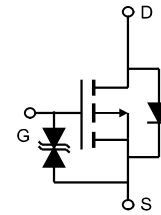


P-Channel Power MOSFET

Description

The AP1605 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch



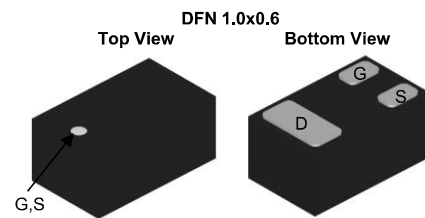
Schematic diagram

General Features

- $V_{DS} = -20V, I_D = -0.7A$
 $R_{DS(ON)} < 600m\Omega @ V_{GS} = -2.5V$
 $R_{DS(ON)} < 420m\Omega @ V_{GS} = -4.5V$
- Lead free product is acquired
- Surface mount package

Application

- Load switch



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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	± 8	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	-0.7	A
	$T_C = 70^\circ C$		-0.55	
Drain Current -Pulsed (Note 1)		I_{DM}	-2	A
Maximum Power Dissipation		P_D	0.9	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	80	$^\circ C/W$
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AP1605
P-Channel Power MOSFET
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 8V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.6	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-0.5A$		360	420	m Ω
		$V_{GS}=-2.5V, I_D=-0.3A$		400	500	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-0.3A$				
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=-4V, V_{GS}=0V,$ $F=1.0MHz$	-	52	-	PF
Output Capacitance	C_{oss}		-	12	-	PF
Reverse Transfer Capacitance	C_{rss}		-	8.2	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-4V, I_D=-0.3A,$ $R_L=-1.2\Omega, V_{GEN}=-4.5V, R_g=1\Omega$	-	6	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	23	-	nS
Turn-Off Fall Time	t_f		-	8	-	nS
Total Gate Charge	Q_g	$V_{DS}=-4V, I_D=-0.5A, V_{GS}=-4.5V$	-	0.8	-	nC
Gate-Source Charge	Q_{gs}		-	0.16	-	nC
Gate-Drain Charge	Q_{gd}		-	0.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-0.5A$	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	0.7	A

Notes:

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

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

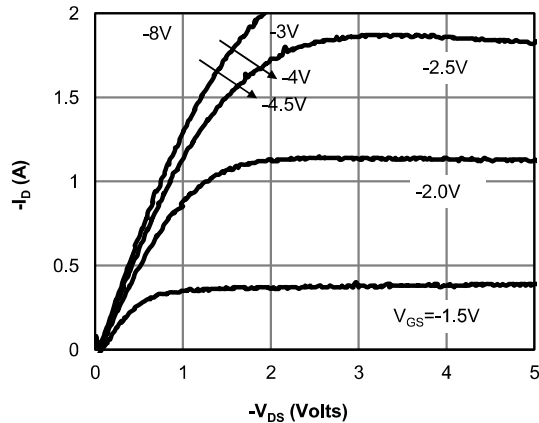


Fig 1: On-Region Characteristics (Note E)

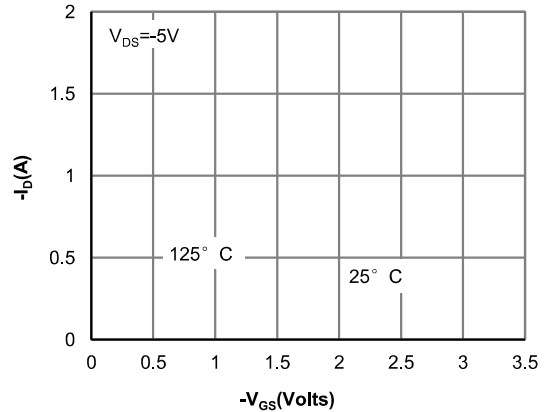


Figure 2: Transfer Characteristics (Note E)

