



General Description

AFC7420, 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

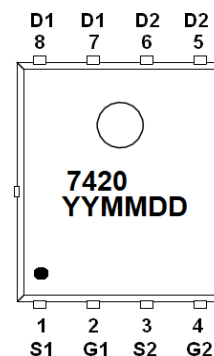
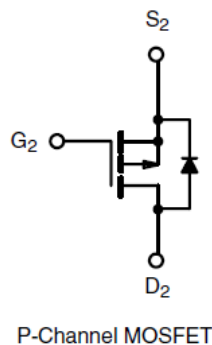
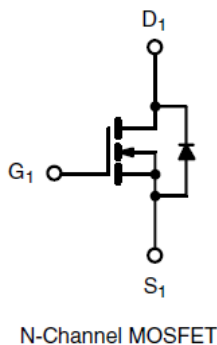
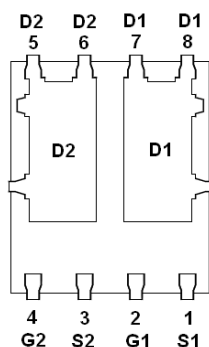
N-Channel

- $I_D = 15A, R_{DS(ON)} = 8m\Omega @ V_{GS} = 10V$
- $I_D = 10A, R_{DS(ON)} = 10m\Omega @ V_{GS} = 4.5V$

P-Channel

- $I_D = -15A, R_{DS(ON)} = 13m\Omega @ V_{GS} = -10V$
- $I_D = -10A, R_{DS(ON)} = 16m\Omega @ V_{GS} = -4.5V$

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
AFC7420FN568RG	7420	DFN 5X6-8L	Tape & Reel	2500 EA

※ 7420 : Parts Code

※ YYMMDD : Date Code

※ AFC7420FN568RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings (N-Channel)

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Value	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	15
		T _A =70°C	10
Pulsed Drain Current	I _{DM}	40	A
Continuous Source Current(Diode Conduction)	I _S	2.9	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	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0		2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±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°C			10	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =10V	15			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =15A		6	8	mΩ
		V _{GS} =4.5V, I _D =10A		7	10	
Forward Transconductance	g _{FS}	V _{DS} =15V, I _D =10A		70		S
Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V		0.8	1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =4.5V I _D ≅10A		16	25	nC
Gate-Source Charge	Q _{gs}		4.2			
Gate-Drain Charge	Q _{gd}		5.6			
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz		1750		pF
Output Capacitance	C _{oss}		260			
Reverse Transfer Capacitance	C _{rss}		115			
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =2.0Ω I _D ≅10A, V _{GEN} =10V R _G =1.0Ω		10	20	ns
	t _r			10	20	
Turn-Off Time	t _{d(off)}			20	40	
	t _f			10	20	



Absolute Maximum Ratings (P-Channel)

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Value	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	-15
		T _A =85°C	-10
Pulsed Drain Current	I _{DM}	-40	A
Continuous Source Current(Diode Conduction)	I _S	-2.9	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

