



### General Description

AFC4510S, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge. These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

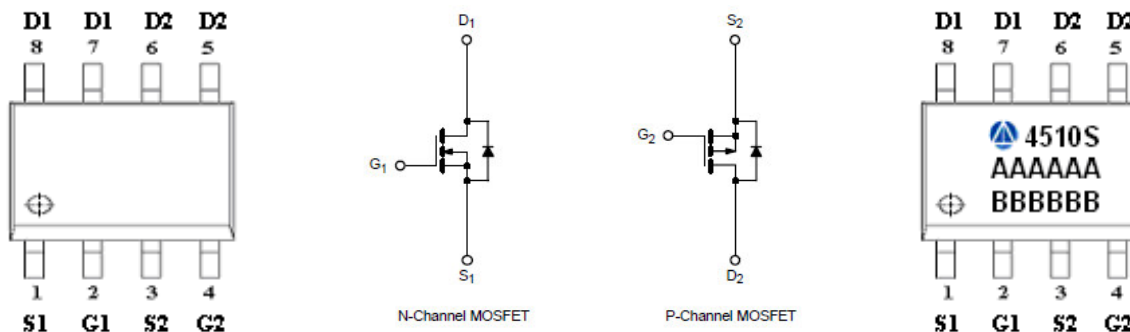
N-Channel

- 100V/3.0A,  $R_{DS(ON)}=140m\Omega@V_{GS}=10V$
- 100V/2.0A,  $R_{DS(ON)}=150m\Omega@V_{GS}=4.5V$

P-Channel

- -100V/-2.5A,  $R_{DS(ON)}=195m\Omega@V_{GS}=-10V$
- -100V/-1.8A,  $R_{DS(ON)}=215m\Omega@V_{GS}=-4.5V$

### Pin Description ( SOP-8P )



### Application

- Low Current DC/DC Conversion
- Load Switch
- CCFL Inverter
- Power Management in Notebook Computer

### Pin Define

Pin	Symbol	Description
1	S1	Source 1
2	G1	Gate 1
3	S2	Source 2
4	G2	Gate 2
5	D2	Drain 2
6	D2	Drain 2
7	D1	Drain 1
8	D1	Drain 1

### Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC4510SS8RG	4510S	SOP-8P	Tape & Reel	3000 EA

- ※ A Lot code
- ※ B Date code
- ※ AFC4510SS8RG : 13" Tape & Reel ; Pb- Free ; Halogen- Free



### Absolute Maximum Ratings ( N-Channel )

(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V <sub>DSS</sub>	100	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>A</sub> =25°C	3.0
		T <sub>A</sub> =70°C	2.5
Pulsed Drain Current	I <sub>DM</sub>	10	A
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	1.5	A
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C	2.8
		T <sub>A</sub> =70°C	1.8
Operating Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	62.5	°C/W

### Electrical Characteristics ( N-Channel )

(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	100			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0		2.5	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C			5	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5V, V <sub>GS</sub> =4.5V	8			A
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A		125	140	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.5A		135	150	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =3.0A		8.5		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =2.0A, V <sub>GS</sub> =0V		0.8	1.3	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =5V I <sub>D</sub> ≅6.5A		2.8	5	nC
Gate-Source Charge	Q <sub>gs</sub>			0.6		
Gate-Drain Charge	Q <sub>gd</sub>			0.7		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V f=1MHz		250		pF
Output Capacitance	C <sub>oss</sub>			45		
Reverse Transfer Capacitance	C <sub>rss</sub>			20		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, R <sub>L</sub> =7.5Ω I <sub>D</sub> ≅6.5A, V <sub>GEN</sub> =10V R <sub>G</sub> =2.5Ω		8	15	ns
	t <sub>r</sub>			10	20	
Turn-Off Time	t <sub>d(off)</sub>			10	20	
	t <sub>f</sub>			12	25	



**Absolute Maximum Ratings ( P-Channel )**

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	$V_{DSS}$	-100	V
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	$I_D$	$T_A=25^{\circ}\text{C}$	-2.5
		$T_A=70^{\circ}\text{C}$	-1.8
Pulsed Drain Current	$I_{DM}$	-10	A
Continuous Source Current(Diode Conduction)	$I_S$	-1.7	A
Power Dissipation	$P_D$	$T_A=25^{\circ}\text{C}$	2.8
		$T_A=70^{\circ}\text{C}$	1.8
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$

