

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

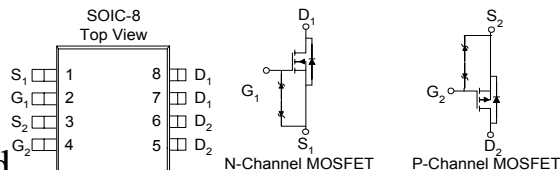
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe SOIC-8 saves board space
- Fast switching speed
- High performance trench technology

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ m(Ω)	I_D (A)
30	40 @ $V_{GS} = 4.5V$	6.0
	31 @ $V_{GS} = 10V$	6.9
-30	80 @ $V_{GS} = -4.5V$	-4.2
	52 @ $V_{GS} = -10V$	-5.2



ESD Protected
2000V



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	N-Channel	P-Channel	Units	
Drain-Source Voltage	V_{DS}	30	-30	V	
Gate-Source Voltage	V_{GS}	± 20	± 20		
Continuous Drain Current ^a	I_D	$T_A=25^\circ C$	6.9	-5.2	A
		$T_A=70^\circ C$	5.4	-6.8	
Pulsed Drain Current ^b	I_{DM}	20	-20		
Continuous Source Current (Diode Conduction) ^a	I_S	1.3	-1.3	A	
Power Dissipation ^a	P_D	$T_A=25^\circ C$	2.1	2.1	W
		$T_A=70^\circ C$	1.3	1.3	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ C$	

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case ^a	$t \leq 5$ sec	$R_{\theta JC}$	40	$^\circ C/W$
Maximum Junction-to-Ambient ^a	$t \leq 5$ sec	$R_{\theta JA}$	60	$^\circ C/W$

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

SPECIFICATIONS (T _A = 25° C UNLESS OTHERWISE NOTED)							
Parameter	Symbol	Test Conditions	Limits				Unit
			Ch	Min	Typ	Max	
Static							
Gate-Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = 250 uA	N	1			V
		V _{GS} = V _{DS} , I _D = -250 uA	P	-1.0			
Gate-Body Leakage	I _{GSS}	V _{GS} = -8 V, V _{DS} = 0 V	P			±100	nA
		V _{GS} = 8 V, V _{DS} = 0 V	N			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -24 V, V _{GS} = 0 V	P			-1	uA
		V _{DS} = 24 V, V _{GS} = 0 V	N			1	
On-State Drain Current ^A	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	N	20			A
		V _{DS} = -5 V, V _{GS} = -10 V	P	-20			
Drain-Source On-Resistance ^A	r _{DS(on)}	V _{GS} = 10 V, I _D = 6.9 A	N			31	mΩ
		V _{GS} = 4.5 V, I _D = 6 A				40	
		V _{GS} = -10 V, I _D = -5.2 A	P			52	
		V _{GS} = -4.5 V, I _D = -4.2 A				80	
Forward Transconductance ^A	g _s	V _{DS} = 15 V, I _D = 6.9 A	N		25		S
		V _{DS} = -15 V, I _D = -5.2 A	P		10		
Dynamic							
Total Gate Charge	Q _g	N-Channel V _{DS} =15V, V _{GS} =10V, I _D =6.9A P-Channel V _{DS} =-15V, V _{GS} =-10V, I _D =-5.2A	N		4.0		nC
			P		10		
Gate-Source Charge	Q _{gs}		N		1.1		
			P		2.2		
Gate-Drain Charge	Q _{gd}		N		1.4		
			P		1.7		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DS} =15V, V _{GS} =10V, I _D =1A , R _{GEN} =6Ω P-Channel V _{DD} =-15V, V _{GS} =-10V, I _D =-1A R _{GEN} =6Ω	N		8		nS
			P		10		
Rise Time	t _r		N		5		
			P		2.8		
Turn-Off Delay Time	t _{d(off)}		N		23		
			P		53.6		
Fall-Time	t _f		N		3		
			P		46		

Notes

- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics (N-Channel)

