



General Description

AFC7540, 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

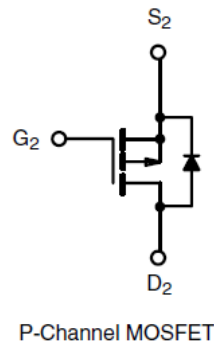
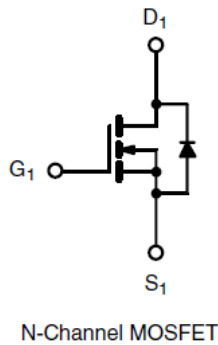
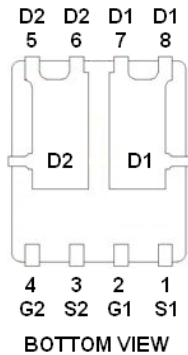
N-Channel

- 20V/ 12A, $R_{DS(ON)}=14m\Omega@V_{GS}=4.5V$
- 20V/ 10A, $R_{DS(ON)}=16m\Omega@V_{GS}=2.5V$
- 20V/ 8A, $R_{DS(ON)}=20m\Omega@V_{GS}=1.8V$

P-Channel

- -20V/-9A, $R_{DS(ON)}=33m\Omega@V_{GS}=-4.5V$
- -20V/-8A, $R_{DS(ON)}=42m\Omega@V_{GS}=-2.5V$
- -20V/-6A, $R_{DS(ON)}=68m\Omega@V_{GS}=-1.8V$

Pin Description (DFN5X6-8L)



Application

- Point-of-Load Synchronous Rectifier
 - 5 V or 3.3 V BUS Step Down
- Synchronous Buck, Shoot-Thru Resistant

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
AFC7540FN568RG	7540	DFN 5X6-8L	Tape & Reel	2500 EA

- ※ 7540 : Parts Code
- ※ YYMMDD : Date Code
- ※ AFC7540FN568RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings (N-Channel)

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	20	V
Gate –Source Voltage	V _{GSS}	±12	V
Continuous Drain Current(T _J =150°C)	I _D	T _A =25°C	12
		T _A =70°C	10
Pulsed Drain Current	I _{DM}	20	A
Continuous Source Current(Diode Conduction)	I _S	1.5	A
Power Dissipation	P _D	T _A =25°C	3.5
		T _A =70°C	2.2
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 (N-Channel)

(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	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	0.35		1.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	uA
		V _{DS} =20V, V _{GS} =0V T _J =85°C			10	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =4.5V	30			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =12A		8.4	14	mΩ
		V _{GS} =2.5V, I _D =10A		9.6	16	
		V _{GS} =1.8V, I _D = 8A		12	20	
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =7.0A		40		S
Diode Forward Voltage	V _{SD}	I _S =9.0A, V _{GS} =0V		0.8	1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =10V, V _{GS} =4.5V I _D ≧9.0A		13	19	nC
Gate-Source Charge	Q _{gs}			2.8		
Gate-Drain Charge	Q _{gd}			2.0		
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V f=1MHz		1450		pF
Output Capacitance	C _{oss}			285		
Reverse Transfer Capacitance	C _{rss}			145		
Turn-On Time	t _{d(on)}	V _{DD} =10V, R _L =1.3Ω I _D ≧8.0A, V _{GEN} =10V R _G =1Ω		10	20	ns
	t _r			10	20	
Turn-Off Time	t _{d(off)}			25	40	
	t _f			10	20	



Absolute Maximum Ratings (P-Channel)

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

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V_{DSS}	-20	V
Gate –Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current($T_J=150^{\circ}\text{C}$)	I_D	$T_A=25^{\circ}\text{C}$	-9.0
		$T_A=70^{\circ}\text{C}$	-8.0
Pulsed Drain Current	I_{DM}	-20	A
Continuous Source Current(Diode Conduction)	I_S	-1.7	A
Power Dissipation	P_D	$T_A=25^{\circ}\text{C}$	3.5
		$T_A=70^{\circ}\text{C}$	2.2
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	$^{\circ}\text{C/W}$

