

• General Description

AP4407 combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load-switch or PWM applications.

• Applications

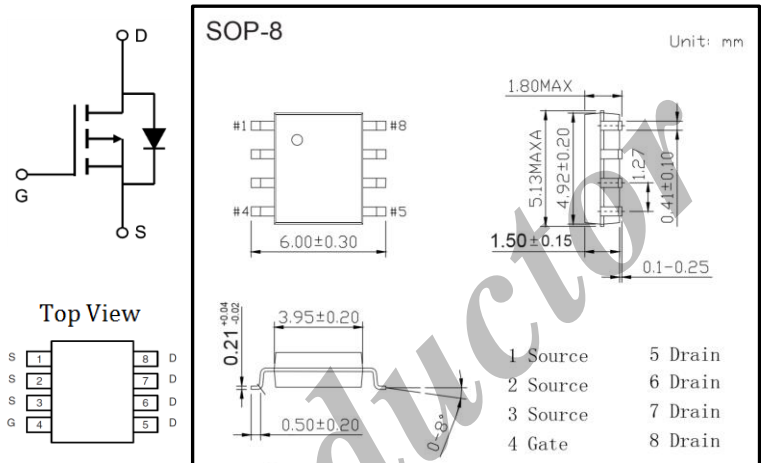
- DC-DC converter for portable devices
- Load switch
- Battery Protection

• Product Summary

V_{DS}	30V
I_D (at $V_{GS} = -20V$)	.12A
$R_{DS(ON)}$ (at $V_{GS} = -20V$)	< 13m Ω
$R_{DS(ON)}$ (at $V_{GS} = -10V$)	< 14m Ω
$R_{DS(ON)}$ (at $V_{GS} = -5V$)	< 30m Ω

• Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current	I_D	$T_a = 25^\circ C$	-12
		$T_a = 70^\circ C$	-10
Pulsed Drain Current	I_{DM}	-60	A
Avalanche Current	I_{AS}, I_{AR}	26	
Power Dissipation	P_D	$T_a = 25^\circ C$	3.1
		$T_a = 70^\circ C$	2
Avalanche Energy ($L = 0.3mH$)	E_{AS}, E_{AR}	101	mJ
Thermal Resistance. Junction-to-Ambient	$R_{\theta JA}$	$t \leq 10s$	40
		Steady State	75
Thermal Resistance. Junction-to-Case	$R_{\theta JC}$	24	$^\circ C/W$
Operating Junction Temperature	T_J	150	$^\circ C$
Storage Temperature Range	T_{STG}	-55 to 150	



• **Electrical Characteristics Ta = 25°C**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	$I_D = -250\mu A, V_{GS} = 0V$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$			-1	μA
		$V_{DS} = -30V, V_{GS} = 0V, T_J = 55^\circ C$			-5	
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 25V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.7		-2.8	V
Static Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = -20V, I_D = -12A$			13	m Ω
		$V_{GS} = -10V, I_D = -12A$			14	
		$V_{GS} = -10V, I_D = -12A, T_J = 125^\circ C$			19	
		$V_{GS} = -5V, I_D = -7A$			30	
On-State Drain Current	$I_{D(on)}$	$V_{GS} = -10V, V_{DS} = -5V$	-60			A
Forward Transconductance	g_{FS}	$V_{DS} = -5V, I_D = -10.5A$		27		S
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = -15V, f = 1MHz$		2060	2600	pF
Output Capacitance	C_{oss}			370		
Reverse Transfer Capacitance	C_{rss}			295		
Gate Resistance	R_g		$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	1.2	2.4	
Total Gate Charge	Q_g	$V_{GS} = -10V, V_{DS} = -15V, I_D = -12A$	24	30	36	nC
Gate Source Charge	Q_{gs}			4.6		
Gate Drain Charge	Q_{gd}			10		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = -10V, V_{DS} = -15V, R_L = 1.25\Omega, R_{GEN} = 3\Omega$		11		ns
Turn-On Rise Time	t_r			9.4		
Turn-Off Delay Time	$t_{D(off)}$			24		
Turn-Off Fall Time	t_f			12		
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -12A, d_i/d_t = 100A/\mu s$		30	40	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = -12A, d_i/d_t = 100A/\mu s$		22		nC
Maximum Body-Diode Continuous Current	I_S				-4	A
Diode Forward Voltage	V_{SD}	$I_S = -1A, V_{GS} = 0V$			-1	V

• **Ordering Information**

Ordering Part Number	Package	MOQ
AP4407	SOP-8	2,500 pcs / reel

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• Typical Electrical and Thermal Characteristics

