

AP3065SD

N and P-Channel Enhancement Mosfet

Feature

- **N-Channel**

$V_{DD}=40V, I_D=7A$

$R_{DS(ON)} < 45m\Omega @ V_{GS}=10V$ TYP=30 m Ω

$R_{DS(ON)} < 60m\Omega @ V_{GS}=4.5V$ TYP=42 m Ω

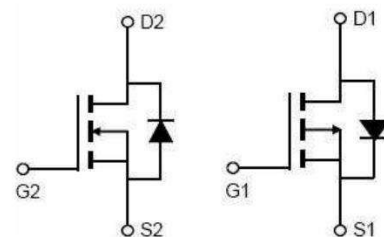
- **P-Channel**

$V_{DD}=-40V, I_D=-6A$

$R_{DS(ON)} < 85m\Omega @ V_{GS}=-10V$ TYP=65 m Ω

$R_{DS(ON)} < 120m\Omega @ V_{GS}=-4.5V$ TYP=90 m Ω

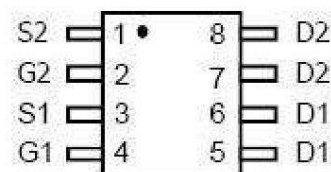
- Lead free product is acquired
- High power and current handling capability
- Surface mount package



N-channel

P-channel

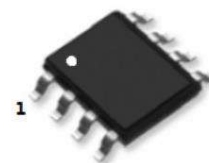
Schematic diagram



Marking and pin assignment

Application

- PWM applications
- Load Switch
- Power management



SOP-8

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
3065SD	AP3065SD	SOP-8	13 inch	-	4000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ C$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ($T_a = 25^\circ C$)	I_D	7	-6	A
Continuous Drain Current ($T_a = 100^\circ C$)	I_D	4.9	-4.2	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	28	-24	A
Power Dissipation	P_D	3	3	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	42	45	$^\circ C/W$
Junction Temperature	T_J	150	150	$^\circ C$
Storage Temperature	T_{STG}	-55~ +150	-55~ +150	$^\circ C$

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N-CH ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage ⁽²⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.7	2.5	V
Drain-source on-resistance ⁽²⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 5A$		30	45	m Ω
		$V_{GS} = 4.5V, I_D = 3A$		42	60	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$		381		pF
Output Capacitance	C_{oss}			48		
Reverse Transfer Capacitance	C_{rss}			40		
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 2A, R_L = 6\Omega$ $V_{GS} = 10V, R_G = 1\Omega$		4		ns
Turn-on rise time	t_r			21		
Turn-off delay time	$t_{d(off)}$			12		
Turn-off fall time	t_f			20		
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 3A,$ $V_{GS} = 10V$		9.8		nC
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			2.1		
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V_{DS}	$V_{GS} = 0V, I_S = 5A$			1.2	V
Diode Forward current ⁽³⁾	I_S		-	-	7	A

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P-CH ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage ⁽²⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.4	-2.5	V
Drain-source on-resistance ⁽²⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -5A$		65	85	m Ω
		$V_{GS} = -4.5V, I_D = -3A$		90	120	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -20V, V_{GS} = 0V, f = 1MHz$		596		pF
Output Capacitance	C_{oss}			90		
Reverse Transfer Capacitance	C_{rss}			70		
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -20V, I_D = -3A, R_L = 6\Omega$ $V_{GS} = -10V, R_G = 1\Omega$		9		ns
Turn-on rise time	t_r			8		
Turn-off delay time	$t_{d(off)}$			28		
Turn-off fall time	t_f			10		
Total Gate Charge	Q_g	$V_{DS} = -20V, I_D = -3A,$ $V_{GS} = -10V$		14		nC
Gate-Source Charge	Q_{gs}			2.9		
Gate-Drain Charge	Q_{gd}			3.8		
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V_{DS}	$V_{GS} = 0V, I_S = -5A$			1.2	V
Diode Forward current ⁽³⁾	I_S		-	-	-6	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit

