-30V P-Channel Trench MOSFET

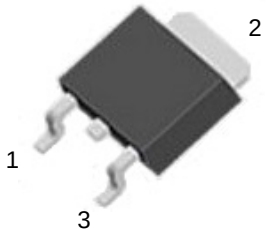
WGD20P03

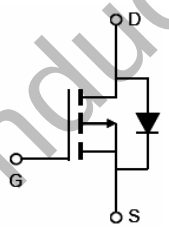
Features:

- ☐ Advanced Trench Technology.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=12.5nC (Typ.).
- ☐ BVDSS=-30V,ID=-20A
- ☐ R_{DS}(on) : 21mΩ (Typ.) @V_G=-10V
- ☐ 100% Avalanche Tested

TO-252

RoHS COMPLIANT





1. Gate (G)
2. Drain (D)
3. Source (S)

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Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_A=25℃) (Note 1)	I_D	-20	A
Drain Current-Continuous (T_A=100℃)		-15	
Drain Current-Pulsed (Note 2)	I_{DM}	-50	A
Maximum Power Dissipation (T_A=25℃) (Note 4)	P_D	29	W
Maximum Power Dissipation (T_A=100℃)		13	
Single pulse avalanche energy	E_{AS}	30	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance Junction-Case (Note 1)	$R_{\theta JC}$	4.32	℃/W
Thermal Resistance,Junction-to-Ambient (Note 1)	$R_{\theta JA}$	75	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Tp	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V , ID=-250uA	-30		---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , ID=-1mA	---	22	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance2	VGS=-10V , ID=-7A	---	21	27	mΩ
		VGS=-4.5V , ID=-4A	---	29	37	
VGS(th)	Gate Threshold Voltage	VGS=VDS , ID =-250uA	-1.0	---	-2.5	V
△VGS(th)	VGS(th) Temperature Coefficient		---	4.6	---	mV/℃
IDSS	Drain-Source Leakage Current	VDS=-24V , VGS=0V , TJ=25℃	---	---	-1	uA
		VDS=-24V , VGS=0V , TJ=55℃	---	---	-5	
IGSS	Gate-Source LeakageCurrent	VGS=±25V , VDS=0V	---	---	±100	nA
gfs	Forward Transconductance	VDS=-5V , ID=-15A	---	19	---	S
Rg	Gate Resistance	VDS=0V , VGS=0V , f=1MHz	---	11	---	
Qg	Total Gate Charge (-4.5V)	VDS=-15V , VGS=-4.5V , ID=-15A	---	12.5	---	nC
Qgs	Gate-Source Charge		---	5.4	---	
Qgd	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time	VDD=-15V , VGS=-10V , RG=3.3 , ID=-15A	---	4.4	---	ns
Tr	Rise Time		---	11.2	---	
Td(off)	Turn-Off Delay Time		---	34	---	
Tf	Fall Time		---	18	---	
Ciss	Input Capacitance	VDS=-15V , VGS=0V , f=1MHz	---	890	---	pF
Coss	Output Capacitance		---	111	---	
Crss	Reverse Transfer Capacitance		---	90	---	

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Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

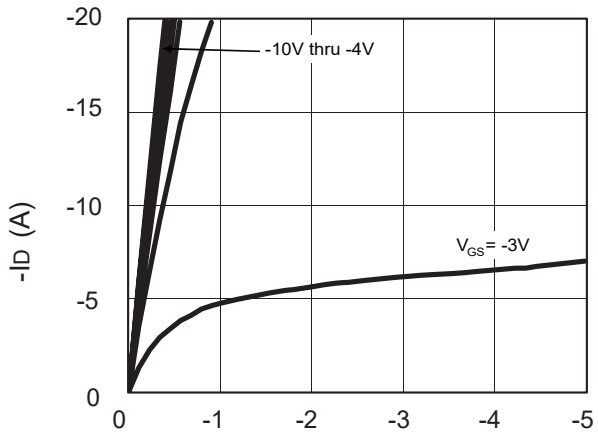
2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

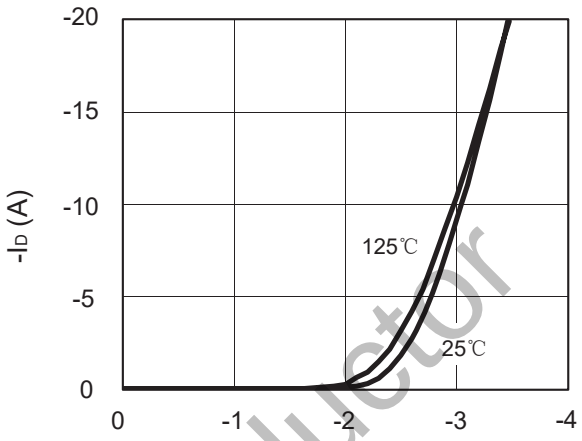
4. Guaranteed by design, not subject to production