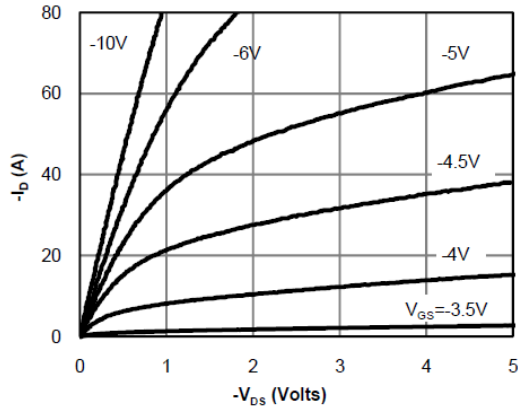


Figure 1: On-Region Characteristics

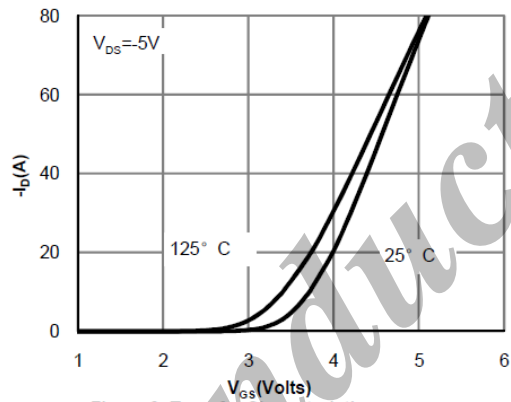


Figure 2: Transfer Characteristics

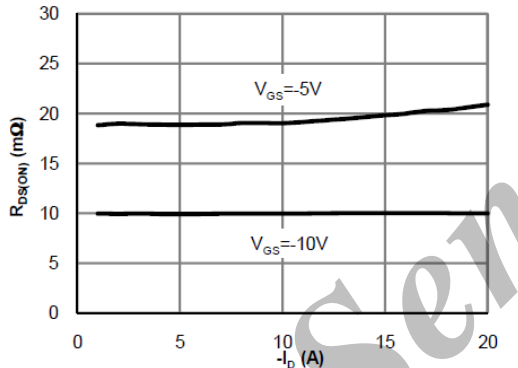


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

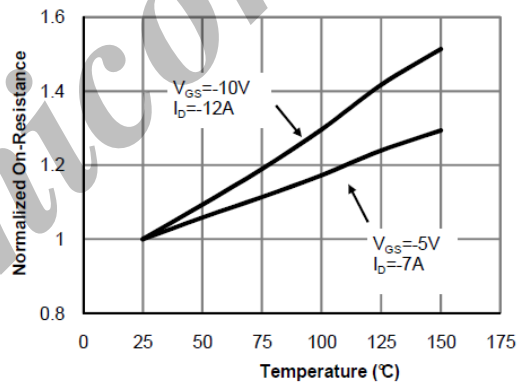


Figure 4: On-Resistance vs. Junction Temperature

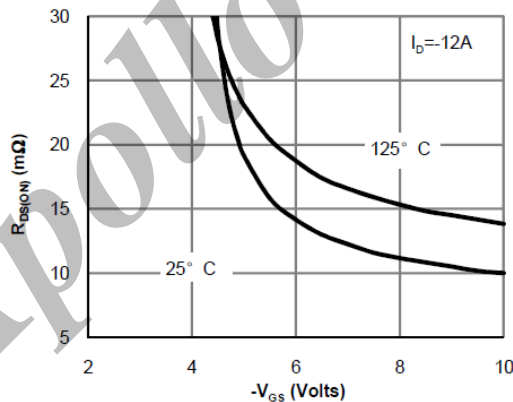


Figure 5: On-Resistance vs. Gate-Source Voltage

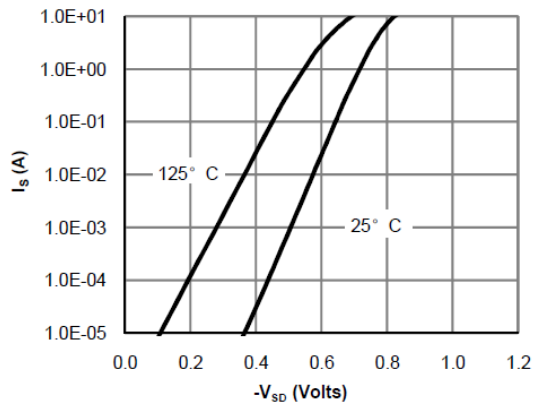


Figure 6: Body-Diode Characteristics

