



General Description

AFC4614WS, 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

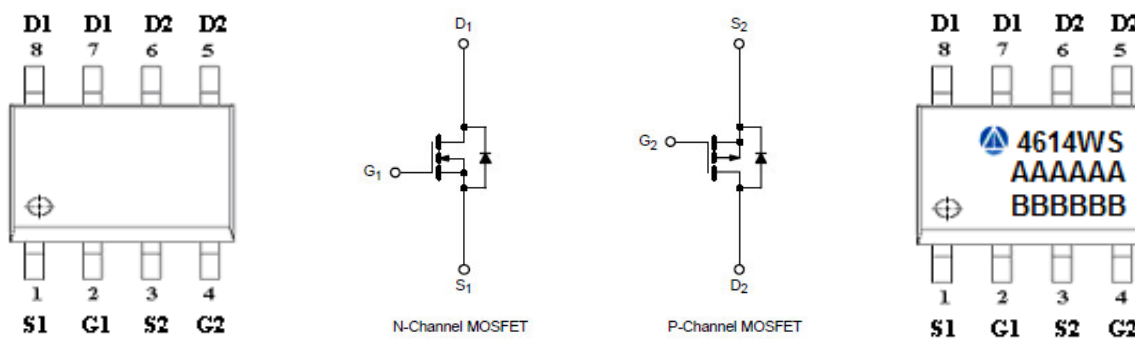
N-Channel

- 40V/10A, $R_{DS(ON)} = 35m\Omega @ V_{GS} = 10V$
- 40V/6A, $R_{DS(ON)} = 45m\Omega @ V_{GS} = 4.5V$

P-Channel

- -40V/-10A, $R_{DS(ON)} = 35m\Omega @ V_{GS} = -10V$
- -40V/-6A, $R_{DS(ON)} = 45m\Omega @ V_{GS} = -4.5V$

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	N-Source 1
2	G1	N-Gate 1
3	S2	P-Source 2
4	G2	P-Gate 2
5	D2	P-Drain 2
6	D2	P-Drain 2
7	D1	N-Drain 1
8	D1	N-Drain 1

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC4614WSS8RG	4614WS	SOP-8P	Tape & Reel	2500 EA

- ※ A Lot code
- ※ B Date code
- ※ AFC4614WSS8RG : 13" Tape & Reel ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings (N-Channel)

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

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V_{DSS}	40	V
Gate –Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current($T_J=150^{\circ}\text{C}$)	I_D	$T_A=25^{\circ}\text{C}$	10
		$T_A=70^{\circ}\text{C}$	6
Pulsed Drain Current	I_{DM}	20	A
Avalanche Current	$L = 0.1 \text{ mH}$	I_{AS}	8
Avalanche Energy		E_{AS}	3.2
Continuous Source Current(Diode Conduction)	I_S	1.6	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

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

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			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}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$			1	uA
		$V_{DS}=32V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=10V$	8			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		27	35	m Ω
		$V_{GS}=4.5V, I_D=6A$		33	45	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=8A$		27		S
Diode Forward Voltage	V_{SD}	$I_S=1.5A, V_{GS}=0V$		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V$ $I_D=8A$		3.3	5	nC
Gate-Source Charge	Q_{gs}			1		
Gate-Drain Charge	Q_{gd}			1.2		
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V$ $f=1\text{MHz}$		385		pF
Output Capacitance	C_{oss}			68		
Reverse Transfer Capacitance	C_{rss}			30		
Turn-On Time	$t_{d(on)}$	$V_{DD}=20V, R_L=2\Omega$ $I_D=8A, V_{GEN}=10V$ $R_G=1\Omega$		9	18	ns
	t_r			11	22	
Turn-Off Time	$t_{d(off)}$			10	20	
	t_f			7	14	



Absolute Maximum Ratings (P-Channel)

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	-40	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	I _D	T _A =25°C	-10
		T _A =70°C	-6
Pulsed Drain Current	I _{DM}	-20	A
Continuous Source Current(Diode Conduction)	I _S	-1.7	A
Power Dissipation	P _D	T _A =25°C	2.8
		T _A =70°C	1.8
Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient	R _{θJA}	62.5	°C/W