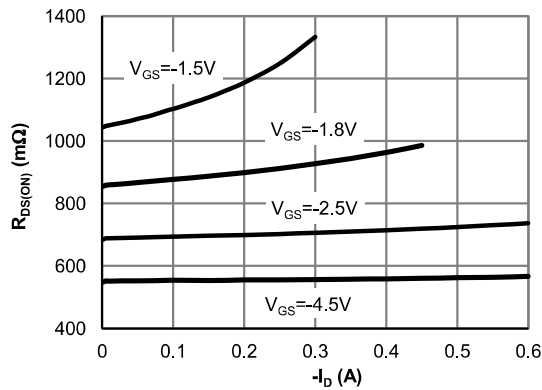


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

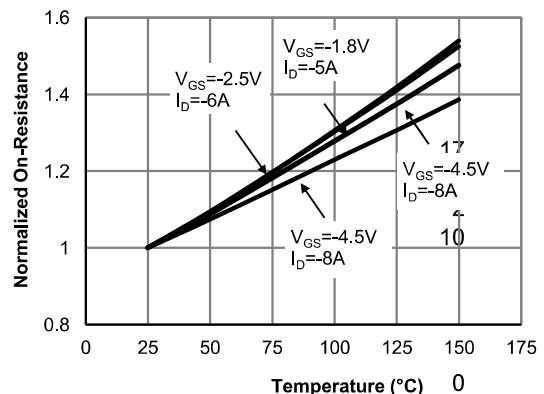


Figure 4: On-Resistance vs. Junction Temperature (Note E)