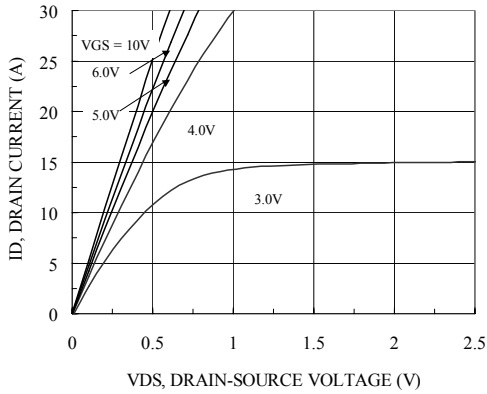


Figure 1. On-Region Characteristics

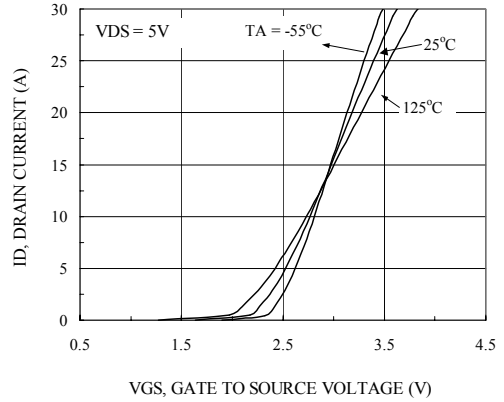


Figure 2. Body Diode Forward Voltage Variation with Source Current and Temperature

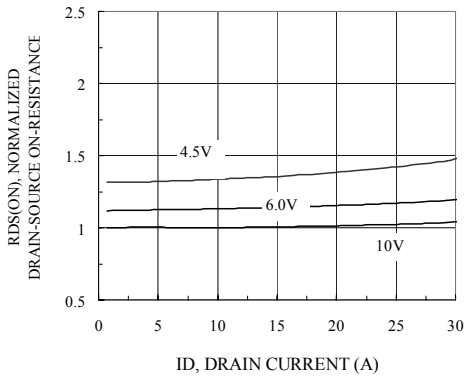


Figure 3. On Resistance Vs Vgs Voltage

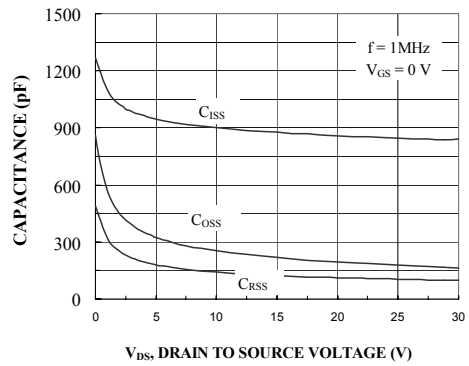


Figure 4. Capacitance Characteristics

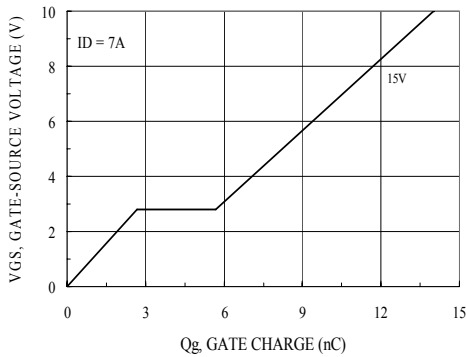


Figure 5. Gate Charge Characteristics

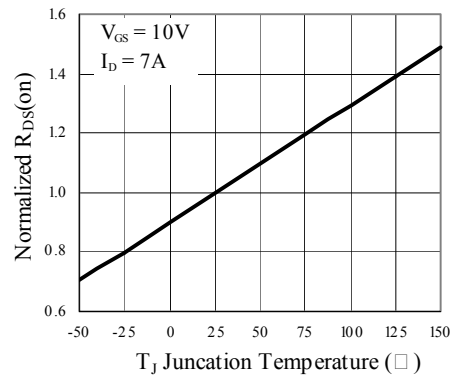


Figure 6. On-Resistance Variation with Temperature

Typical Electrical Characteristics (N-Channel)

