Single N-Channel Enhancement Mode MOSFET

V_{DS}=70V, I_D=80A, $R_{DS(ON)}$=5.9 mΩ

DESCRIPTION

The OR7080 is N-Channel logic enhancement mode power field effect transistors designed for high current switching applications.

Rugged E_{AS} capability and ultra low $R_{DS(ON)}$ is suitable for PWM, load switching especially for E-Bike controller applications.

FEATURE

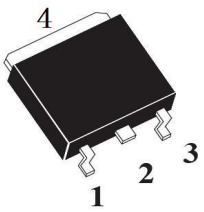
- 70V/80A: $R_{DS(ON)}$<7.2mΩ@V_{GS}=10V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Special designed for E-bike controller
- Full RoHS compliance
- TO-220,TO-263 package design

APPLICATIONS

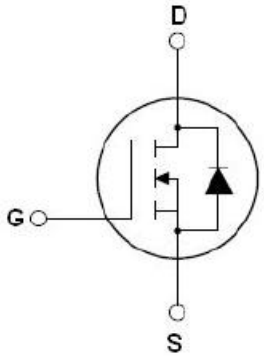
- 48V E-bike controller applications
- Hard switched and high frequency circuits
- Power supply

PIN CONFIGURATION

To-220 Top View



TO-263



Schematic Diagram

■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C Unless otherwise noted)

Symbol	Parameter		Typical	Unit
V_{DSS}	Drain-Source Voltage		70	V
V_{GSS}	Gate-Source Voltage		±25	V
I_D	Continuous Drain Current(T_J=150°C)	V_{GS}=-10V	80	A
I_{DM}	Pulsed Drain Current		320	A
T_J	Operation Junction Temperature		-55~150	°C
T_{STG}	Storage Temperature Range		-55~150	°C
P_D	Power Dissipation(T_C=25 °C)		100	W
E_{AS}	Single Pulse Avalanche Energy (T_J=25 °C,V_{DD}=40V,V_{GS}=10V, R_G=25Ω)		410	mJ
$R_{\theta JC}$	Thermal Resistance-Junction to Ambient		1.25	°C/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (T_A=25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	70	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{CS}, I_{DS}=250μA	2	-	4	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS} =±20V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=68V, V_{GS} =0V T_C=25 °C	-	-	1	μA
		V_{DS}=68V, V_{GS} =0V T_C=125 °C	-	-	10	μA
$R_{DS(ON)}$	Drain-Source On-Resistance	V_{GS}= 10V, I_{DS}=40A	-	5.9	7.2	mΩ
Source-Drain Diode						
I_S	Diode Forward Current (Max.)		-	92	-	A
V_{SD}	Diode Forward Voltage	I_S=40A,V_{GS}=0V		0.69	0.95	V
Dynamic Parameters						
Q_g	Total Gate Charge	V_{DS}=50V, V_{GS} =10V I_D=40A	-	82	-	nC
Q_{gs}	Gate-Source Charge		-	16.2	-	
Q_{gd}	Gate-Drain Charge		-	36.7	-	
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS} =0V F=1MHz	-	3483	-	pF
C_{oss}	Output Capacitance		-	459	-	
C_{rss}	Reverse Transfer Capacitance		-	214	-	
$t_{d(on)}$	Turn-On Time	V_{DS}=30V, R_L=15Ω V_{GS}=10V, R_G=2.5Ω	-	11	-	nS
t_r			-	13	-	
$t_{d(off)}$	Turn-Off Time		-	22	-	
t_f			-	37	-	

Note: 1. Pulse test: pulse width≤300us, duty cycle≤2%;
2. Static parameters are based on package level with recommened wire-bonding

TYPICAL CHARACTERISTICS (TA=25°C Unless otherwise noted)

