N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
30	0.0052 @ V_{GS} = 10 V	17	21
	0.0076 @ V_{GS} = 4.5 V	14	

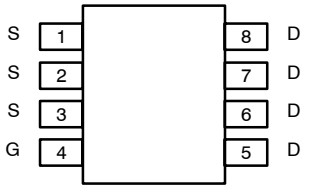
FEATURES

- TrenchFET® Power MOSFETS
- 100% R_g Tested

APPLICATIONS

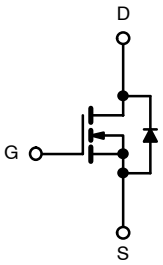
- Buck Converter
- Synchronous Rectifier
  - Secondary Rectifier

SO-8



Top View

Ordering Information: Si4856ADY—E3
Si4856ADY-T1—E3 (with Tape and Reel)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C)[a, b]	T_C = 25°C	I_D	26	A
	T_C = 70°C		21	
	T_A = 25°C		17	
	T_A = 70°C		14	
Pulsed Drain Current		I_{DM}	±50	
Continuous Source Current (Diode Conduction)[a, b]		I_S	2.7	
Pulse Source-Drain Diode Current		I_{SM}	50	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	45	
Single Pulse Avalanche Energy		E_{AS}	100	mJ
Maximum Power Dissipation[a]	T_C = 25°C	P_D	6.5	W
	T_C = 70°C		4.2	
	T_A = 25°C		3.0	
	T_A = 70°C		2.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (MOSFET)[a]	t ≤ 10 sec	R_{thJA}	34	41	°C/W
	Steady State		67	80	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	15	19	

Notes
a. Surface Mounted on 1" x 1" FR4 Board.
b. t = 10 sec

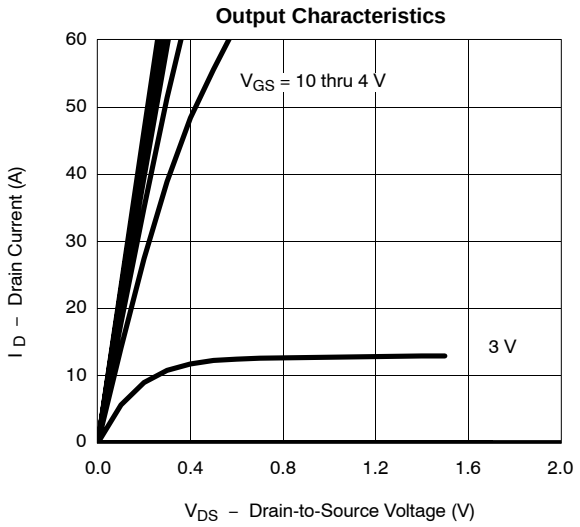
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

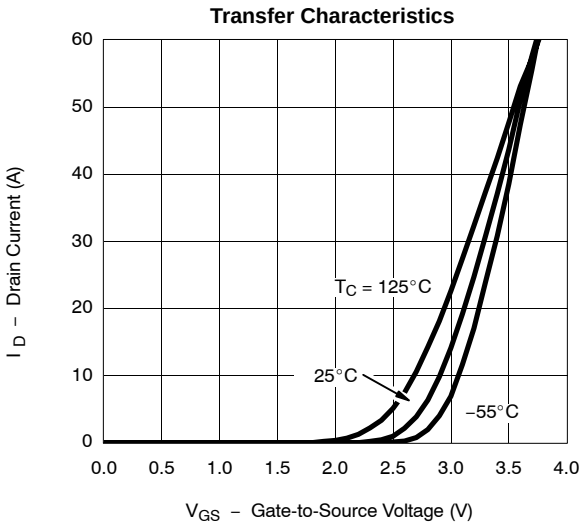
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μA	1.5		2.5	V
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA	30			
V_{DS} Temperature Coefficient	$\Delta V_{DS/Tj}$	I_D = 250 μA		24		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)/Tj}$			−6.2		
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	μA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 70°C			5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	40			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 17 A		0.0043	0.0052	Ω
		V_{GS} = 4.5 V, I_D = 14 A		0.0063	0.0076	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 17 A		57		S
Diode Forward Voltage[a]	V_{SD}	I_S = 2.7 A, V_{GS} = 0 V		0.72	1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 17 A		21	32	nC
Gate-Source Charge	Q_{gs}			8.2		
Gate-Drain Charge	Q_{gd}			7.2		
Gate-Resistance	R_g		0.7	1.5	2.3	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		18	27	ns
Rise Time	t_r			15	23	
Turn-Off Delay Time	$t_{d(off)}$			57	90	
Fall Time	t_f			20	30	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 2.7 A, di/dt = 100 A/μs		40	60	
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 2.9 A, di/dt = 100 A/μs		36	60	nC

Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

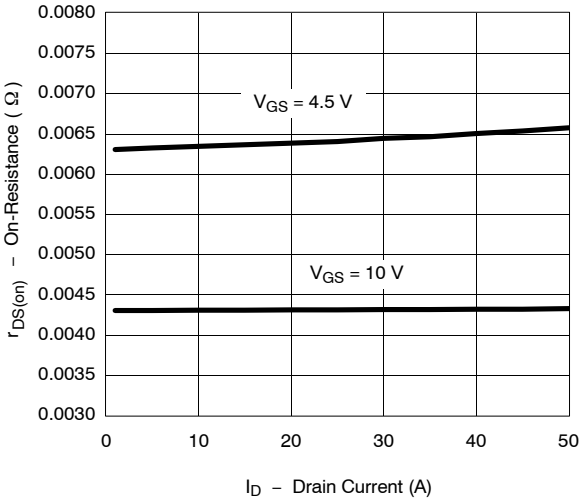
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



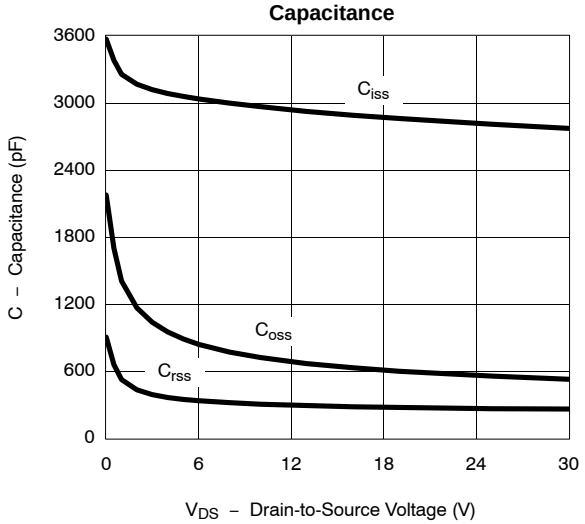


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

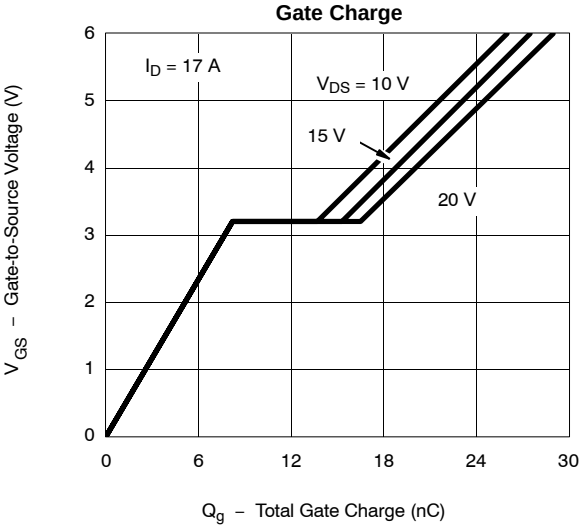
On-Resistance vs. Drain Current



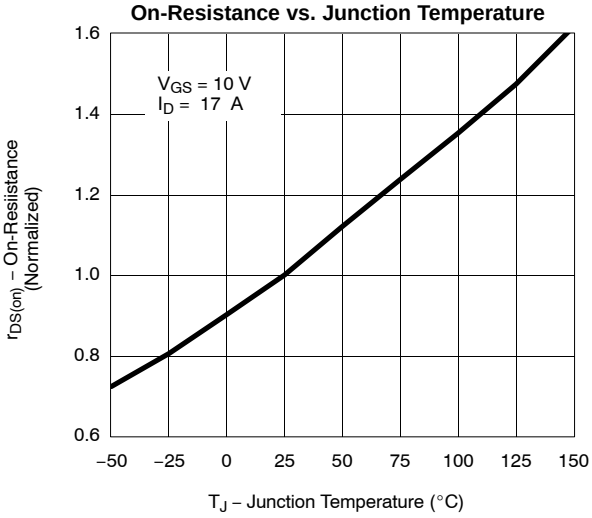
Capacitance



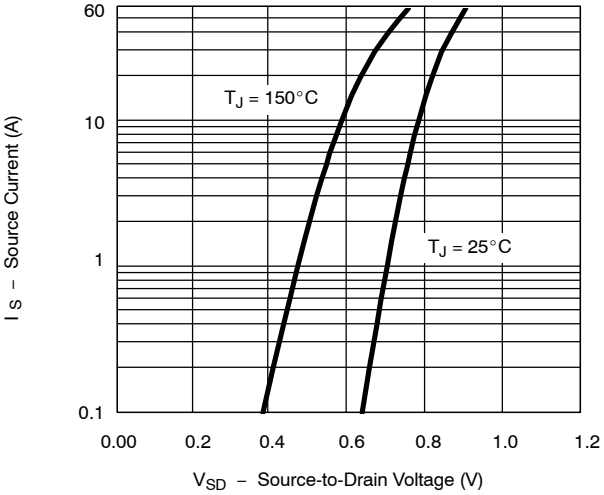
Gate Charge



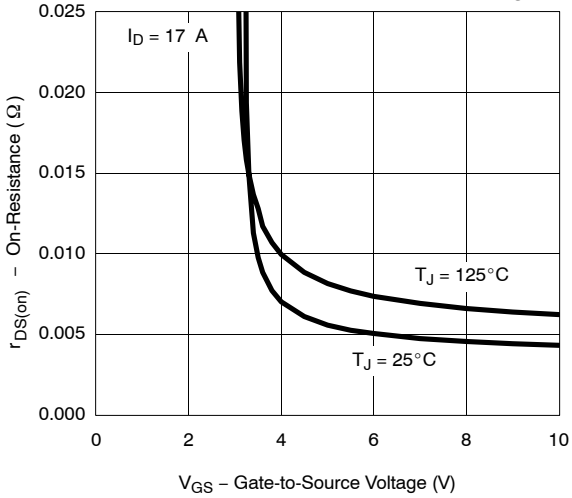
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