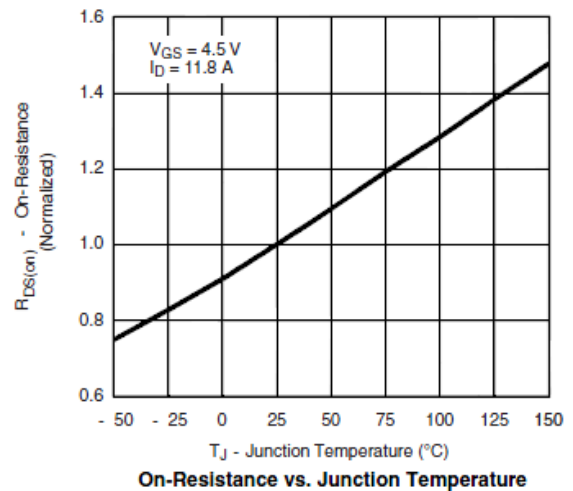
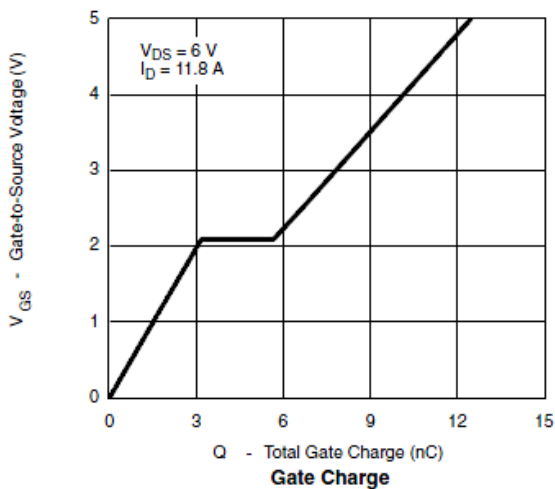
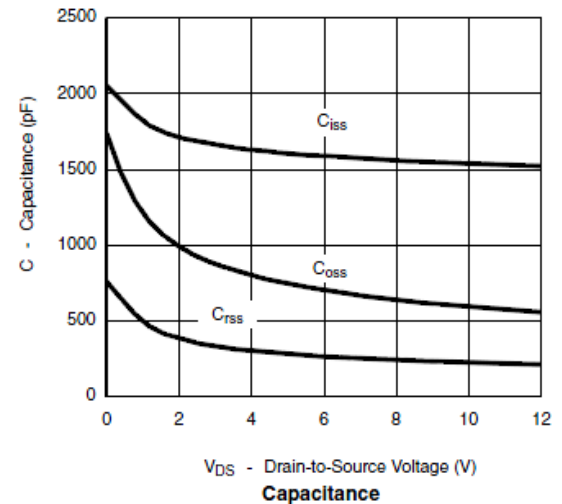
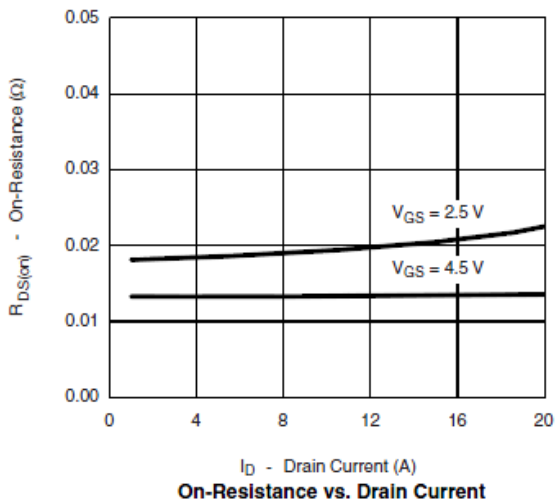
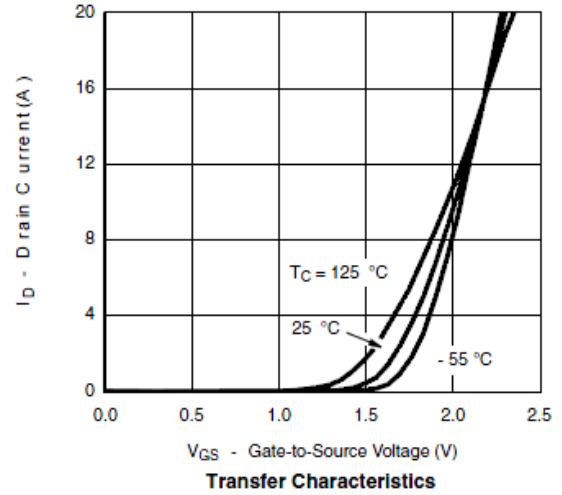
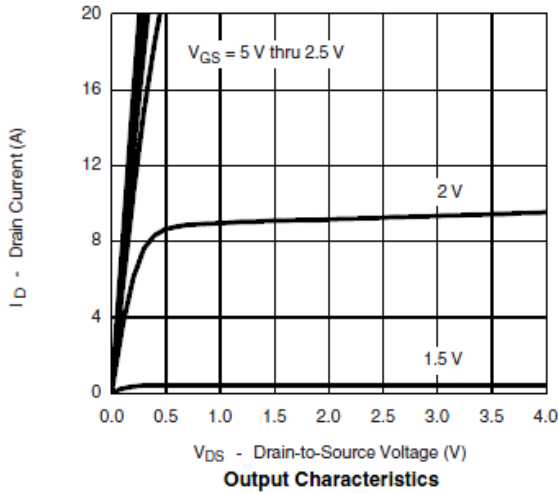
Electrical Characteristics (P-Channel)