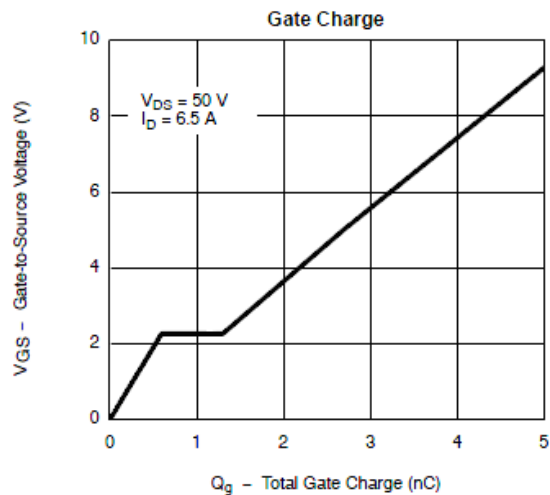
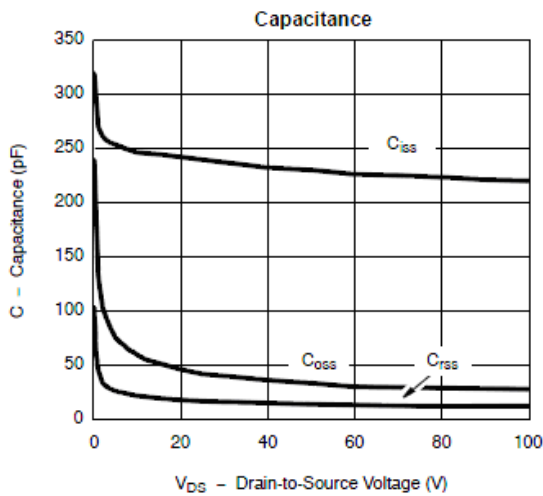
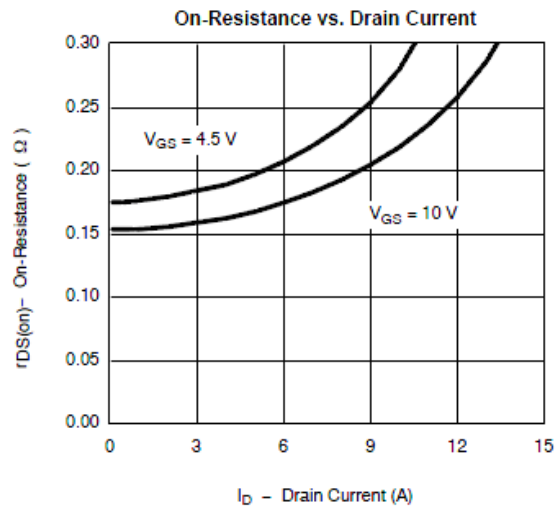
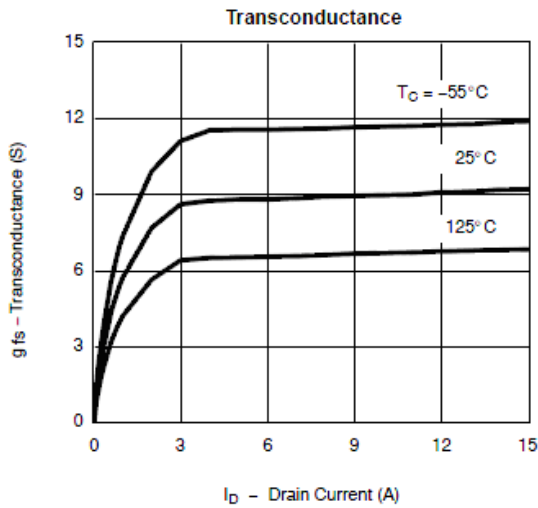
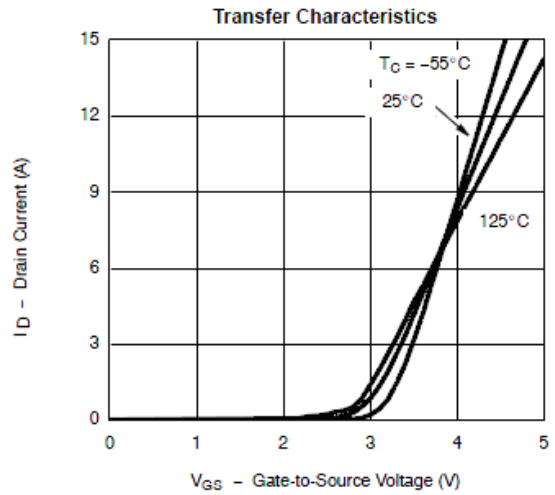
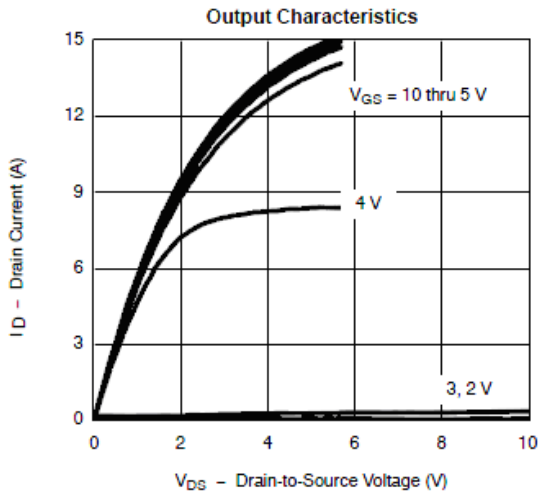
**Electrical Characteristics ( P-Channel )**

