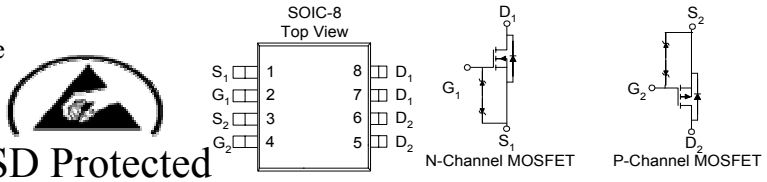
P & N-Channel 30-V (D-S) MOSFET

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 °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]	T_A=25°C	I_D	6.9	-5.2	A
	T_A=70°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]	T_A=25°C	P_D	2.1	2.1	W
	T_A=70°C		1.3	1.3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Case[a]	t <= 5 sec	$R_{\theta JC}$	40	°C/W
Maximum Junction-to-Ambient[a]	t <= 5 sec	$R_{\theta JA}$	60	°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 Tranconductance[A]	g_{fs}	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-Chaneel V_{DD}=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)

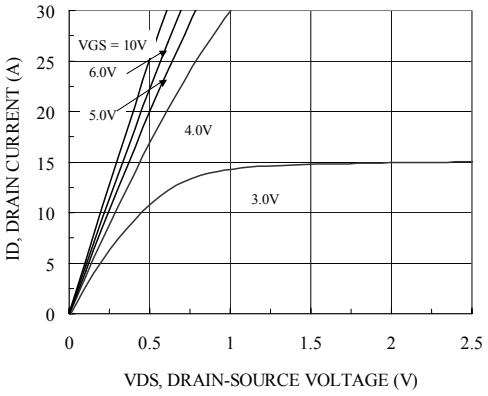


Figure 1. On-Region Characteristics

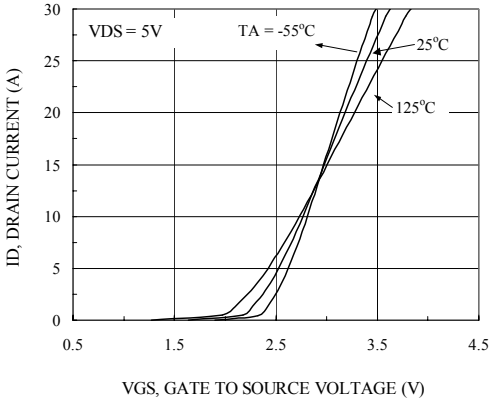


Figure 2. Body Diode Forward Voltage Variation with Source Current and Temperature

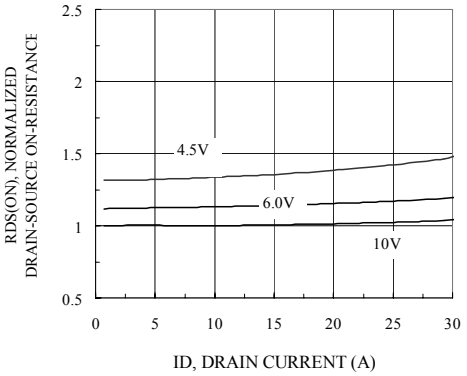


Figure 3. On Resistance Vs Vgs Voltage

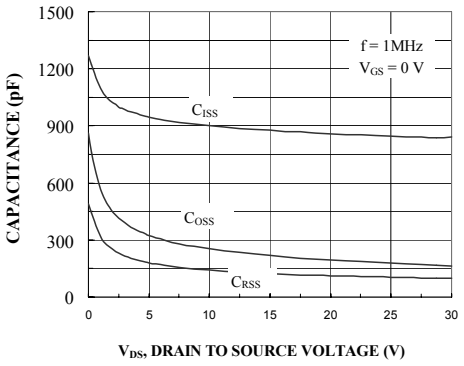


Figure 4. Capacitance Characteristics

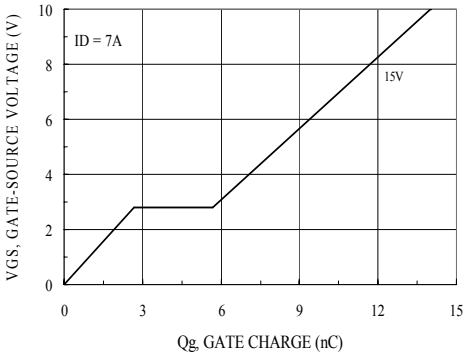


Figure 5. Gate Charge Characteristics

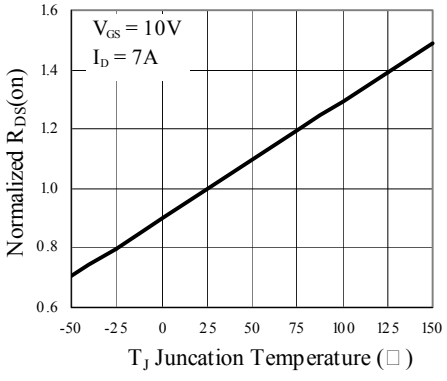


Figure 6. On-Resistance Variation with Temperature

Typical Electrical Characteristics (N-Channel)

