



20P03

P-Channel Enhancement Mode MOSFET

Description

The 20P03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



TO-252

General Features

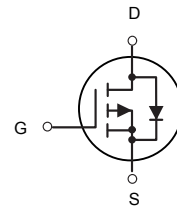
$V_{DS} = -30V, I_D = -20A$

$R_{DS(ON)} < 32m\Omega @ V_{GS} = 10V$

$R_{DS(ON)} < 48m\Omega @ V_{GS} = 4.5V$

Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
20P03	TO-252-3L	20P03 XXX YYYY	2500

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units	
VDS	Drain-Source Voltage	-30	V	
VGS	Gate-Source Voltage	± 25	V	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V_1$	-20	A	
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V_1$	-15	A	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V_1$	-12.2	-7.7	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V_1$	-9.8	-6.2	A
IDM	Pulsed Drain Current ²	-50	A	
EAS	Single Pulse Avalanche Energy ³	72.2	mJ	
IAS	Avalanche Current	-38	A	
$PD @ T_C = 25^\circ C$	Total Power Dissipation ⁴	29	W	
$PD @ T_A = 25^\circ C$	Total Power Dissipation ⁴	4.2	1.67	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$	
TJ	Operating Junction Temperature Range	-55 to 150	$^\circ C$	



Symbol				
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	75	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	---	30	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	4.32	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Tp	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V , ID=-250uA	-30		---	V
ΔBVDSS/ΔTJ	BVDSS Temperature Coefficient	Reference to 25°C , ID=-1mA	---	22	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	VGS=-10V , ID=-15A	32	---	39	mΩ
		VGS=-4.5V , ID=-10A	48	---	58	
VGS(th)	Gate Threshold Voltage	VGS=VDS , ID =-250uA	-1.0	---	-2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	4.6	---	mV/°C
IDSS	Drain-Source Leakage Current	VDS=-24V , VGS=0V , TJ=25°C	---	---	-1	uA
		VDS=-24V , VGS=0V , TJ=55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	VGS=±25V , VDS=0V	---	---	±100	nA
gfs	Forward Transconductance	VDS=-5V , ID=-15A	---	19	---	S
Rg	Gate Resistance	VDS=0V , VGS=0V , f=1MHz	---	13	---	
Qg	Total Gate Charge (-4.5V)		---	12.5	---	nC
Qgs	Gate-Source Charge	VDS=-15V , VGS=-4.5V , ID=-15A	---	5.4	---	
Qgd	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time		---	4.4	---	ns
Tr	Rise Time	VDD=-15V , VGS=-10V , RG=3.3 , ID=-15A	---	11.2	---	
Td(off)	Turn-Off Delay Time		---	34	---	
Tf	Fall Time		---	18	---	
Ciss	Input Capacitance		---	1345	---	pF
Coss	Output Capacitance	VDS=-15V , VGS=0V , f=1MHz	---	194	---	
Crss	Reverse Transfer Capacitance		---	158	---	