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D = -250\mu A$	-100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D = -250\mu A$	-1.0		-2.5	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS} = \pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -80V, V_{GS}=0V$			-1	
		$V_{DS} = -80V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			-20	$\mu A$
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq -5V, V_{GS} = -10V$	-8			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -2.5A$		180	195	$m\Omega$
		$V_{GS} = -4.5V, I_D = -1.8A$		198	215	
Forward Transconductance	$g_{FS}$	$V_{DS} = -15V, I_D = -3.6A$		12		S
Diode Forward Voltage	$V_{SD}$	$I_S = -2.9A, V_{GS}=0V$		-0.8	-1.5	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = -50V, V_{GS} = -4.5V$ $I_D = -3.6A$		12	20	nC
Gate-Source Charge	$Q_{gs}$		4			
Gate-Drain Charge	$Q_{gd}$		6			
Input Capacitance	$C_{iss}$	$V_{DS} = -50V, V_{GS} = 0V$ $f = 1\text{MHz}$		980		$pF$
Output Capacitance	$C_{oss}$		100			
Reverse Transfer Capacitance	$C_{rss}$		80			
Turn-On Time	$t_{d(on)}$	$V_{DD} = -50V, R_L = 17.2\Omega$ $I_D = -2.9A, V_{GEN} = -10V$ $R_G = 1\Omega$		8	15	ns
	$t_r$			15	20	
Turn-Off Time	$t_{d(off)}$			35	50	
	$t_f$			10	20	

