P-Channel Enhancement Mode MOSFET
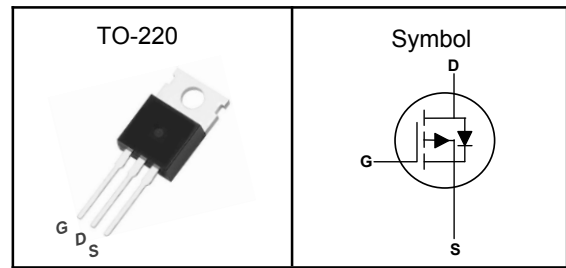
Features

● Low Rdson for low conduction loss

● Reliable and Rugged

● ROHS Compliant & Halogen-Free

Applications

● Power Management in Desktop Computer

● DC/DC Converters

Pin Description

TO-220	Symbol

V_{DSS}	-60	V
$R_{DS(ON)-Typ}$	12	mΩ
I_D	-58	A

Absolute Maximum Ratings(T_C=25℃, 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 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
I_{DM}[①]	Pulse Drain Current Tested	-250	A
I_D	Continuous Drain Current	-58	A
P_D	Maximum Power Dissipation	114	W
E_{AS}	Single Pulse Avalanche Energy	450	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{θJA}$[③]	Thermal Resistance-Junction to Ambient	62	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case	1.1	℃/W

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

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Electrical Characteristics (T$_J$=25℃, Unless Otherwise Noted)

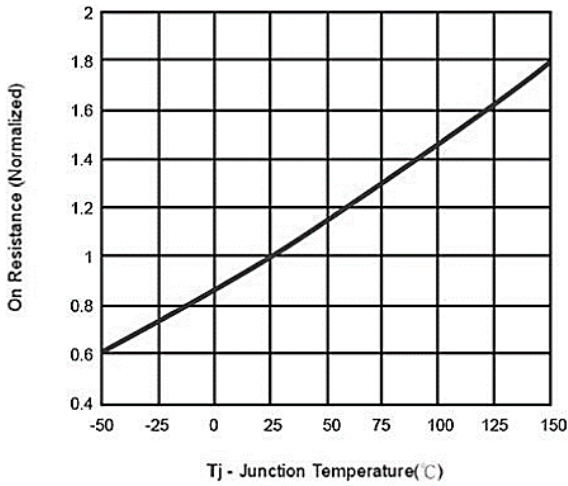| Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=-250uA	-60	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=-60V, V$_{GS}$=0V	---	---	-1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=-250uA	-1.0	---	-2.5	V
I$_{GSS}$	Gate Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0V	---	---	±100	nA
R$_{DS(ON)}$	Drain-Source On-state Resistance	V$_{GS}$=-10V, I$_D$=-20A	---	12	16	mΩ
		V$_{GS}$=-4.5V, I$_D$=-10A	---	15	18	
gfs	Forward Transconductance	V$_{DS}$=-10V, I$_D$=-80A	---	---	---	S
Dynamic Characteristics[5]						
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=-15V, Freq.=1MHz	---	4710	---	pF
C$_{oss}$	Output Capacitance		---	373	---	
C$_{rss}$	Reverse Transfer Capacitance		---	336	---	
T$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=-30V , V$_{GS}$=-10V , R$_G$=6Ω,	---	53	---	nS
T$_r$	Turn-on Rise Time		---	19	---	
T$_{d(off)}$	Turn-off Delay Time		---	221	---	
T$_f$	Turn-off Fall Time		---	61	---	
Q$_g$	Total Gate Charge	V$_{DS}$=-30V , V$_{GS}$=-10V, I$_D$=-50A	---	94	---	nC
Q$_{gs}$	Gate-Source Charge		---	18	---	
Q$_{gd}$	Gate-Drain Charge		---	24	---	
Source-Drain Characteristics						
V$_{SD}$[4]	Diode Forward Voltage	I$_S$=-17A, V$_{GS}$=0V	---	---	-1.2	V

