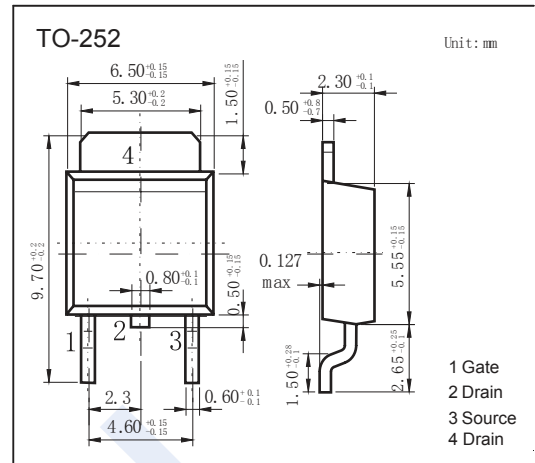
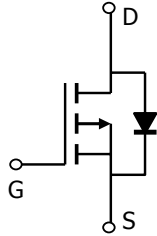


## P-Channel MOSFET

### AOD413 (KOD413)

#### ■ Features

- $V_{BS} (V) = -40V$
- $I_D = -12 A (V_{GS} = -10V)$
- $R_{DS(ON)} < 45m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 69m\Omega (V_{GS} = -4.5V)$



#### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DS}$	-40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current	$T_a = 25^\circ C$	$I_D$	-12	A
	$T_a = 100^\circ C$		-12	
Pulsed Drain Current		$I_{DM}$	-30	
Avalanche Current		$I_{AR}$	-12	W
Repetitive avalanche energy	$L=0.1mH$	$E_{AR}$	30	
	Power Dissipation	$T_c=25^\circ C$	$P_D$	50
$T_c=100^\circ C$		25		
Power Dissipation	$T_a=25^\circ C$	$P_{DSM}$	2.5	W
	$T_a=100^\circ C$		1.6	
Thermal Resistance.Junction- to-Ambient	$t \leq 10s$	$R_{thJA}$	25	$^\circ C/W$
	Steady-State		50	
Thermal Resistance.Junction- to-Case	Steady-State	$R_{thJC}$	3	$^\circ C$
Junction Temperature		$T_J$	175	
Junction Storage Temperature Range		$T_{stg}$	-55 to 175	

## P-Channel MOSFET

### AOD413 (KOD413)

#### ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =-10mA, V <sub>GS</sub> =0V	-40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V			-1	μA
		V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C			-5	
Gate-Body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 μA	-1		-3	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-12A			45	mΩ
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-12A, T <sub>J</sub> =125°C			70	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A			69	
On state drain current	I <sub>D(ON)</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-30			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-12A		16		S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-20V, f=1MHz		657	850	pF
Output Capacitance	C <sub>oss</sub>			143	185	
Reverse Transfer Capacitance	C <sub>rss</sub>			63	90	
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		6.5		Ω
Total Gate Charge (10V)	Q <sub>g</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-20V, I <sub>D</sub> =-12A		14.1		nC
Total Gate Charge (4.5V)				7		
Gate Source Charge	Q <sub>gs</sub>			2.2		
Gate Drain Charge	Q <sub>gd</sub>			4.1		
Turn-On DelayTime	t <sub>d(on)</sub>			8		
Turn-On Rise Time	t <sub>r</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-20V, R <sub>L</sub> =1.7Ω, R <sub>GEN</sub> =3Ω		12.2		ns
Turn-Off DelayTime	t <sub>d(off)</sub>			24		
Turn-Off Fall Time	t <sub>f</sub>			12.5		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-12A, di/dt=100A/us		23.2		nC
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			18.2		
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-12	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V			-1	V