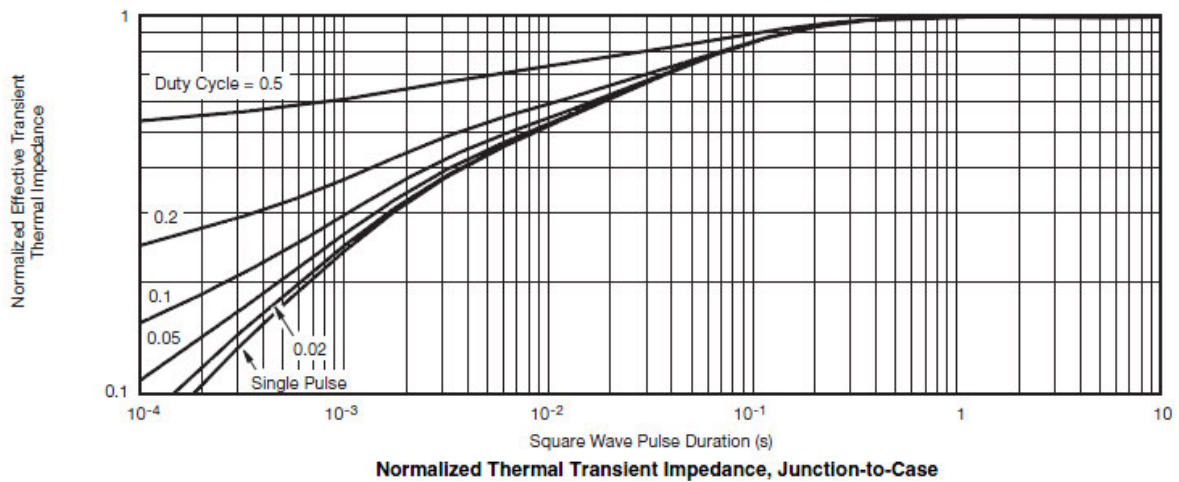
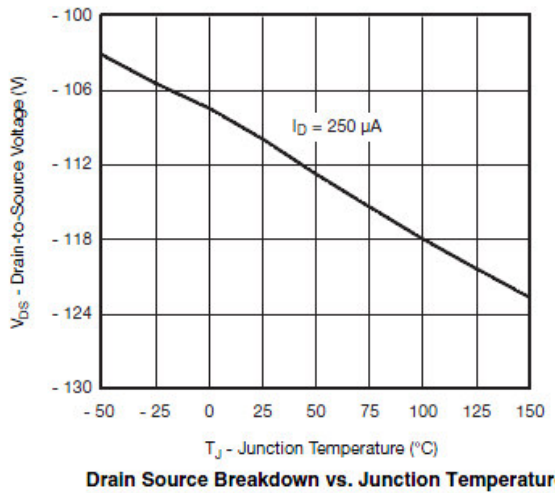
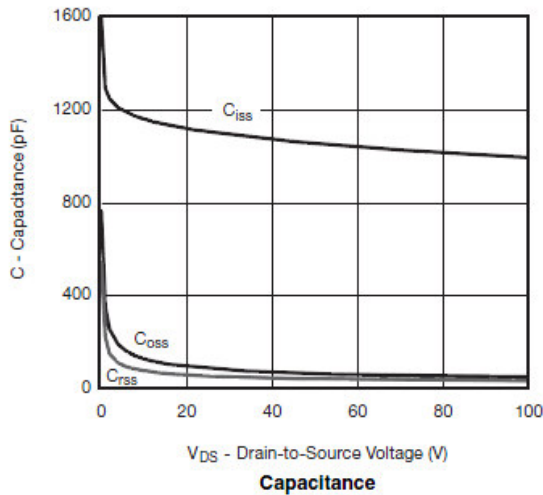
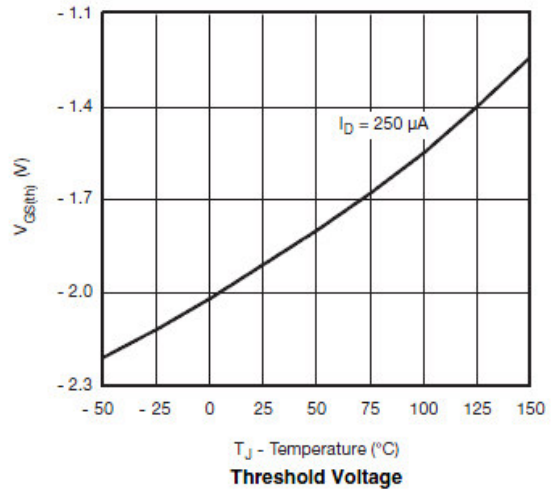
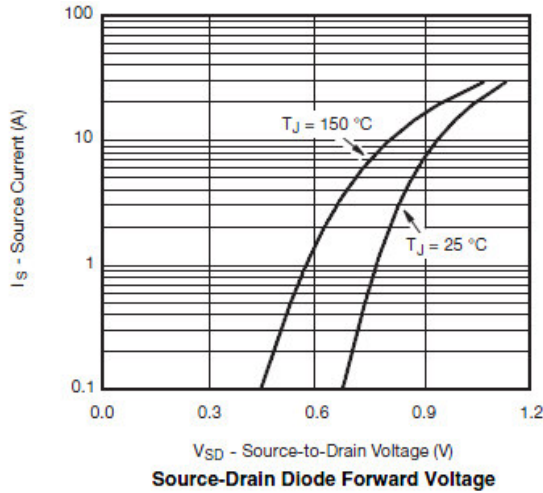


