Alfa-MOS Technology

AFN7456S

100V N-Channel Enhancement Mode MOSFET

General Description

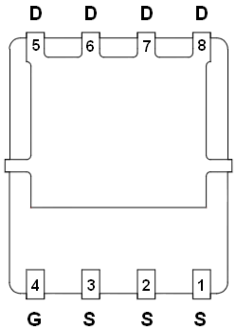
AFN7456S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

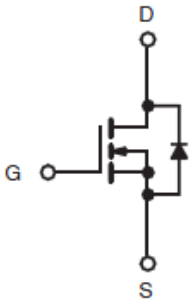
Features

- I_D=12A,$R_{DS(ON)}$= 20mΩ@V_{GS}=10V
- I_D=10A,$R_{DS(ON)}$= 28mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN 5X6-8L package design

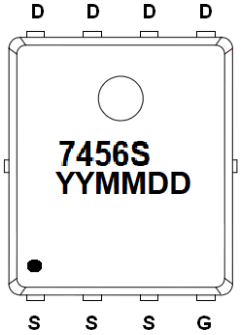
Pin Description (DFN 5X6-8L)



BOTTOM VIEW



SYMBOL



TOP VIEW

Application

- Synchronous Rectification
- DC/DC Primary Side Switch
- Telecom/Server 48 V, Full/Half-Bridge DC/DC
- Quick Charge 2.0/3.0

Pin Define

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5 ~ 8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN7456SFN568RG	7456S	DFN 5X6-8L	Tape & Reel	2500 EA

※ 7456S : Parts Code
※ YYMMDD : Date Code
※ AFN7456SFN568RG : 13”Tape & Reel ; Pb- Free ; Halogen –Free

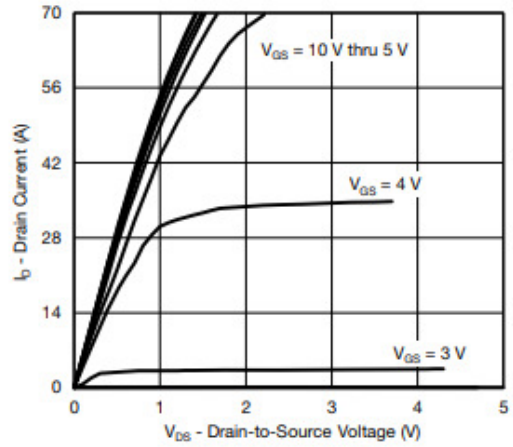
Absolute Maximum Ratings (T_A=25℃ Unless otherwise noted)

Parameter			Symbol	Typical		Unit
Drain-Source Voltage			V_{DSS}	100		V
Gate –Source Voltage			V_{GSS}	±20		V
Continuous Drain Current(T_J=150℃)	T_C=25℃	T_C=70℃	I_{DSM}	28	24	A
	T_A=25℃	T_A=70℃		12	10	
Pulsed Drain Current (t=100us)			I_{DM}	70		
Continuous Source Current(Diode Conduction)	T_C=25℃		I_S	25		
	T_A=25℃			4.5		
Single Pulse Avalanche Current	L=0.1mH		I_{AS}	15		
			E_{AS}	11		mJ
Power Dissipation	T_C=25℃	T_C=75℃	P_D	36	24	W
	T_A=25℃	T_A=75℃		5	3.2	
Operating Junction Temperature			T_J	150		℃
Storage Temperature Range			T_{STG}	-55/150		℃
Thermal Resistance-Junction to Ambient	t ≤ 10 s		$R_{\theta JA}$	25		℃/W
Maximum Junction-to-Case (Drain)	Steady-State		$R_{\theta JA}$	3.5		