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

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4		-1.0	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-16V, V_{GS}=0V$			-1	uA
		$V_{DS}=-16V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			-10	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\leq -5V, V_{GS}=-4.5V$	-10			A
		$V_{DS}\leq -5V, V_{GS}=-2.5V$	-5			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-9A$		21	33	m Ω
		$V_{GS}=-2.5V, I_D=-8A$		32	42	
		$V_{GS}=-1.8V, I_D=-6A$		54	68	
Forward Transconductance	g_{FS}	$V_{DS}=-9V, I_D=-6A$		14		S
Diode Forward Voltage	V_{SD}	$I_S=-2.5A, V_{GS}=0V$		-0.85	-1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=-15V, V_{GS}=-4.5V$ $I_D=-6.0A$		10	18	nC
Gate-Source Charge	Q_{gs}			1.6		
Gate-Drain Charge	Q_{gd}			3.0		
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V$ $f=1\text{MHz}$		950		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			175		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=15\Omega$ $I_D=-5.0A, V_{GEN}=-10V$ $R_G=6\Omega$		8	18	ns
	t_r			8	18	
Turn-Off Time	$t_{d(off)}$			25	50	
	t_f			25	35	

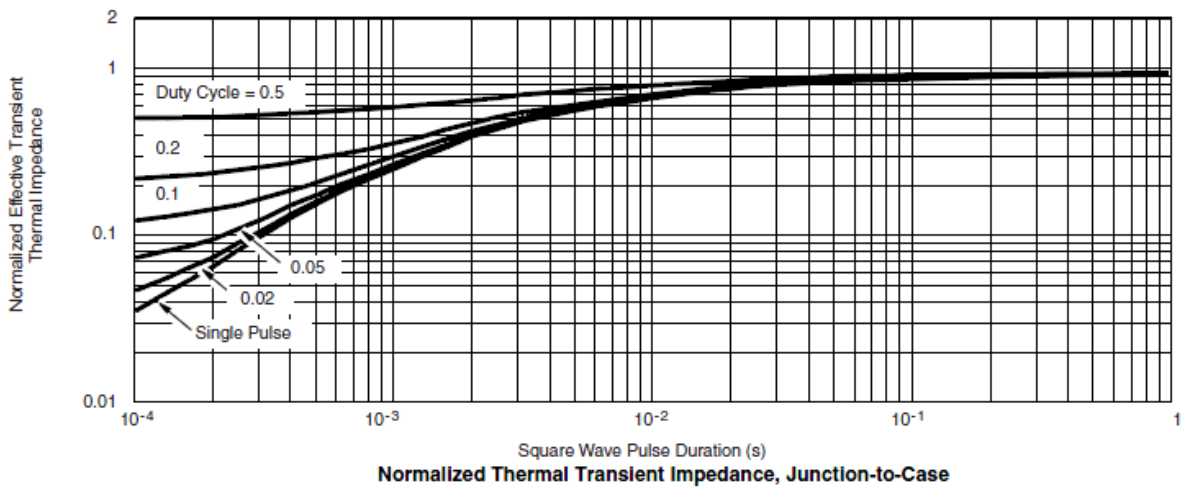
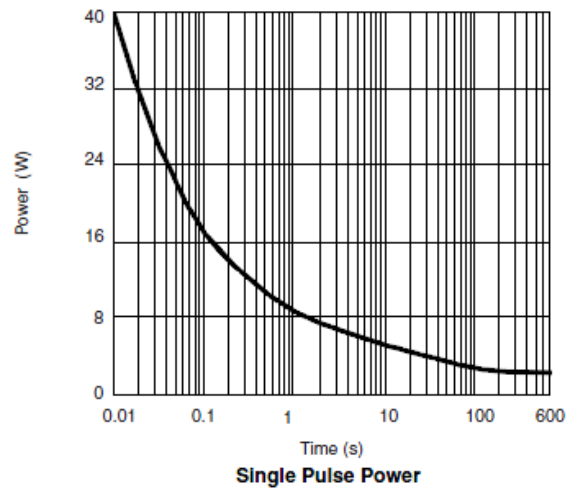
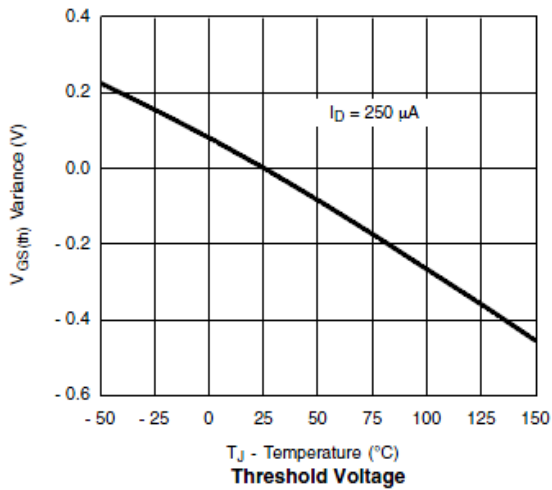
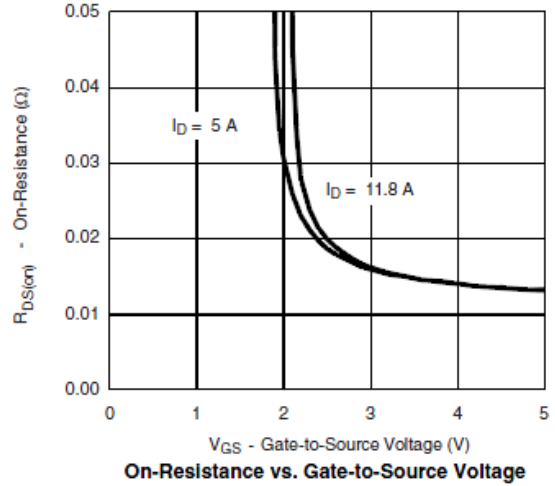
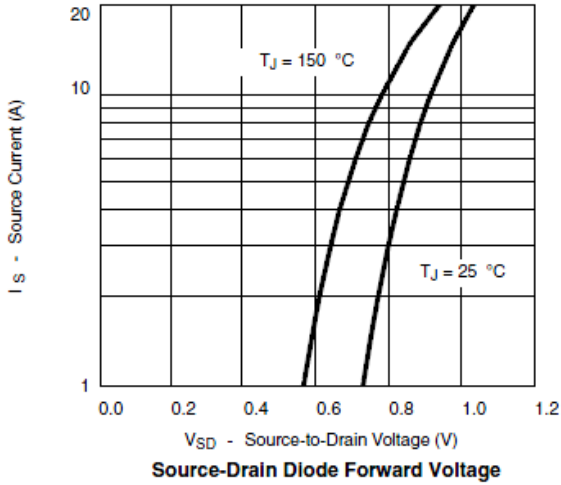


Typical Characteristics (N-Channel)



