Wuxi Unigroup Microelectronics CO.,LTD.

30V P-Channel Trench MOSFET(Preliminary)

General Description

- Trench Power technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications

Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial

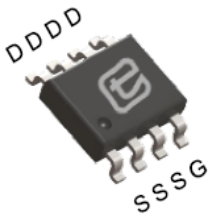
Product Summary

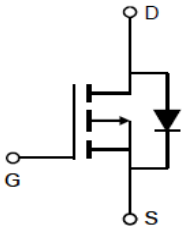
V_{DS}	-30V
I_D (at V_{GS}=10V)	-12A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 7.5mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	< 12mΩ

100% UIS Tested

RoHS

SOP-8





Part Number	Package Type	Form	Marking
TTJ90P03AT	SOP-8	Tape & Reel	90P03AT

Absolute Maximum Ratings (T_A =25°C unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	- 30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [B]	T_C =25°C	I_D	-12	A
	T_C =100°C		-9.6	
Pulsed Drain Current [A]		I_{DM}	-36	A
Avalanche Current [A]		I_{AS}	-22	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	135	mJ
Power Dissipation [C]	T_C =25°C	P_D	79	W
	T_C =100°C		39.5	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.9	°C/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	100	

Electrical Characteristics(T_J =25ºC unless otherwise noted)

Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =-250μA,V_{GS} =0V		-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =-30V, V_{GS} =0V	T_J =25ºC			-1	μA
			T_J =100ºC			-100	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =-250μA		-1	-1.7	-2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =-10V, I_D =-20A			6.3	7.5	mΩ
		V_{GS} =-4.5V, I_D =-20A			10	12	mΩ
g_{FS}	Forward Transconductance	V_{DS} =-5V, I_D =-20A			30		S
V_{SD}	Diode Forward Voltage	I_S =-15A, V_{GS} =0V				-1	V
I_S	Maximum Body-Diode Continuous Current [B]					-46	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =-15V, f =1MH_Z			4942		pF
C_{oss}	Output Capacitance				473		
C_{rss}	Reverse Transfer Capacitance				461		
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =-10V,V_{DS} =-15V, I_D =-20A			82		nC
Q_{gs}	Gate Source Charge				14		
Q_{gd}	Gate Drain Charge				16		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =-10V,V_{DS} =-15V, I_D =-20A, R_G =2.5Ω			182		ns
t_r	Turn-On Rise Time				262		
$T_{D(off)}$	Turn-Off Delay Time				1.3		
t_f	Turn-Off Fall Time				9.8		
t_{rr}	Body Diode Reverse Recovery Time	I_F =-15A, di/dt =100A/μs			34		ns
Q_{rr}	Body Diode Reverse Recovery Charge				79		nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)}$ =175ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