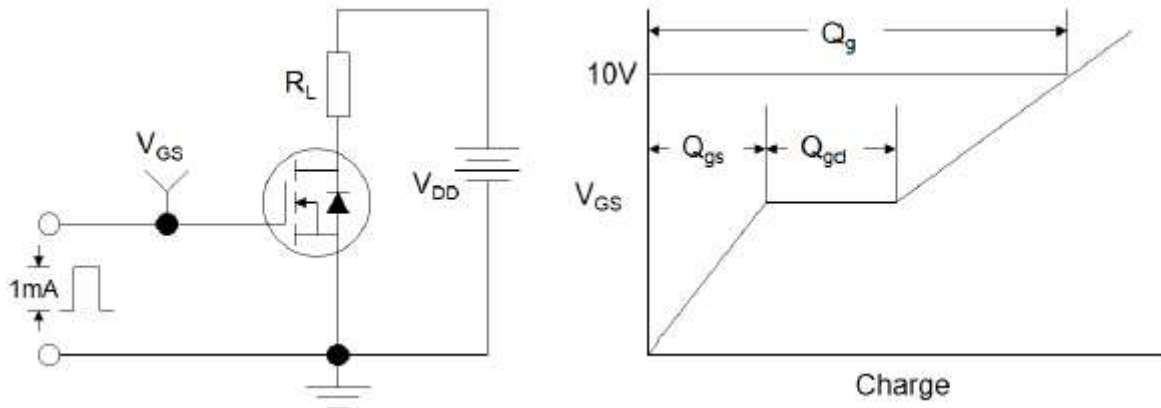


Figure1:Gate Charge Test Circuit & Waveform

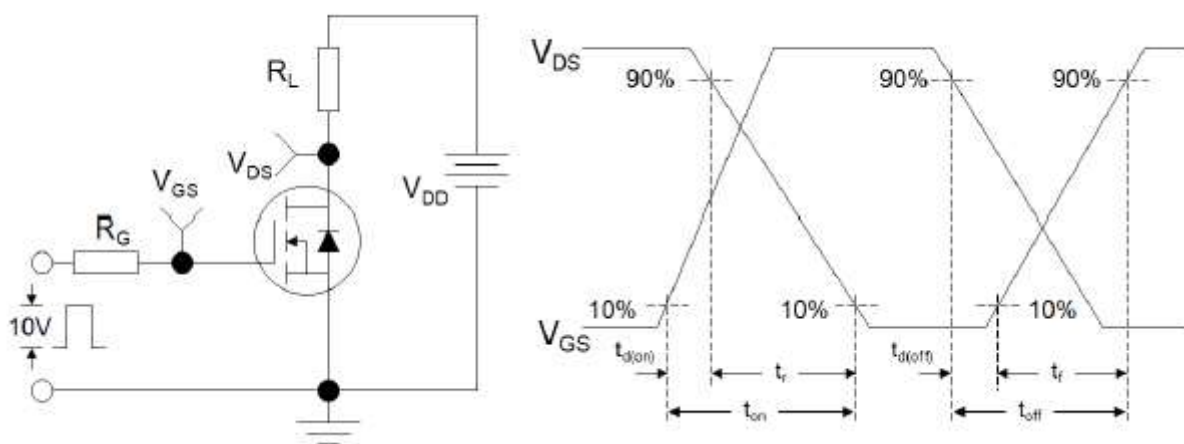


Figure 2: Resistive Switching Test Circuit & Waveforms

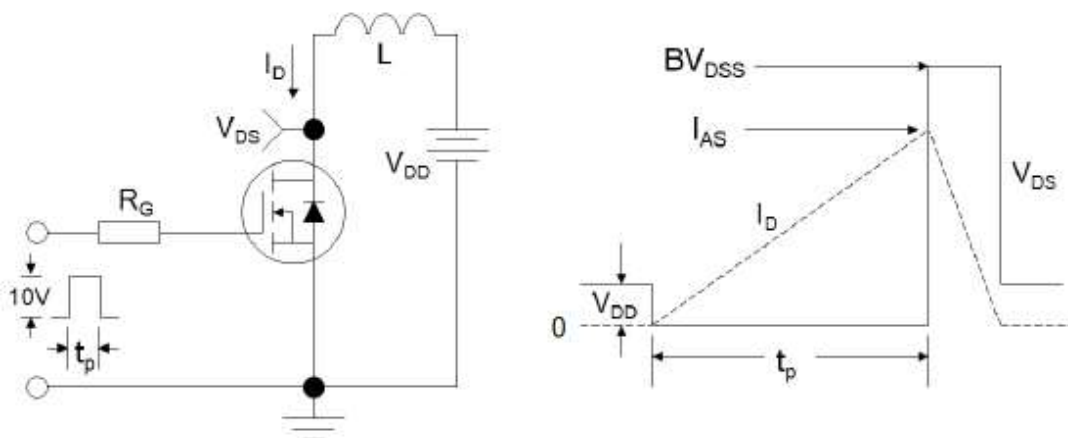


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

N-Channel

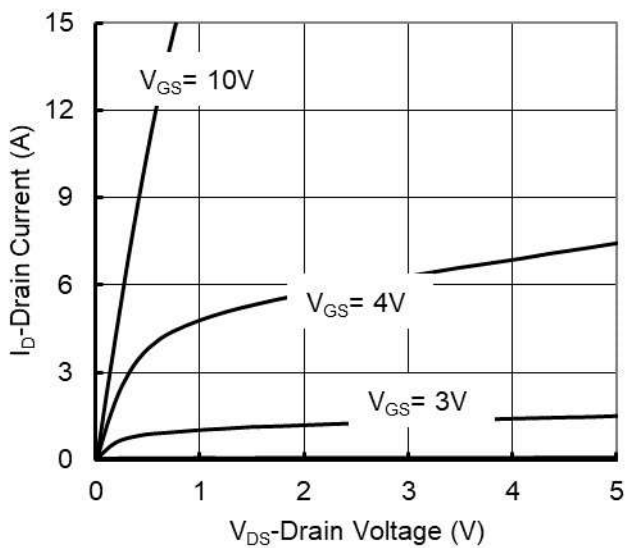