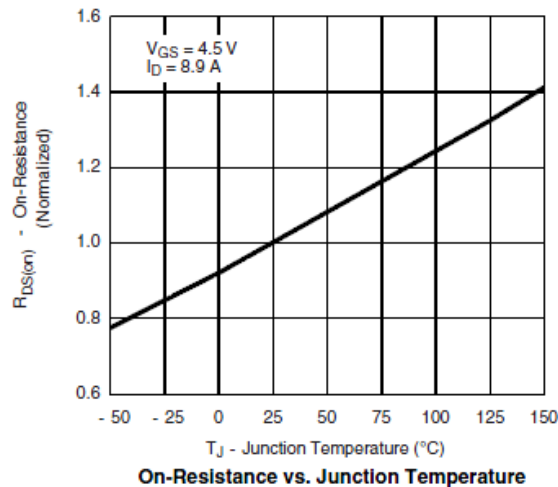
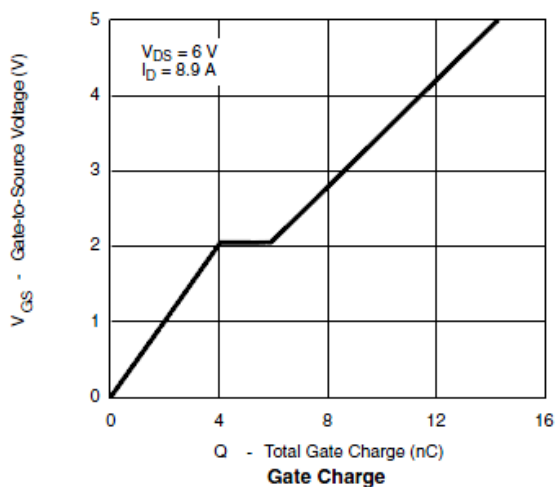
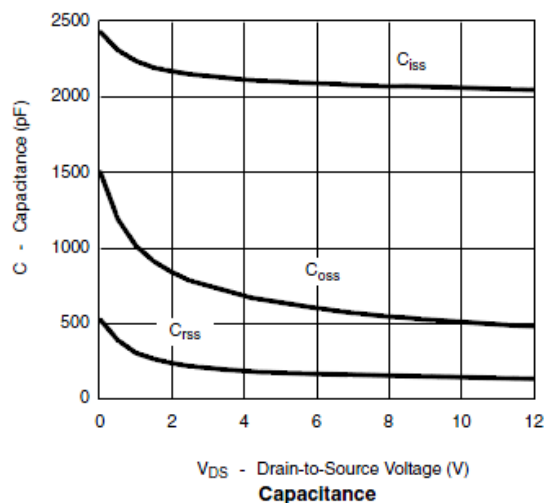
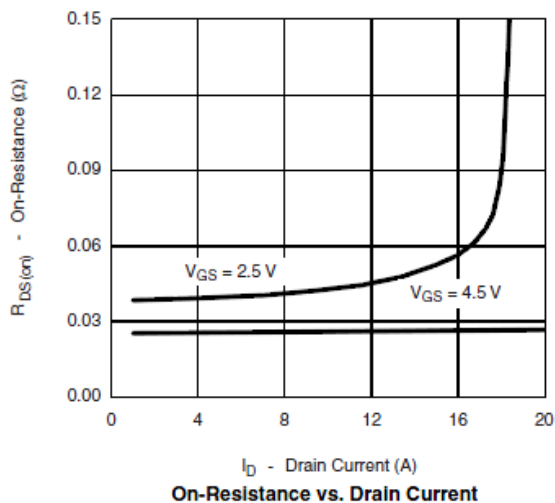
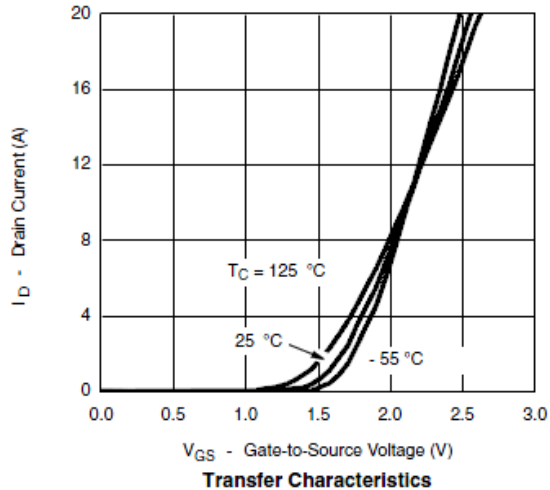
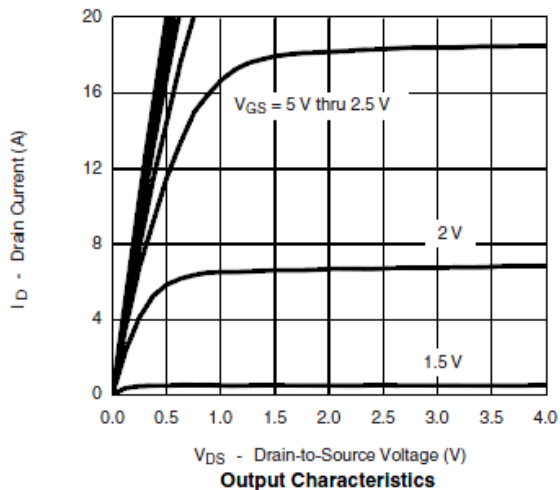