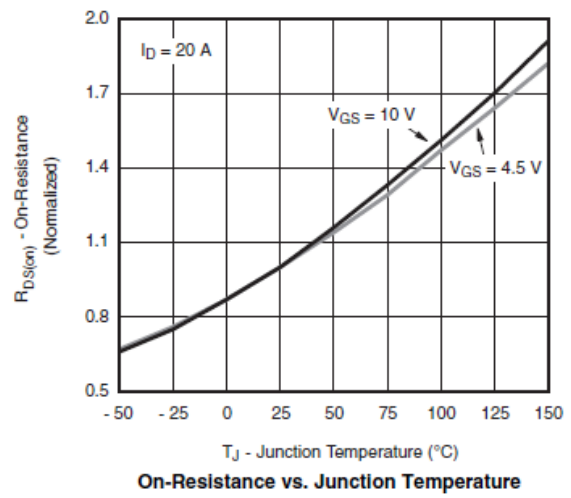
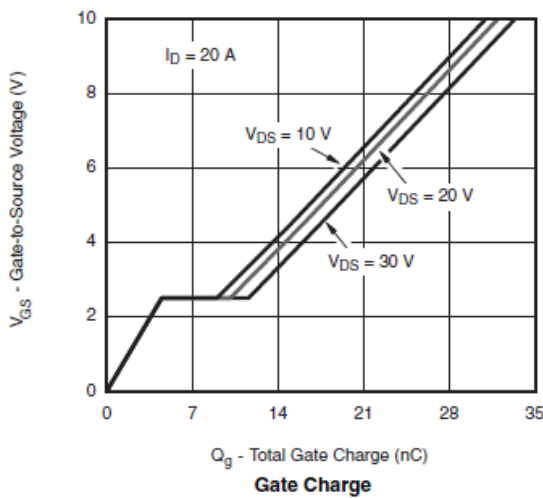
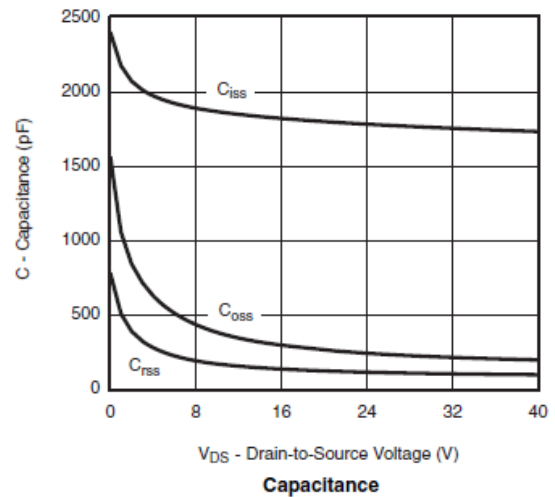
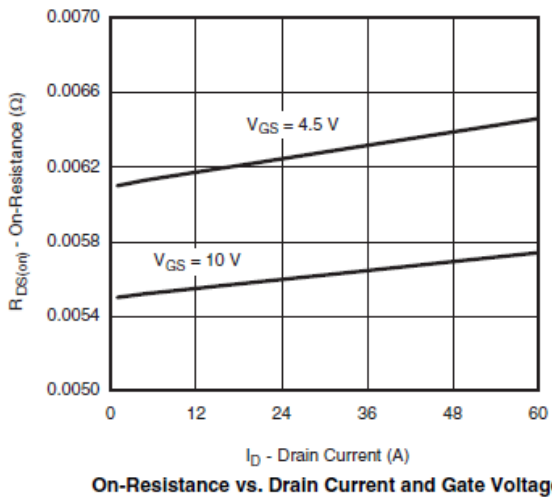
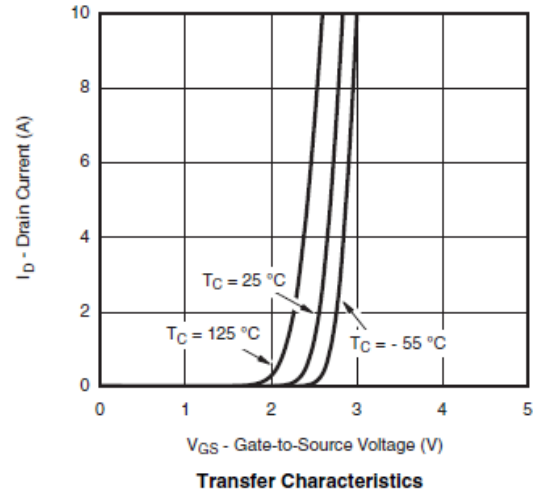
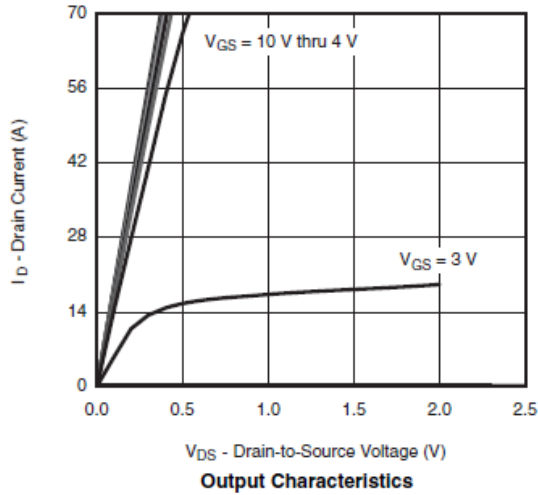
Electrical Characteristics (P-Channel)