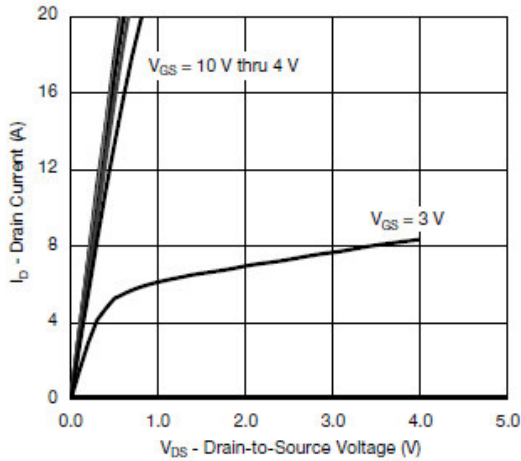
Electrical Characteristics

(T_A=25°C Unless otherwise noted)

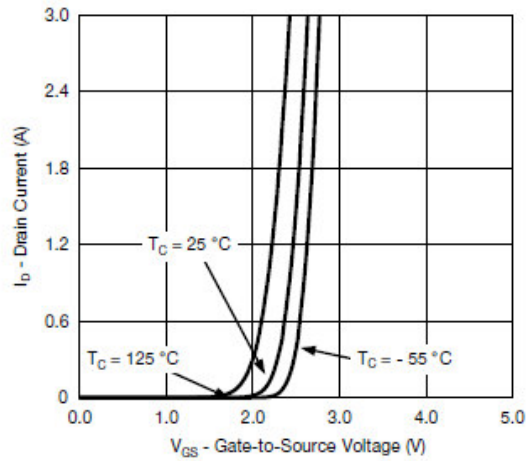
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D = -250uA	-40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	-1.0		-3.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -40V, V _{GS} =0V			-1	uA
		V _{DS} = -40V, V _{GS} =0V T _J =85°C			-20	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ -5V, V _{GS} = -10V	-20			A
Drain-Source On-Resistance	R _{Ds(on)}	V _{GS} = -10V, I _D =-10A		28	35	mΩ
		V _{GS} = -4.5V, I _D =-6A		36	45	
Forward Transconductance	g _{FS}	V _{DS} = -15V, I _D = -5A		20		S
Diode Forward Voltage	V _{SD}	I _S = -2A, V _{GS} =0V		-0.8	-1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =-20V, V _{GS} =-4.5V I _D = -5.0A		13	20	nC
Gate-Source Charge	Q _{gs}			4.5		
Gate-Drain Charge	Q _{gd}			6.5		
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V f=1MHz		1100		pF
Output Capacitance	C _{oss}			145		
Reverse Transfer Capacitance	C _{rss}			115		
Turn-On Time	t _{d(on)}	V _{DD} =-20V, R _L =4Ω I _D ≡-5.0A, V _{GEN} =-4.5V R _G =1Ω		40	80	ns
	t _r			55	100	
Turn-Off Time	t _{d(off)}			30	60	
	t _f			12	20	



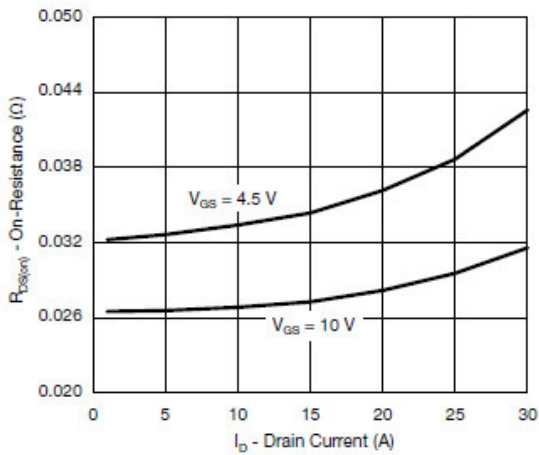
Typical Characteristics (N-Channel)