Typical Characteristics (N-Channel)



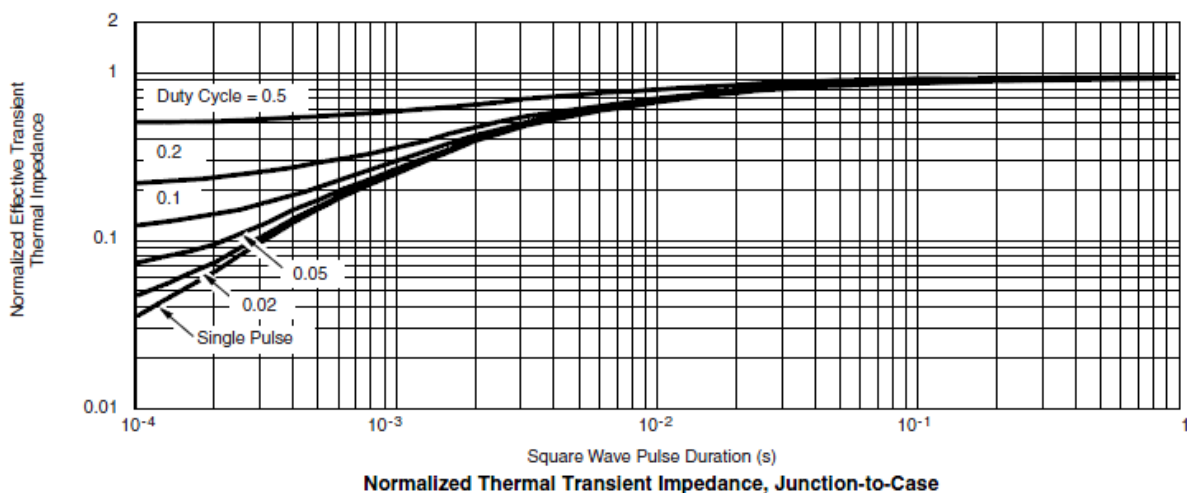
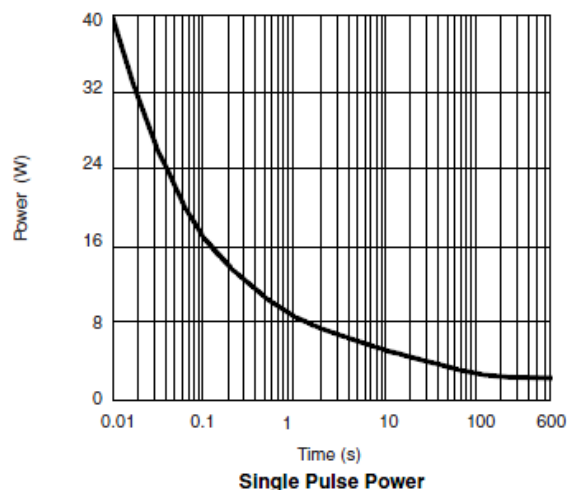
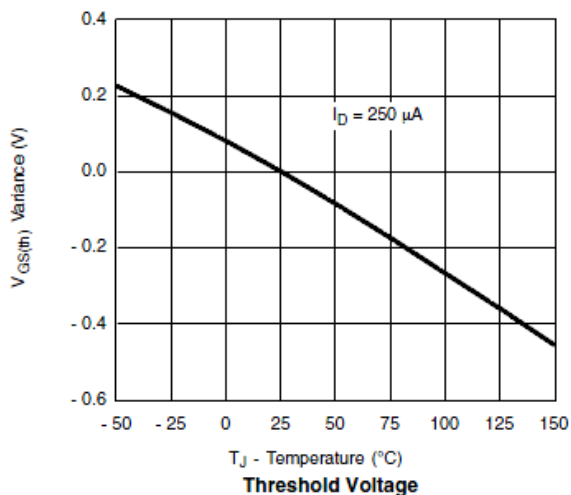
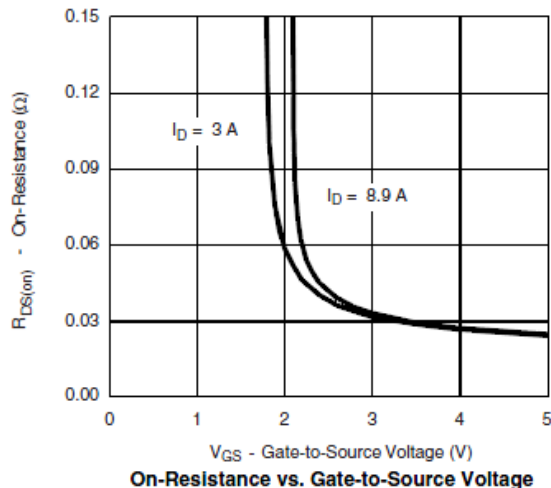
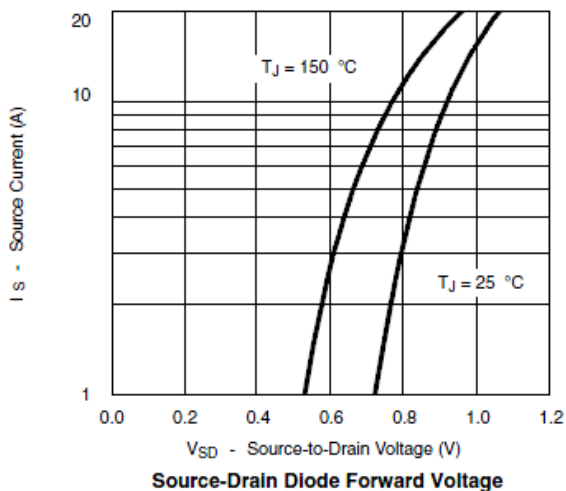


