

Features

- P-Channel MOSFET
- Advanced Trench Technology
- Very low on-resistance $R_{DS(on)}$
- 100% avalanche tested

B_{VDSS}	-20V
$I_{D_{MAX}}$	-4A
$R_{DS(on)}$ (typ.) @ $V_{GS} = -4.5V, I_D = -3A$	50m Ω

Application

- PWM Application
- Power Management
- Load Switch

Packing & Marking information

Type	Package	Marking	Packing	Q'ty
PG2301D	SOT23	2301D	REEL	3000PCS/REEL

Package & PIN information


Maximum ratings, at $T_j=25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter		Symbol	Ratings	Units
Drain-source voltage		V_{DSS}	-20	V
Drain current	$T_C=25\text{ }^\circ\text{C}$	I_D	-4.0	A
	$T_C=100\text{ }^\circ\text{C}$		-3.0	A
Drain current (note1)		I_{DM}	-12	A
Gate-source Voltage		V_{GSS}	± 10	V
Power dissipation	$T_C=25\text{ }^\circ\text{C}$	P_D	1.2	W
	$T_C=100\text{ }^\circ\text{C}$		0.8	W
Operating and storage temperature range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	70	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{AD}	$R_{\theta JA}$	85	125	$^\circ\text{C/W}$

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	μA
		$V_{DS} = -30V, T_C = 125^\circ\text{C}$			-5	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 12V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	-0.4	-	-1.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -4.5V, I_D = -3.0A$	-	50	70	m Ω
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -2.5V, I_D = -2A$	-	80	100	m Ω
Dynamic Characteristics						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	6	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = -6V, V_{GS} = 0V, f = 1.0MHz$	-	420	-	pF
C_{oss}	Output Capacitance		-	220	-	pF
C_{rss}	Reverse Transfer Capacitance		-	85	-	pF
Q_g	Total Gate Charge	$V_{DS} = -15V, I_D = -4A, V_{GS} = -4.5V$ note 2,3	-	9.5	-	nC
Q_{gs}	Gate-Source Charge		-	2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge		-	3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = -6V, R_L = 6\Omega, V_{GS} = -4.5V$	-	12	-	ns
t_r	Turn-On Rise Time		-	35	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	40	-	ns
t_f	Turn-Off Fall Time		-	36	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-1.5	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 1A$	-	-0.5	-1.15	V

Note:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
3. Essentially independent of operating temperature