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

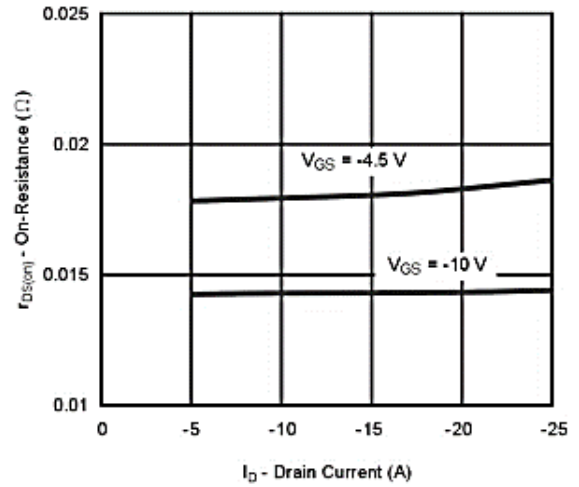Note ⑤ : Guaranteed by design, not subject to production testing.
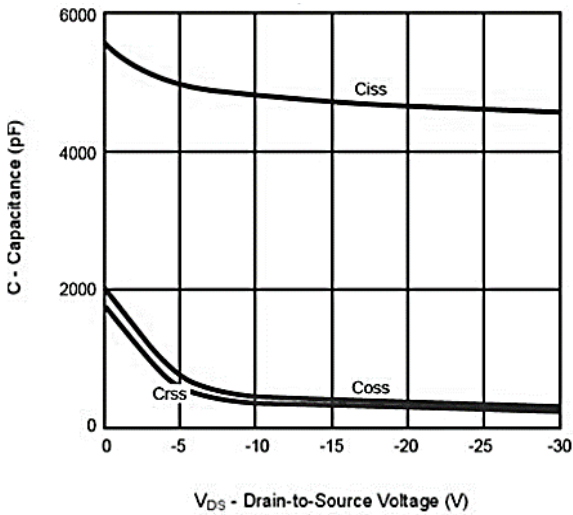
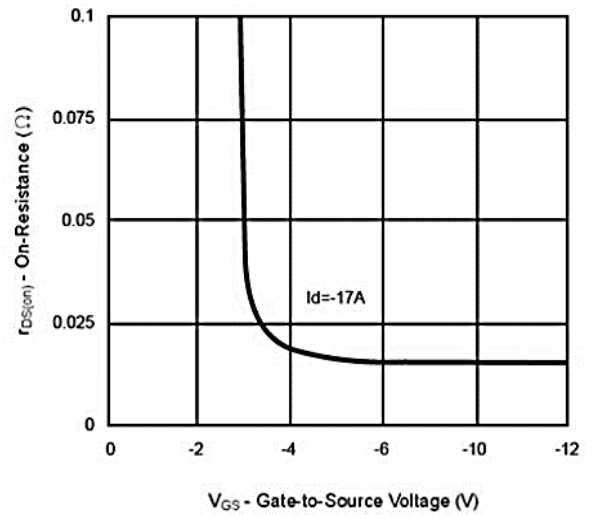# P-Channel Enhancement Mode MOSFET

Typical Characteristics

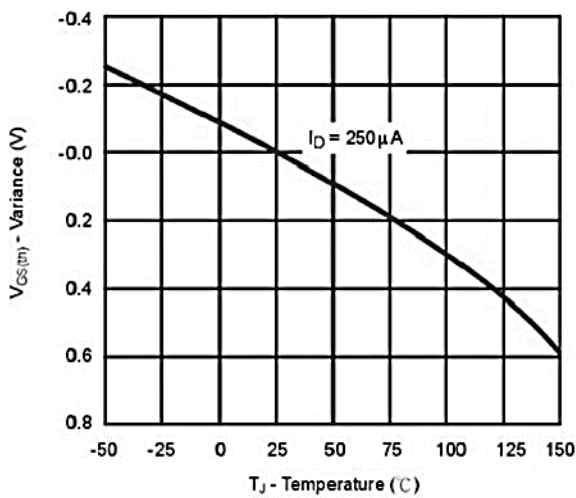**Fig.1 On Resistance Vs Junction Temperature**
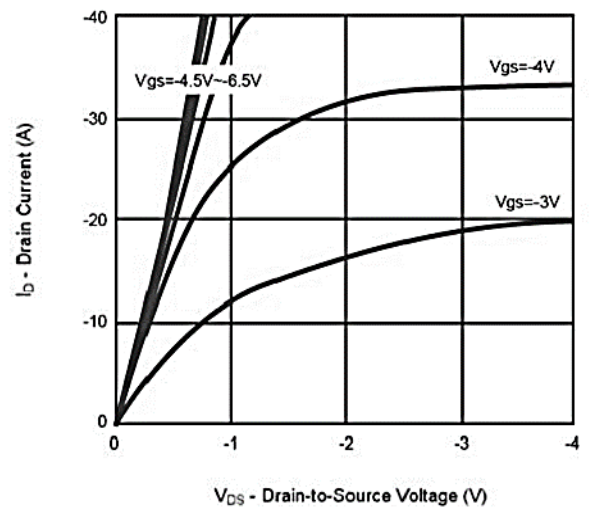