## P-Channel MOSFET AOD413 (KOD413)

### ■ Typical Characteristics

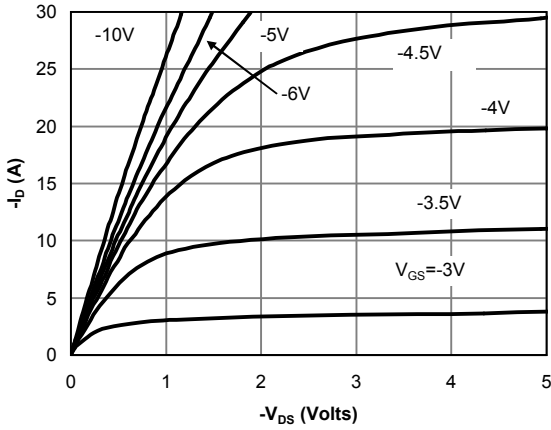


Fig 1: On-Region Characteristics

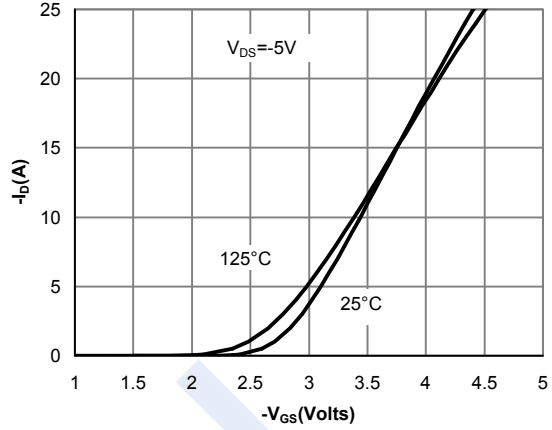


Figure 2: Transfer Characteristics

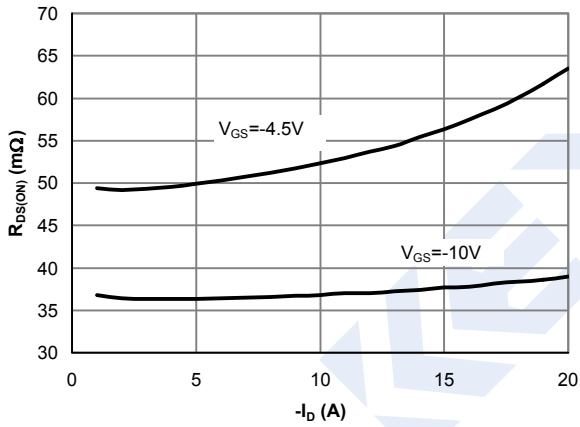


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

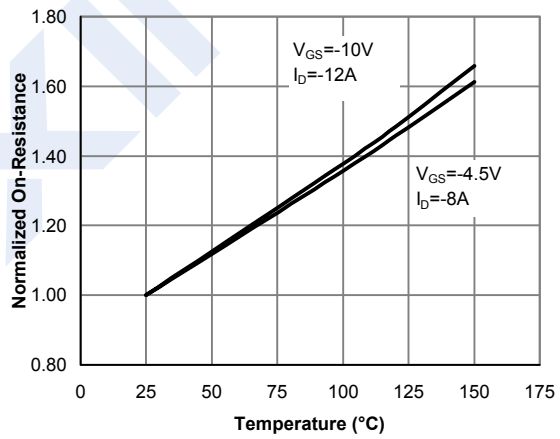


Figure 4: On-Resistance vs. Junction Temperature