(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	-40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	-1.0		-2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = ±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°C			-20	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ -10V, V _{GS} = -10V	-15			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -15A		10	13	mΩ
		V _{GS} = -4.5V, I _D = -10A		13	16	
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -15A		40		S
Diode Forward Voltage	V _{SD}	I _S = -1A, V _{GS} =0V		-0.8	-1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =-20V, V _{GS} =-4.5V I _D = -10A		45	90	nC
Gate-Source Charge	Q _{gs}			10		
Gate-Drain Charge	Q _{gd}			20		
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V f=1MHz		4150		pF
Output Capacitance	C _{oss}			435		
Reverse Transfer Capacitance	C _{rss}			400		
Turn-On Time	t _{d(on)}	V _{DD} =-20V, R _L =2Ω I _D ≡ -10A, V _{GEN} =-10V R _G =1Ω		15	30	ns
	t _r			15	30	
Turn-Off Time	t _{d(off)}			55	110	
	t _f			12	25	

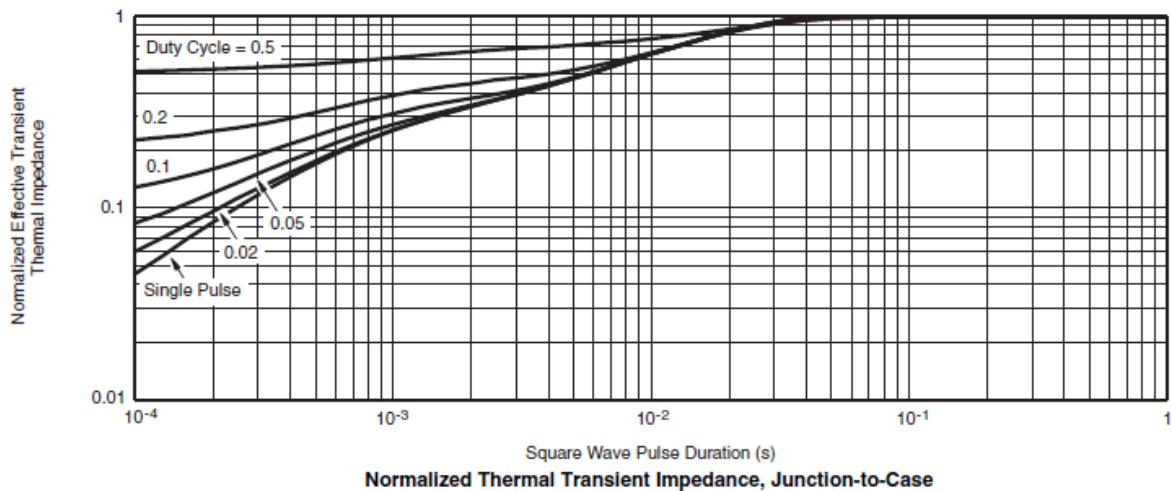
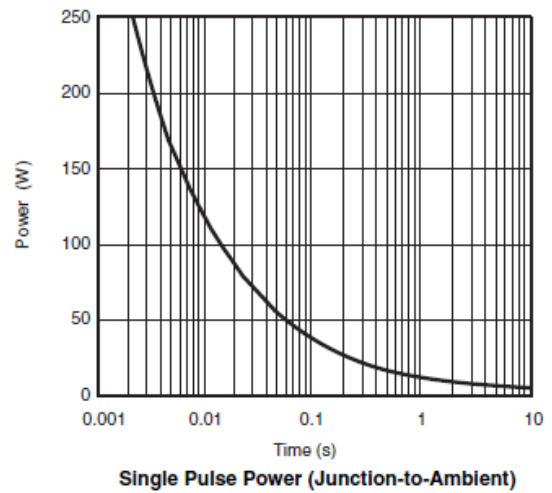
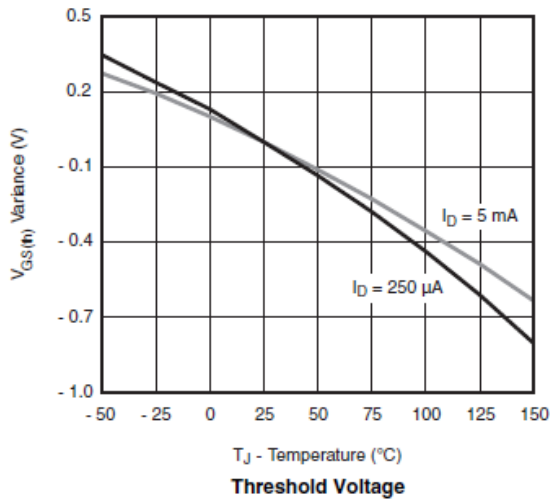
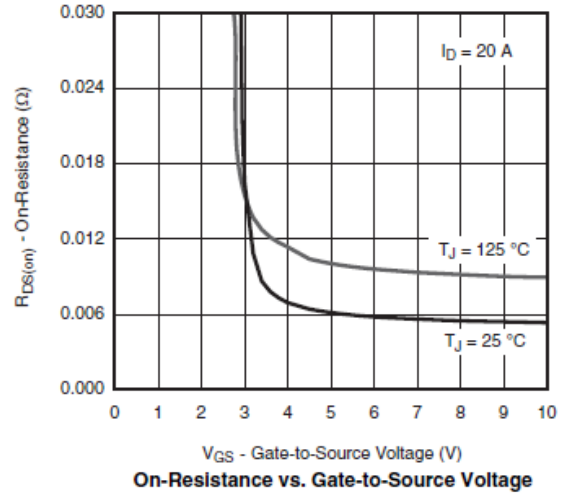
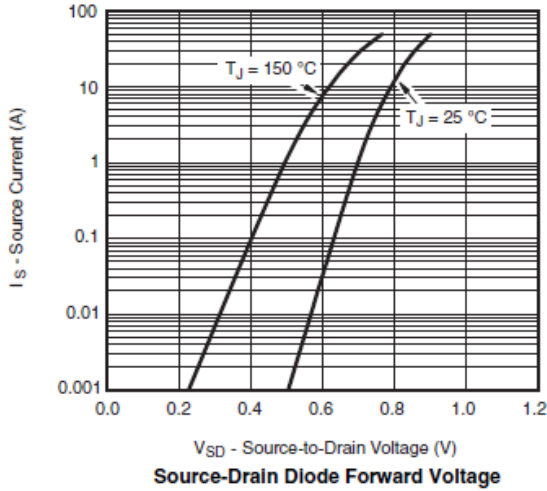


Typical Characteristics (N-Channel)