Typical Performance Characteristics

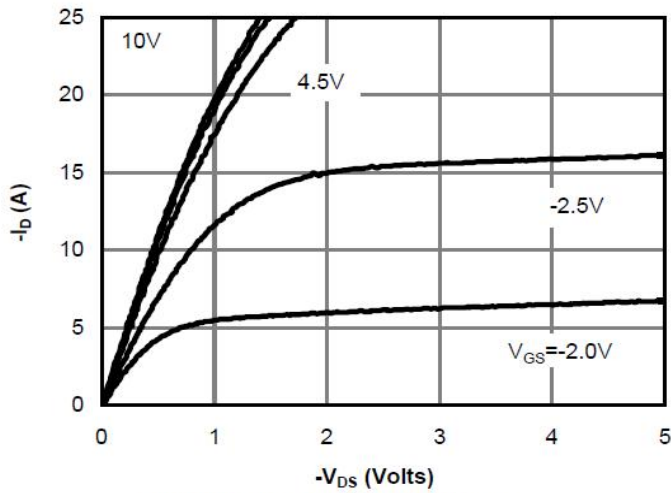


Fig 1: On-Region Characteristics

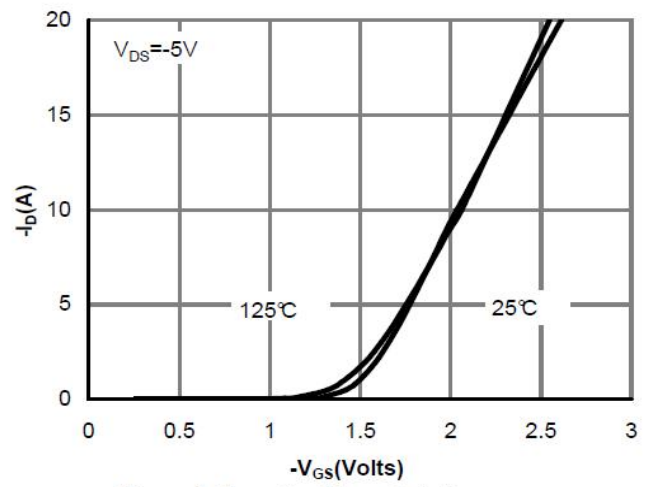


Figure 2: Transfer Characteristics

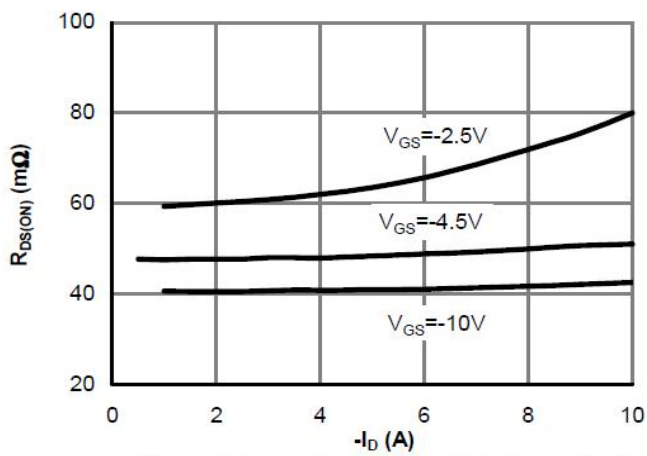


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

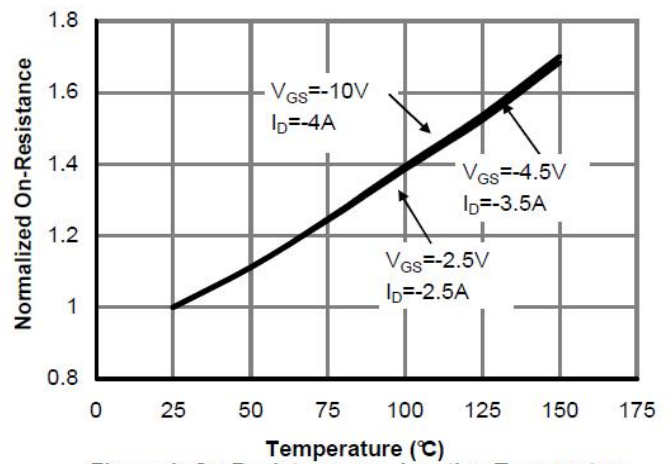


Figure 4: On-Resistance vs. Junction Temperature