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production



Typical Characteristics

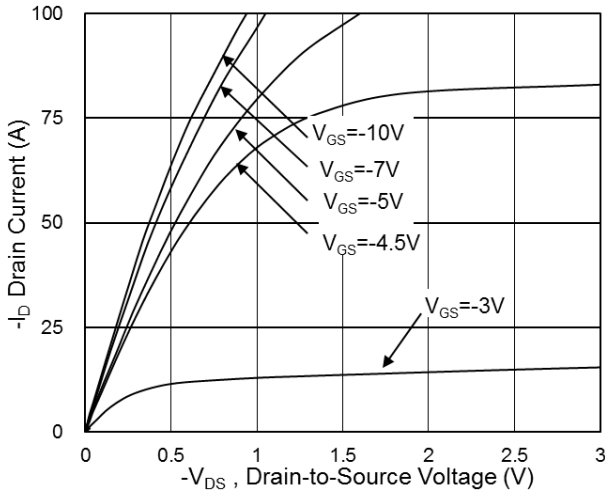


Fig.1 Typical Output Characteristics

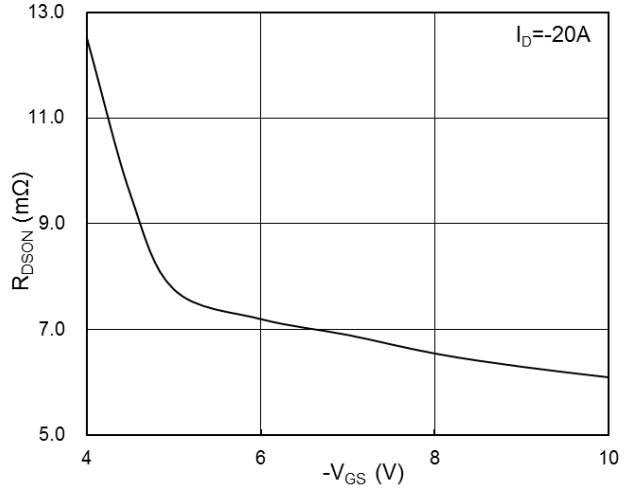


Fig.2 On-Resistance vs. Gate-Source Voltage

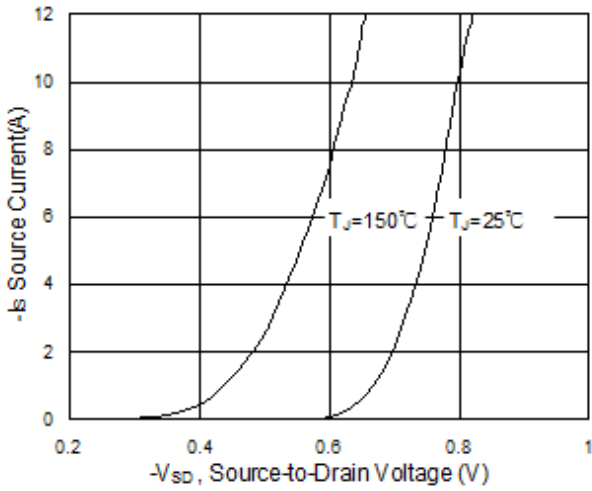


Fig.3 Forward Characteristics of Reverse