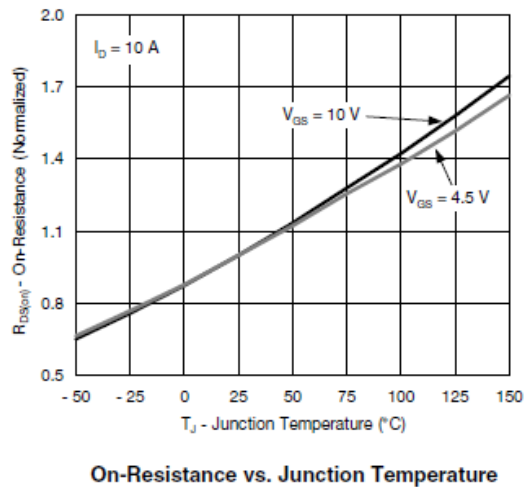
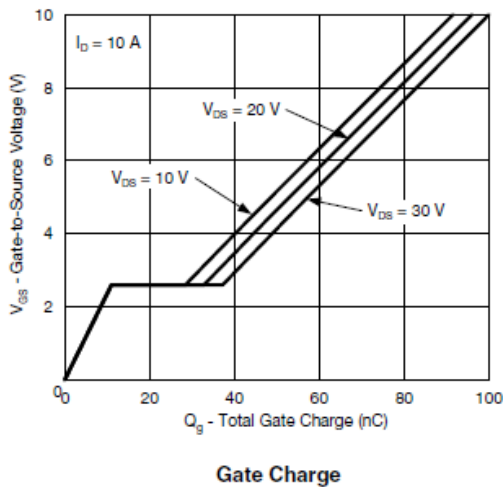
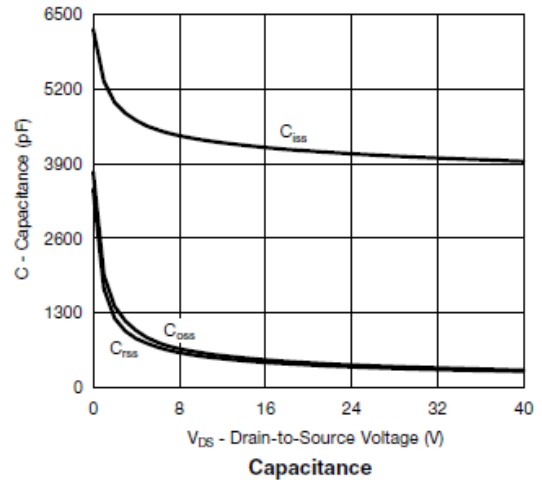
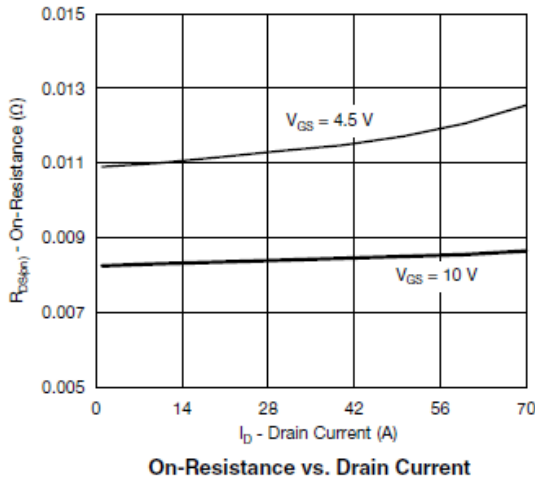
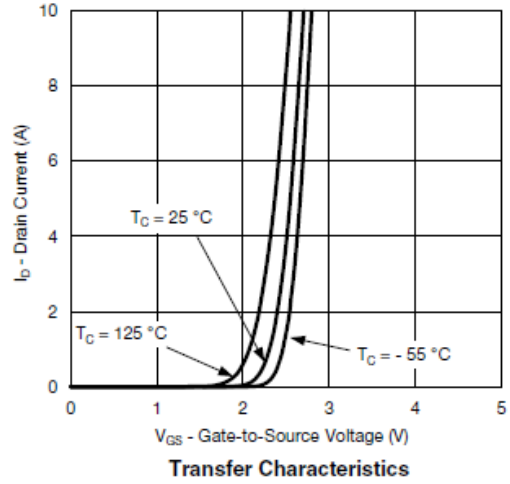
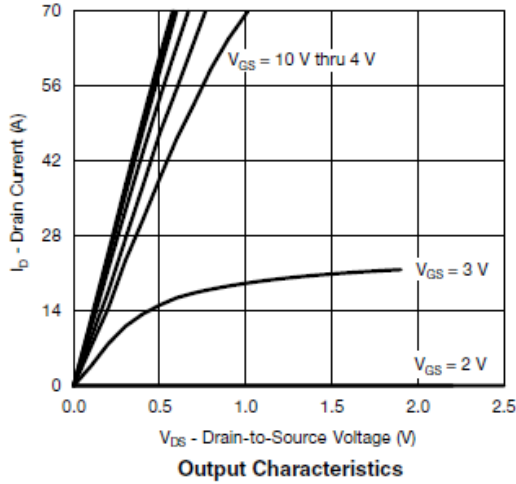