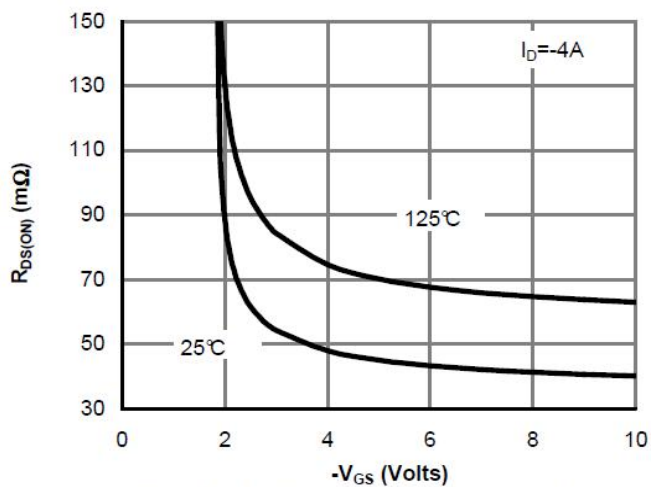


Figure 5: On-Resistance vs. Gate-Source Voltage

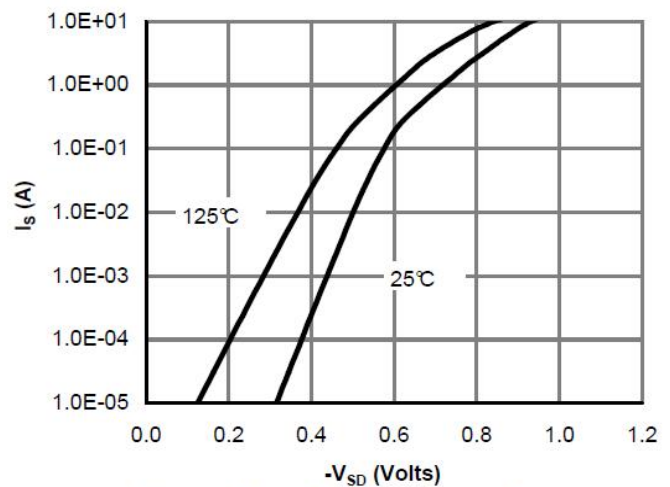


Figure 6: Body-Diode Characteristics

Typical Performance Characteristics

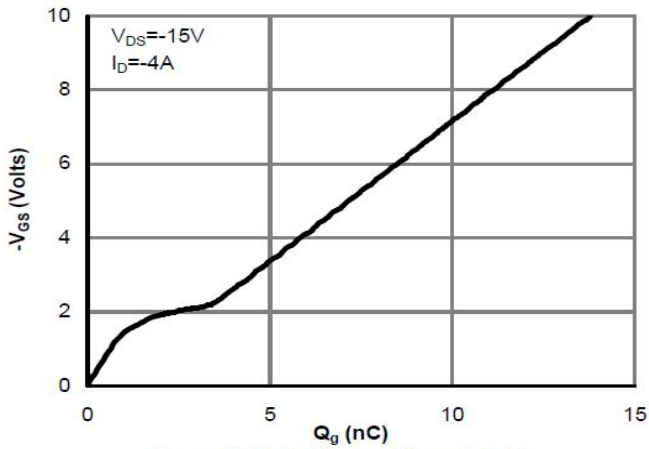


Figure 7: Gate-Charge Characteristics

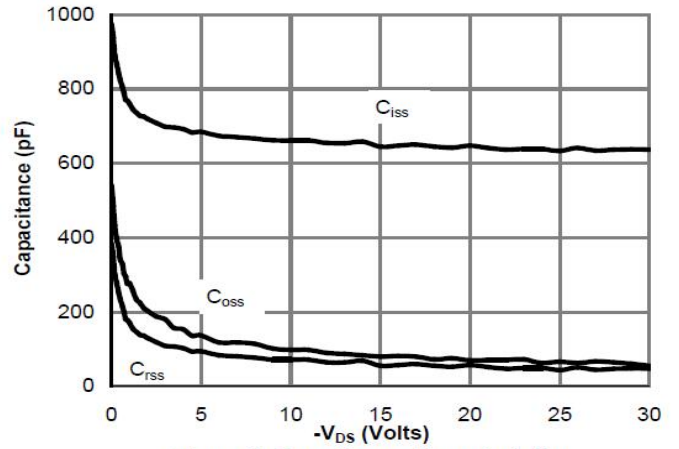


Figure 8: Capacitance Characteristics