## Typical Characteristics ( N-Channel )



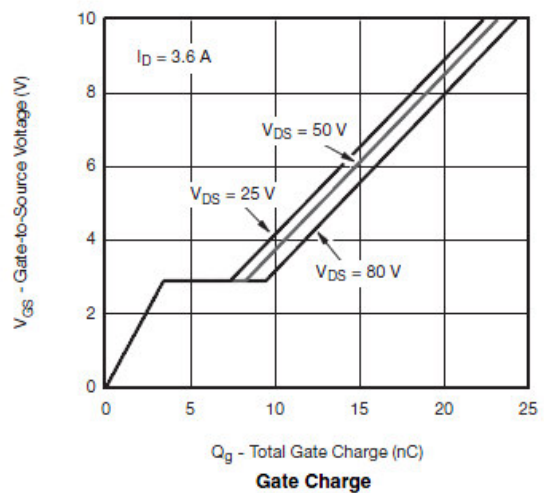
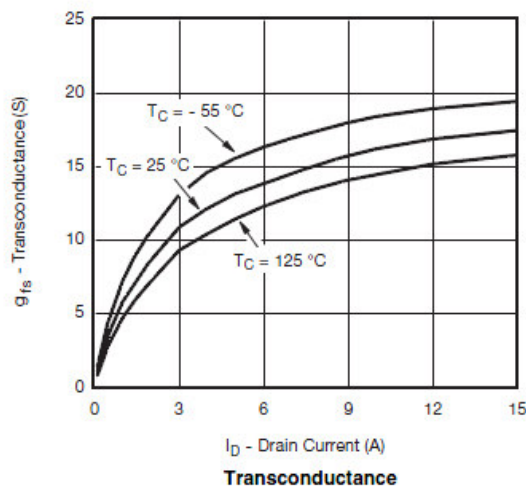
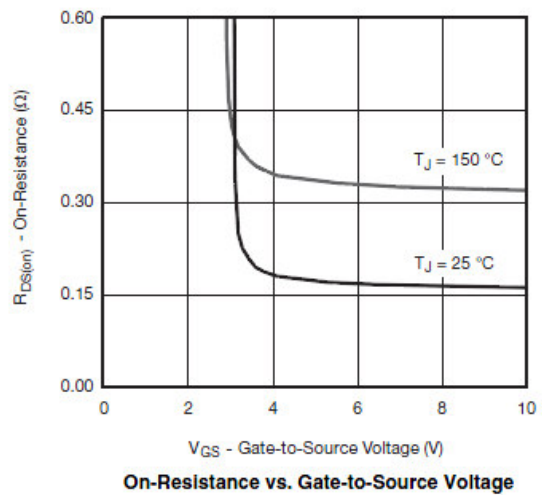
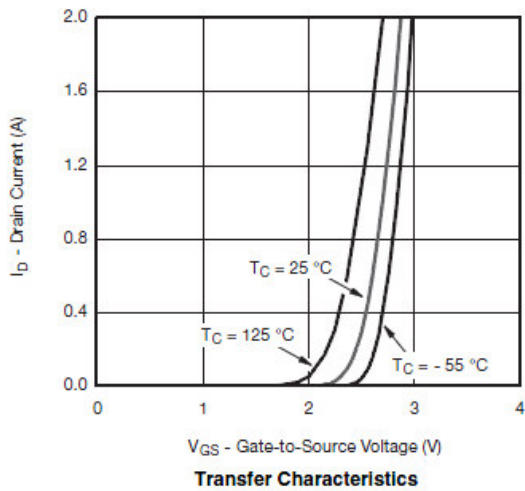
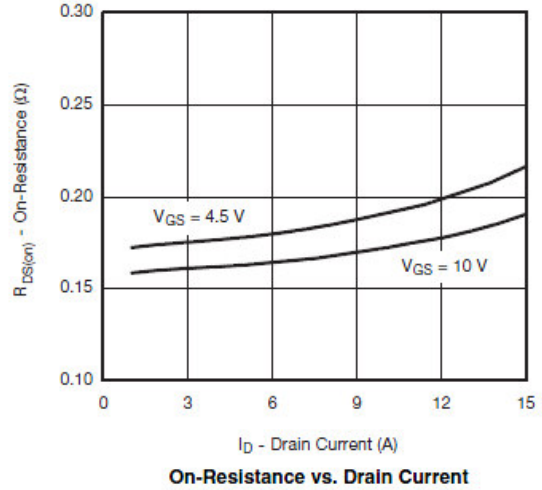
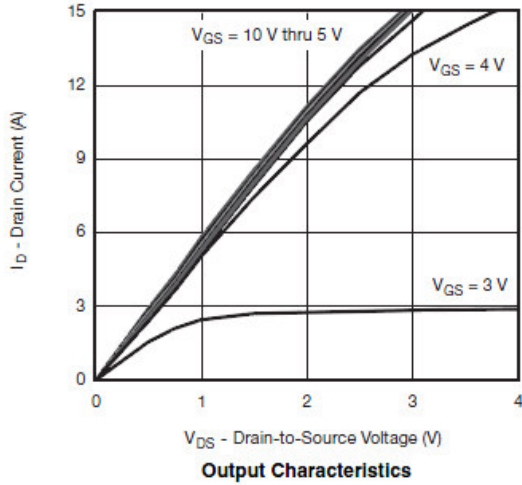