5. EAS condition: Starting TJ=25°C, V_{DD}=-15V, V_{GS}=-10V, R_G=25Ω，L=0.5mH, IAS=-11A

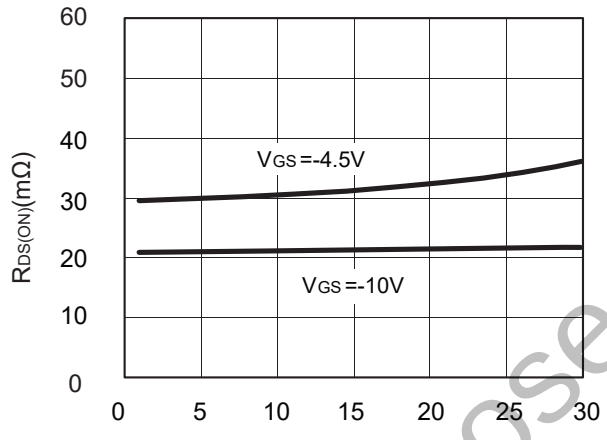
Typical Characteristics



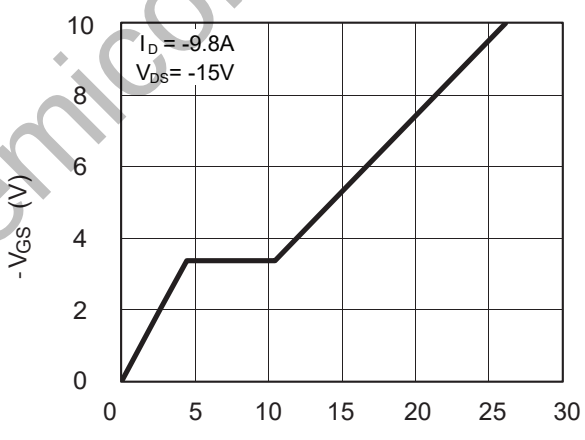
On-Region Characteristics



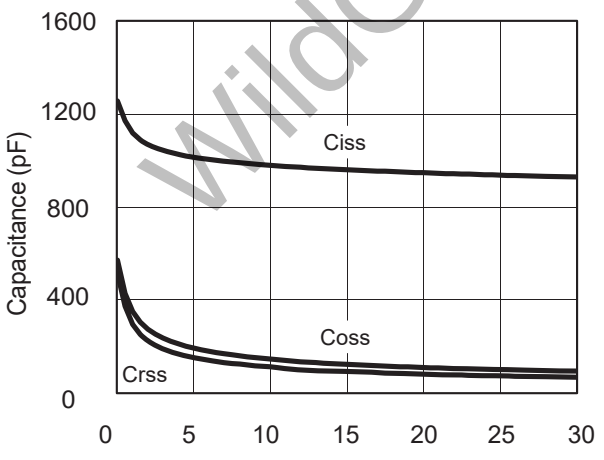
transfer characteristics



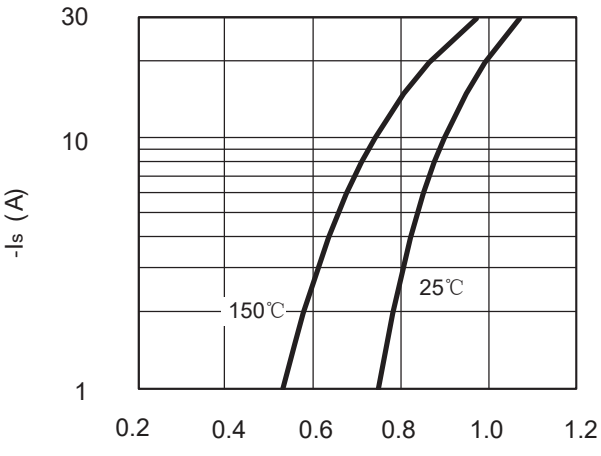
On-Resistance vs. Drain Current



Gate Charge Characteristics



Capacitance Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature

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Figure A：Gate Charge Test Circuit and Waveform