Figure1. Output Characteristics

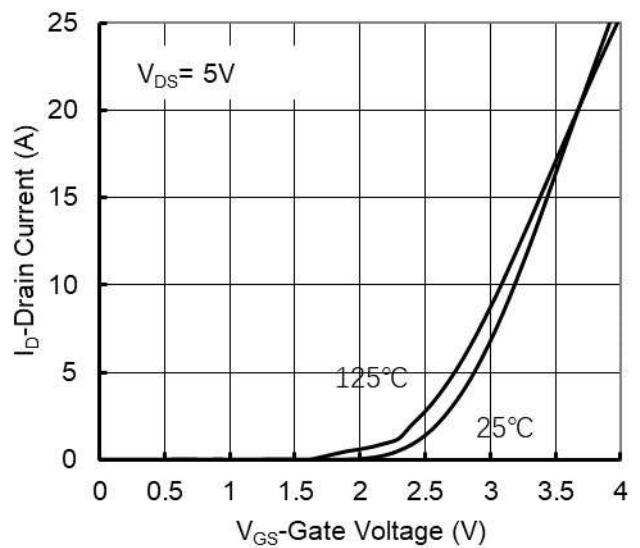


Figure2. Transfer Characteristics

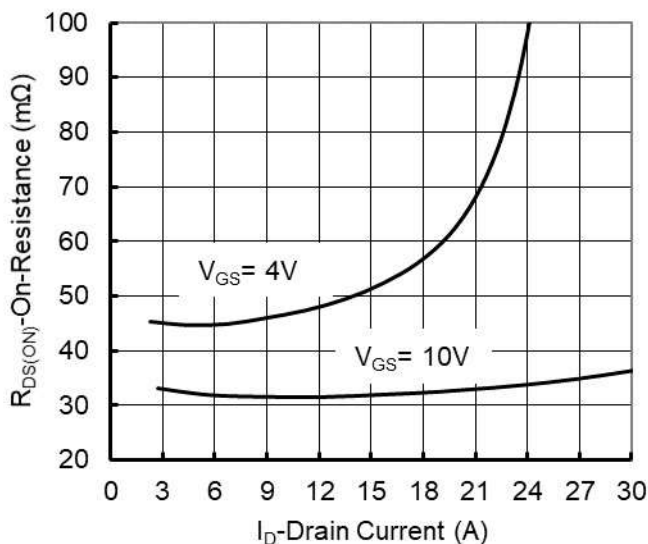


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

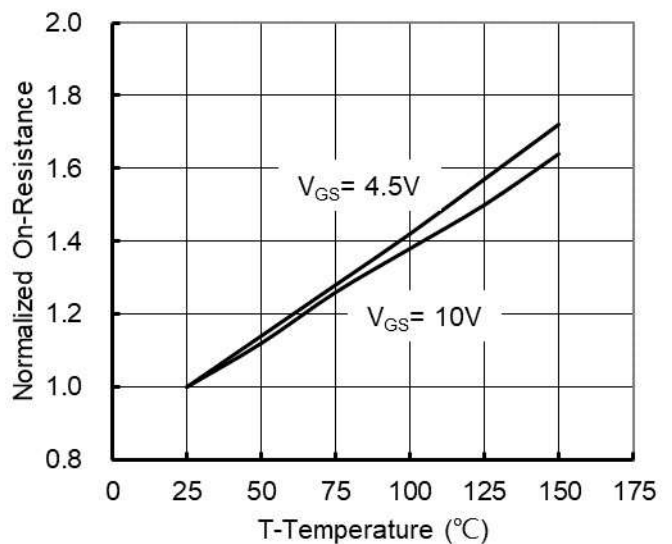


Figure 4: On-Resistance vs. Junction Temperature