Typical Characteristics (N-Channel)



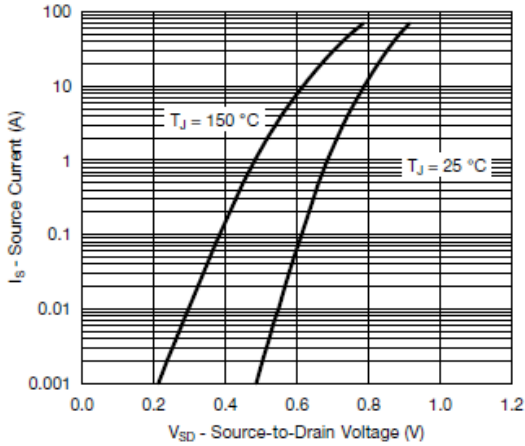


Typical Characteristics (P-Channel)

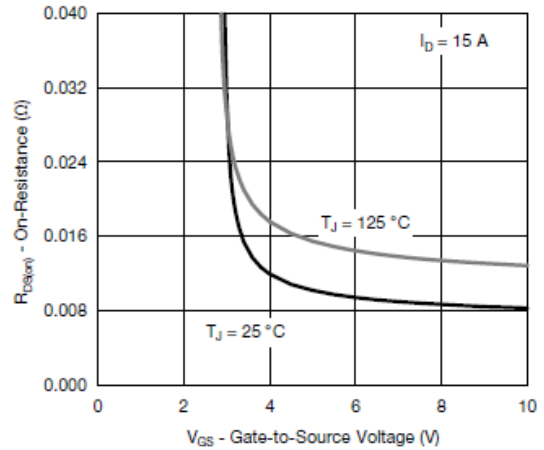




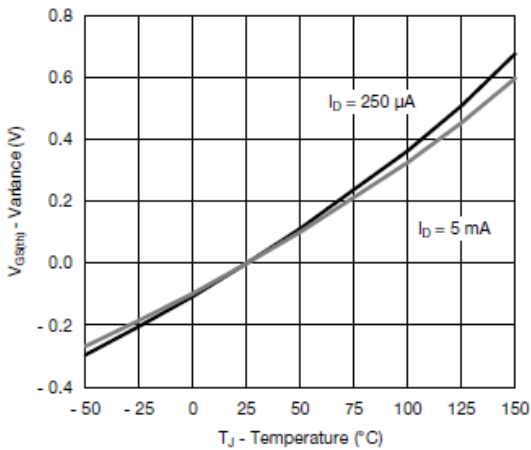
Typical Characteristics (P-Channel)



