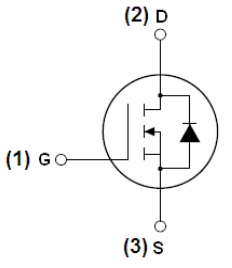
N-Channel Power MOSFET

General Features

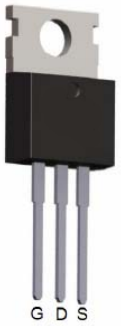
- V_{DS} =80V,I_D =100A
  $R_{DS(ON)}$ < 12mΩ @ V_{GS}=10V
- Special process technology for high ESD capability
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



TO-220-3L top view

Absolute Maximum Ratings (T_C=25 unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current-Continuous	100	A
I_D (100)	Drain Current-Continuous(TC=100)	70	A
I_{DM}	Pulsed Drain Current	200	A
P_D	Maximum Power Dissipation	89	W
	Derating factor	1.33	W/
E_{AS}	Single pulse avalanche energy (Note 5)	80	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	

Thermal Characteristic

R_{JC}	Thermal Resistance,Junction-to-Case (Note 2)	0.65	/W

Electrical Characteristics (T_C=25 unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250 A	80	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	-	-	1	A
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250 A	1.2	-	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=13.5A	-	9.6	12	m
g_{FS}	Forward Transconductance	V_{DS}=50V,I_D=40A	-	32	-	S
Dynamic Characteristics (Note4)						
C_{lss}	Input Capacitance	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	3120	-	PF
C_{oss}	Output Capacitance		-	140	-	PF
C_{rss}	Reverse Transfer Capacitance		-	110	-	PF
Switching Characteristics (Note 4)						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=50V,I_D=40A V_{GS}=10V,R_{GEN}=2.5	-	12.2	-	nS
t_r	Turn-on Rise Time		-	24.5	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	50.5	-	nS
t_f	Turn-Off Fall Time		-	17.6	-	nS
Q_g	Total Gate Charge	V_{DS}=80V,I_D=40A, V_{GS}=10V	-	60.9	-	nC
Q_{gs}	Gate-Source Charge		-	8.1	-	nC
Q_{gd}	Gate-Drain Charge		-	17.9	-	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V,I_S=40A	-	-	1.2	V
I_S	Diode Forward Current (Note 2)	-	-	-	57	A
t_{rr}	Reverse Recovery Time	TJ = 25°C, IF = 40A di/dt = 100A/ s(Note3)	-	18.6	-	nS
Qrr	Reverse Recovery Charge		-	65	-	nC
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=40A
4.The power dissipation is limited by 175℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