## Typical Characteristics ( N-Channel )





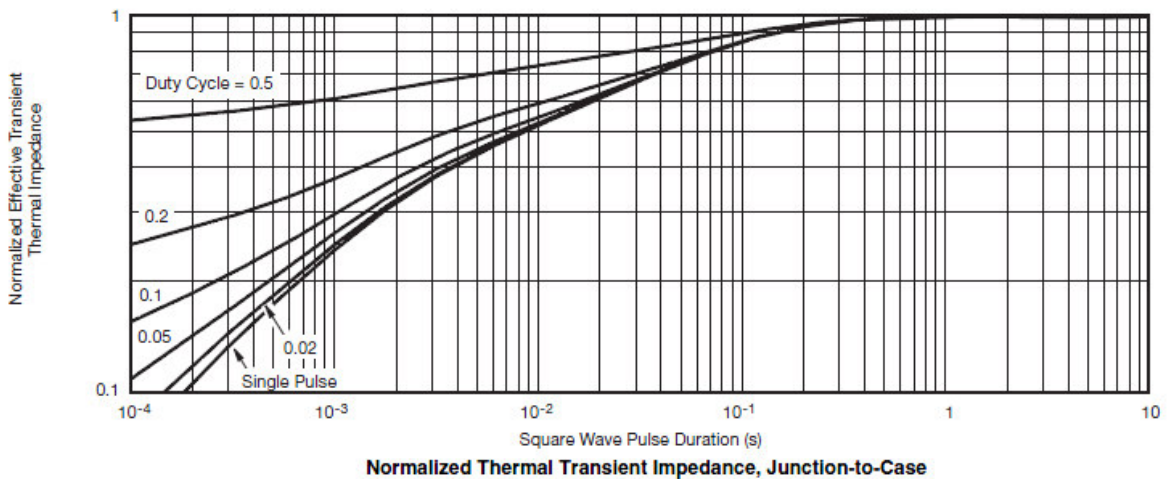
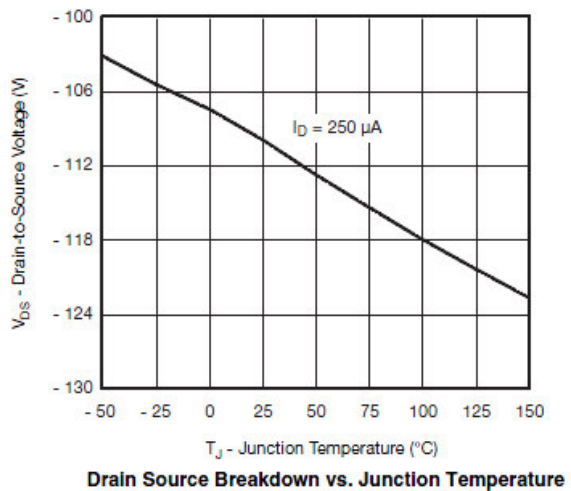
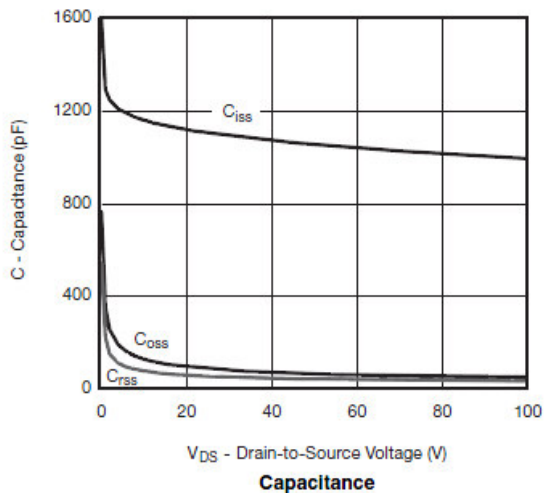
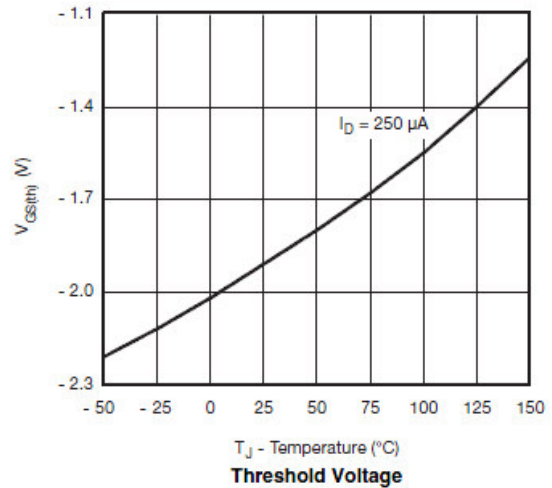
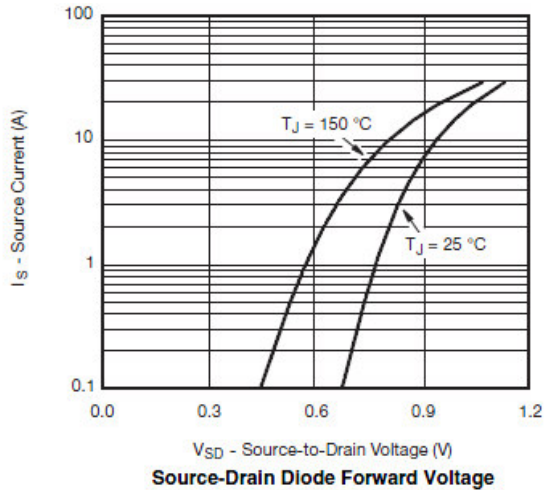
## Typical Characteristics ( P-Channel )