Typical Characteristics T_J = 25ºC, unless otherwise noted

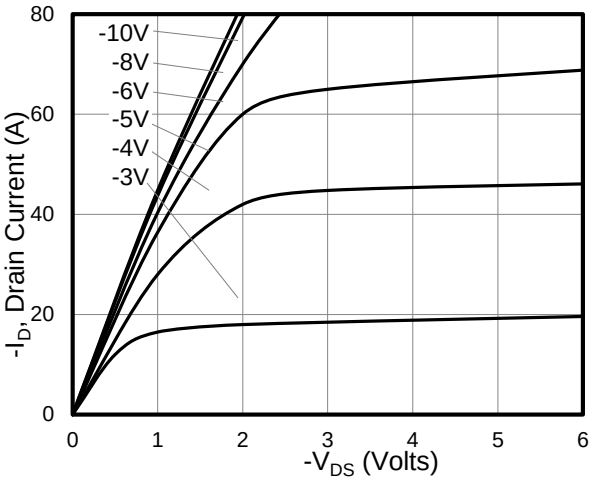


Figure 1: On-Region Characteristics

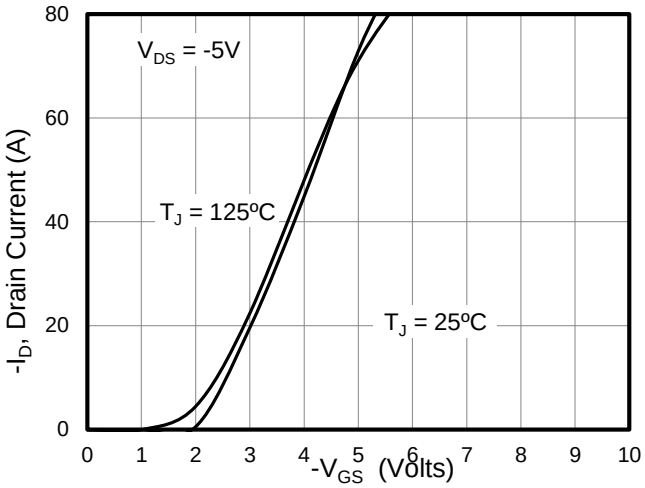


Figure 2: Transfer Characteristics

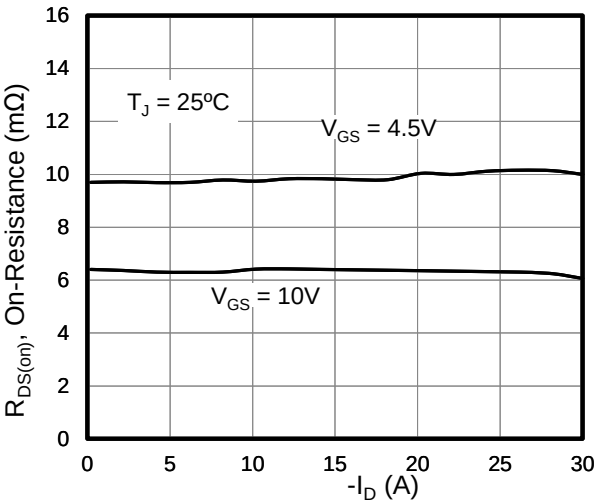


Figure 3: On-Resistance vs. Drain Current

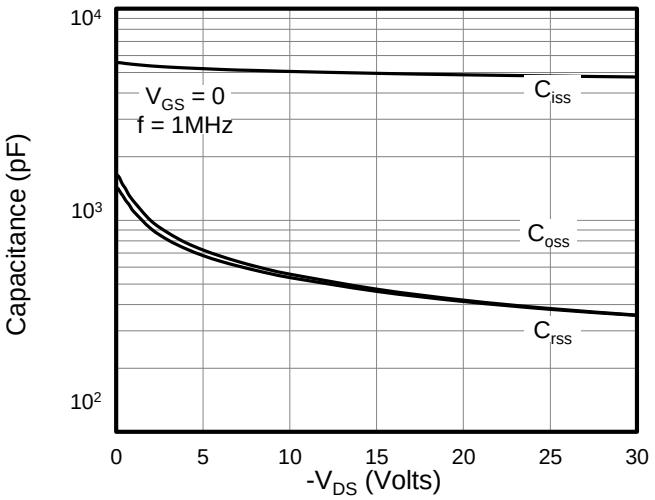


Figure 4: Capacitance Characteristics