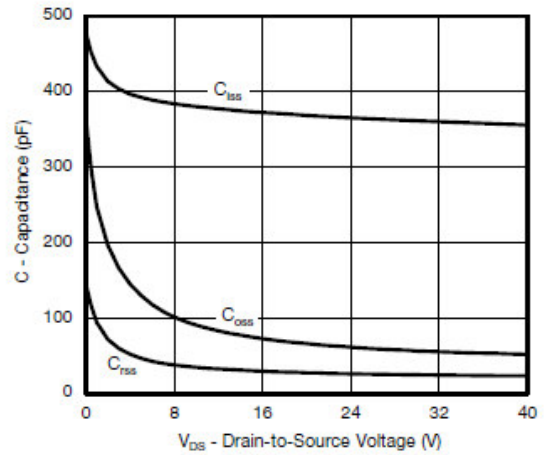
Output Characteristics



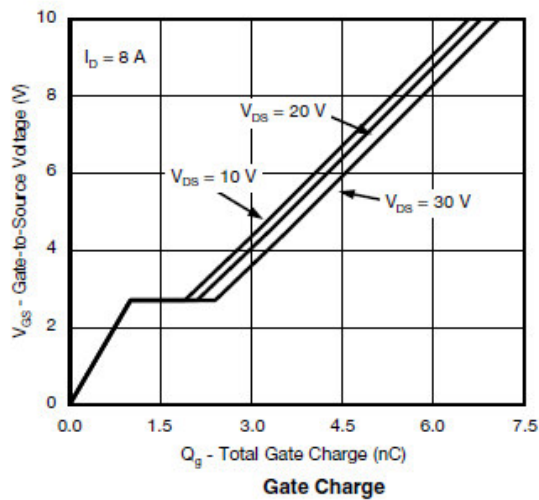
Transfer Characteristics



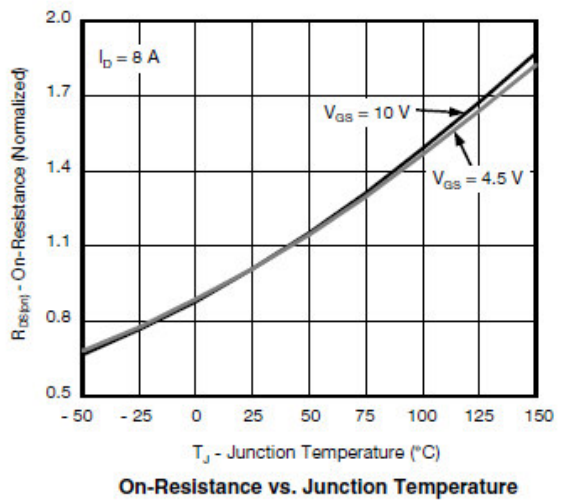
On-Resistance vs. Drain Current



Capacitance



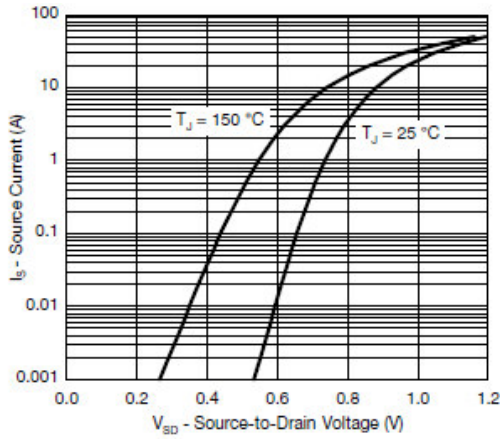
Gate Charge



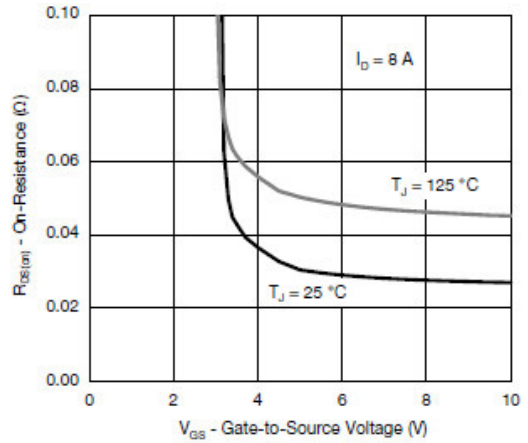
On-Resistance vs. Junction Temperature



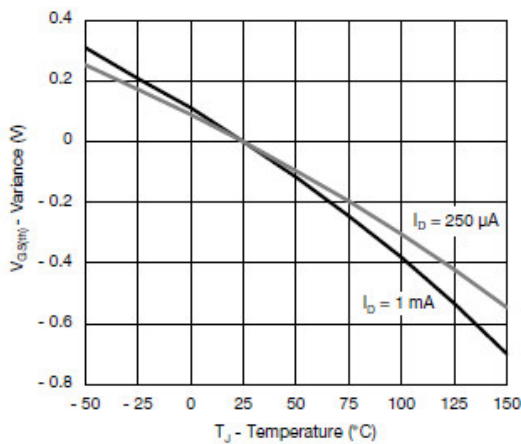
Typical Characteristics (N-Channel)