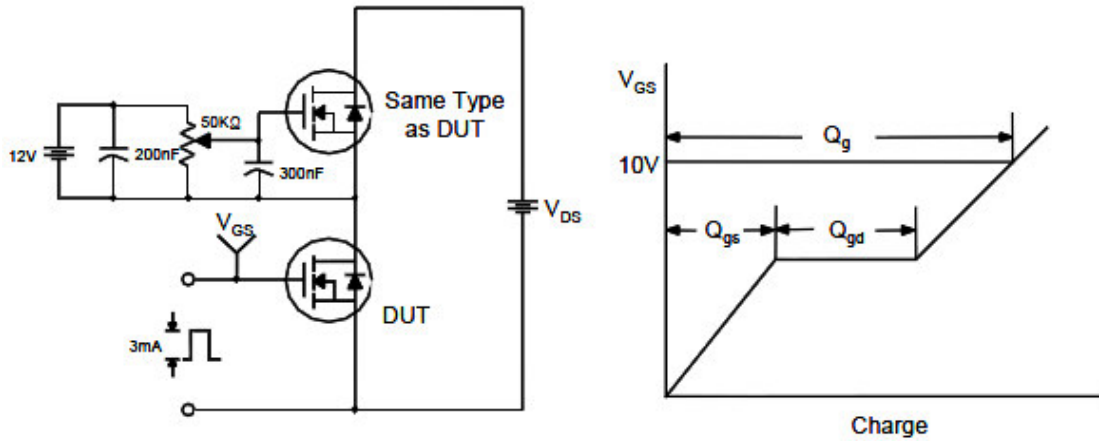
## Typical Characteristics ( P-Channel )