Figure1. Safe Operating Area

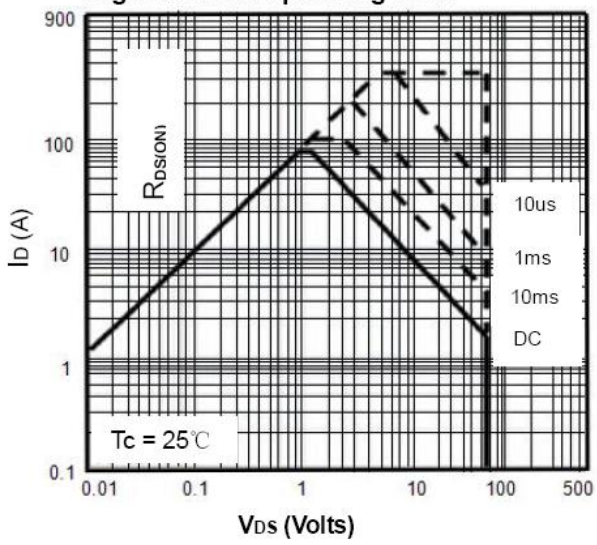


Figure2. Source-Drain Diode Forward Voltage

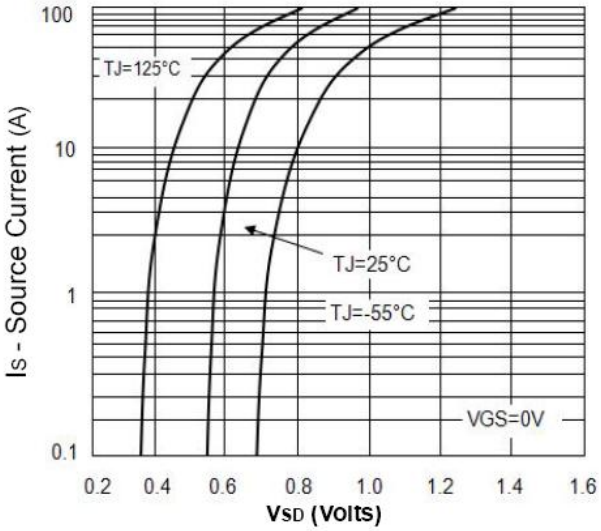


Figure3. Output Characteristics

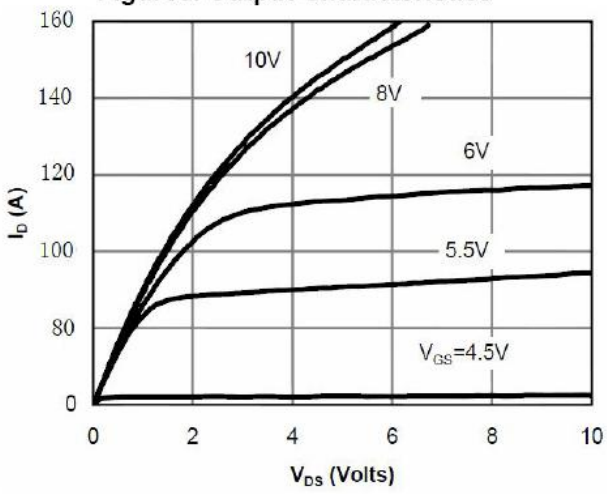


Figure4. Transfer Characteristics

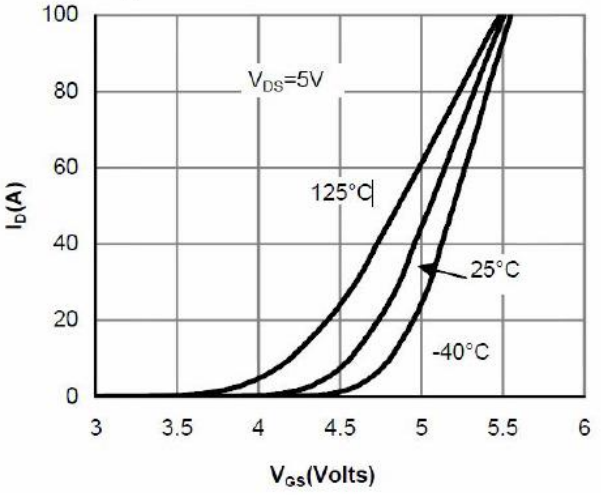


Figure5. Static Drain-Source On Resistance

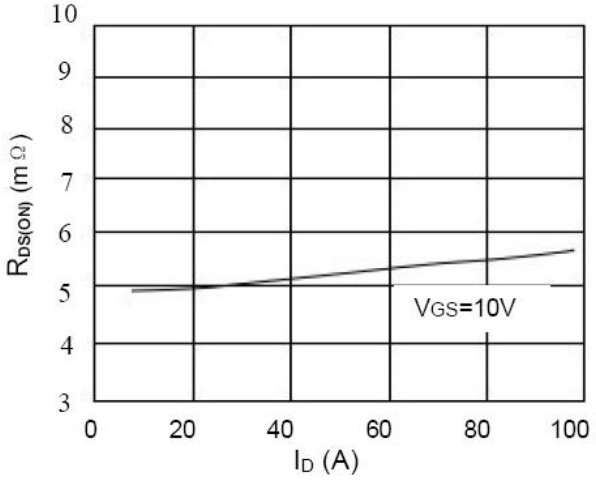
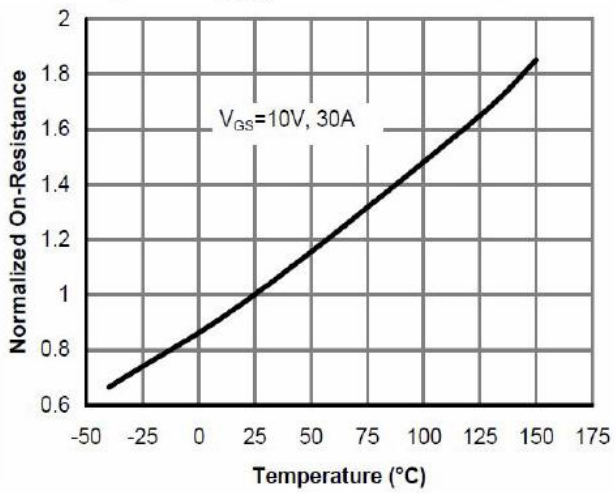