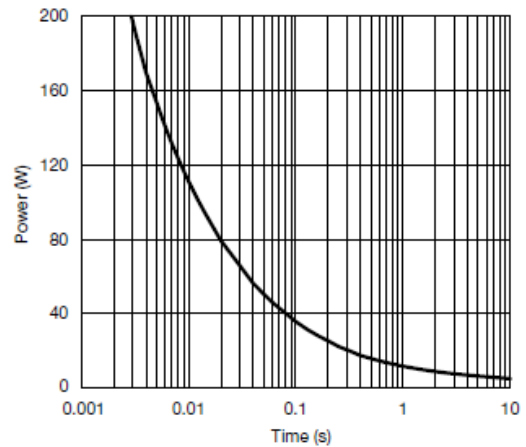
Source-Drain Diode Forward Voltage



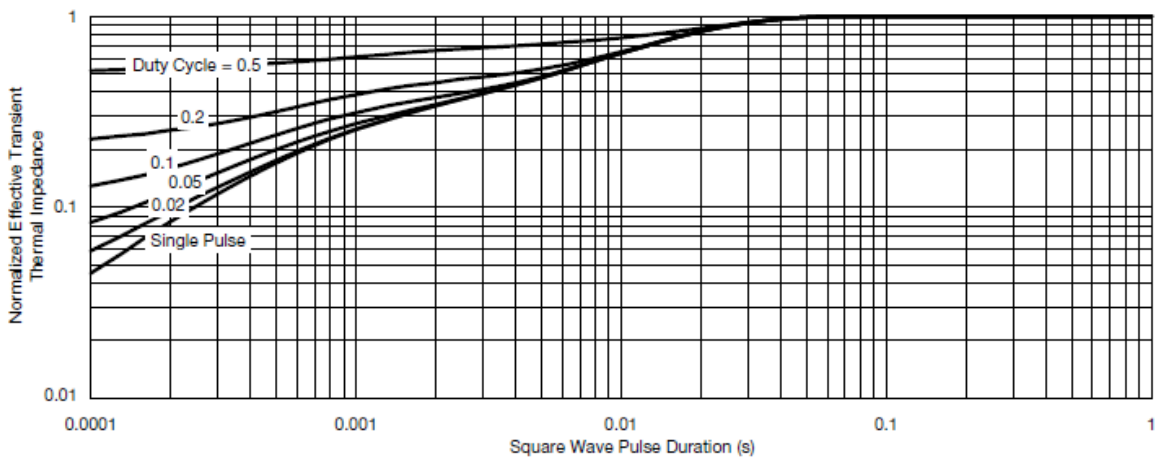
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