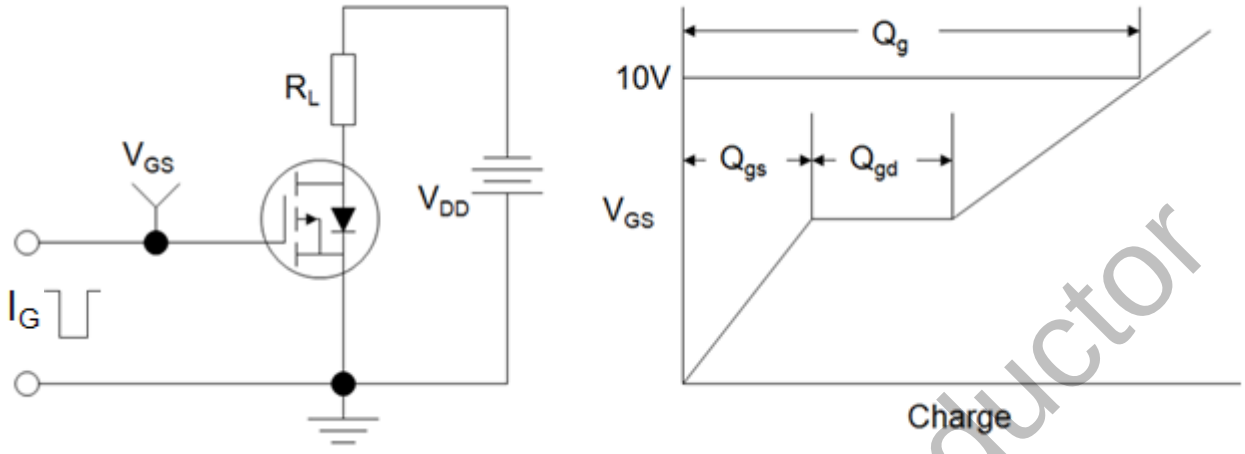


Figure B：Resistive Switching Test Circuit and Waveform

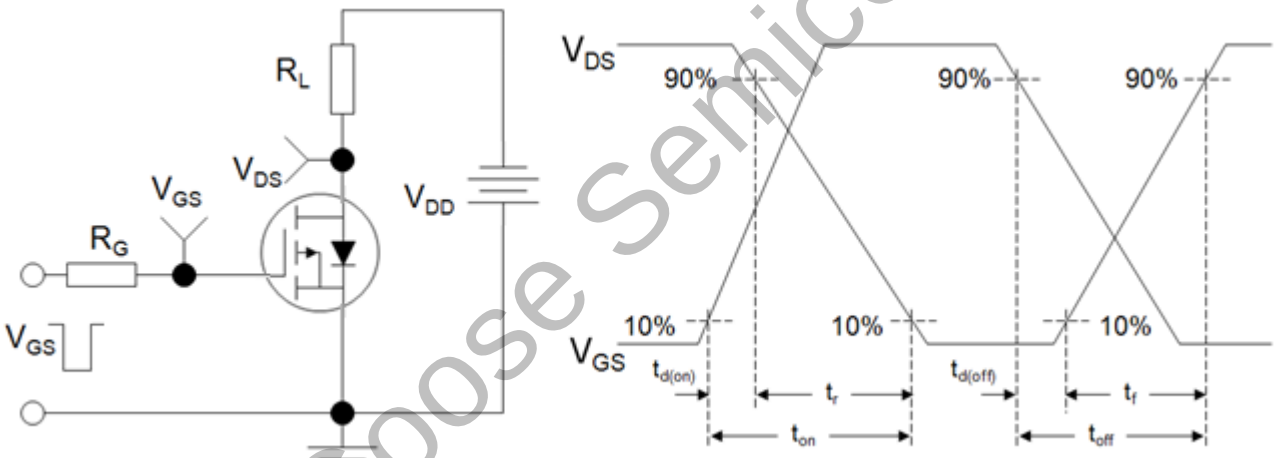
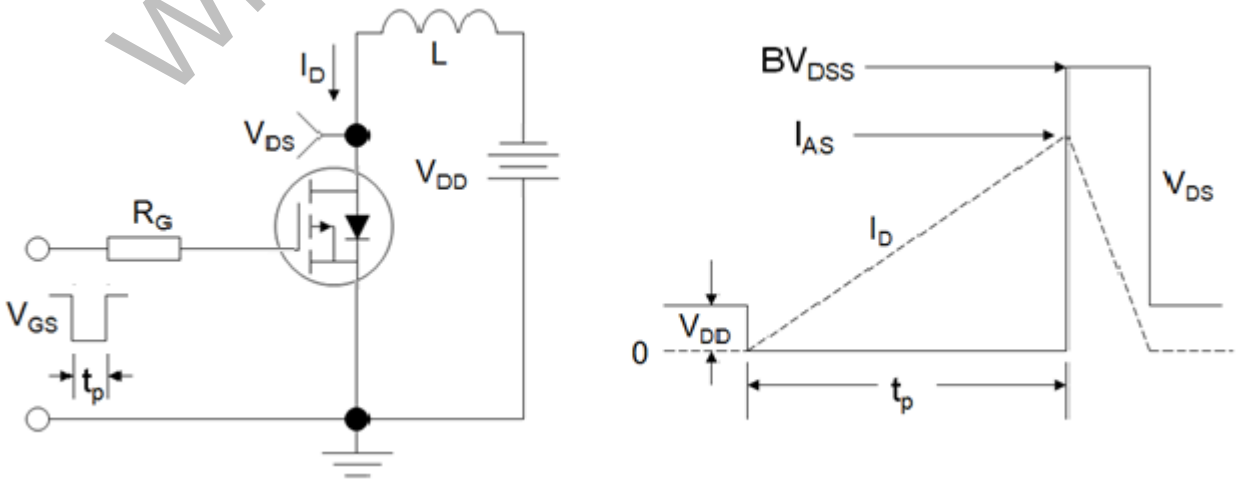