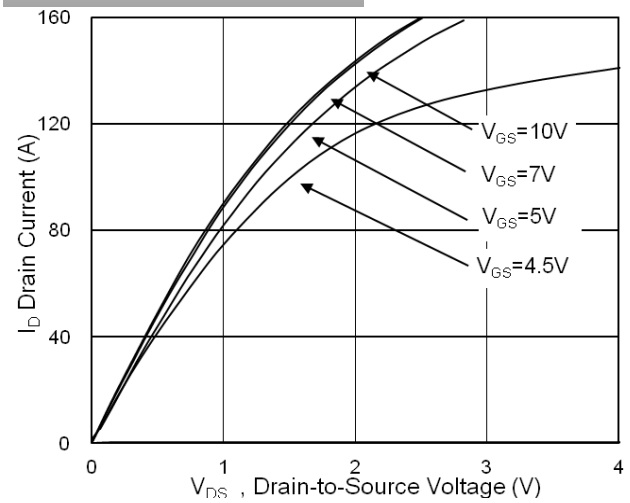


Fig.1 Typical Output Characteristics

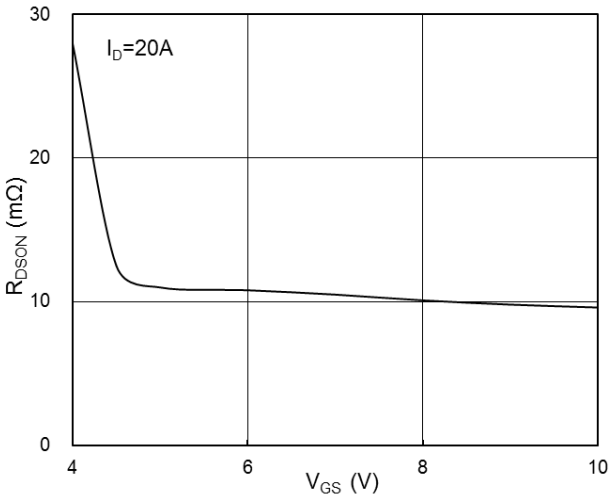
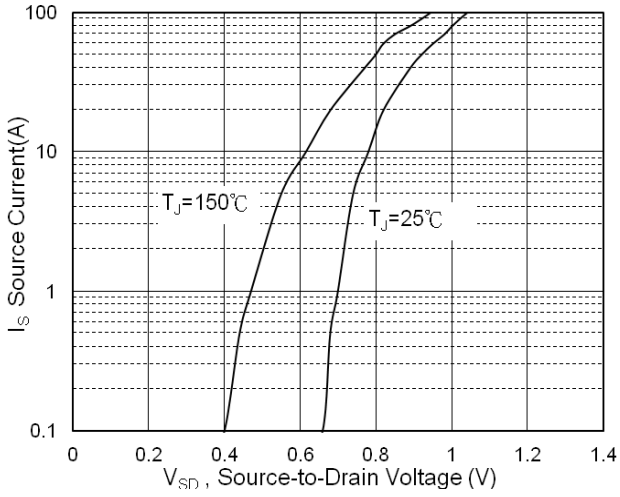
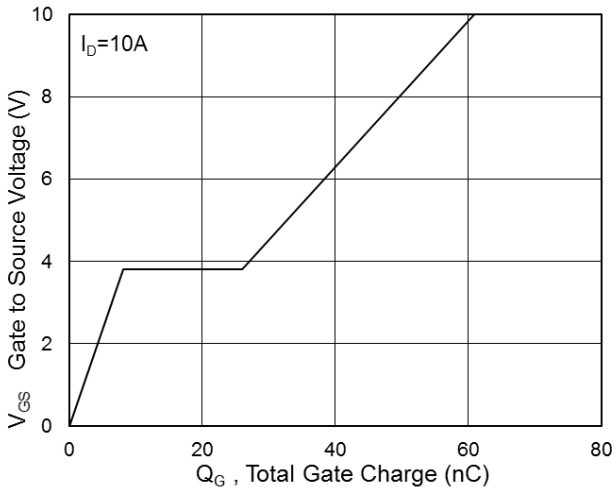