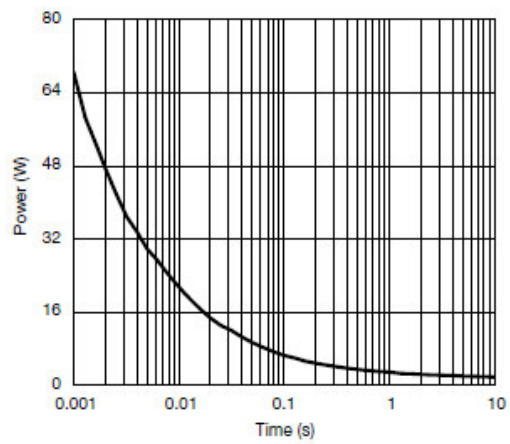
Source-Drain Diode Forward Voltage



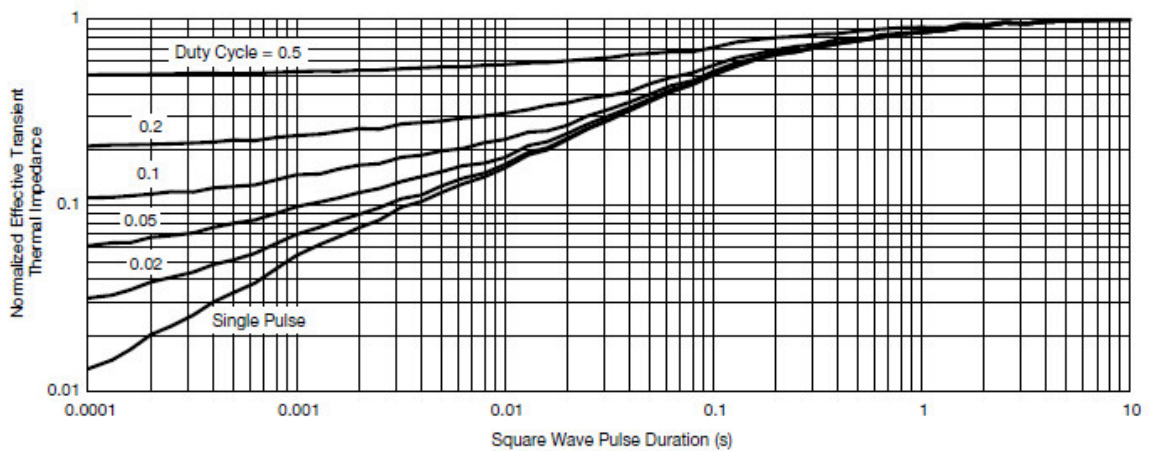
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



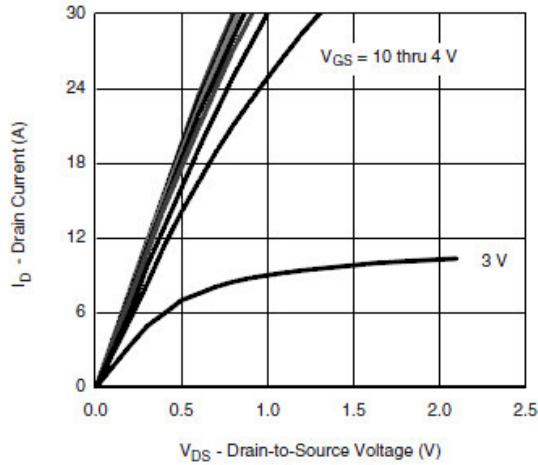
Single Pulse Power



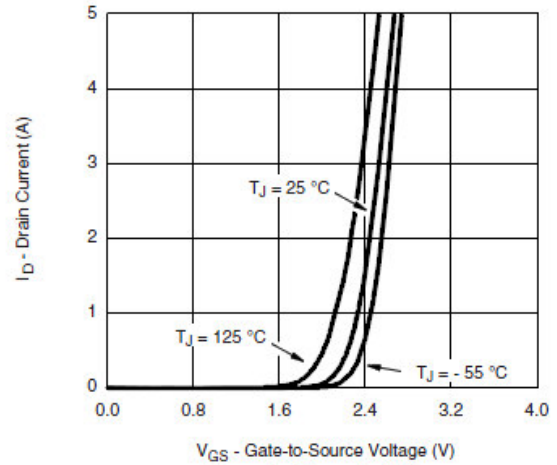
Normalized Thermal Transient Impedance, Junction-to-Foot