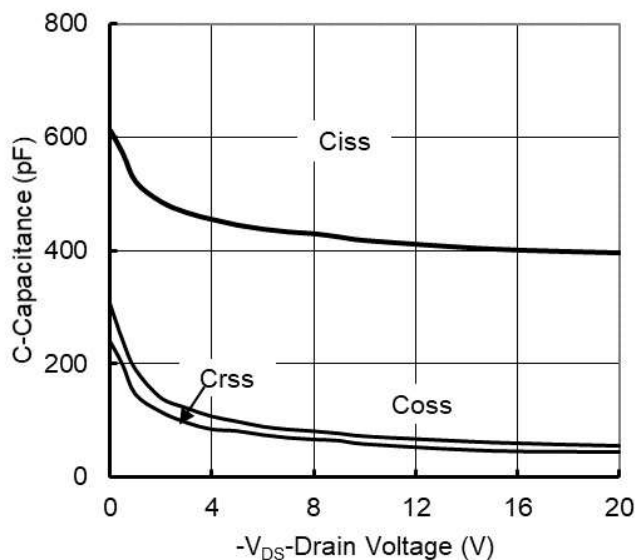


Figure5. Capacitance Characteristics

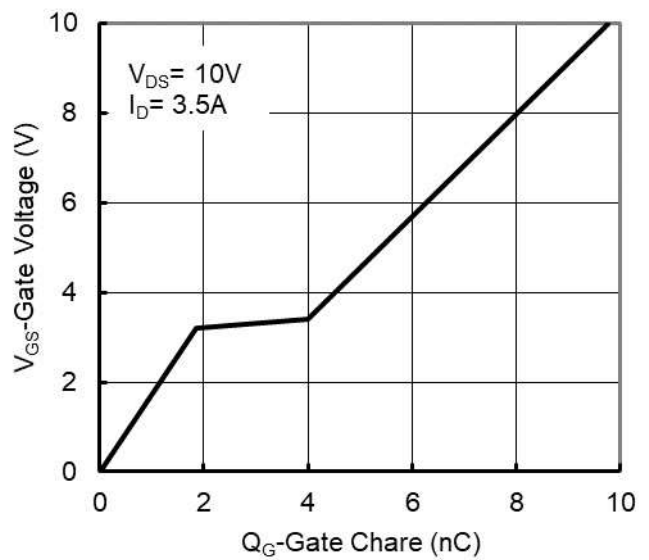


Figure6. Gate Charge

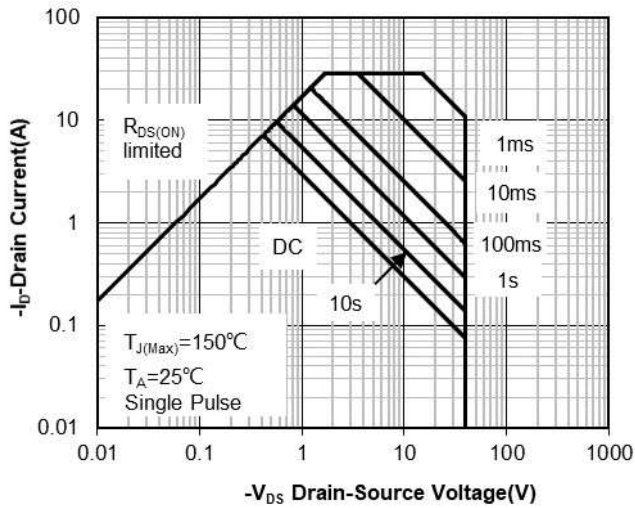


Figure7. Safe Operation Area

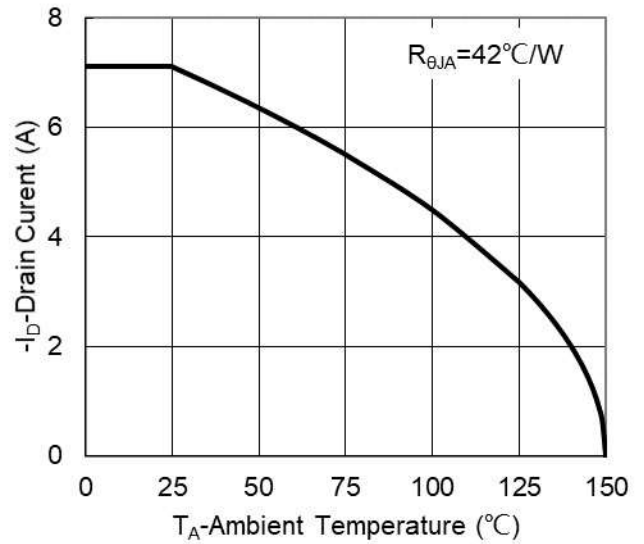


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