Fig.2 On-Resistance v.s Gate-Source





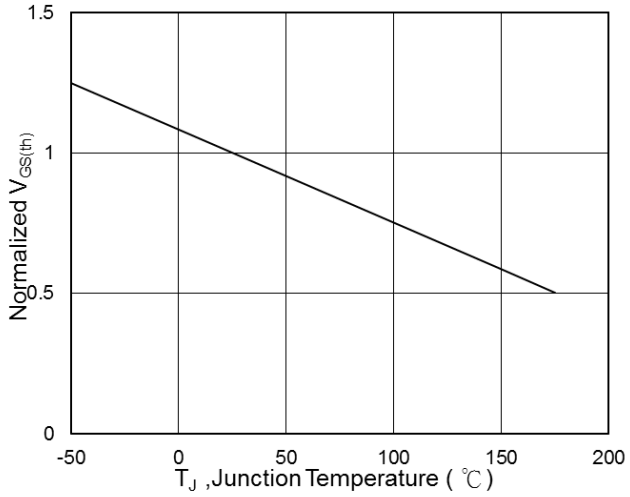


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

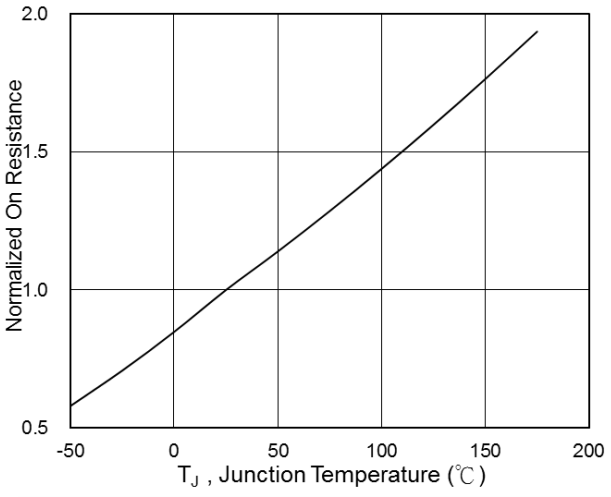


Fig.6 Normalized R_{DSON} vs. T_J

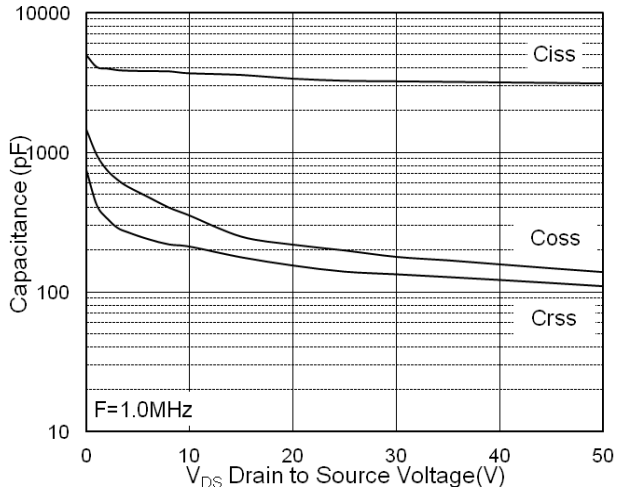


Fig.7 Capacitance

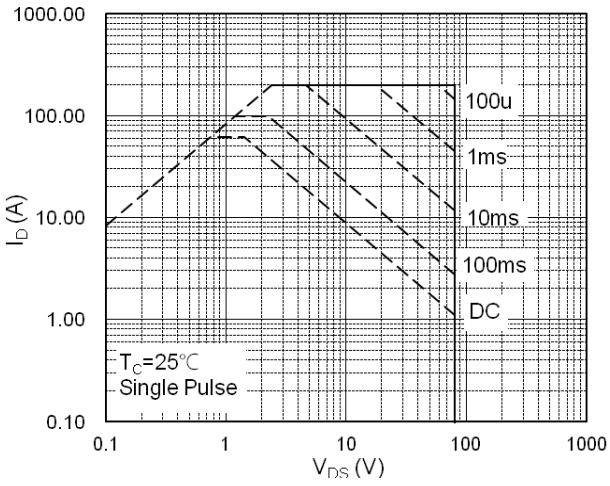


Fig.8 Safe Operating Area