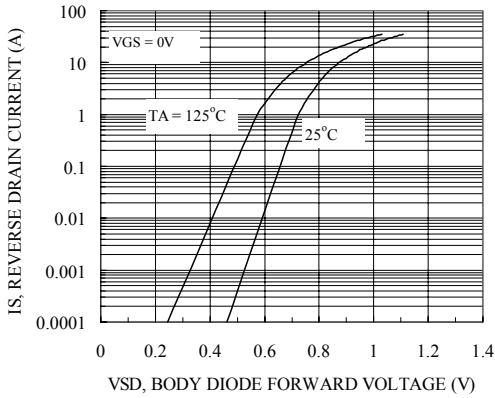


Figure 7. Transfer Characteristics

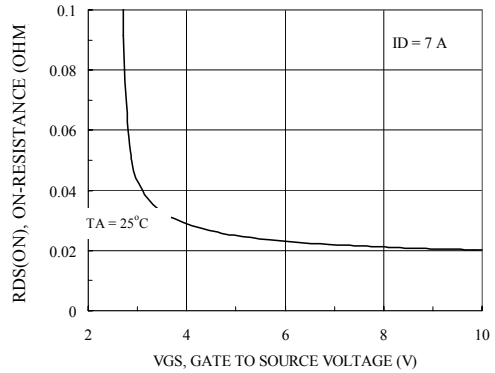


Figure 8. On-Resistance with Gate to Source Voltage

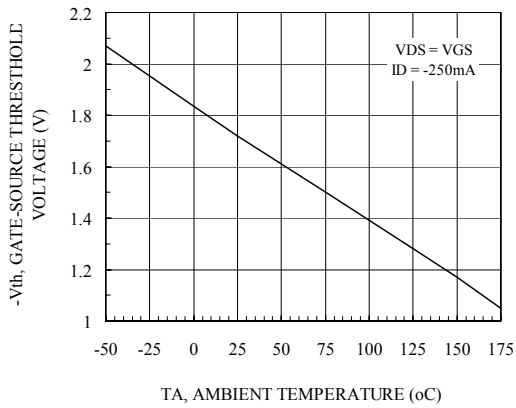


Figure 9. Vth Gate to Source Voltage Vs Temperature

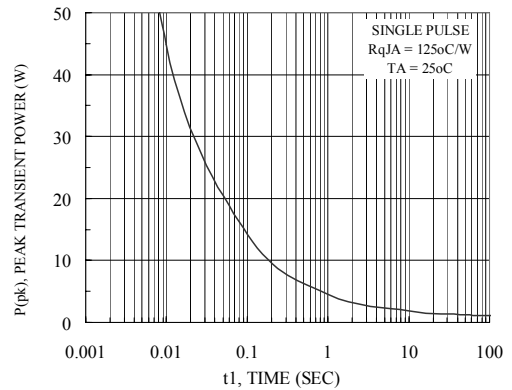


Figure 10. Single Pulse Maximum Power Dissipation

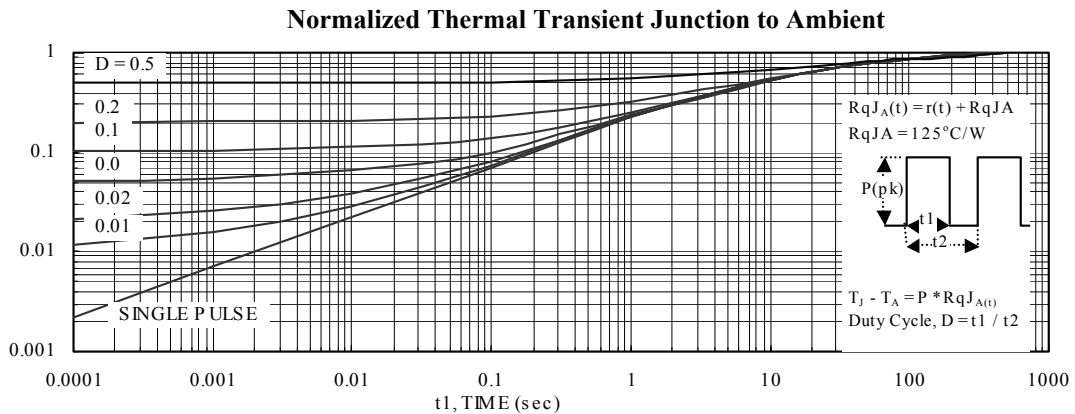


Figure 11. Transient Thermal Response Curve

Typical Electrical Characteristics (P-Channel)

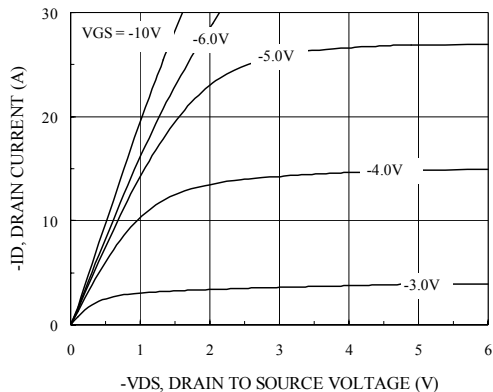


Figure 1. On-Region Characteristics

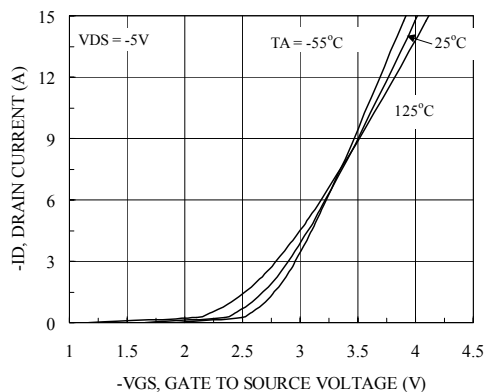


Figure 2. Body Diode Forward Voltage Variation with Source Current and Temperature