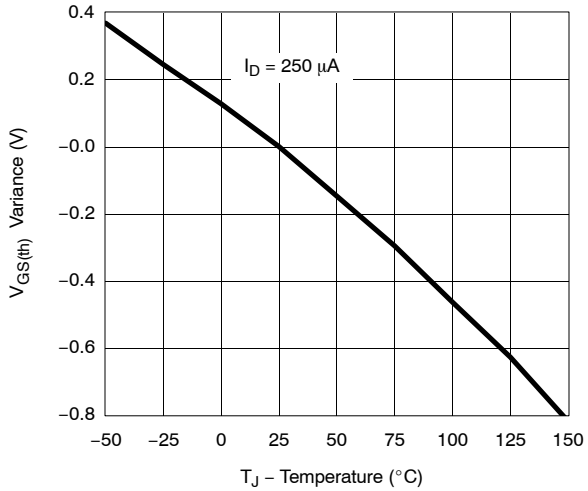


On-Resistance vs. Gate-to-Source Voltage

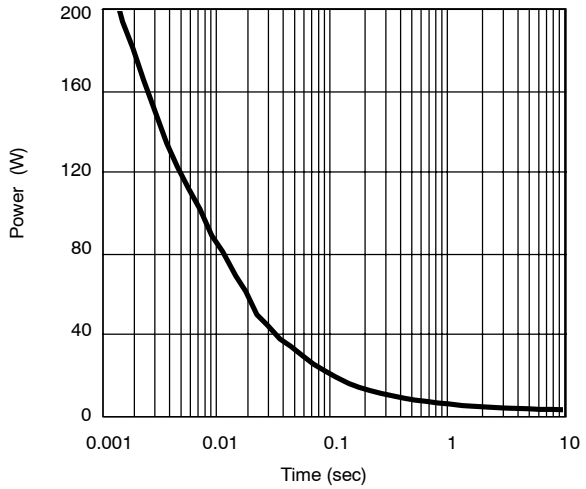


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

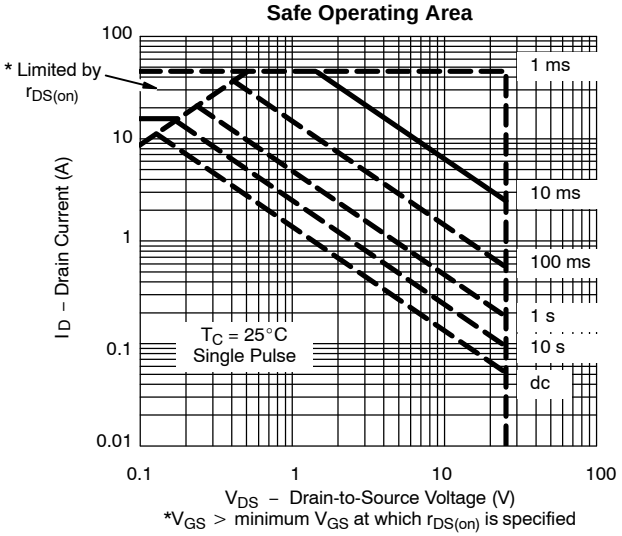
Threshold Voltage