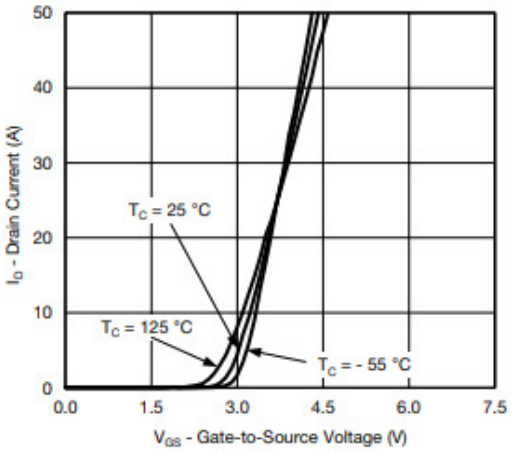
Electrical Characteristics (T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	100			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}=80V,V_{GS}=0V			1	uA
		V_{DS}=80,V_{GS}=0V T_J=85℃			30	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=10V	30			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=12A		16	20	mΩ
		V_{GS}=4.5V,I_D=10A		22	28	
Forward Transconductance	g_{FS}	V_{DS}=10,I_D=10A		26		S
Diode Forward Voltage	V_{SD}	I_S=4A,V_{GS}=0V		0.75	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=50V,V_{GS}=4.5V I_D≡10A		9.5	20	nC
Gate-Source Charge	Q_{gs}			2.8		
Gate-Drain Charge	Q_{gd}			4.5		
Gate Resistance	R_g	f=1MHz	0.2	0.8	1.6	Ω
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V f=1MHz		900		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			30		
Turn-On Time	$t_{d(on)}$	V_{DD}=50V,R_L=5Ω I_D≡10A,V_{GEN}=10V R_G=1Ω		12	25	ns
	t_r			10	20	
Turn-Off Time	$t_{d(off)}$			20	40	
	t_f			10	20	

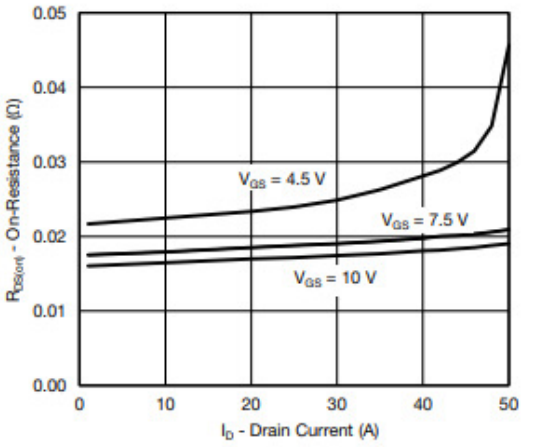
Typical Characteristics



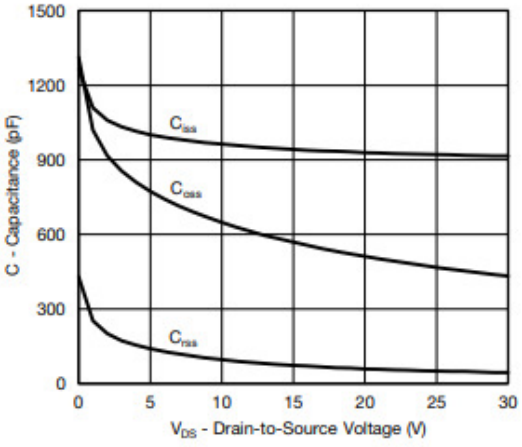
Output Characteristics



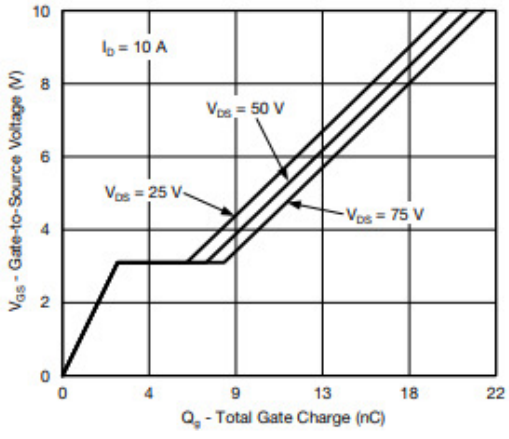
Transfer Characteristics



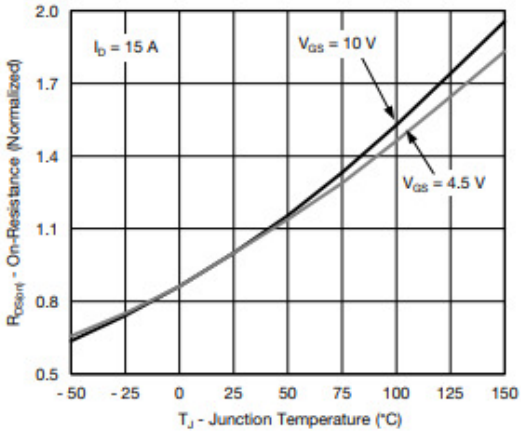
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