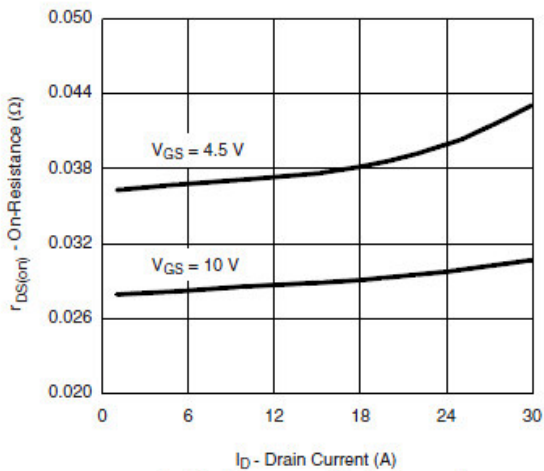
Typical Characteristics (P-Channel)



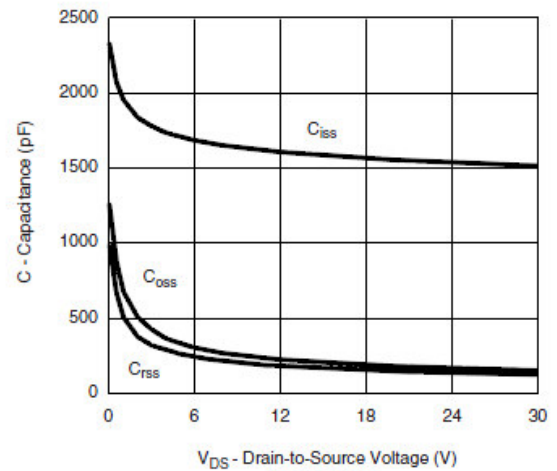
Output Characteristics



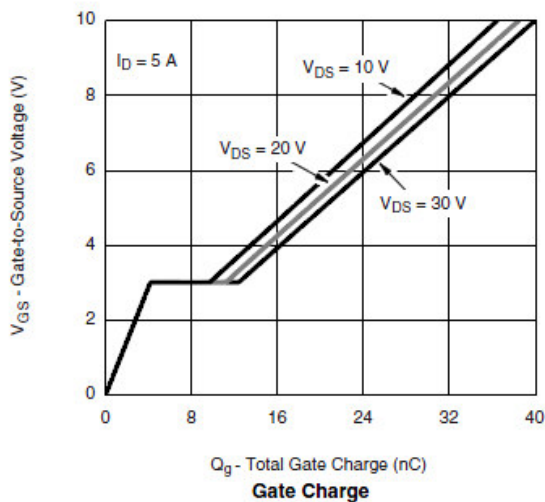
Transfer Characteristics



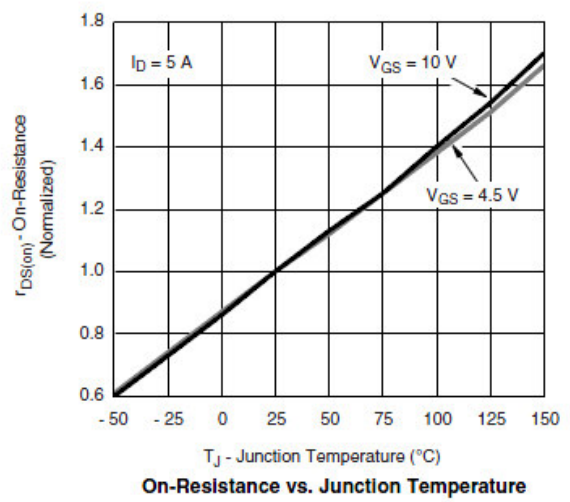