Fig.2 On-Resistance Vs.Drain Current

Fig.3 Capacitance

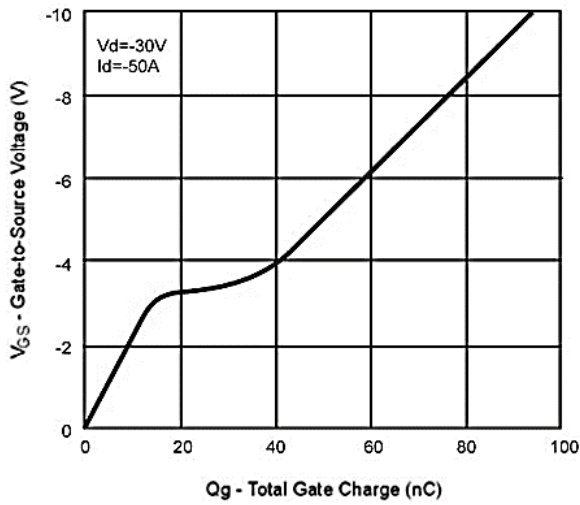**Fig.4 On-Resistance Vs. Gate-to-Sourece Voltage**
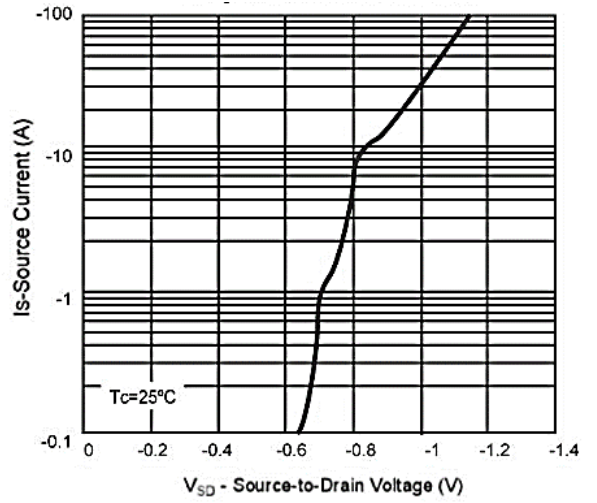