• Typical Electrical and Thermal Characteristics

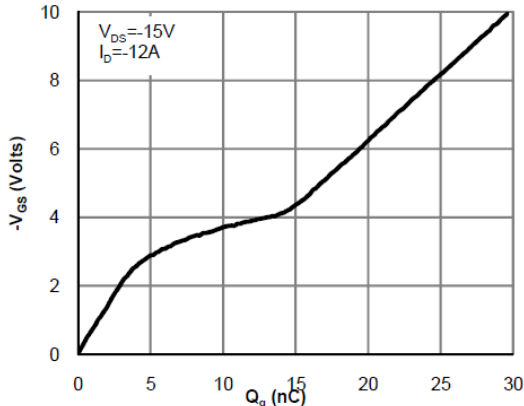


Figure 7: Gate-Charge Characteristics

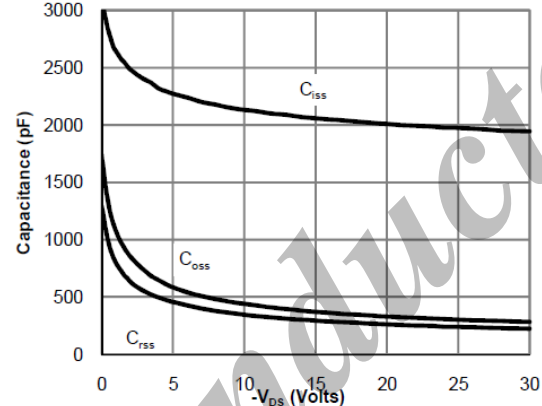


Figure 8: Capacitance Characteristics

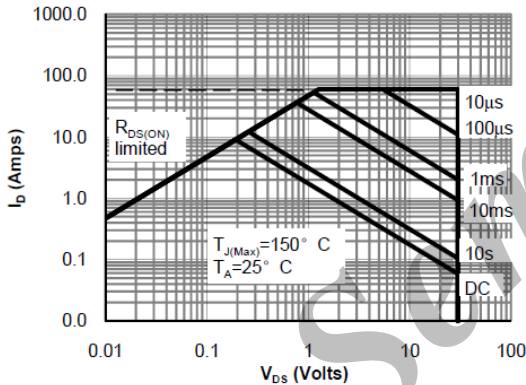


Figure 9: Maximum Forward Biased Safe Operating Area

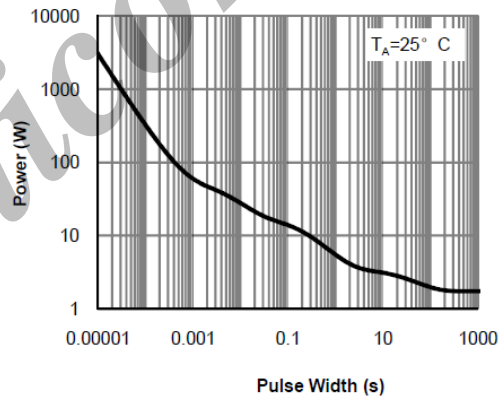


Figure 10: Single Pulse Power Rating Junction-to-Ambient

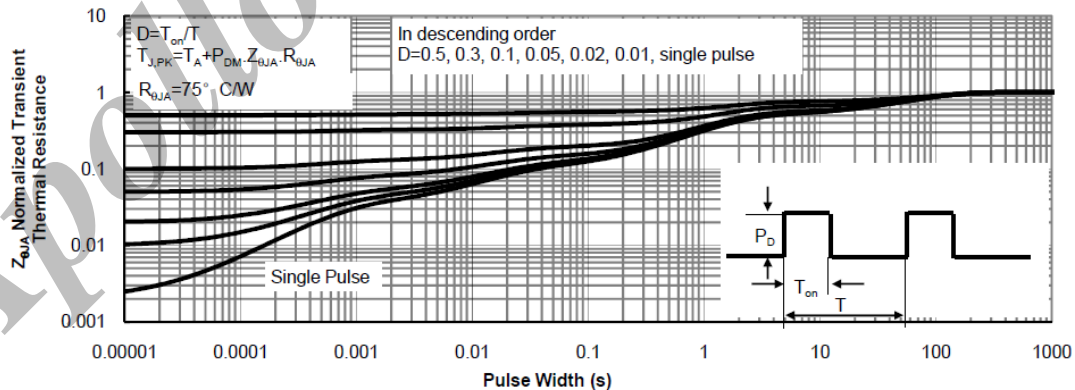


Figure 11: Normalized Maximum Transient Thermal Impedance

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