On-Resistance vs. Drain Current



Capacitance



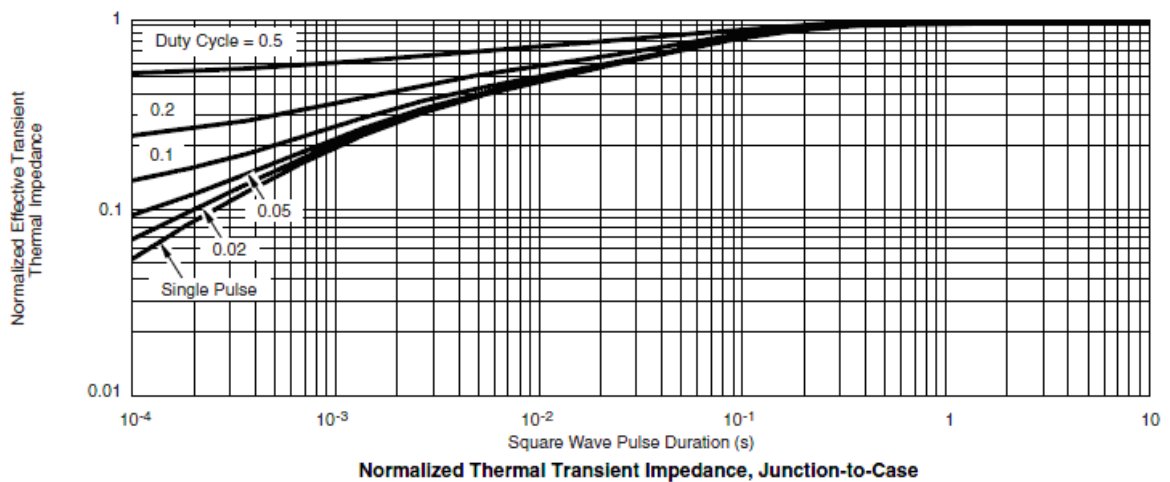
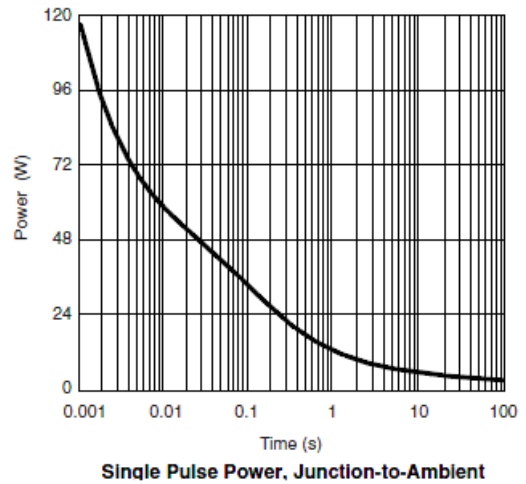
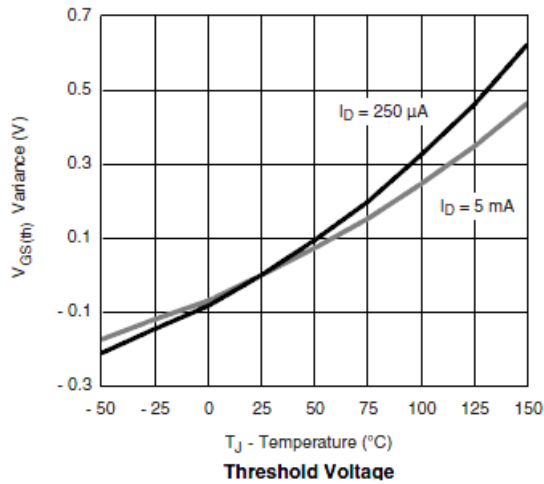
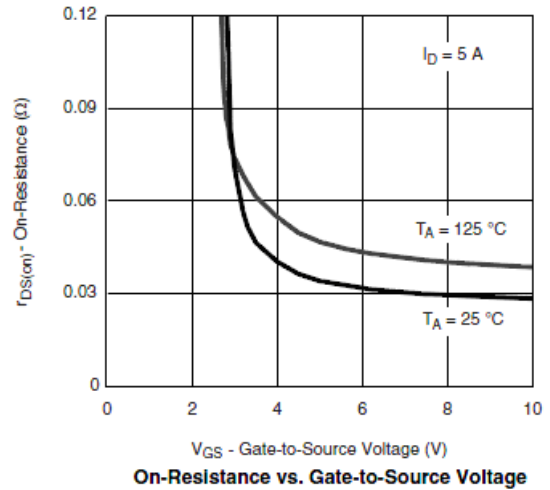
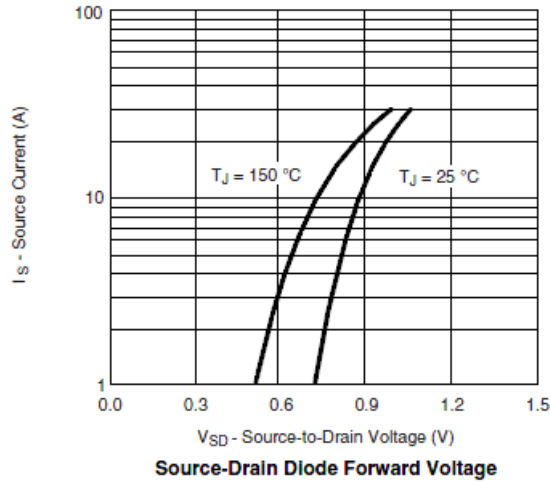
Gate Charge