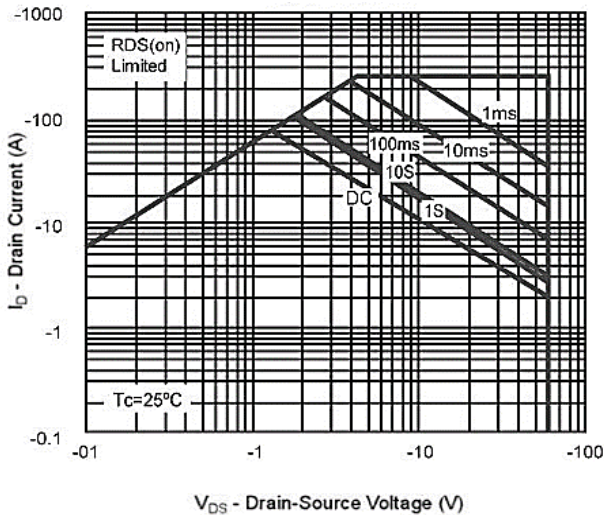**Fig.5 Threshold Voltage**

Fig.6 On-Region Characteristics
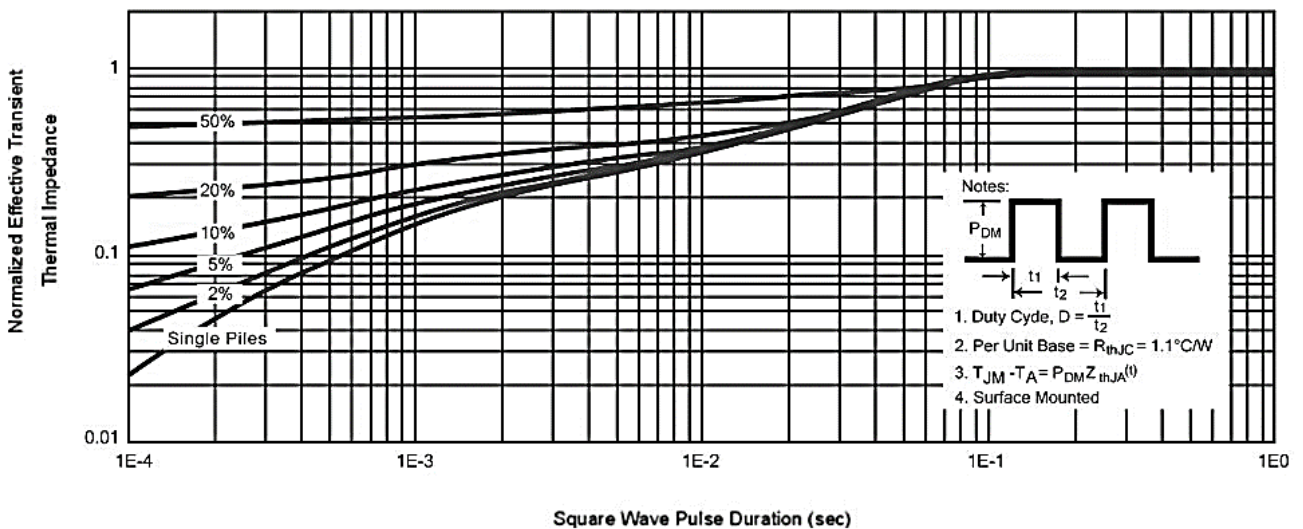
P-Channel Enhancement Mode MOSFET
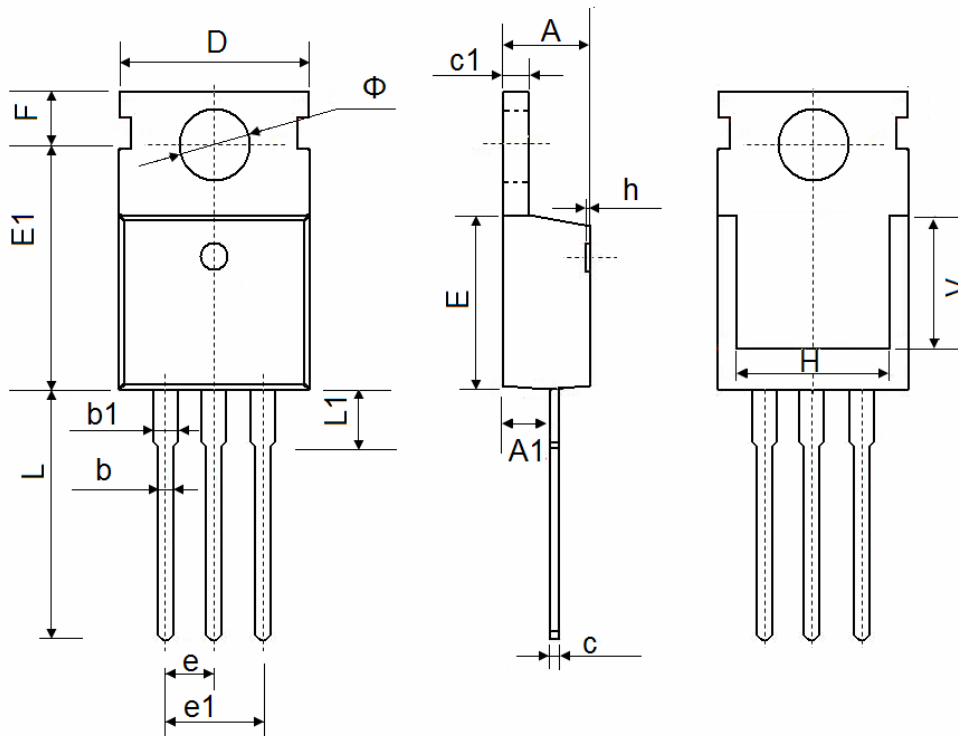
Fig.7 Gate Charge

Fig.8 Body-diode Characteristice

Fig.9 Safe Operating Area

Fig.10 Normalized Maximum Transient Thermal Impedance

P-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