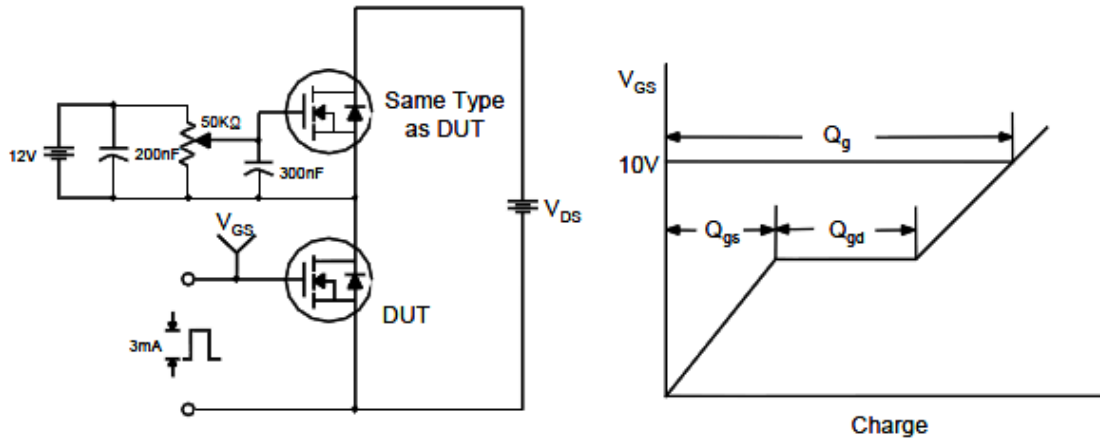


Normalized Thermal Transient Impedance, Junction-to-Case

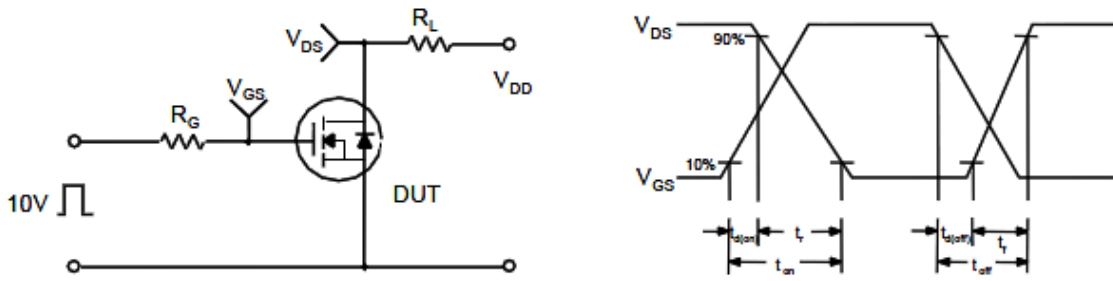


Typical Characteristics

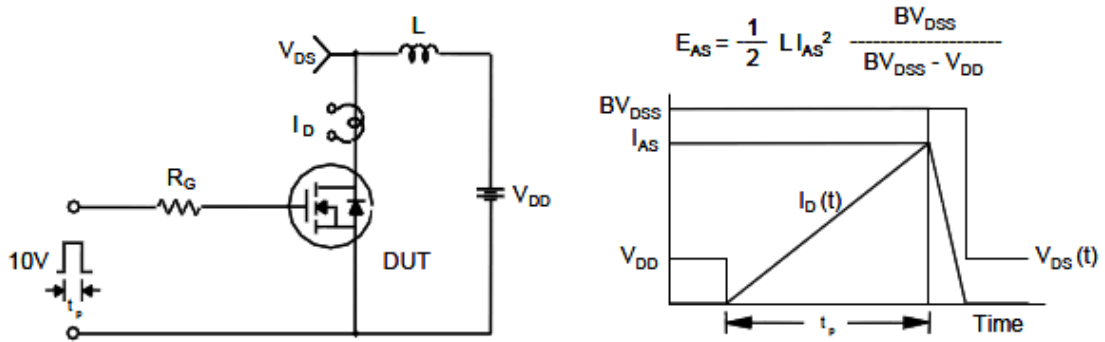
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

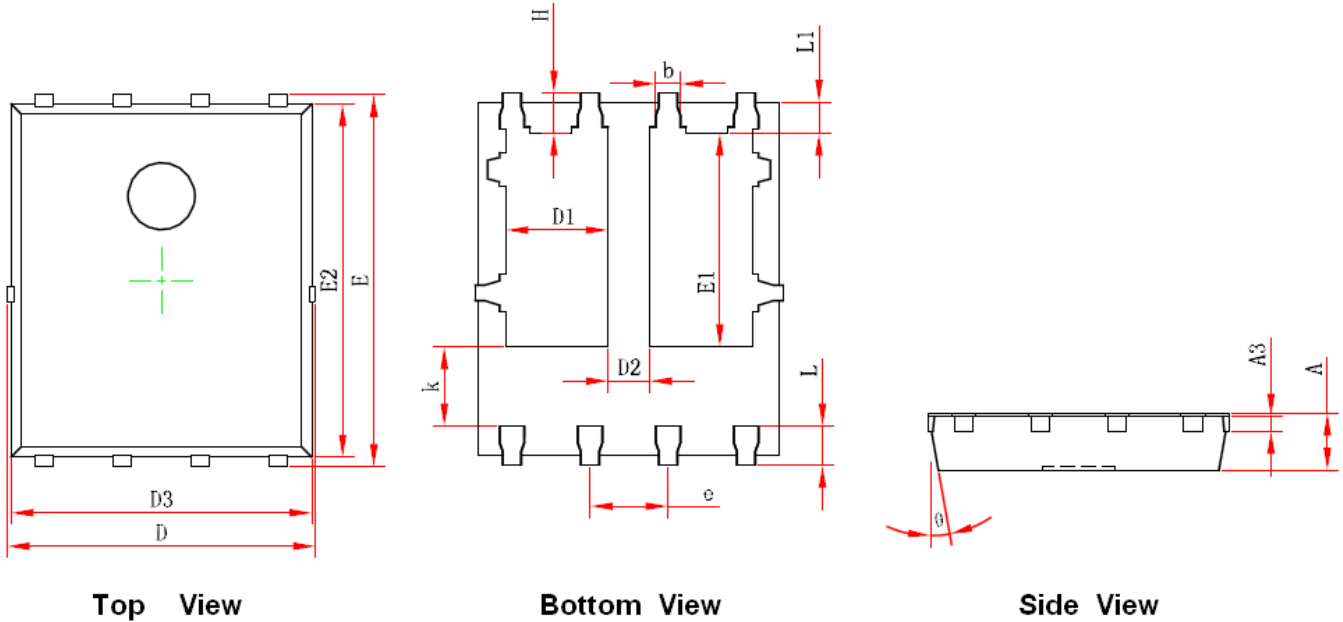


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (DFN 5X6-8L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF.		0.010 REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270 TYP.		0.050 TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

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