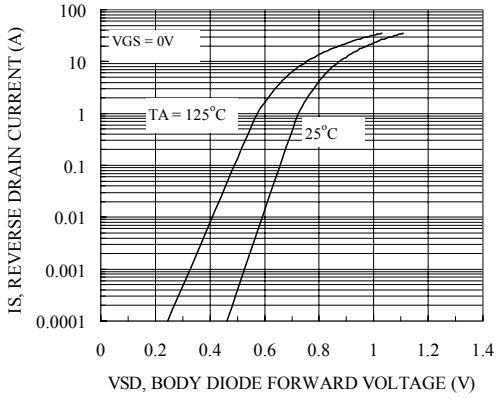


Figure 7. Transfer Characteristics

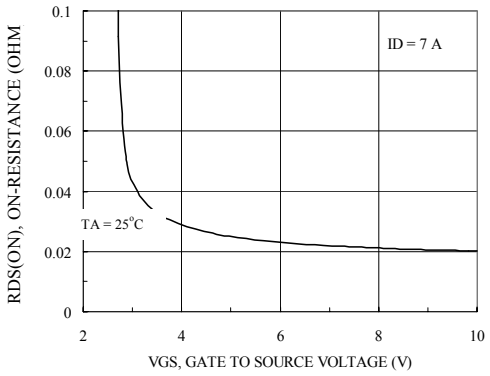


Figure 8. On-Resistance with Gate to Source Voltage

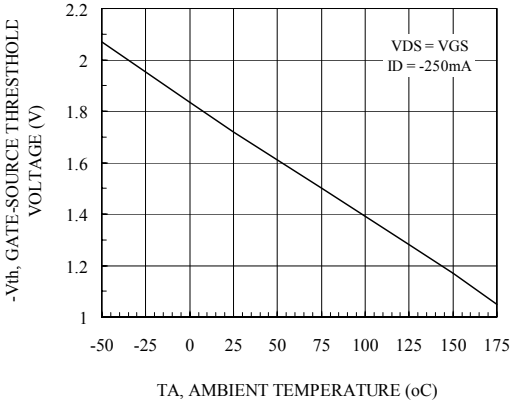


Figure 9. Vth Gate to Source Voltage Vs Temperature

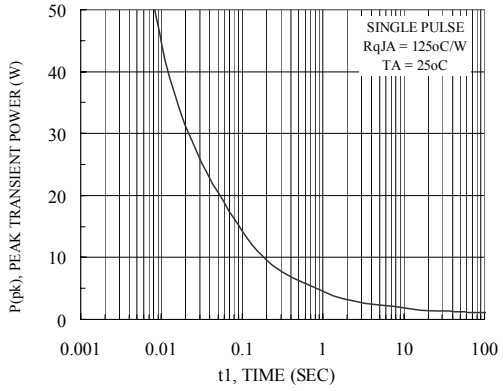


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

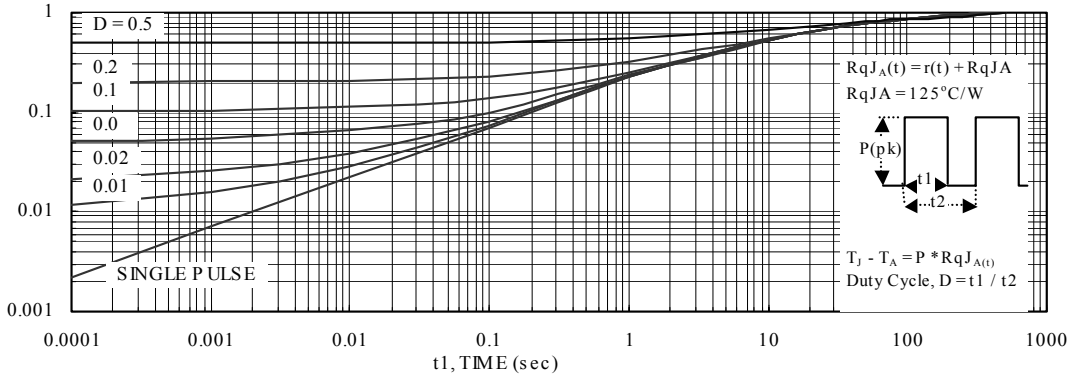
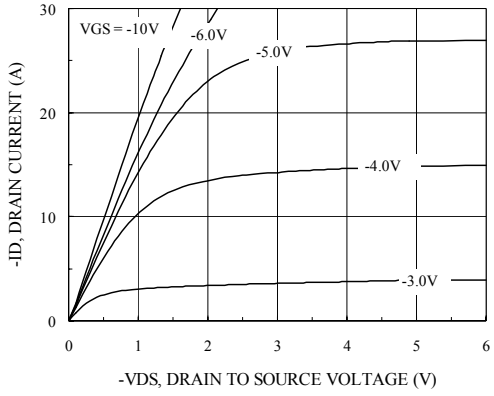