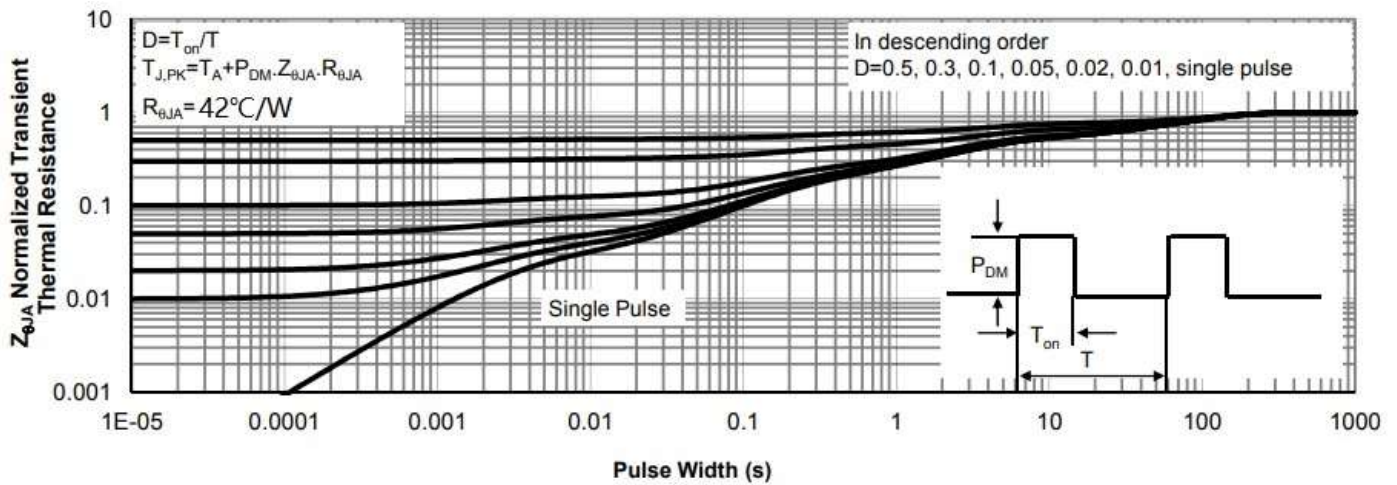


Figure9. Normalized Maximum Transient Thermal Impedance

P-Channel

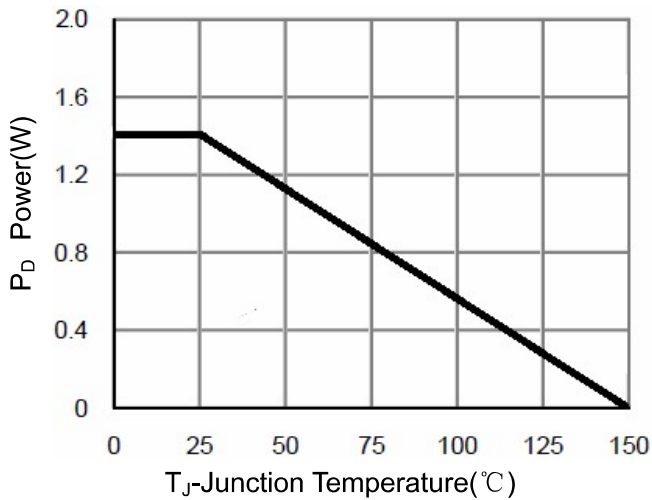


Figure 1 Power Dissipation

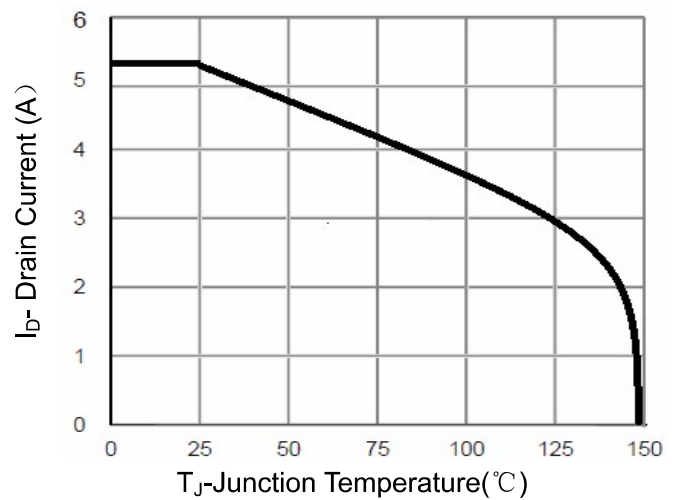


Figure 2 Drain Current

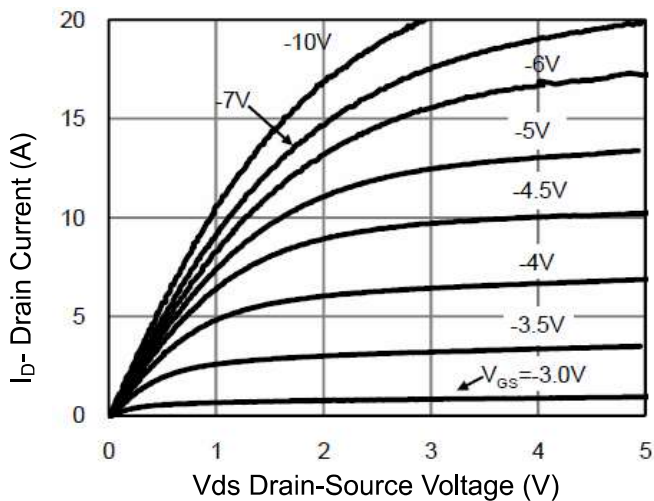


Figure 3 Output Characteristics