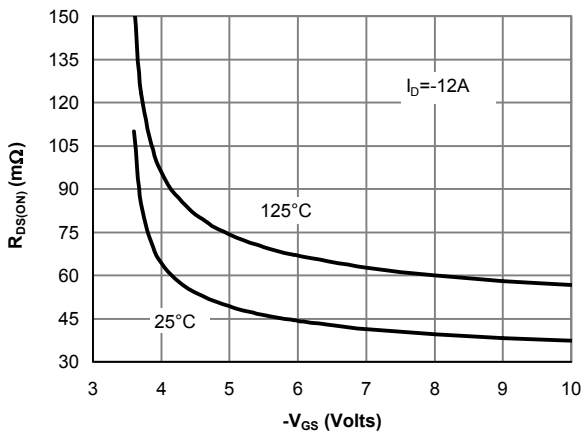


Figure 5: On-Resistance vs. Gate-Source Voltage

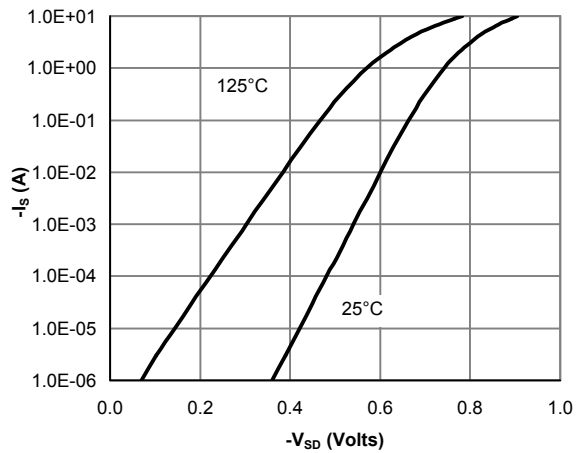


Figure 6: Body-Diode Characteristics

## P-Channel MOSFET AOD413 (KOD413)

■ Typical Characteristics

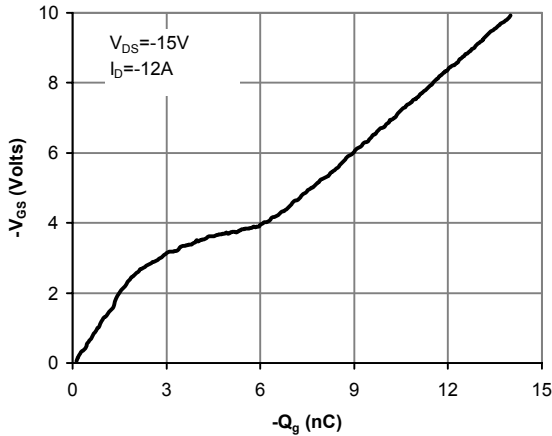


Figure 7: Gate-Charge Characteristics

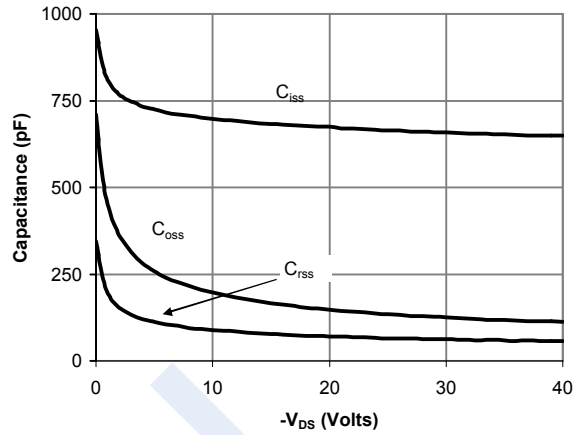


Figure 8: Capacitance Characteristics