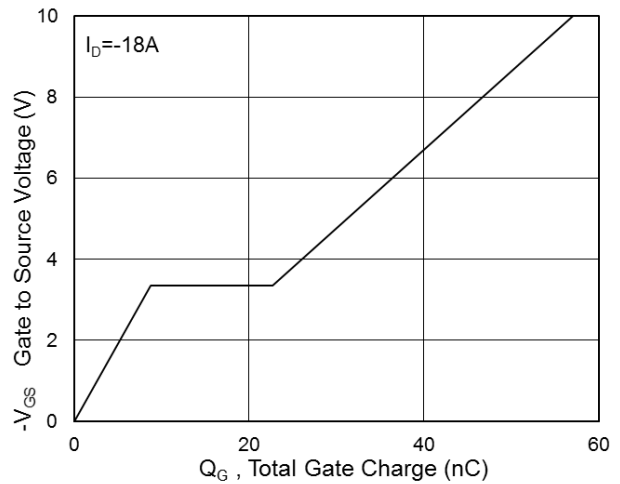


Fig.4 Gate-Charge Characteristics

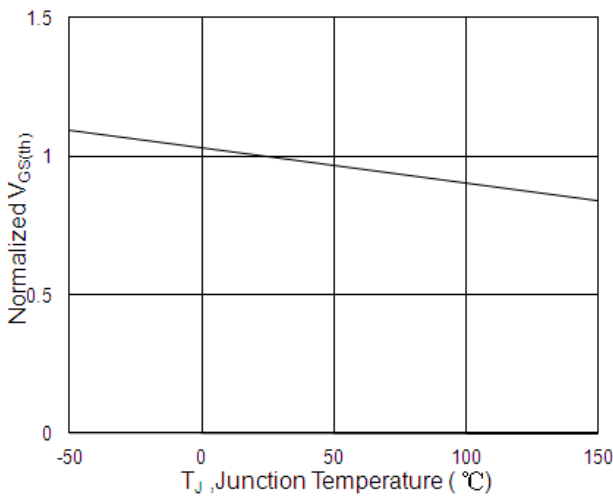


Fig.5 Normalized $-V_{GS(th)}$ vs. T_J

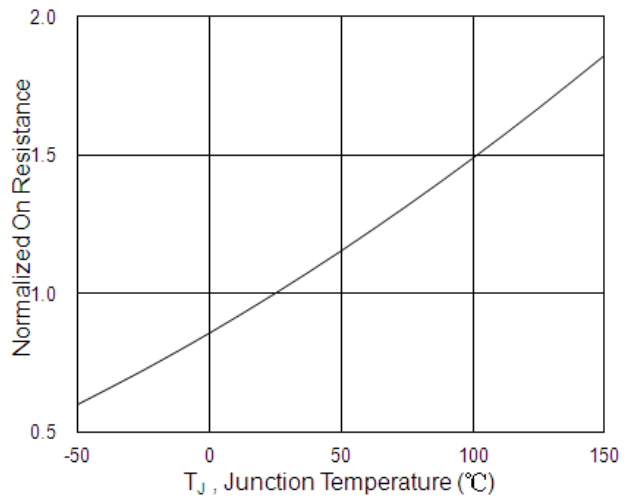


Fig.6 Normalized R_{DSON} vs. T_J

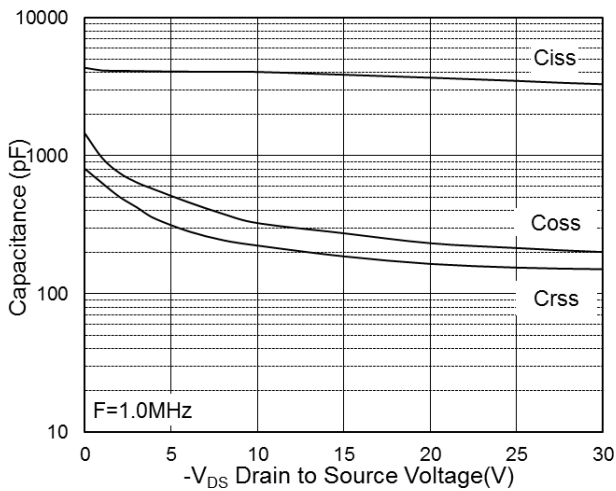


Fig.7 Capacitance

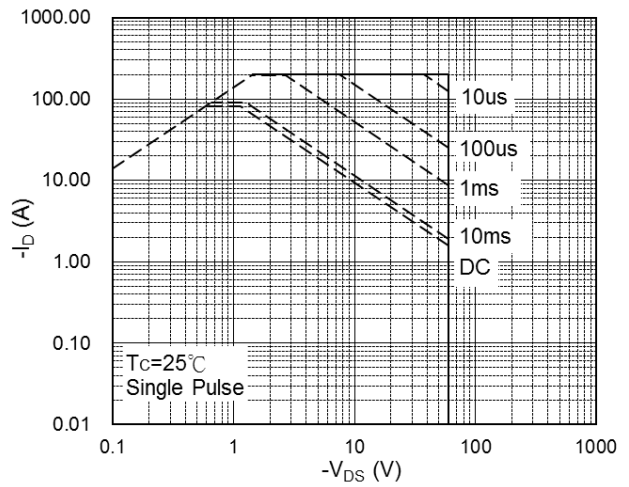


Fig.8 Safe Operating Area