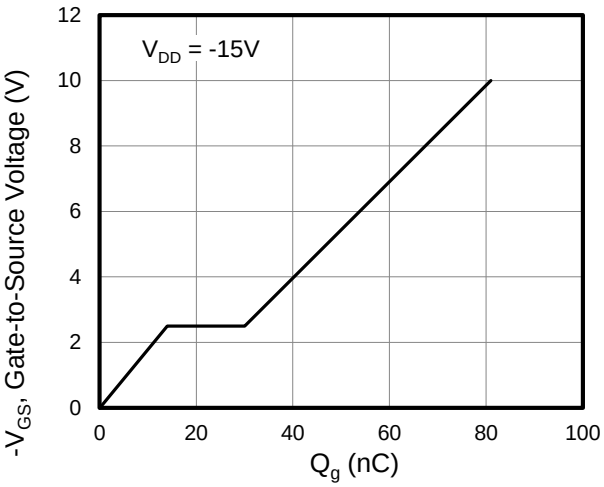


Figure 5: Gate Charge Characteristics

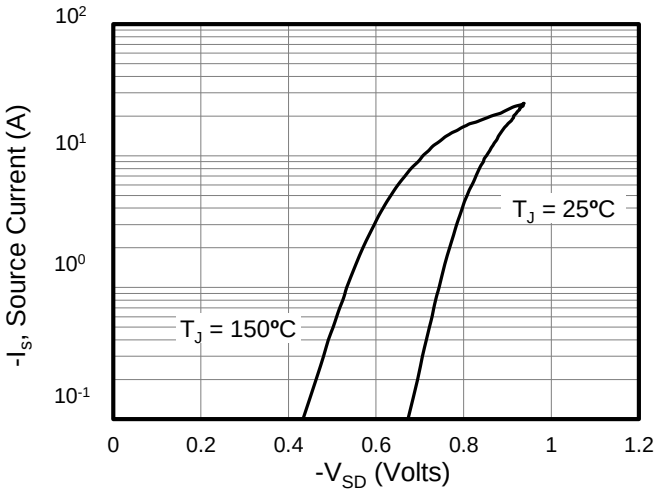


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

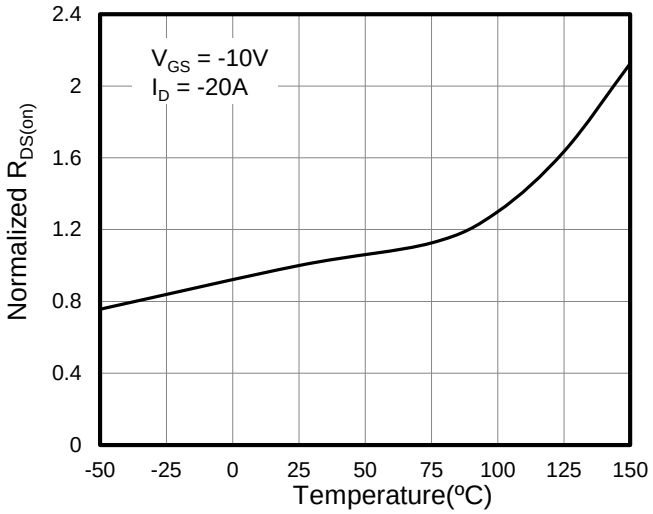


Figure 7: On-Resistance vs. Junction Temperature

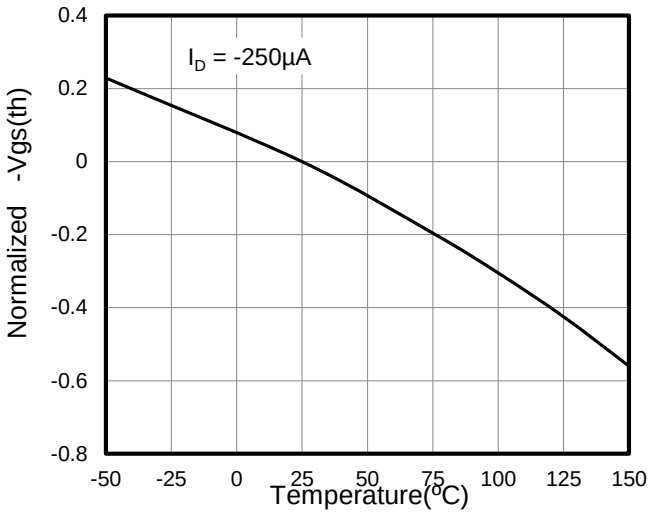


Figure 8: Vgs(th) vs. Junction Temperature