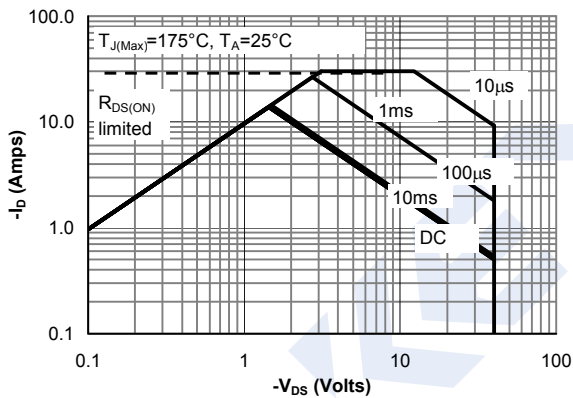


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

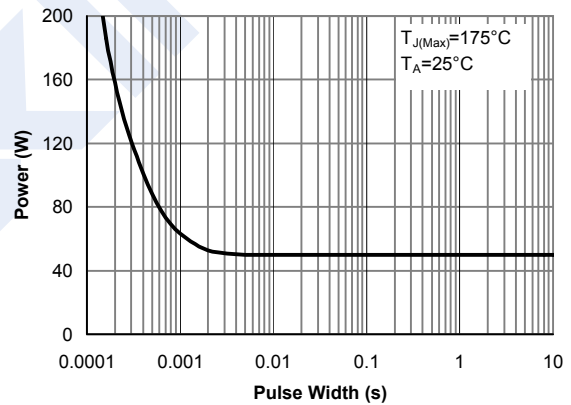


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

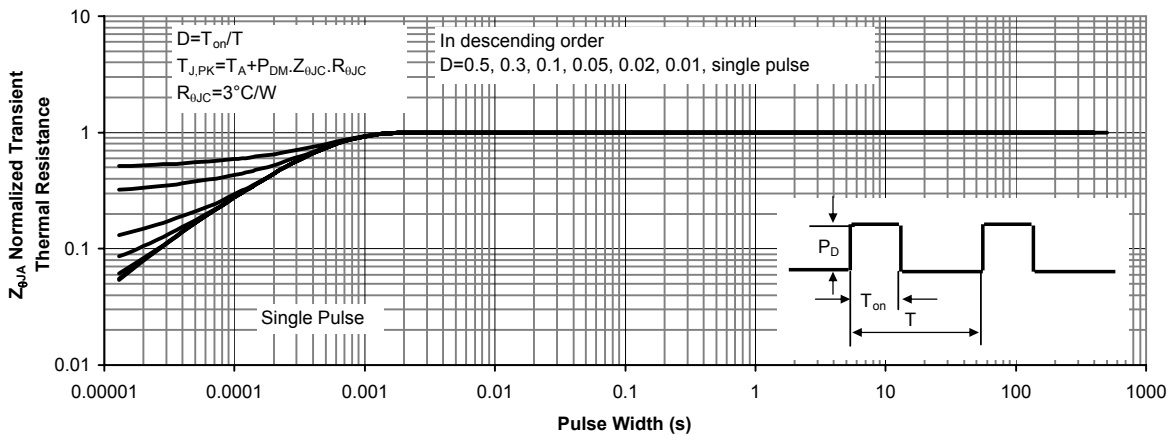


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

## P-Channel MOSFET AOD413 (KOD413)

■ Typical Characteristics

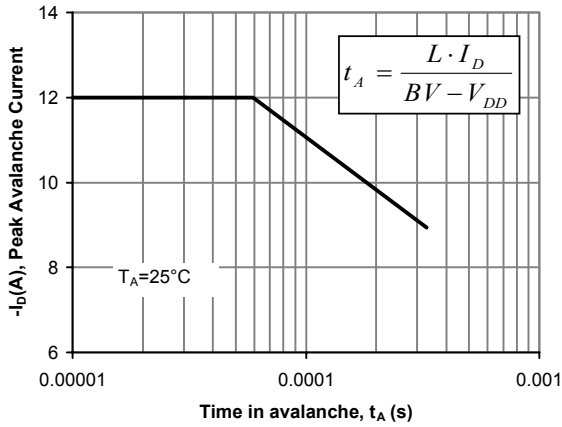