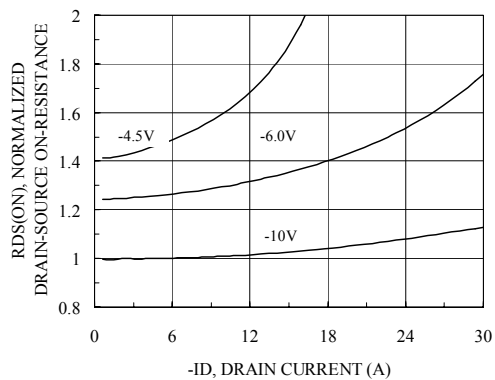


Figure 3. On Resistance Vs Vgs Voltage

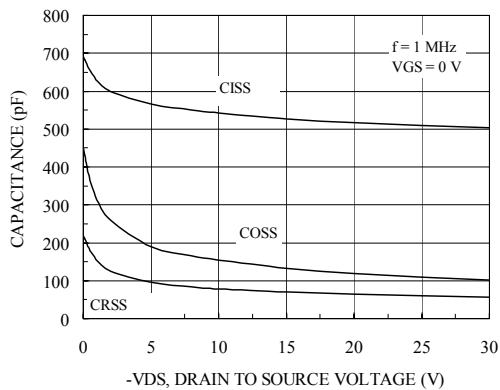


Figure 4. Capacitance Characteristics

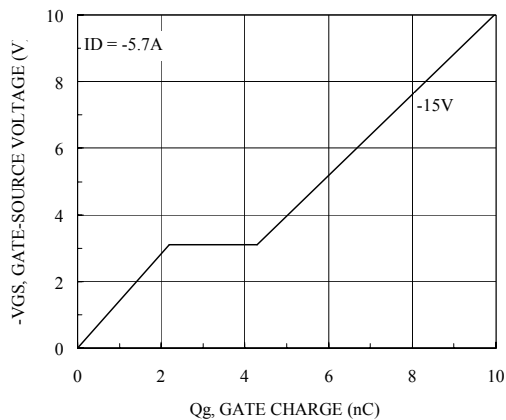


Figure 5. Gate Charge Characteristics

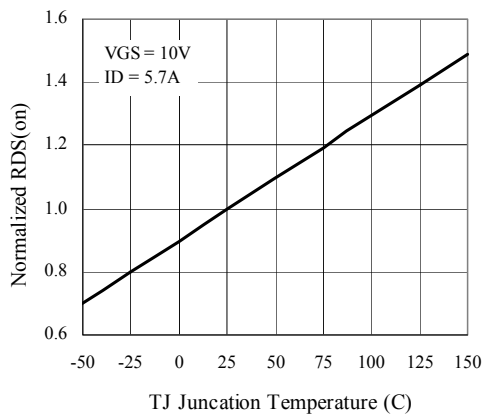


Figure 6. On-Resistance Variation with Temperature

Typical Electrical Characteristics (P-Channel)