On-Resistance vs. Junction Temperature



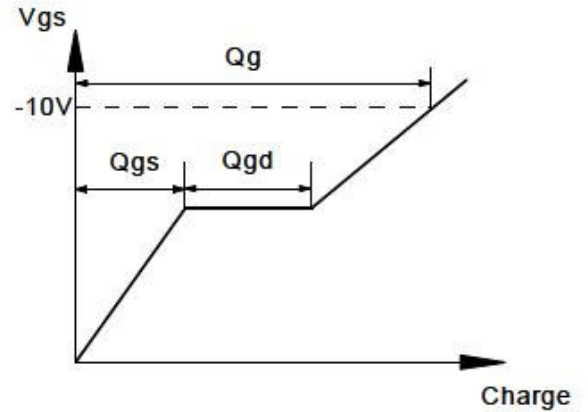
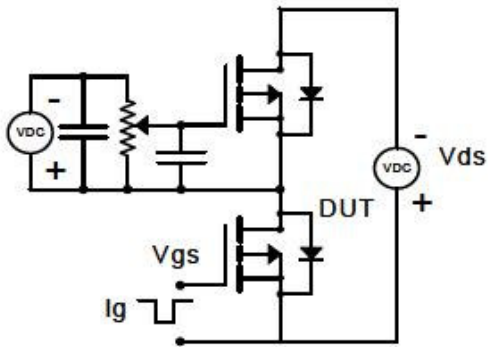
Typical Characteristics (P-Channel)



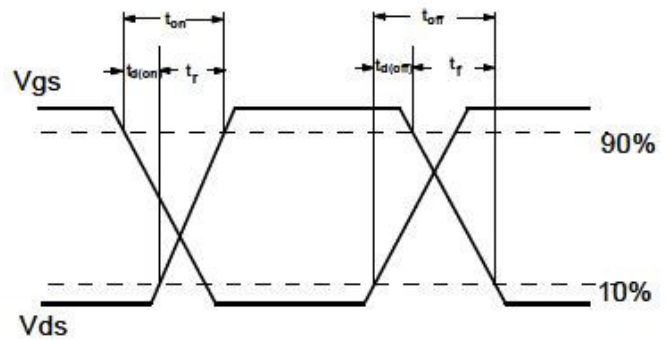
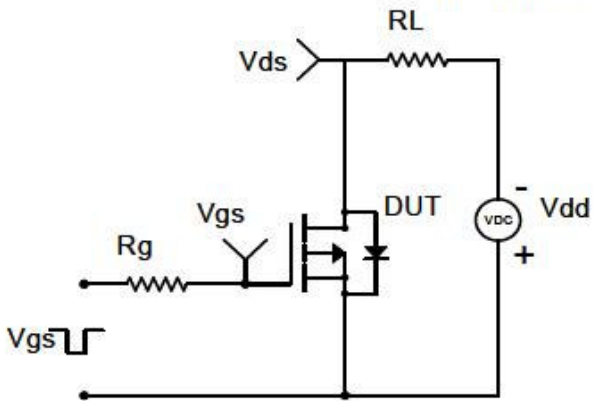


