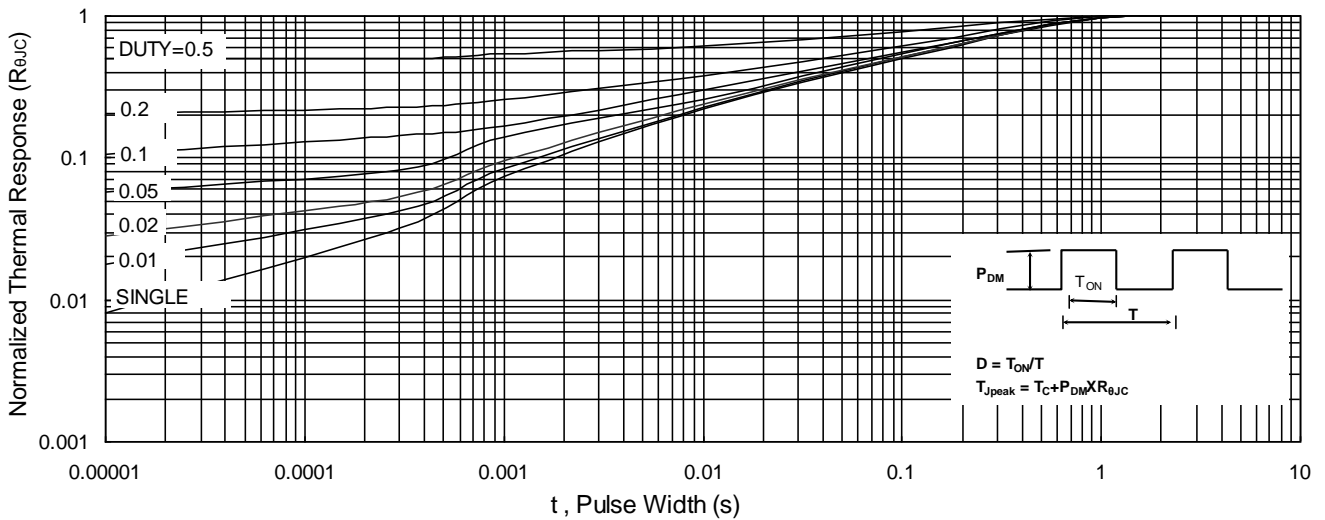
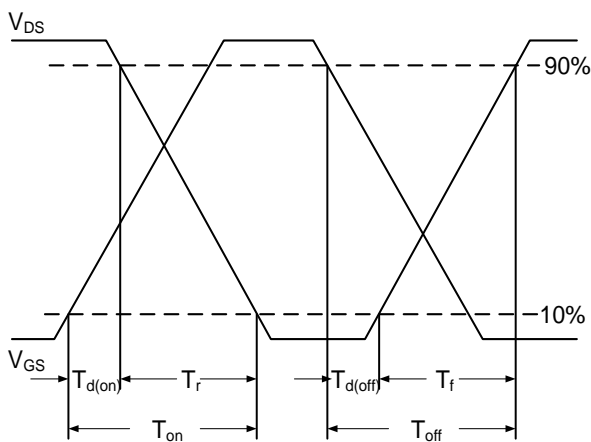
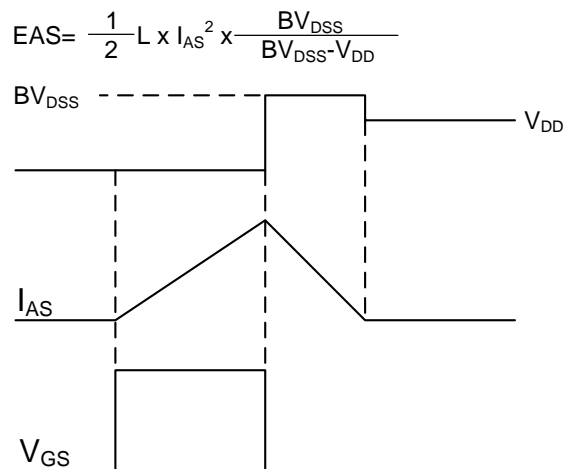
Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

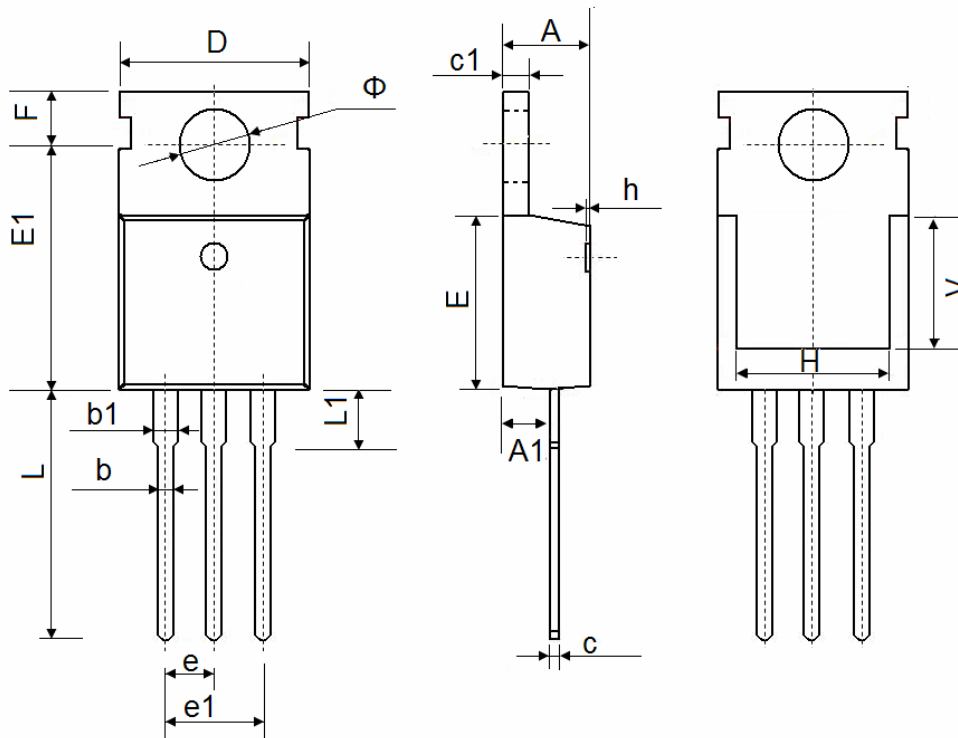
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$	---	---	1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	---	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=20A$	---	6.5	8.5	m Ω
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ Freq.=1MHz	---	3307	---	pF
C_{oss}	Output Capacitance		---	201	---	
C_{rss}	Reverse Transfer Capacitance		---	151	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=30V, V_{GS}=10V,$ $R_G=3.3\Omega, I_D=20A$	---	16.2	---	nS
T_r	Turn-on Rise Time		---	41.2	---	
$T_{d(off)}$	Turn-off Delay Time		---	56.4	---	
T_f	Turn-off Fall Time		---	16.2	---	
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V,$ $f=1MHz$	---	1.2	---	Ω
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_D=18A$	---	57	---	nC
Q_{gs}	Gate-Source Charge		---	8.7	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	$I_S=1A, V_{GS}=0V$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=20A$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	72	---	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

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs G-S Voltage

Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs T_J

Fig.6 Normalized $R_{DS(on)}$ vs T_J

N-Channel Enhancement Mode MOSFET

Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Switching Waveform

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


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.10	4.60
A1	2.250	2.550
b	0.710	0.910
b1	1.170	1.160
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	12.100	13.100
L1	2.850	3.250
V	7.500 REF.	
Φ	3.400	3.800