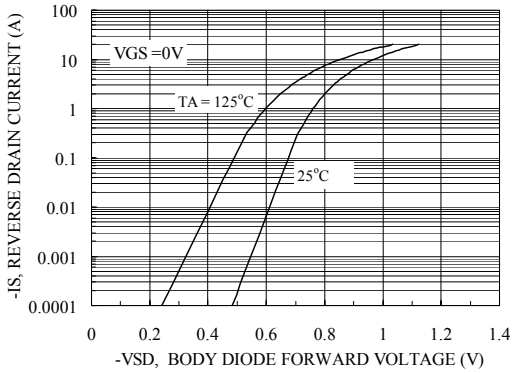


Figure 7. Transfer Characteristics

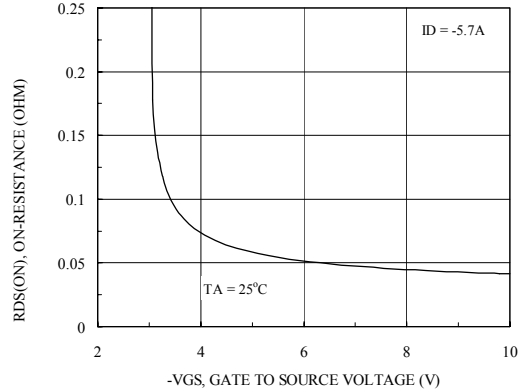


Figure 8. On-Resistance with Gate to Source Voltage

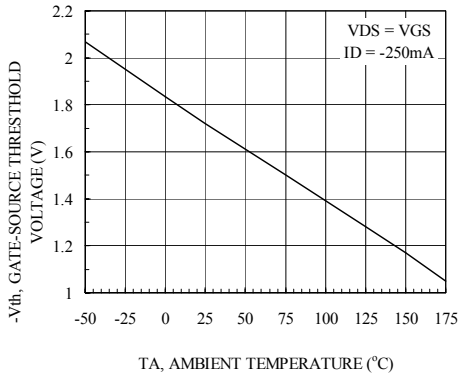


Figure 9. Vth Gate to Source Voltage Vs Temperature

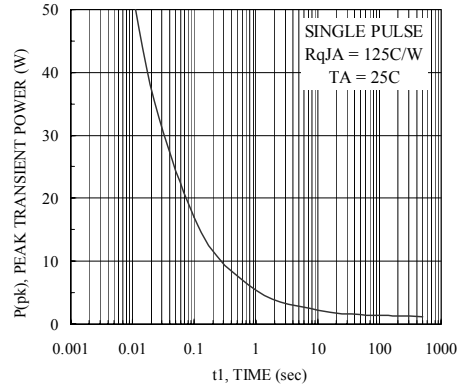


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

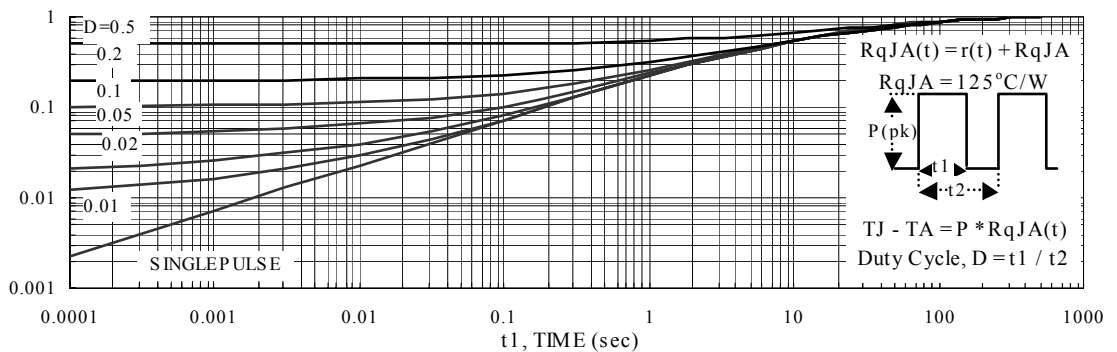
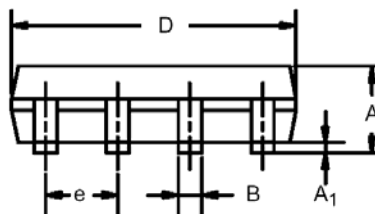
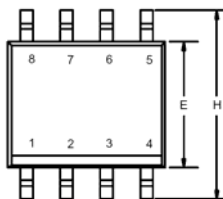


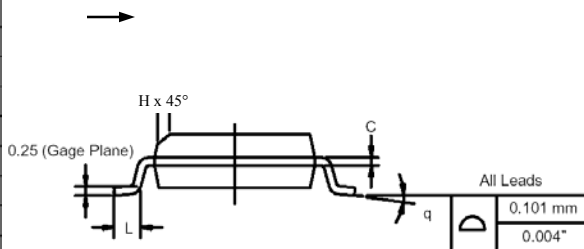
Figure 11. Transient Thermal Response Curve

Package Information

SO-8: 8LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°



Ordering information

- AM4512CE-T1-XX
 - A: Analog Power
 - M: MOSFET
 - 4512: Part number
 - C: Complementary
 - E: ESD Protected
 - T1: Tape & reel
 - XX: Blank: Standard
PF: Leadfree