Typical Characteristics

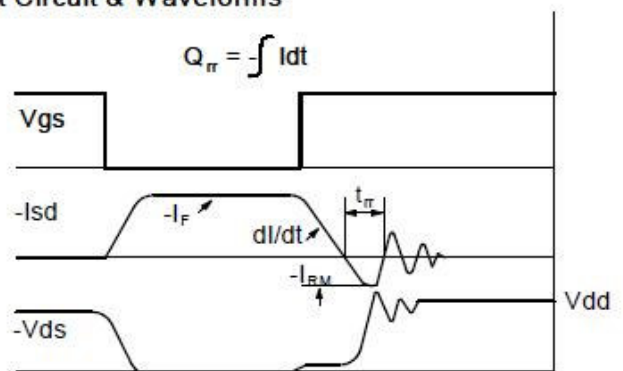
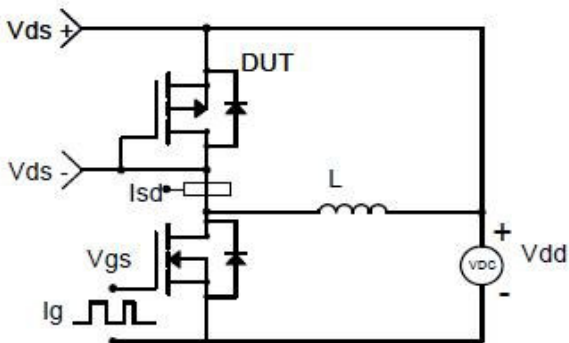
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

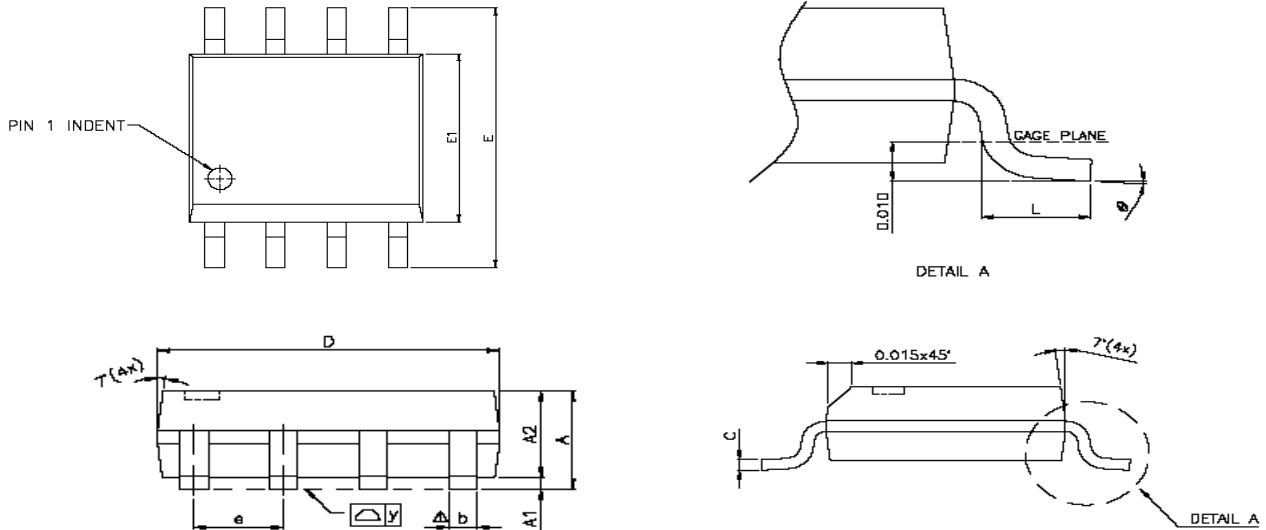


Diode Recovery Test Circuit & Waveforms





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
Δy	—	—	0.076	—	—	0.003
ϕ	0°	—	8°	0°	—	8°

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 2F, No.80, Sec.1, Cheng Kung Rd., Nan Kang Dist., Taipei City 115, Taiwan (R.O.C.)
 Tel : 886 2) 2651 3928
 Fax : 886 2) 2786 8483
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