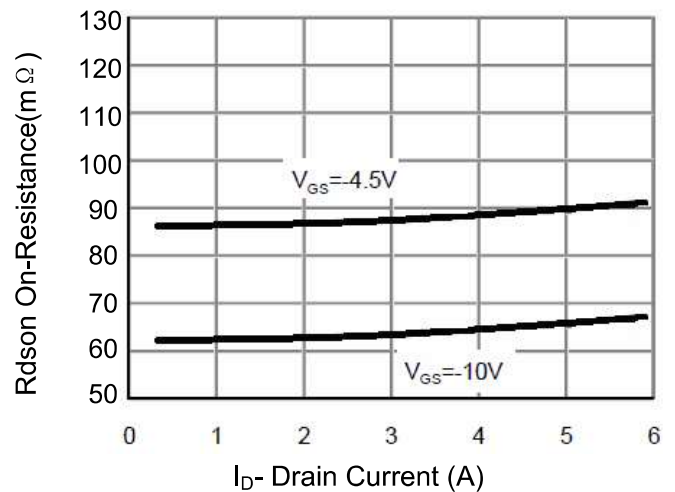


Figure 4 Drain-Source On-Resistance

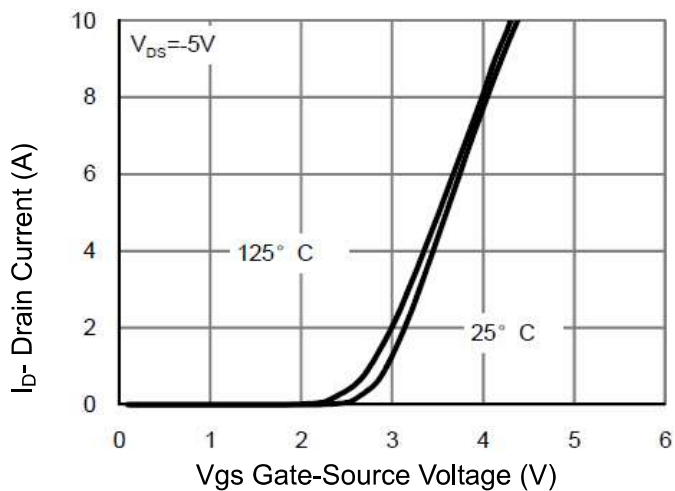


Figure 5 Transfer Characteristics

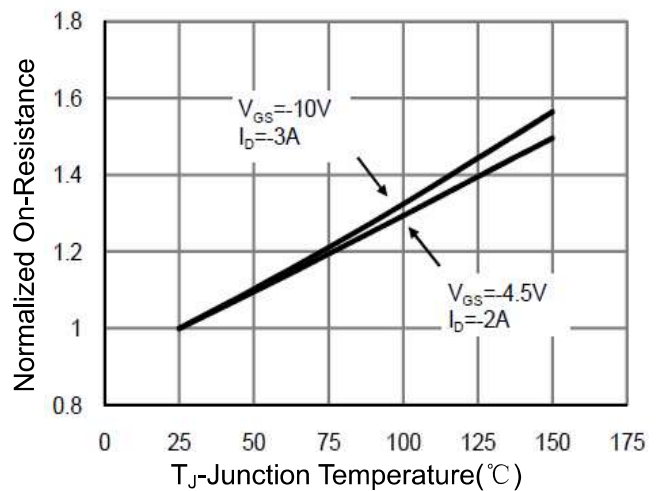


Figure 6 Drain-Source On-Resistance

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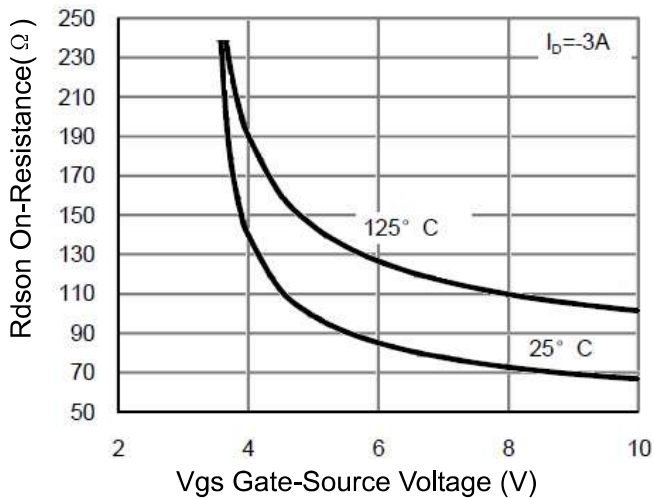