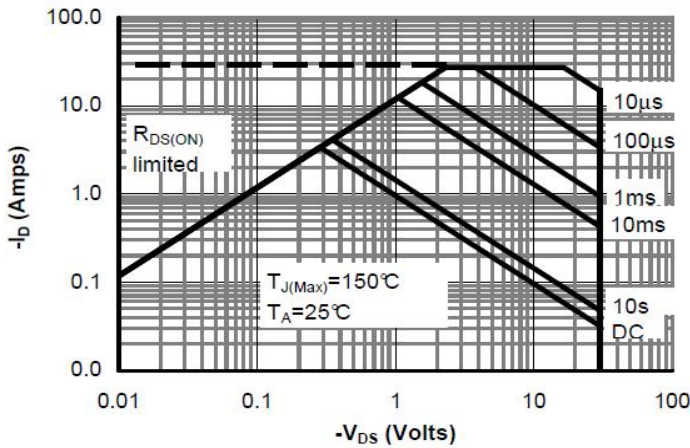


Figure 9: Maximum Forward Biased Safe Operating Area

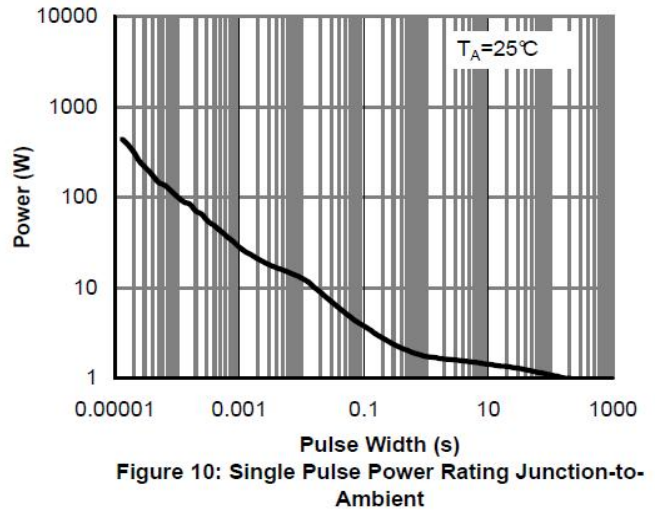


Figure 10: Single Pulse Power Rating Junction-to-Ambient

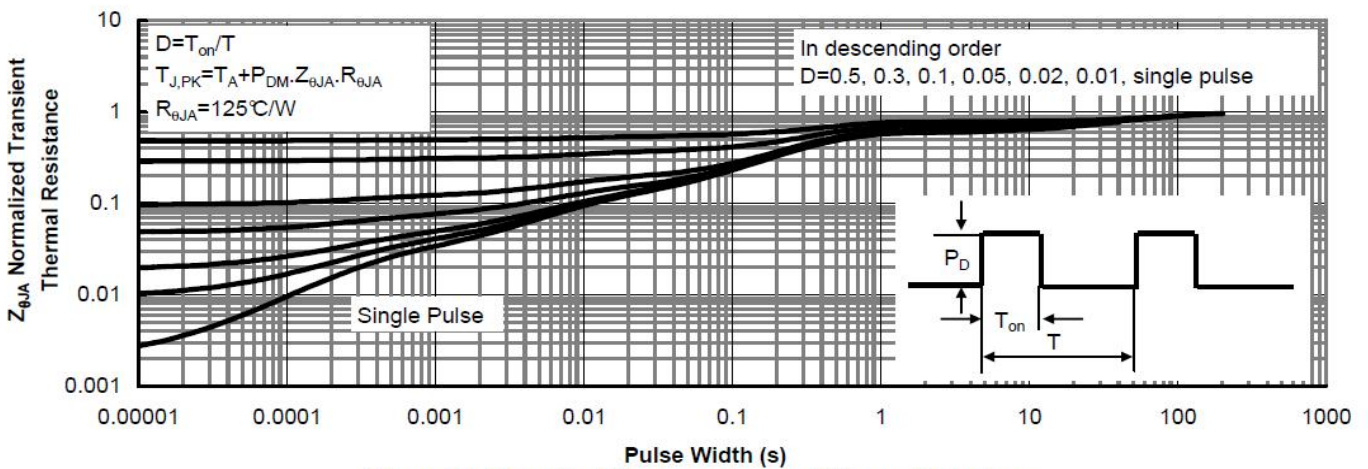
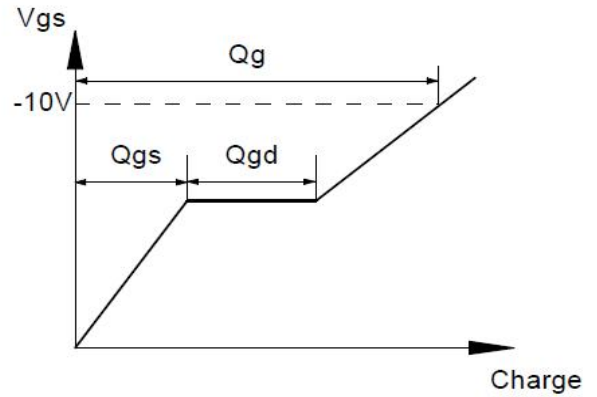
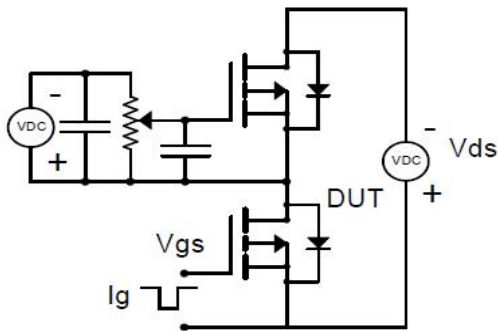
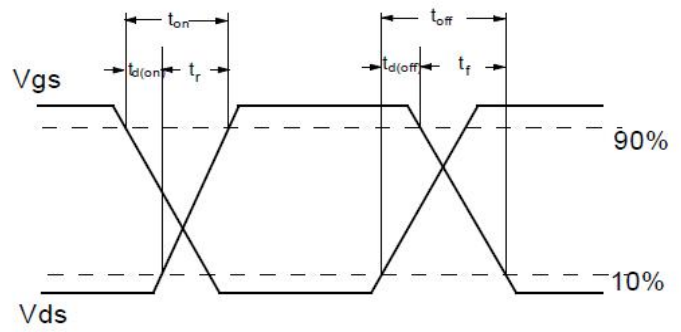
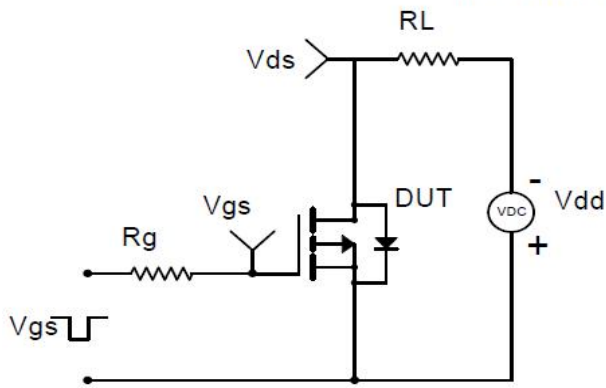