Figure 11. Transient Thermal Response Curve

Typical Electrical Characteristics (P-Channel)



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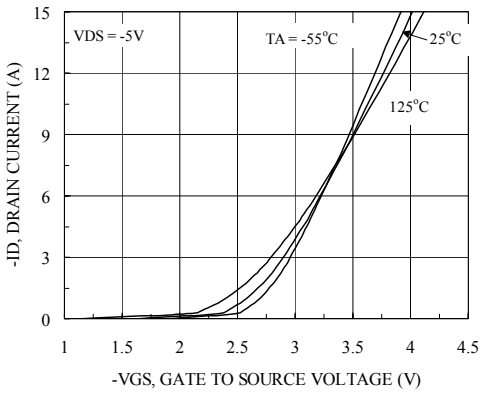

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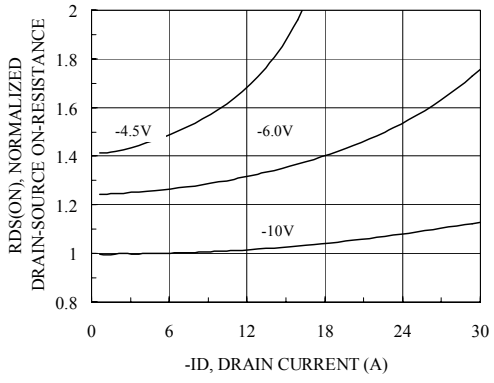

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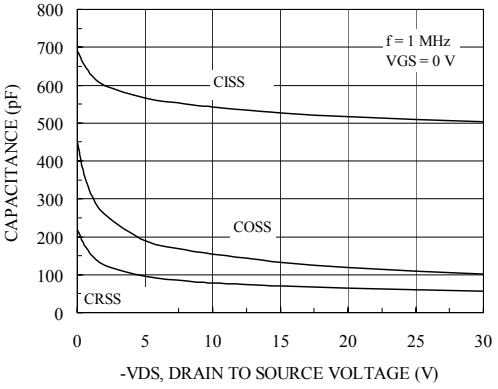


Figure 4. Capacitance Characteristics

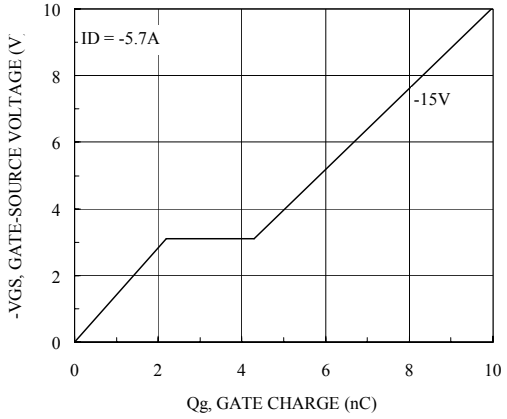


Figure 5. Gate Charge Characteristics

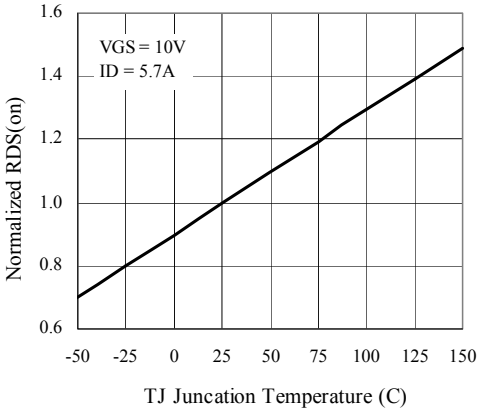


Figure 6. On-Resistance Variation with Temperature

Typical Electrical Characteristics (P-Channel)