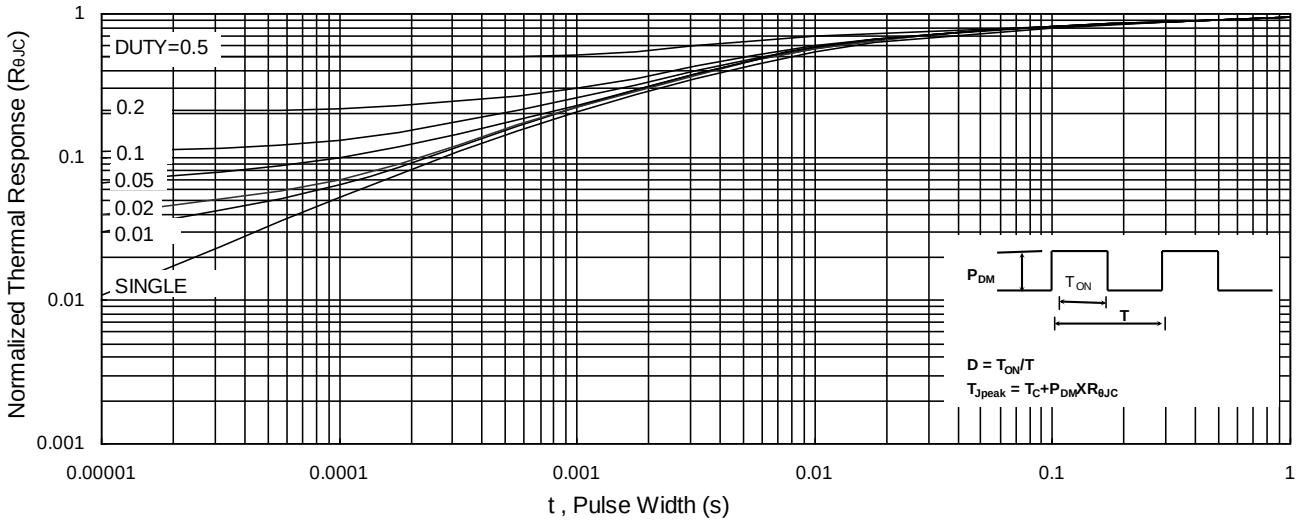


Fig.9 Normalized Maximum Transient Thermal Impedance

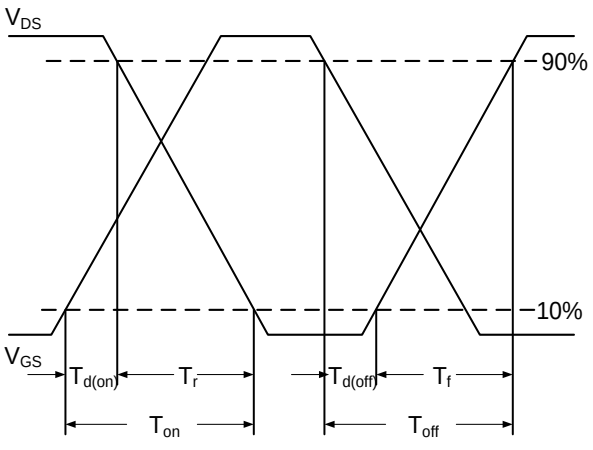


Fig.10 Switching Time Waveform

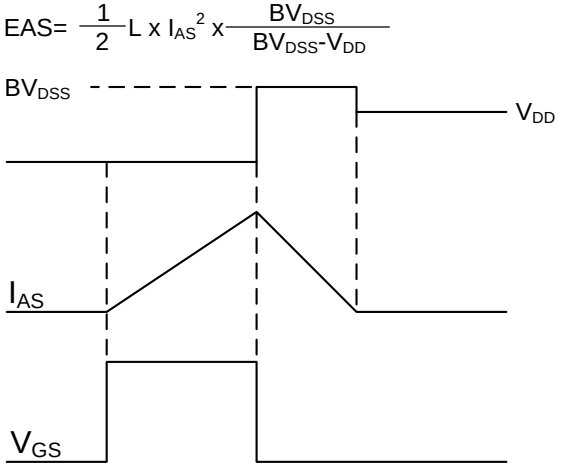
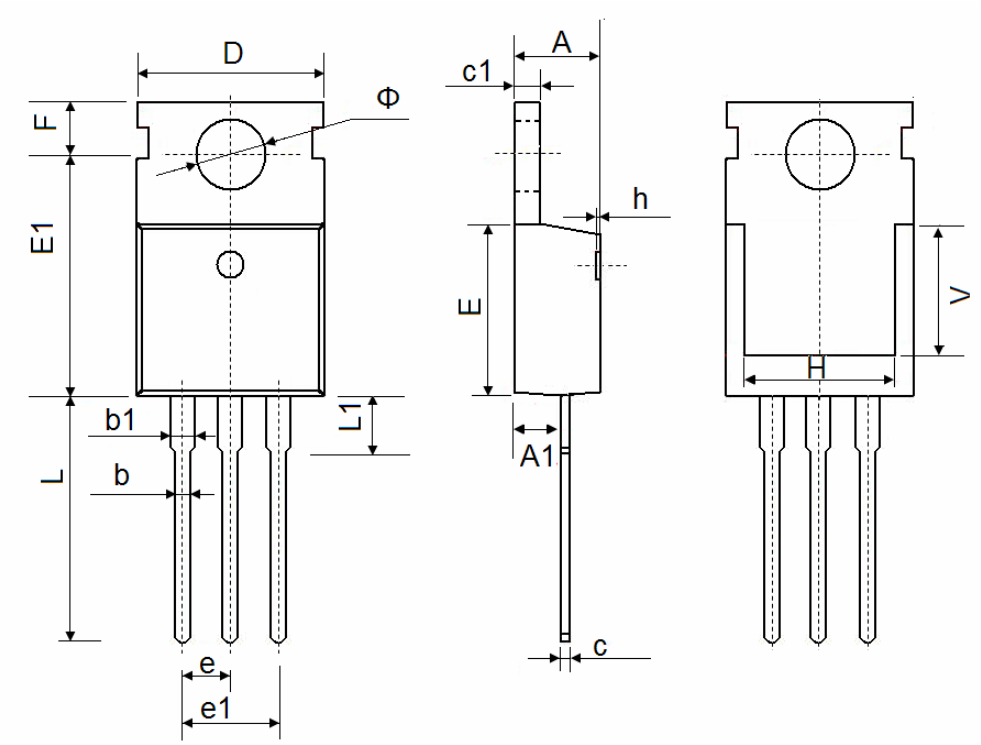


Fig.11 Unclamped Inductive Switching Waveform

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150