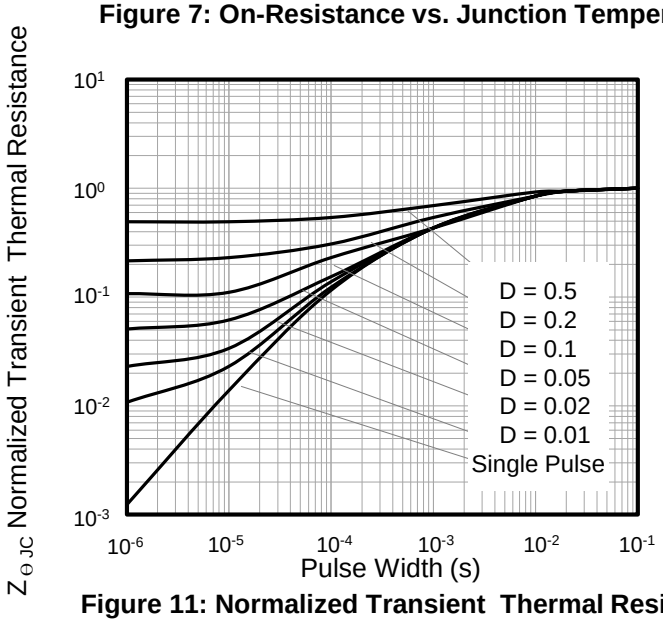


Figure 11: Normalized Transient Thermal Resistance

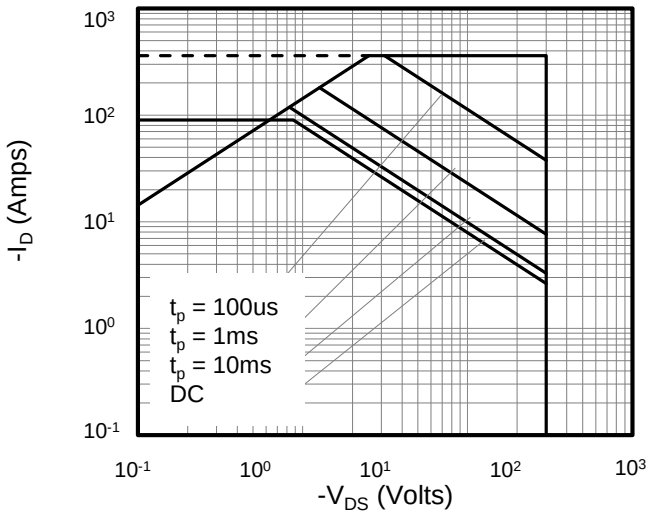


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

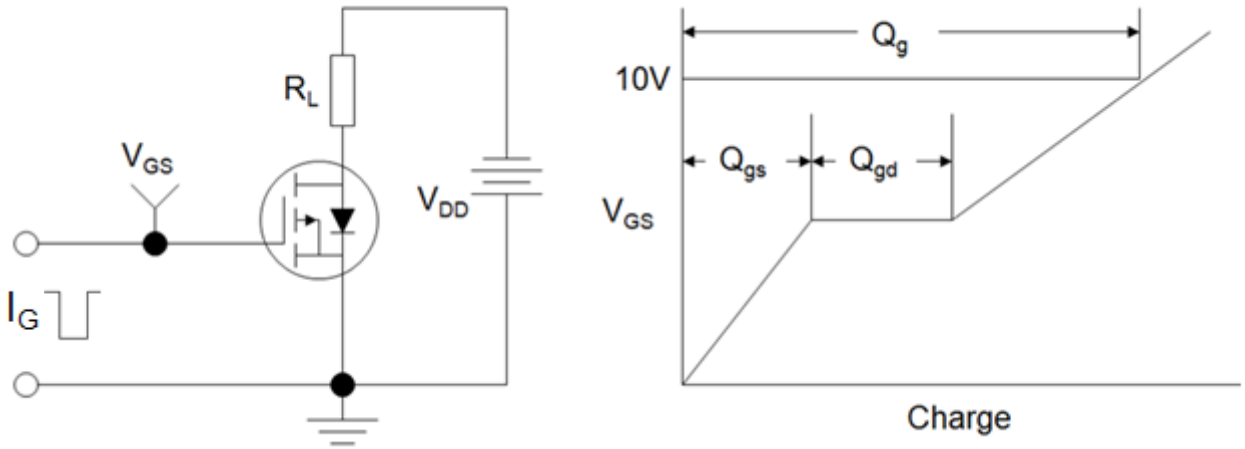


Figure B：Resistive Switching Test Circuit and Waveform

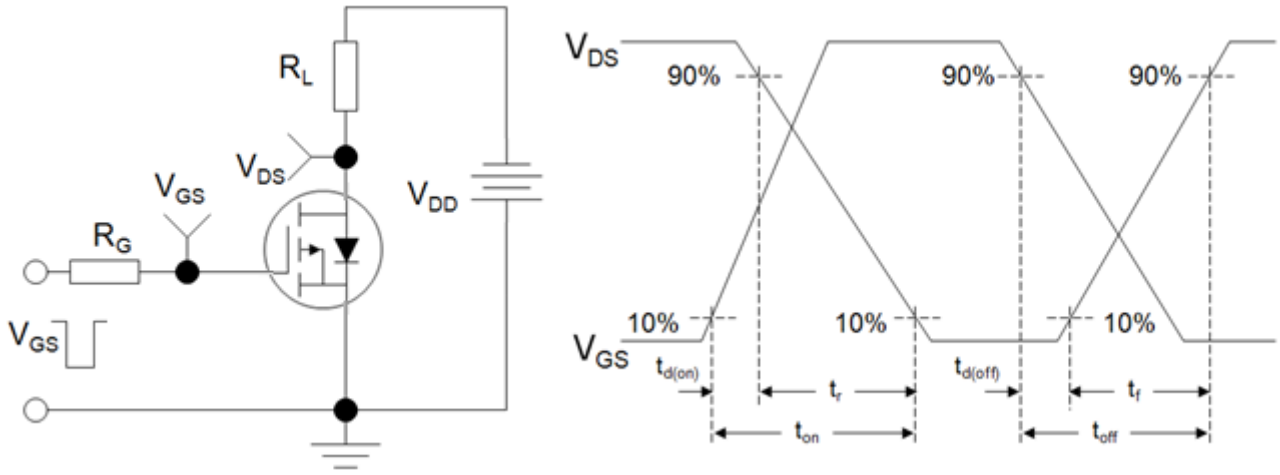
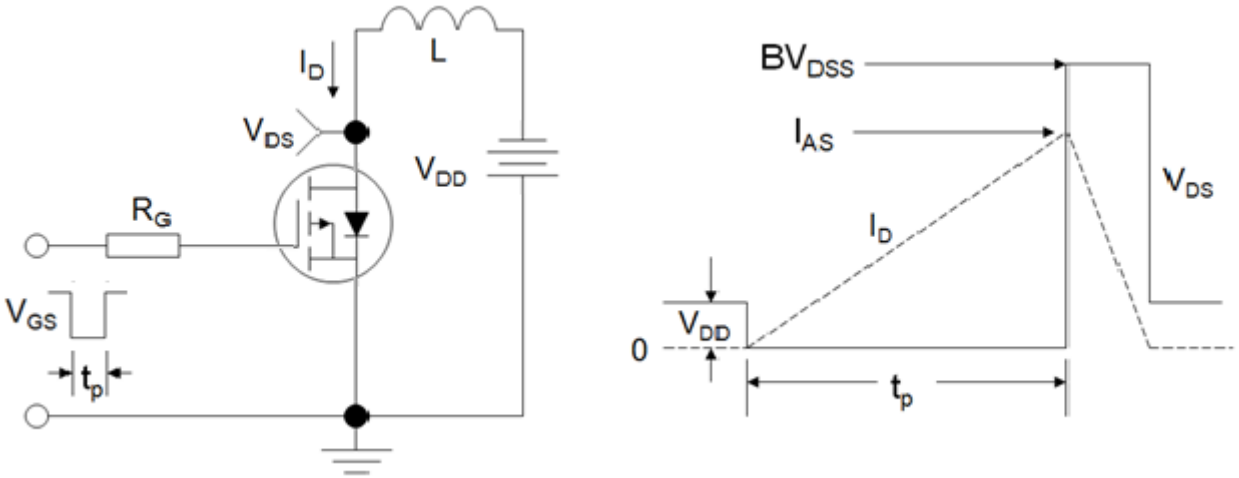