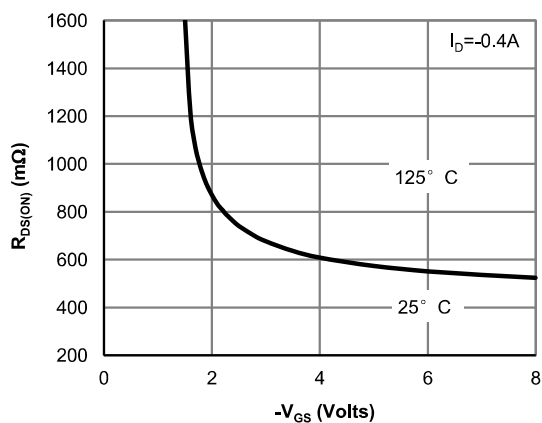


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

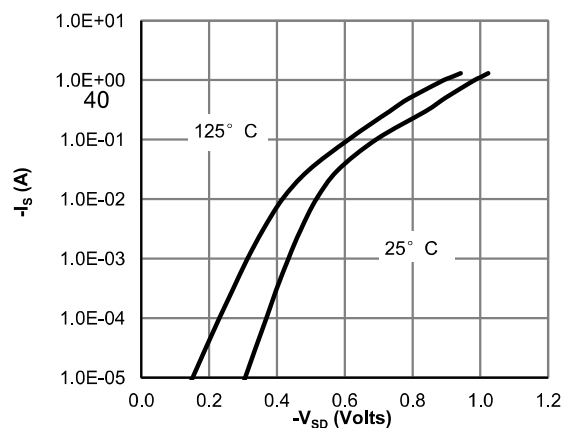


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

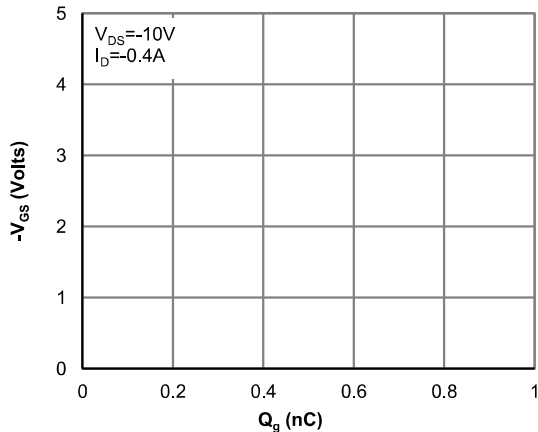


Figure 7: Gate-Charge Characteristics

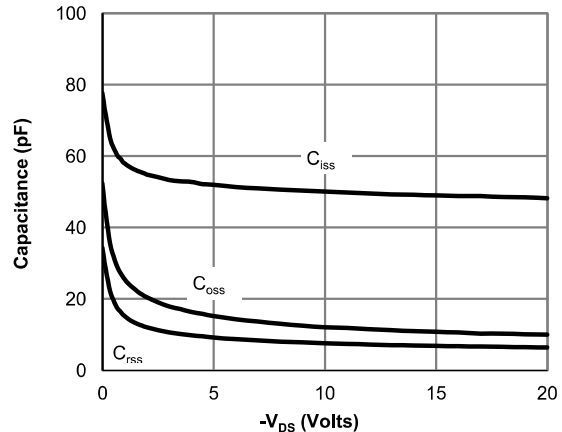


Figure 8: Capacitance Characteristics

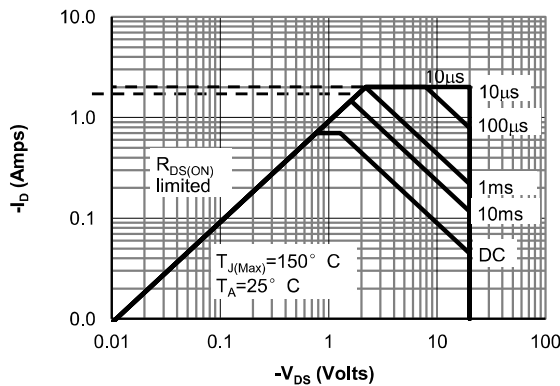


Figure 9: Maximum Forward Biased Safe Operating Area (Note B)

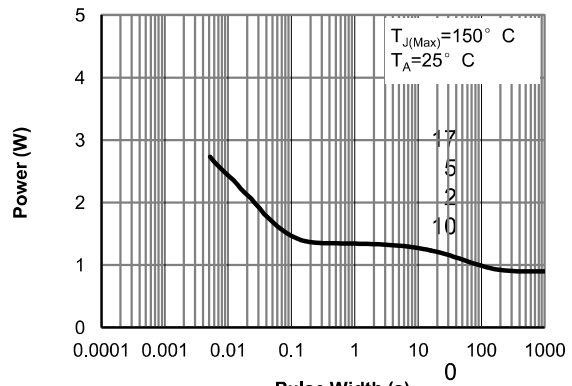


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note B)

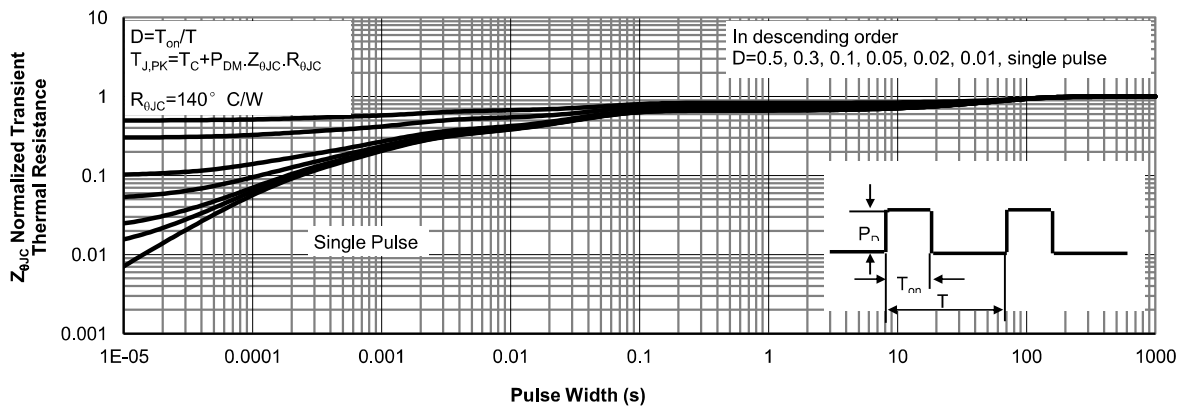


Figure 11: Normalized Maximum Transient Thermal Impedance (Note B)