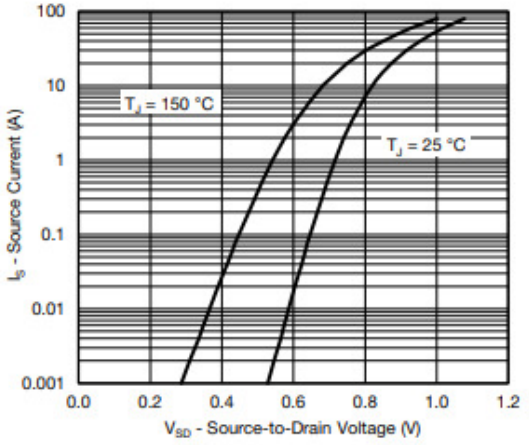


Gate Charge

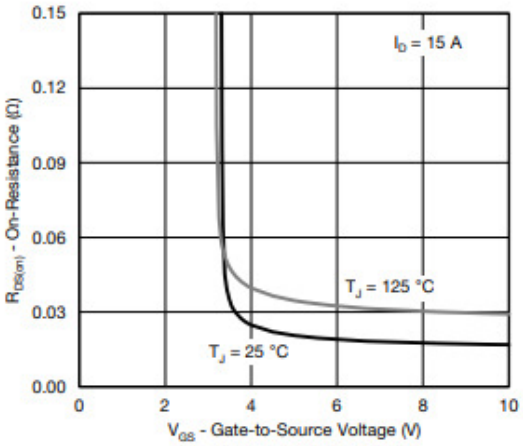


On-Resistance vs. Junction Temperature

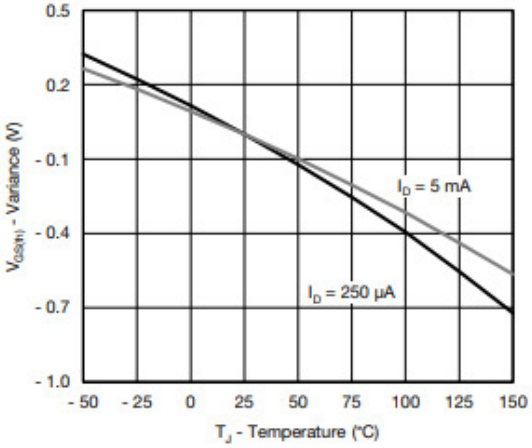
Typical Characteristics



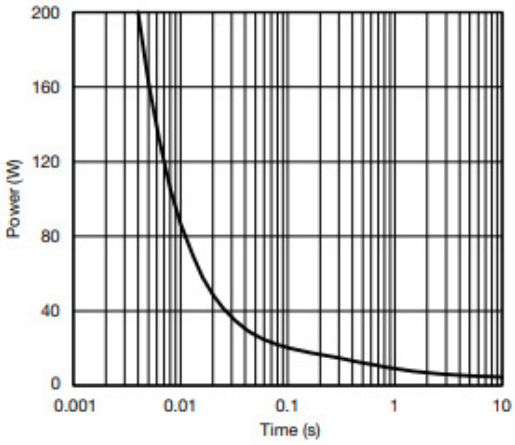
Source-Drain Diode Forward Voltage



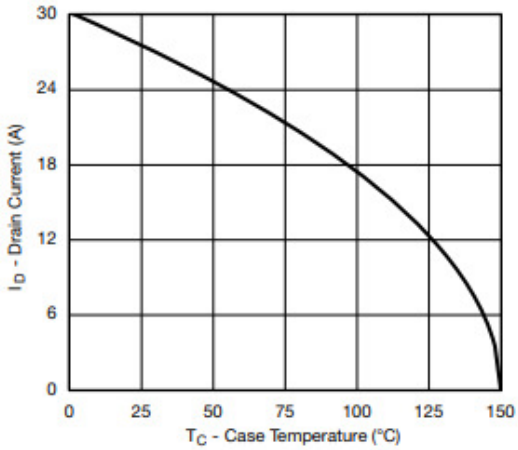
On-Resistance vs. Gate-to-Source Voltage