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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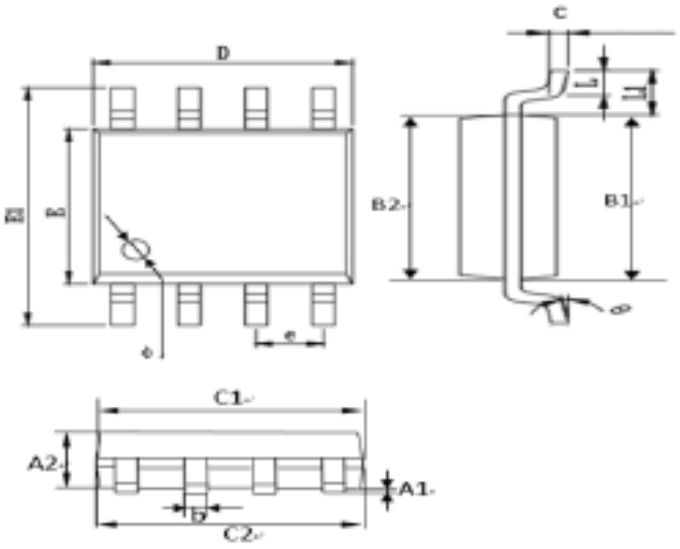

符号		标准	下公差	上公差	下限值		上限值	
					内控	放行	内控	放行
A1 足高	ESOP8	0.04	0.02	0.02	0.025	0.02	0.055	0.06
	SOP8	0.095	0.045	0.045	0.06	0.05	0.13	0.14
A2		1.4	0.1	0.1	1.35	1.3	1.45	1.5
B1		3.9	0.05	0.05	3.86	3.85	3.94	3.95
B2		3.85	0.05	0.05	3.81	3.80	3.89	3.90
b		0.42	0.03	0.03	0.40	0.39	0.44	0.45
C1		4.85	0.05	0.05	4.81	4.80	4.89	4.90
C2		4.9	0.05	0.05	4.86	4.85	4.94	4.95
c		0.235	0.025	0.025	0.215	0.21	0.255	0.26
D		4.9	0.2	0.2	4.8	4.7	5.0	5.1
E		3.9	0.2	0.2	3.8	3.7	4.0	4.1
E1		6.0	0.2	0.2	5.9	5.8	6.1	6.2
e		1.27	0.03	0.03	1.25	1.24	1.29	1.30
L		0.6	0.1	0.1	0.52	0.5	0.68	0.7
*L1		1.045	0.055	0.055	1.00	0.99	1.09	1.1
θ_1		4°	4°	4°	0°	0°	8°	8°

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