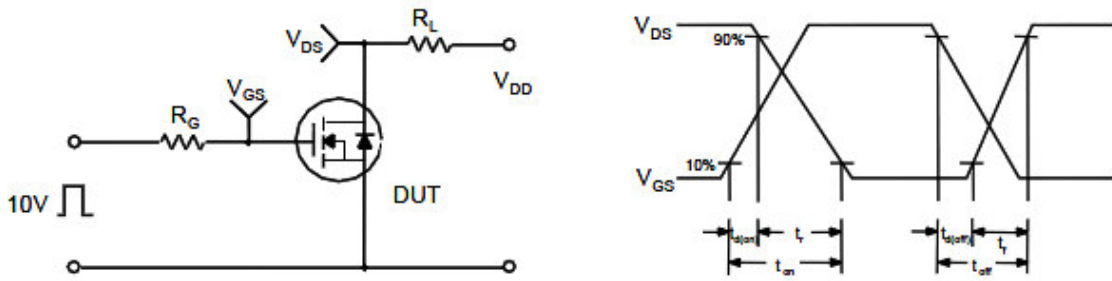


**Typical Characteristics**

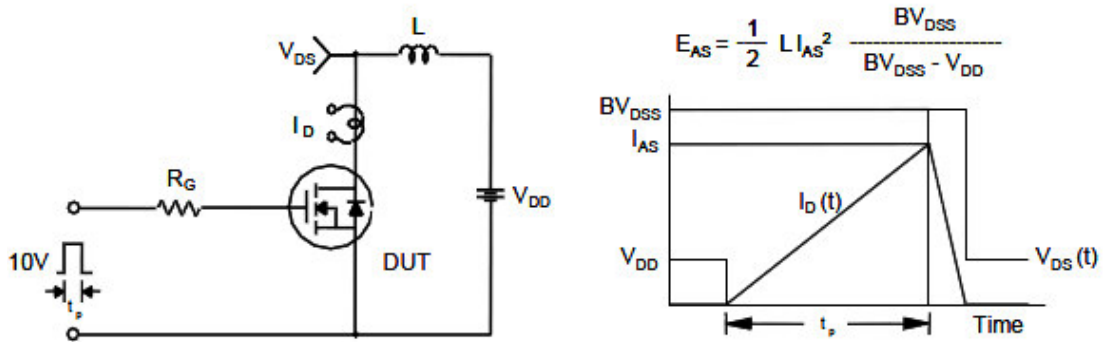
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



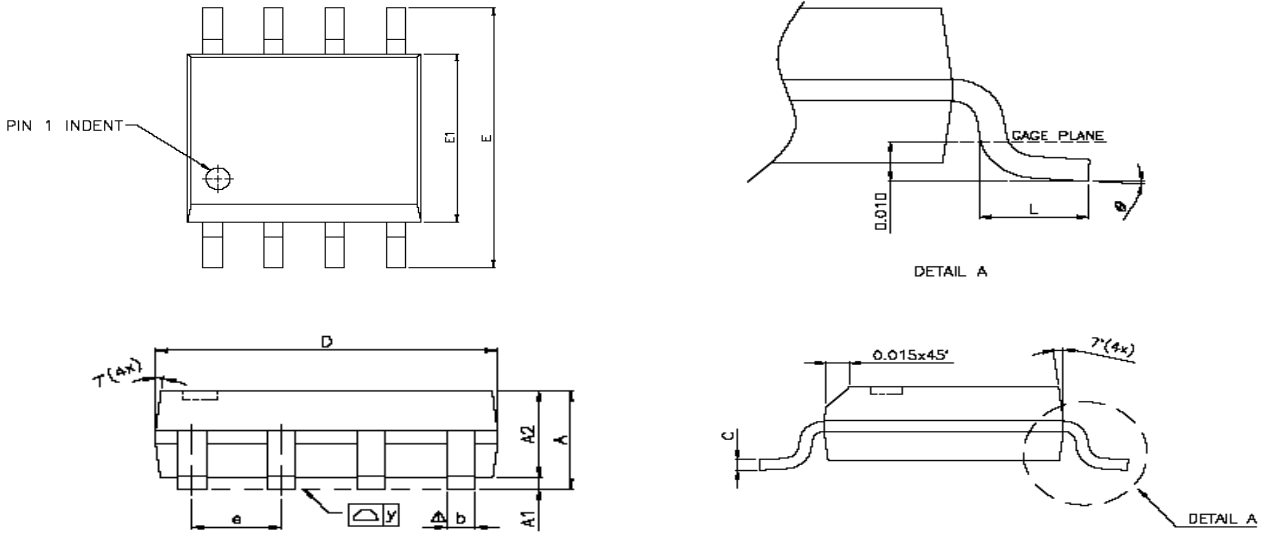
Unclamped Inductive Switching Test Circuit & Waveforms







**Package Information ( SOP-8P )**



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	—	0.25	0.004	—	0.010
A2	—	1.45	—	—	0.057	—
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	—	1.27	—	—	0.050	—
L	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta y$	—	—	0.076	—	—	0.003
$\varnothing$	0°	—	8°	0°	—	8°

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