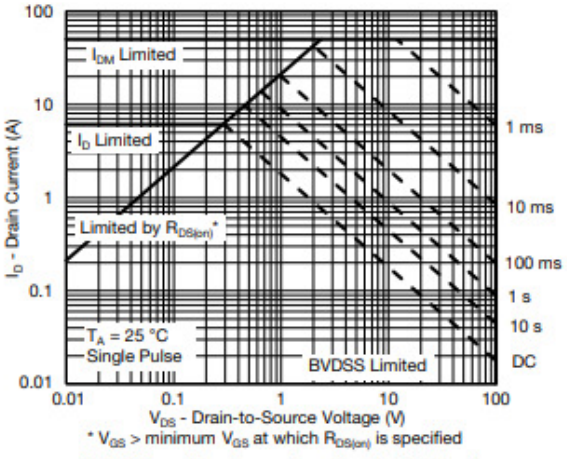
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

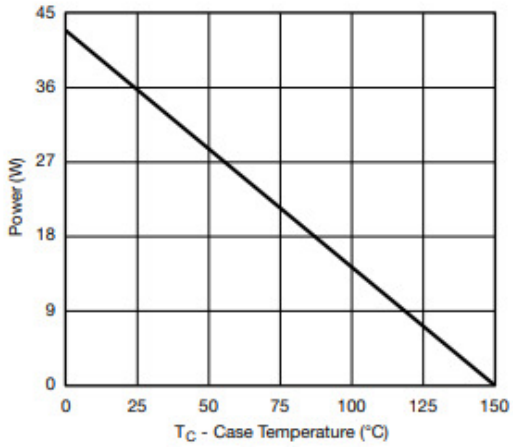


Current Derating*

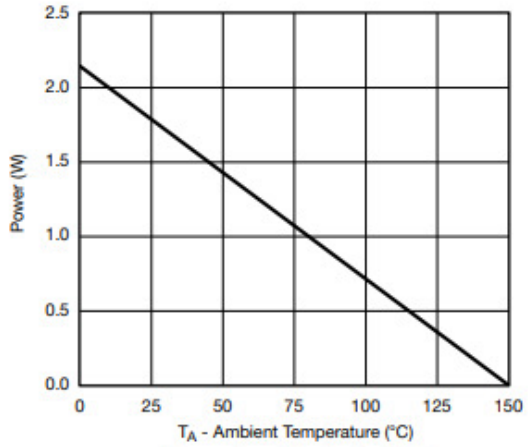


Safe Operating Area, Junction-to-Ambient