Figure 7 Rdson vs Vgs

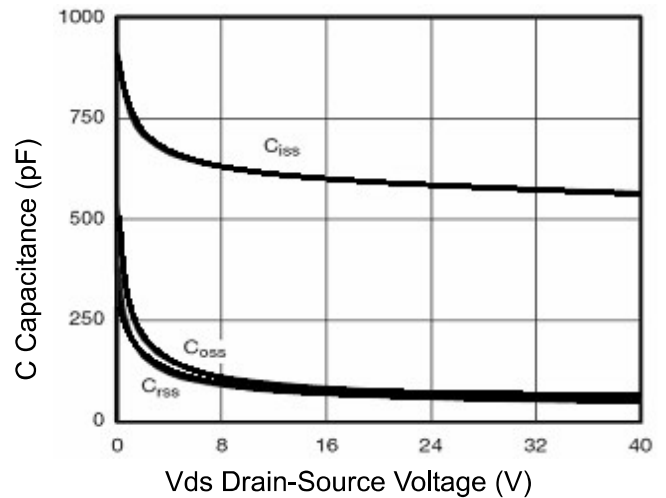


Figure 8 Capacitance vs Vds

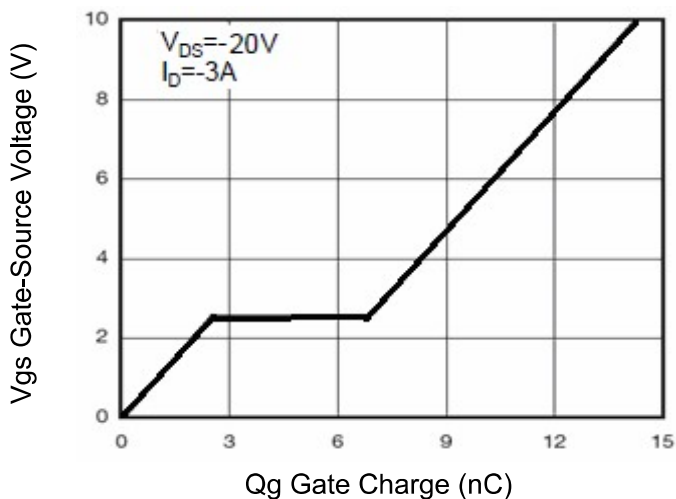


Figure 9 Gate Charge

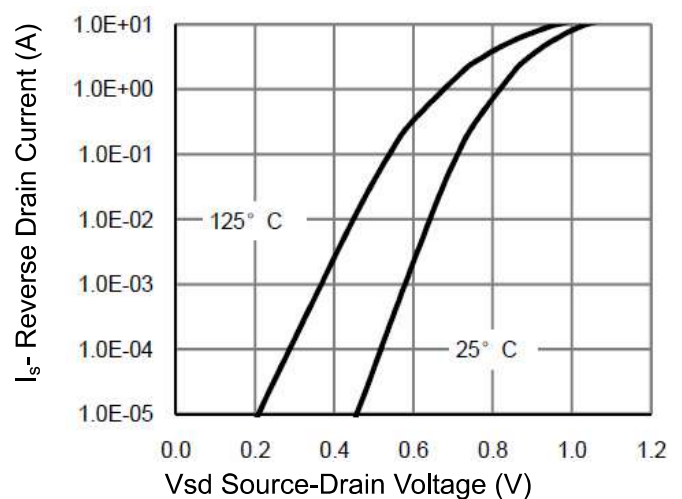