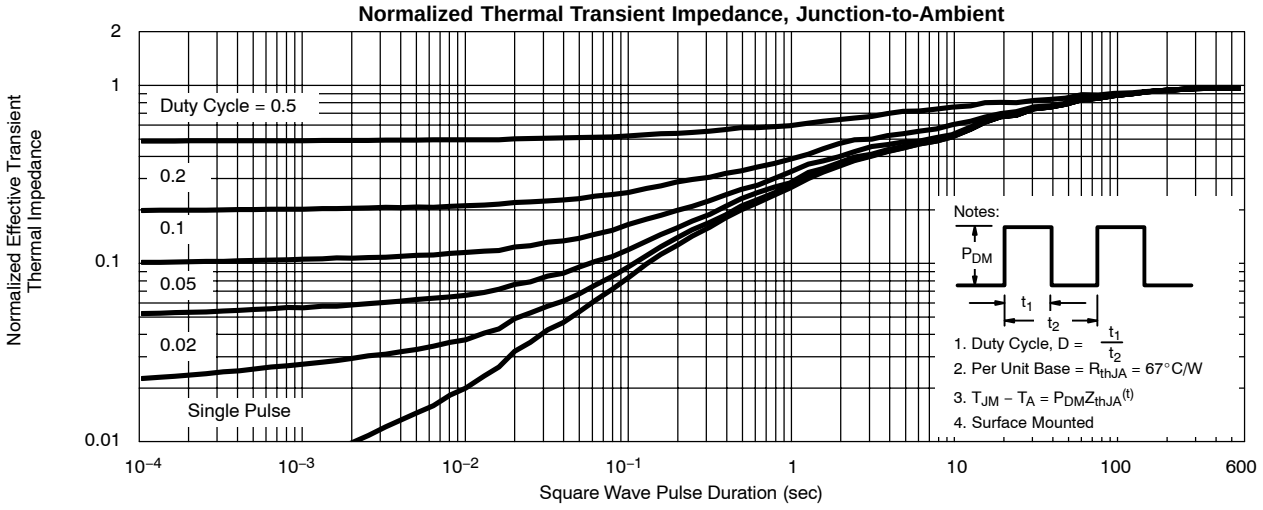
Single Pulse Power



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



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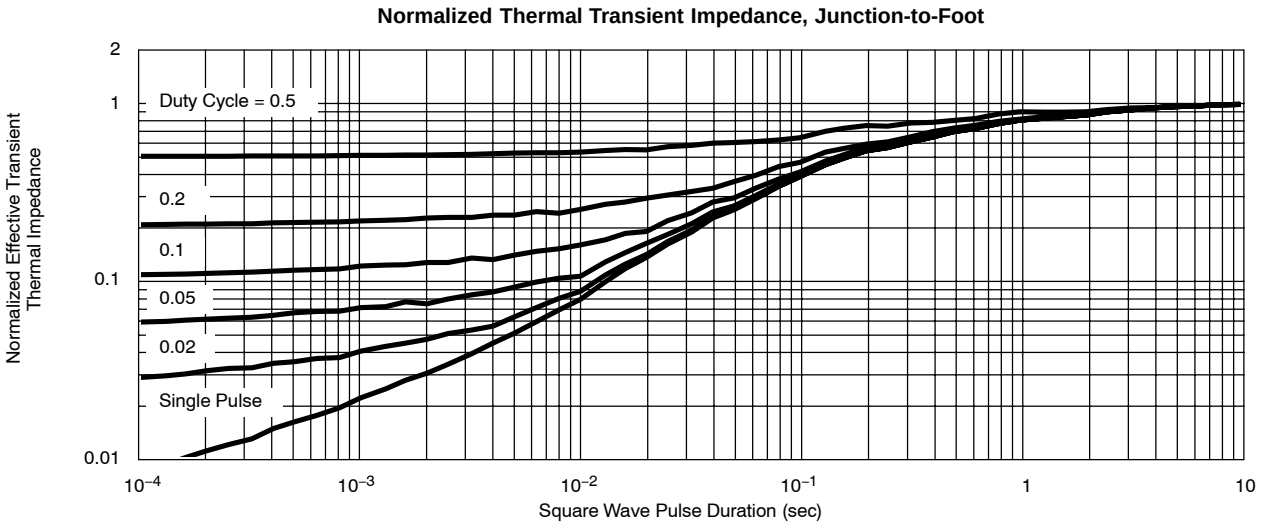

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