Typical Characteristics (P-Channel)





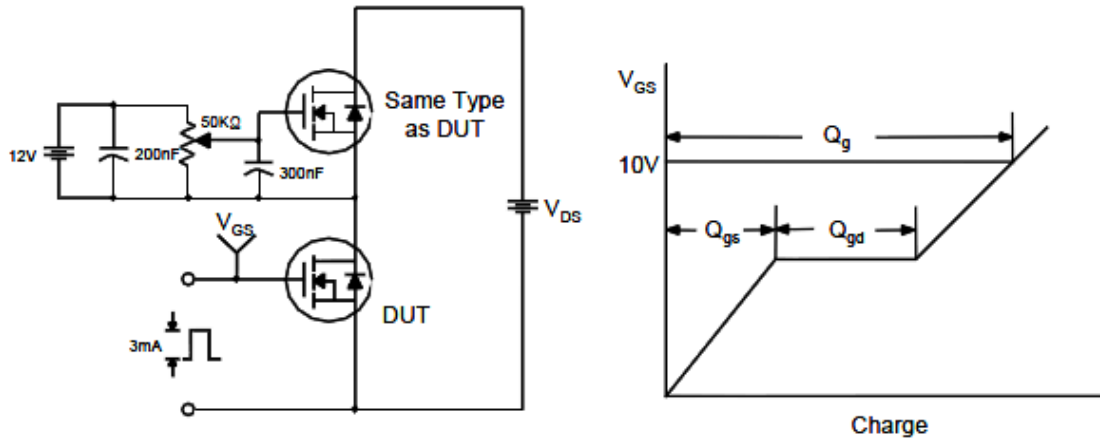
Typical Characteristics (P-Channel)