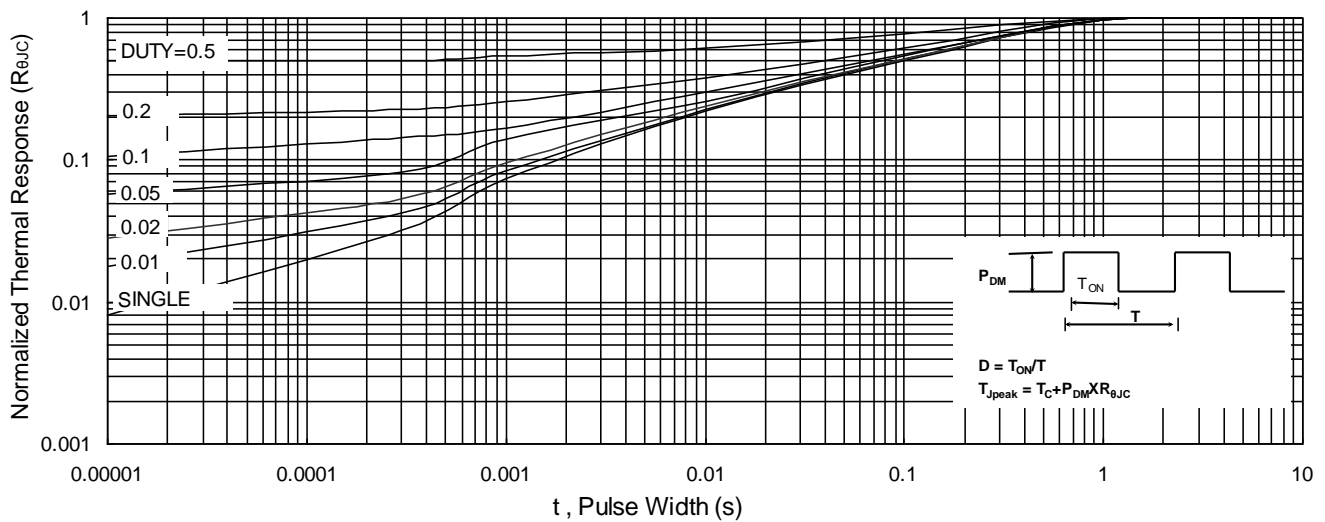


Fig.9 Normalized Maximum Transient Thermal Impedance

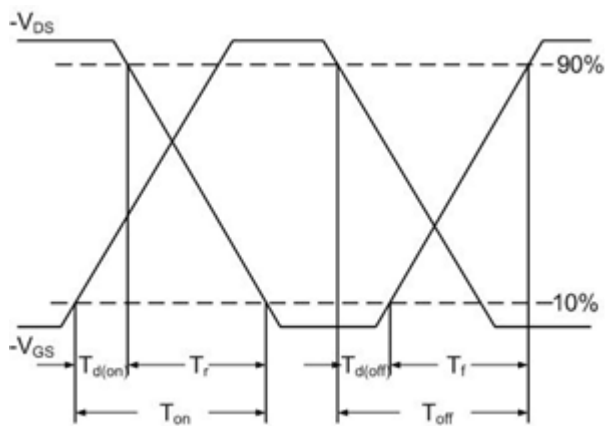


Fig.10 Switching Time Waveform

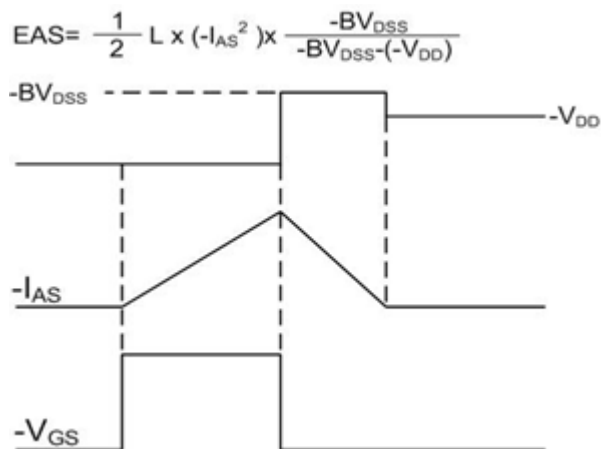
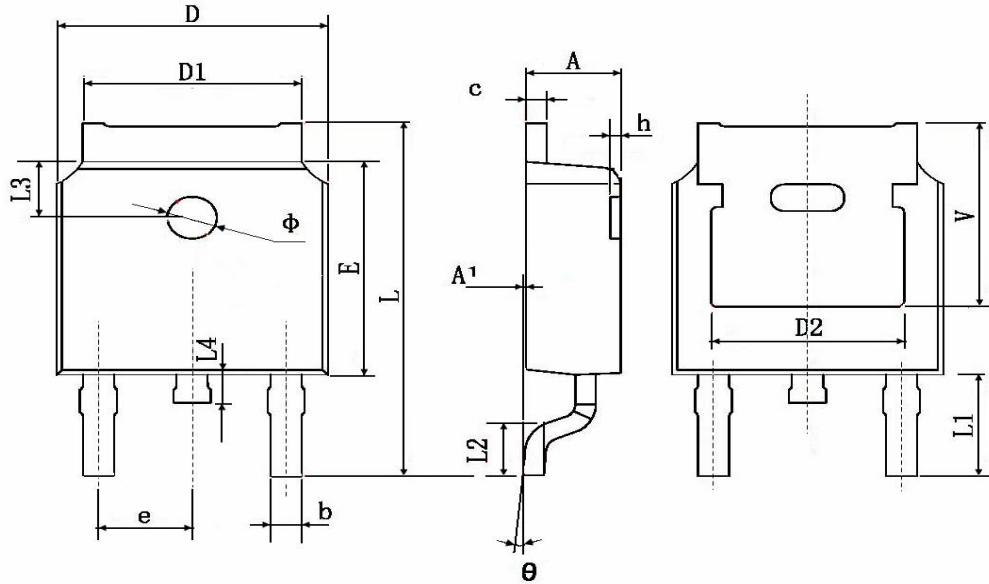


Fig.11 Unclamped Inductive Switching Waveform



TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	