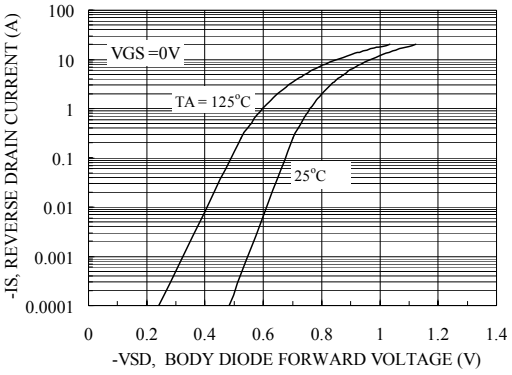


Figure 7. Transfer Characteristics

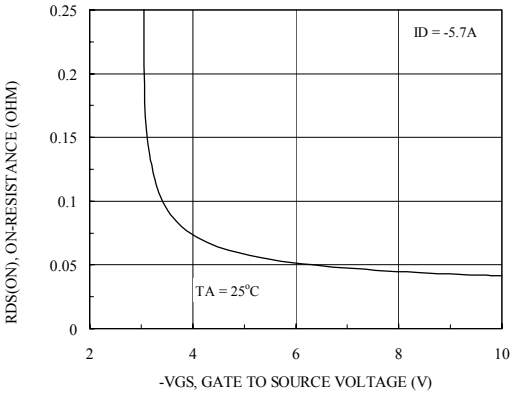
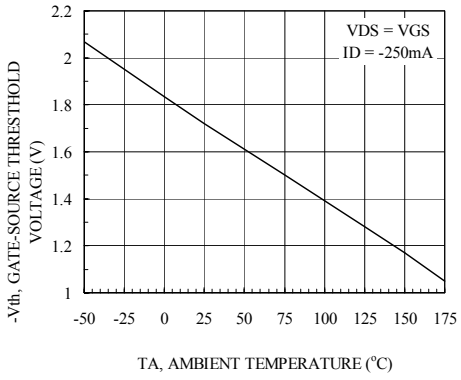


Figure 8. On-Resistance with Gate to Source Voltage



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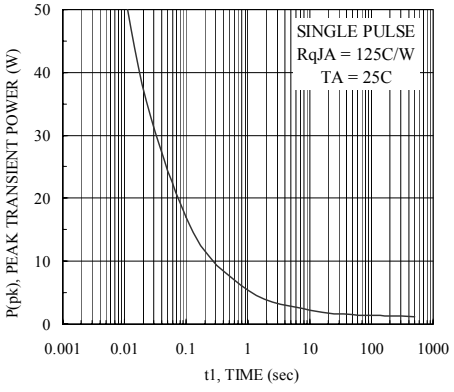

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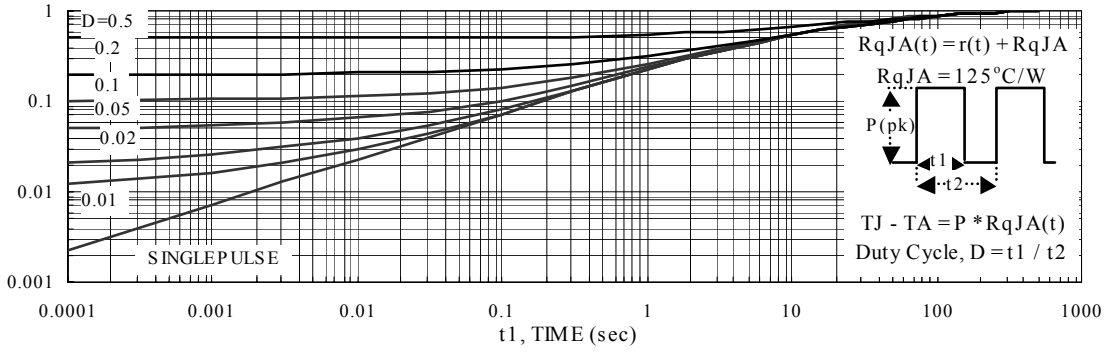
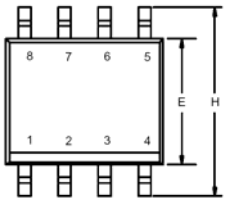
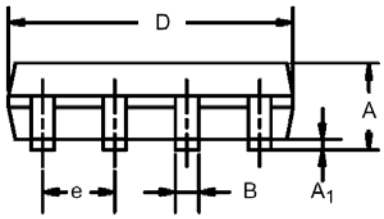


Figure 11. Transient Thermal Response Curve

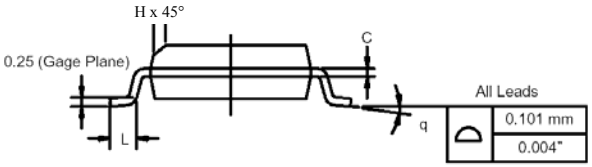
Package Information

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