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

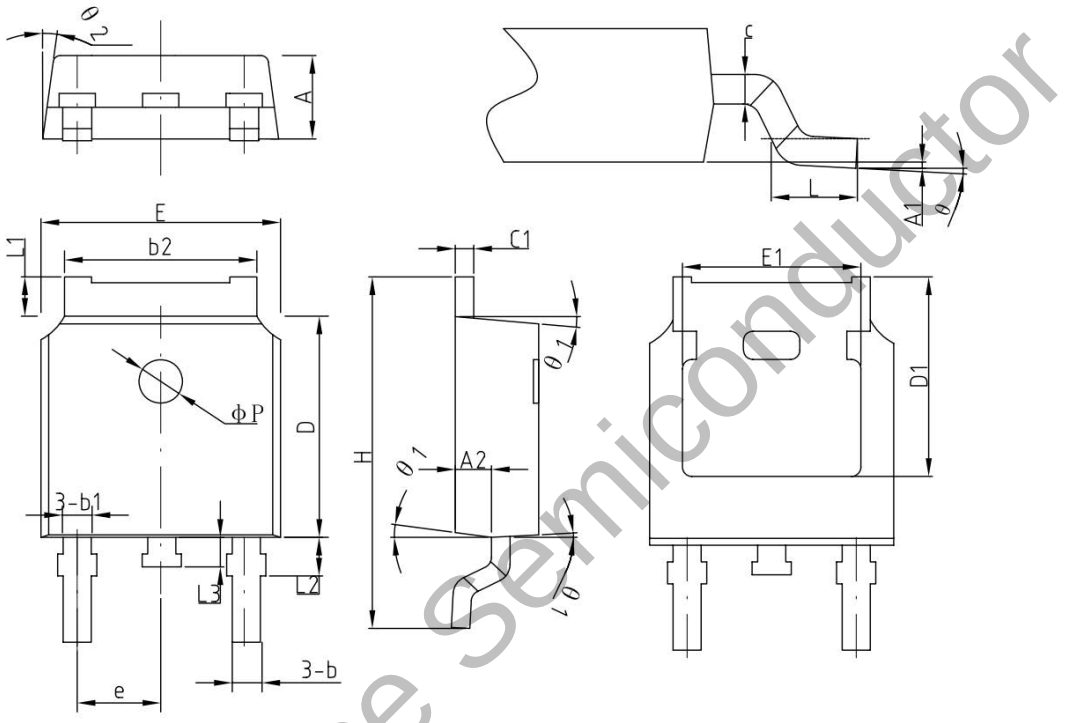


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Package Dimension

TO-252

Units：mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0	–	0.10
A2	0.90	1.01	1.10
b	0.71	0.76	0.86
b1		0.76	
b2	5.13	5.33	5.46
c	0.47	0.50	0.60
c1	0.47	0.50	0.60
D	6.0	6.10	6.20
D1	–	5.30	–
E	6.50	6.60	6.70
E1	–	4.80	–
e		2.286BSC	
H	9.70	10.10	10.40
L	1.40	1.50	1.70
L1	0.90	–	1.25
L2		1.05	
L3		0.8	
ΦP		1.2	
θ	0°	–	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°

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