Figure 11: Normalized Maximum Transient Thermal Impedance

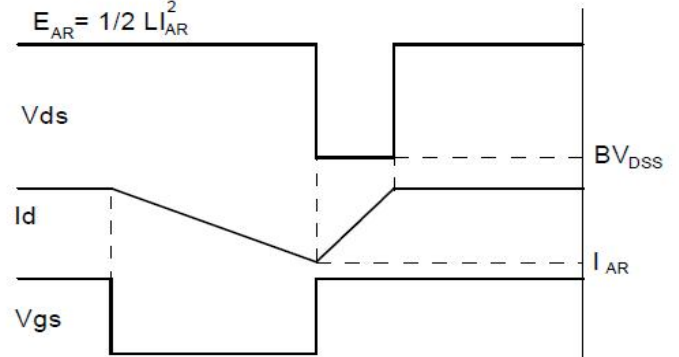
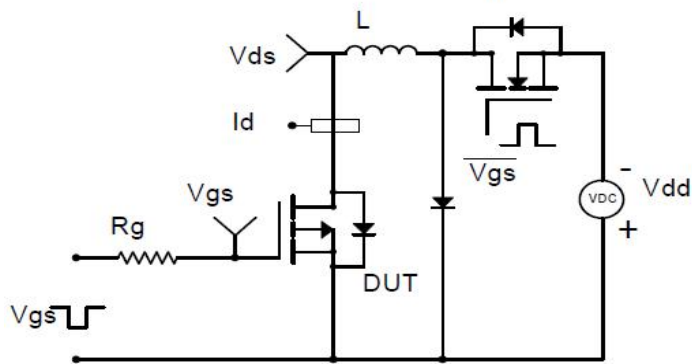
Gate Charge Test Circuit & Waveform



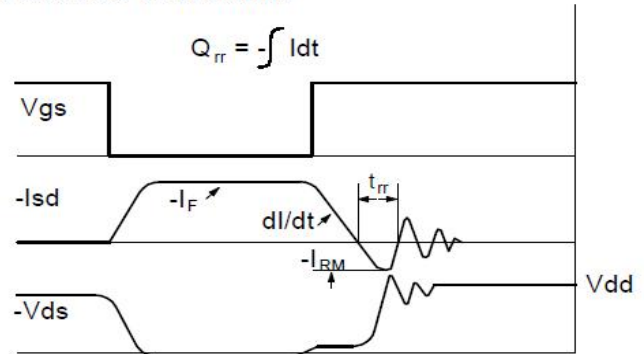
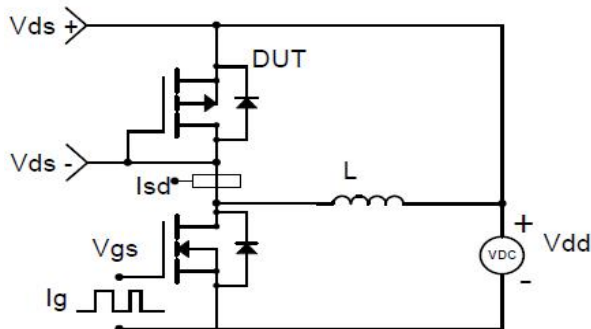
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



NOTE

- 1.We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
- 2.Please do not exceed the absolute maximum ratings of the device when circuit designing.
- 3.GUANGDONG PANGU SEMICONDUCTOR CO.,LTD. reserved the right to make changes in this specification sheet and is subject to change without prior notice.