Figure6. $R_{DS(ON)}$ vs Junction Temperature



TYPICAL CHARACTERISTICS (TA=25°C Unless otherwise noted) （Continue）

Figure7. BV_{DSS} vs Junction Temperature

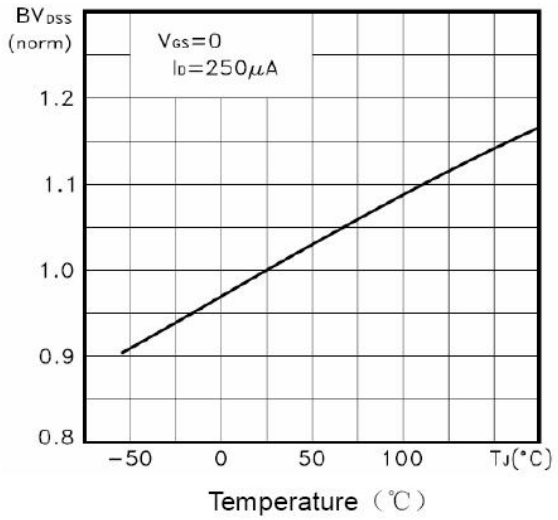


Figure8. $V_{GS(th)}$ vs Junction Temperature

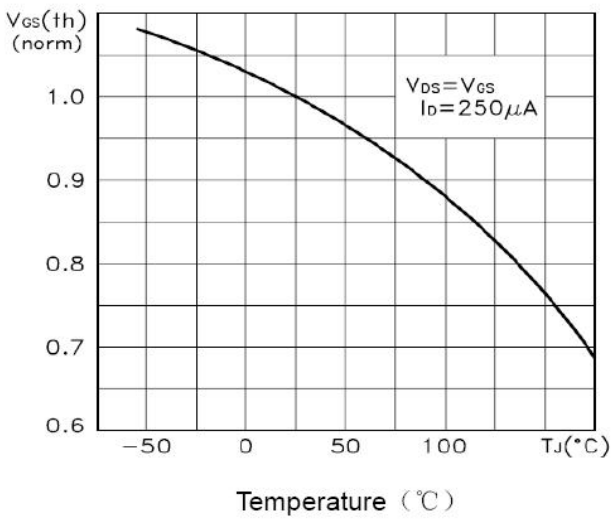


Figure9. Gate Charge Waveforms

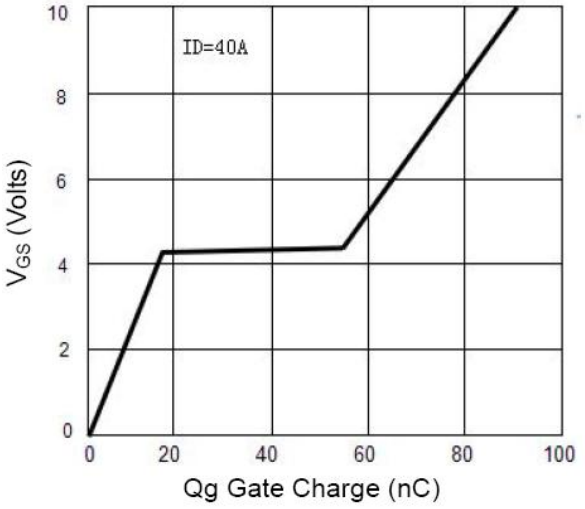