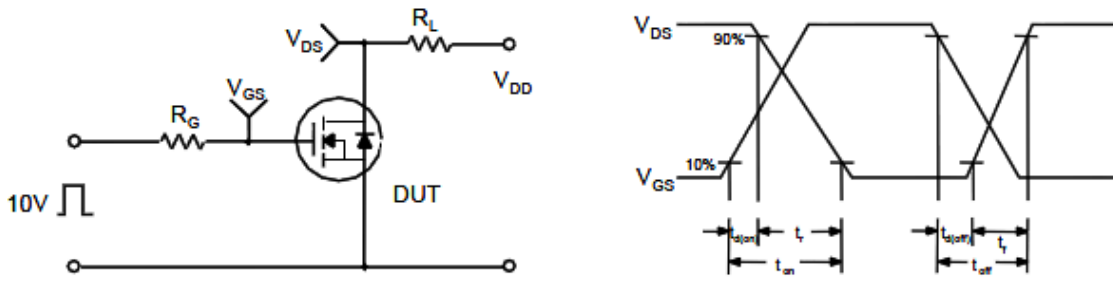


Typical Characteristics

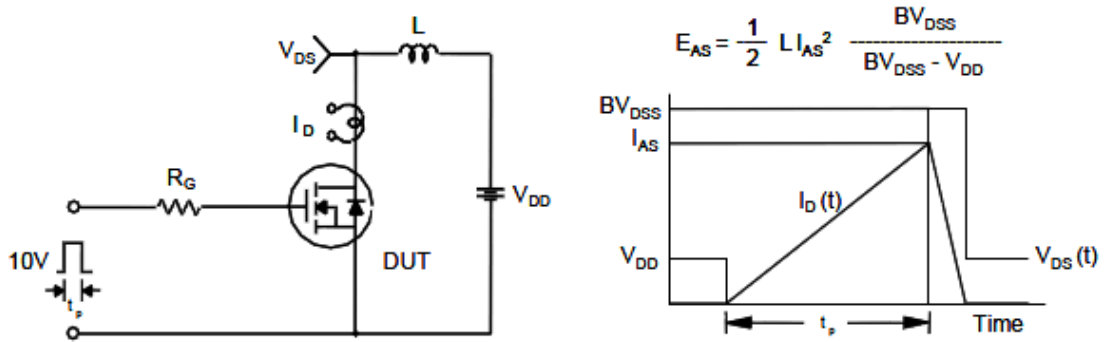
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

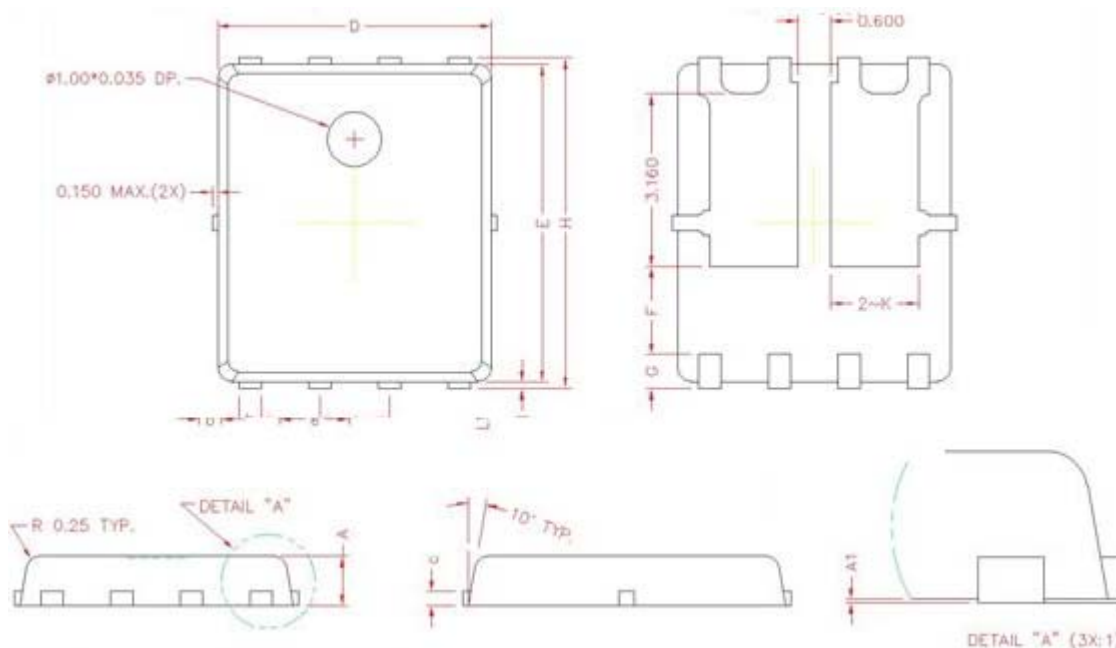


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (DFN 5X6-8L)



DIMENSIONS

REF.	Millimeters		REF.	Millimeters	
	Min.	Max.		Min.	Max.
A	0.80	1.00	E	5.70	5.90
A1	0.00	0.05	e	1.27 BSC.	
b	0.35	0.49	H	5.95	6.20
c	0.254 Ref.		L1	0.10	0.18
D	4.90	5.10	G	0.60 Ref.	
F	1.60 Ref.		K	1.60 Ref.	

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