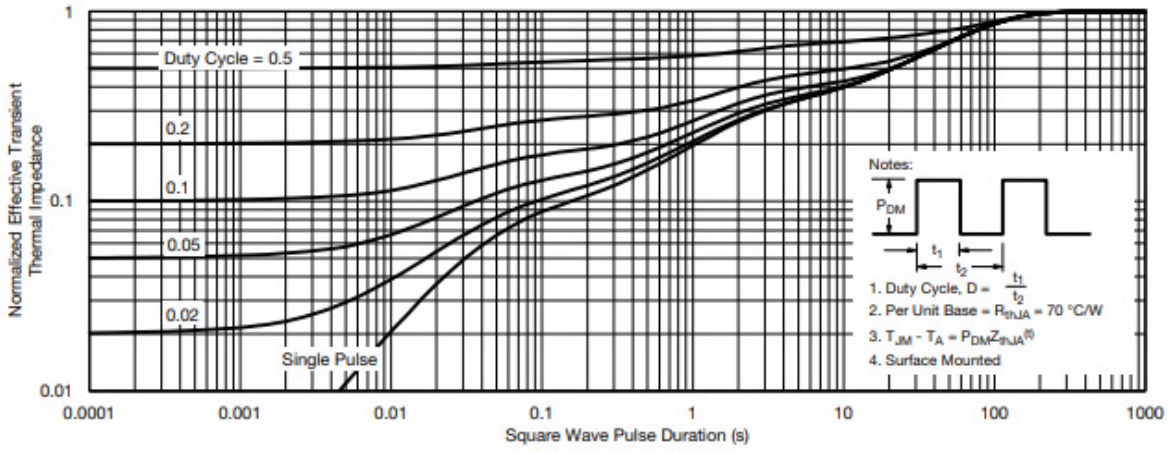
Typical Characteristics



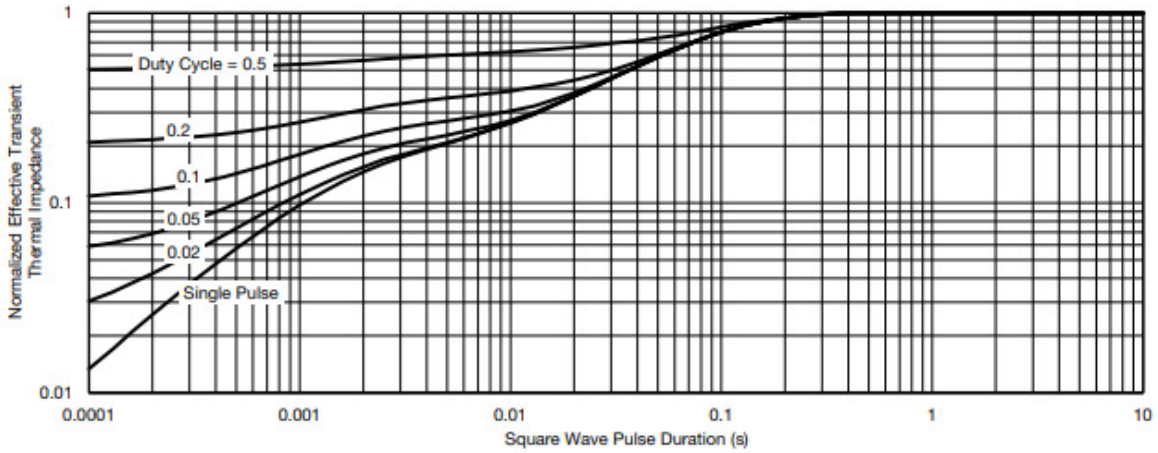
Power, Junction-to-Case



Power, Junction-to-Ambient



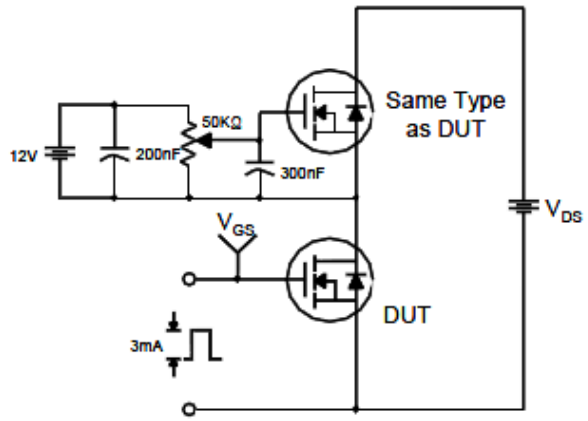
Normalized Thermal Transient Impedance, Junction-to-Ambient