Figure 10 Source- Drain Diode Forward

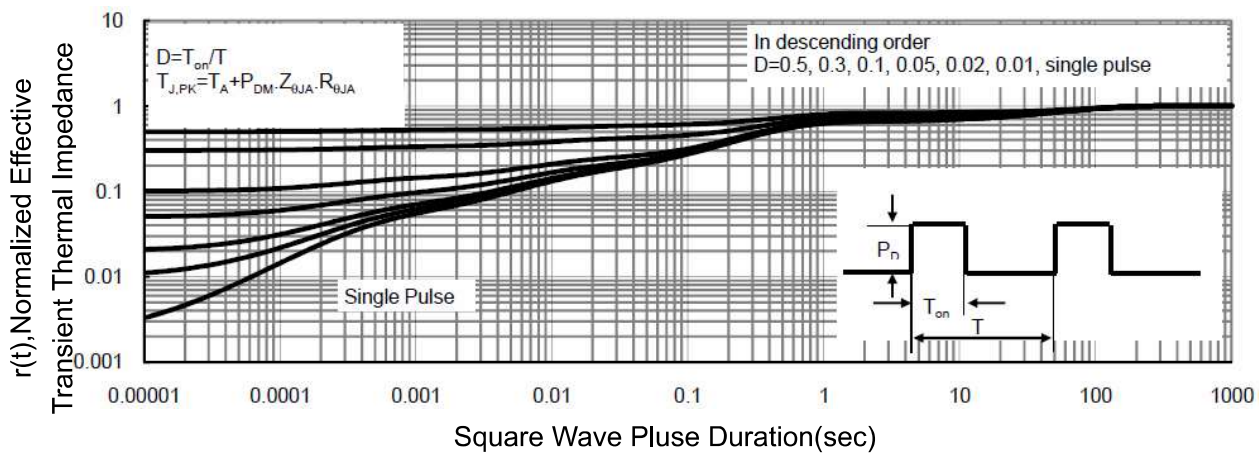
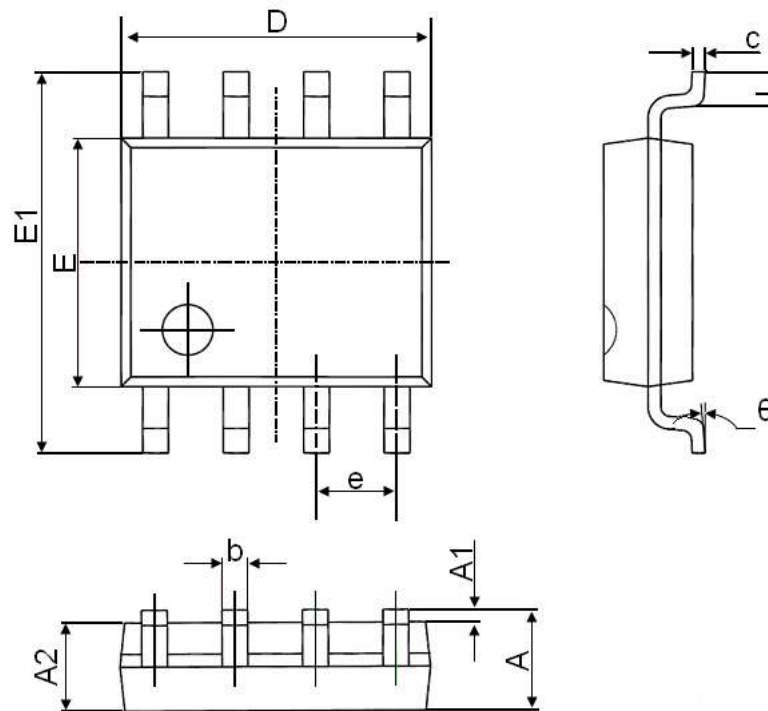


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°

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