Figure 12: Single Pulse Avalanche capability

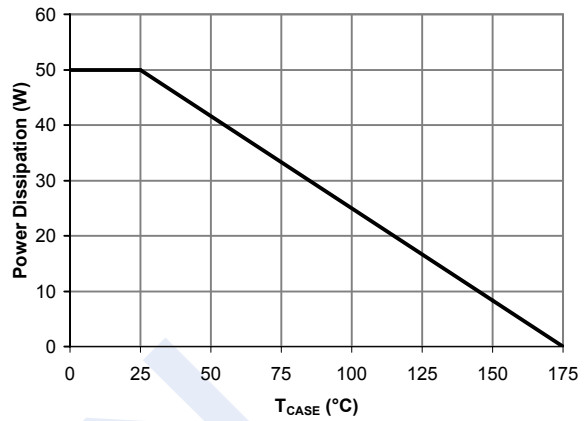


Figure 13: Power De-rating (Note B)

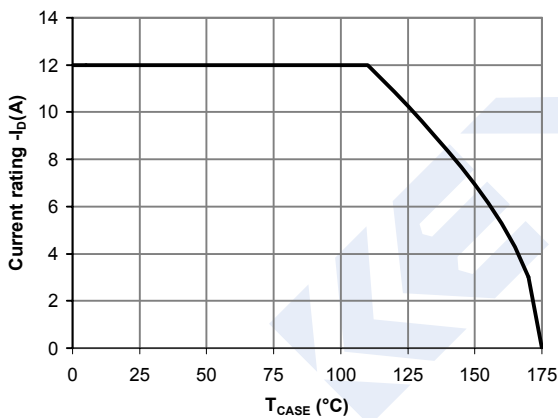


Figure 14: Current De-rating (Note B)

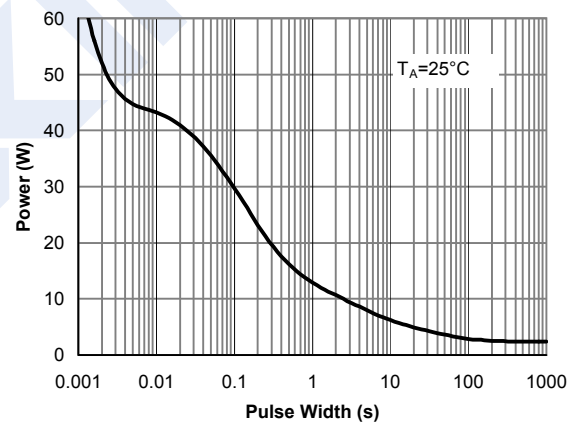


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

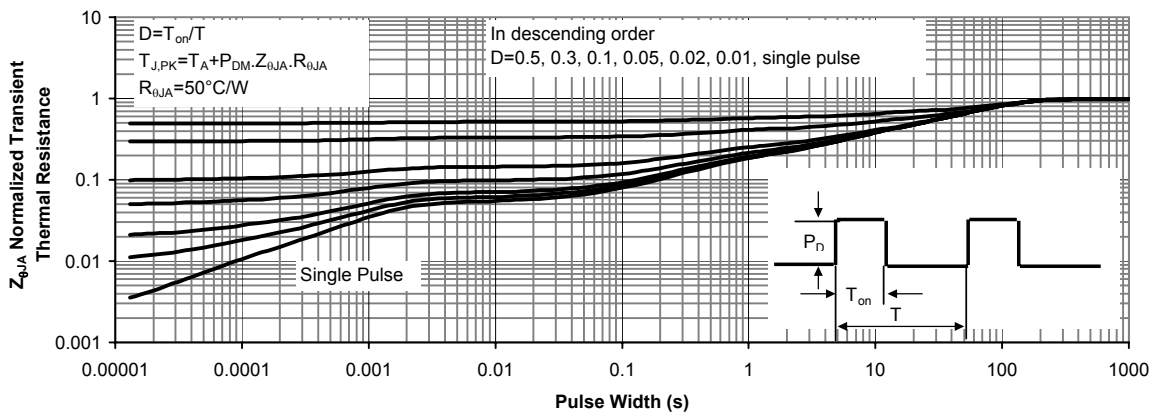


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)