Figure10. Capacitance

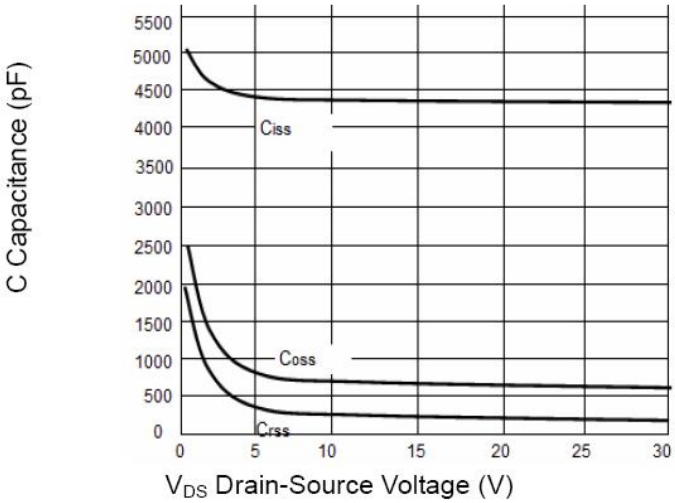
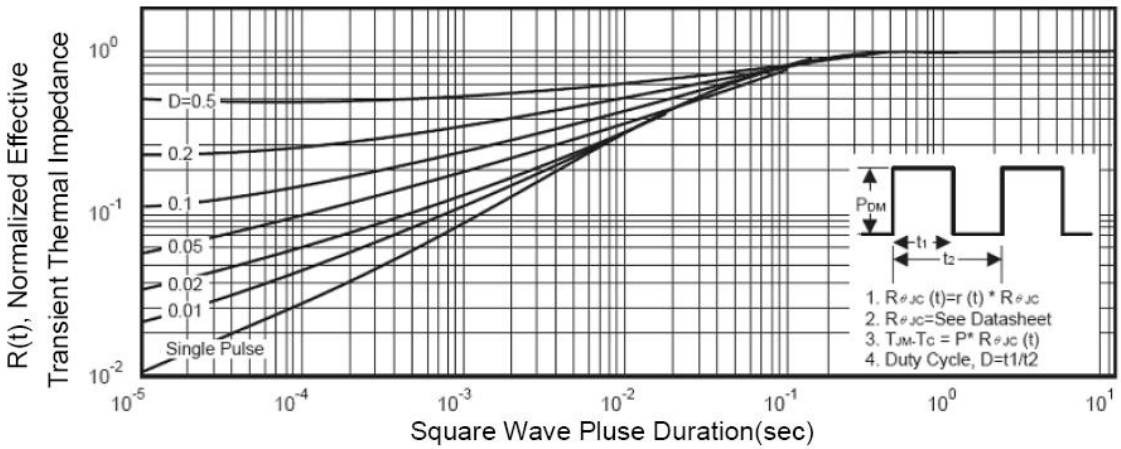
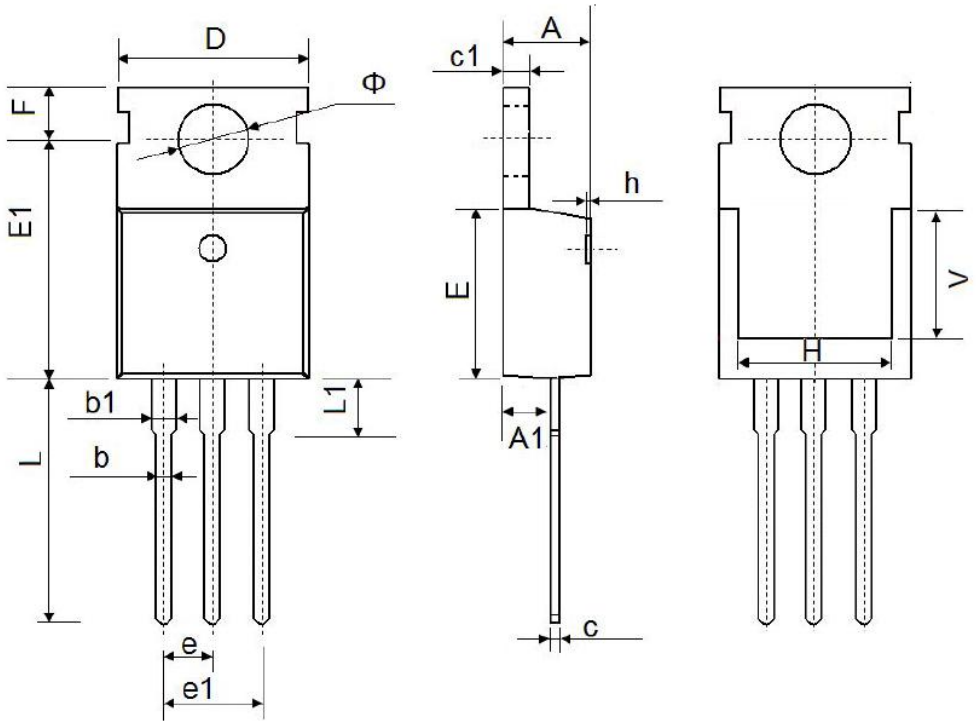


Figure11. Normalized Maximum Transient Thermal Impedance



T0-220 PACKAGE DIMENSIONS



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.		0.100TYP.	
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