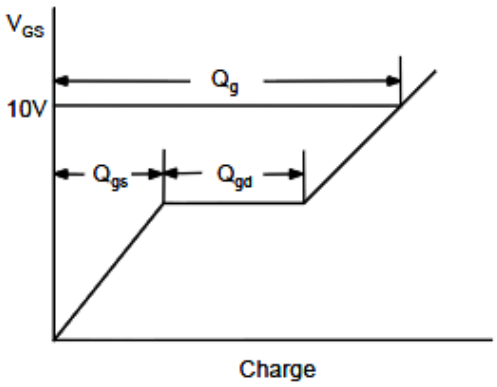


Normalized Thermal Transient Impedance, Junction-to-Case

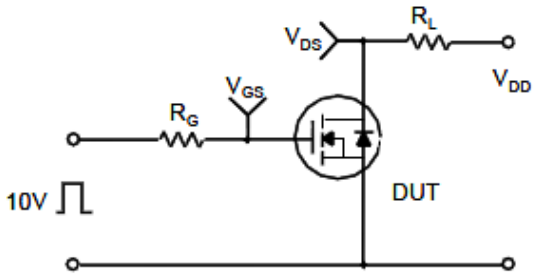
Typical Characteristics

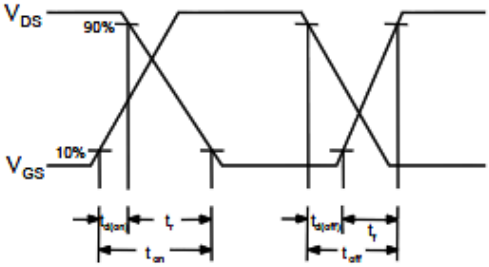
Gate Charge Test Circuit & Waveform



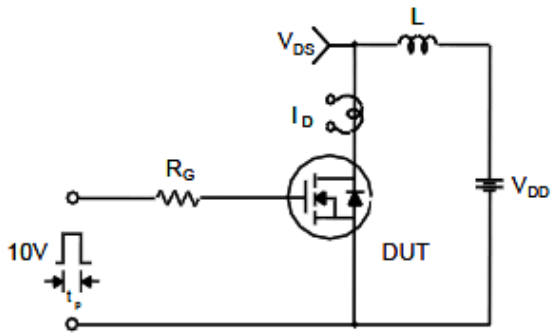


Resistive Switching Test Circuit & Waveforms

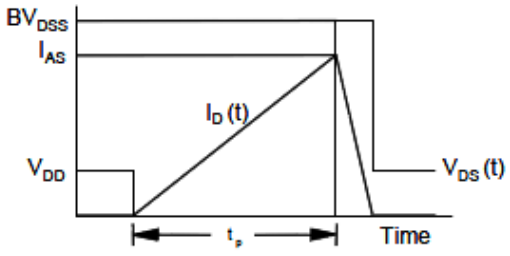




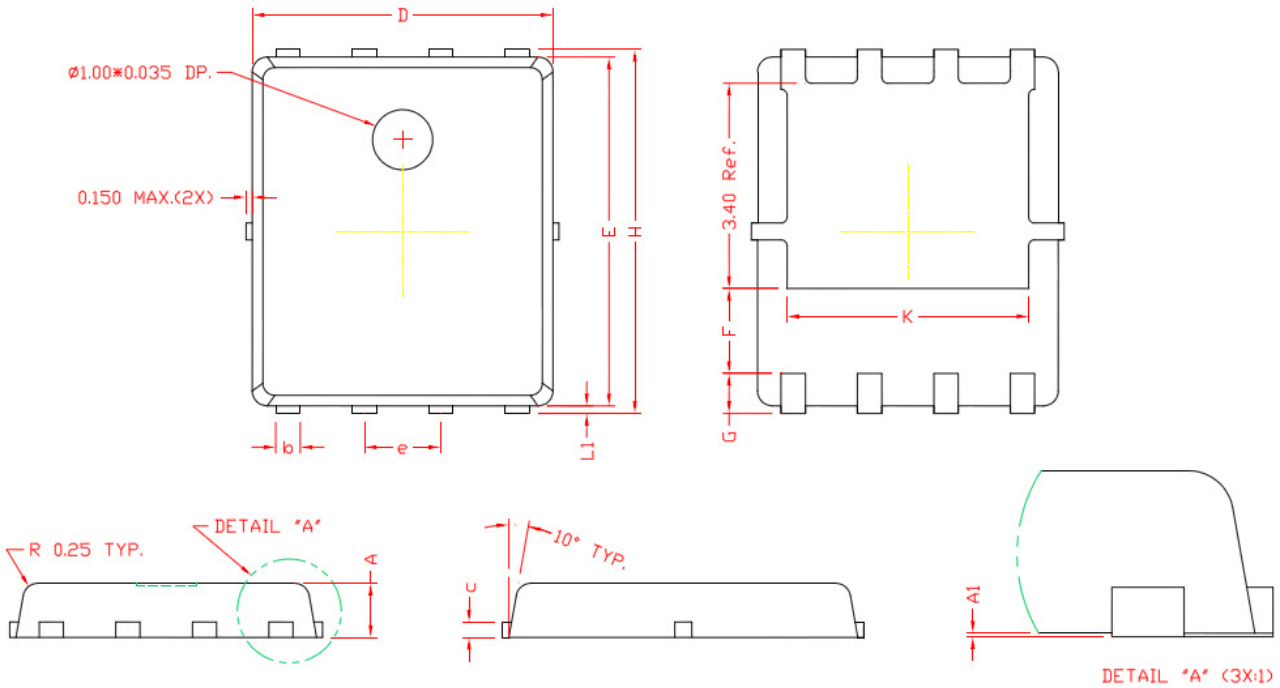
Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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	1.40 Ref.		K	4.00 Ref.	

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