



General Description

AFC5521, 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

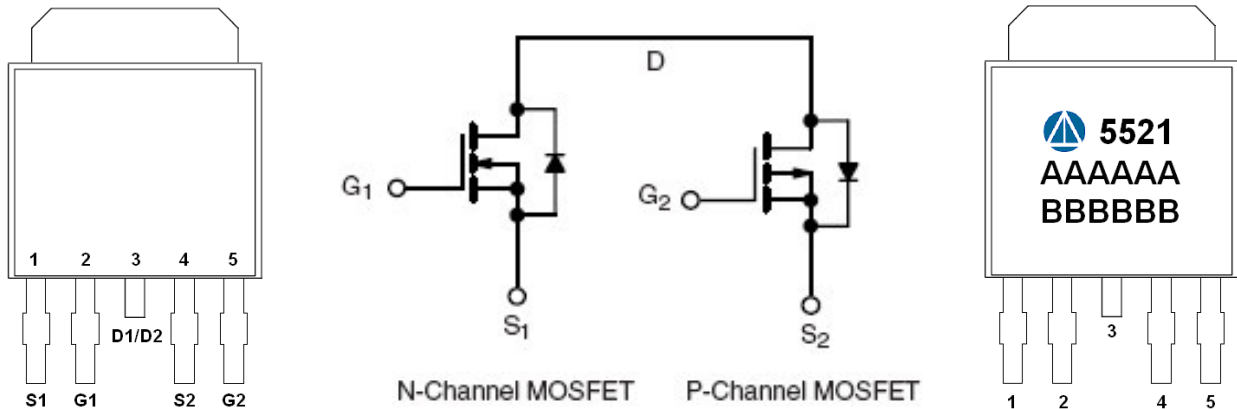
N-Channel

- 100V/5.0A, $R_{DS(ON)} = 110m\Omega @ V_{GS} = 10V$
- 100V/3.0A, $R_{DS(ON)} = 120m\Omega @ V_{GS} = 4.5V$

P-Channel

- -100V/-5.0A, $R_{DS(ON)} = 190m\Omega @ V_{GS} = -10V$
- -100V/-3.0A, $R_{DS(ON)} = 200m\Omega @ V_{GS} = -4.5V$

Pin Description (TO-252-4L)



Application

- DC/DC Conversion
- Load Switch
- DC FAN

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC5521T254RG	5521	TO-252-4L	Tape & Reel	2500 EA

- ※ A Lot code
- ※ B Date code
- ※ AFC5521T254RG : 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}	100	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	I _D	T _c =25°C	5
		T _c =70°C	3
Pulsed Drain Current	I _{DM}	8	A
Continuous Source Current(Diode Conduction)	I _S	2	
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 (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	100			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	1.8	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} =80V, V _{GS} =0V T _J =85°C			5	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =10V	8			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =5.0A		86	110	mΩ
		V _{GS} =4.5V, I _D =3.0A		90	120	
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =3A		12		S
Diode Forward Voltage	V _{SD}	I _S =3A, V _{GS} =0V		0.8	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10V I _D ≅4.5A		10	15	nC
Gate-Source Charge	Q _{gs}			1.7		
Gate-Drain Charge	Q _{gd}			2		
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V f=1MHz		415		pF
Output Capacitance	C _{oss}			40		
Reverse Transfer Capacitance	C _{rss}			20		
Turn-On Time	t _{d(on)}	V _{DD} =50V, R _L =23.8Ω I _D ≅2.1A, V _{GEN} =10V R _G =1.0Ω		10	15	ns
	t _r			10	15	
Turn-Off Time	t _{d(off)}			12	20	
	t _f			10	15	



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}	± 20	V
Continuous Drain Current($T_J=150^{\circ}\text{C}$)	I_D	$T_A=25^{\circ}\text{C}$	-5
		$T_A=70^{\circ}\text{C}$	-3
Pulsed Drain Current	I_{DM}	-8	A
Continuous Source-Drain Diode Current	I_S	-2	
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	$^{\circ}\text{C/W}$

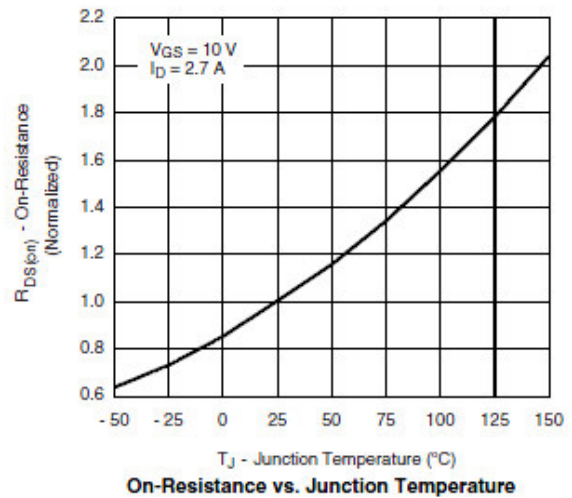
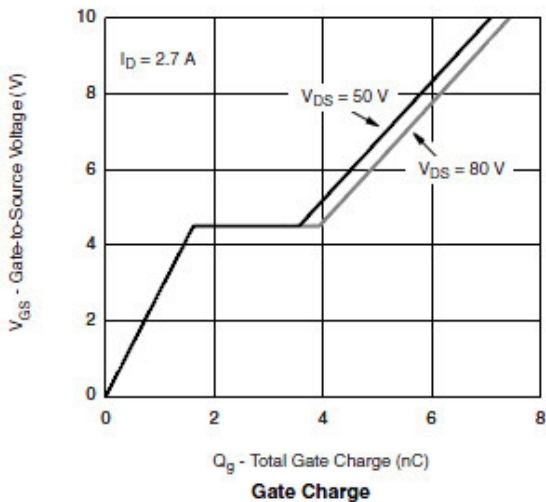
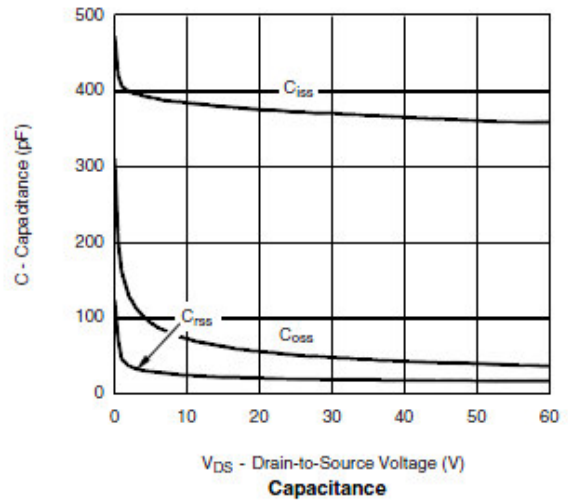
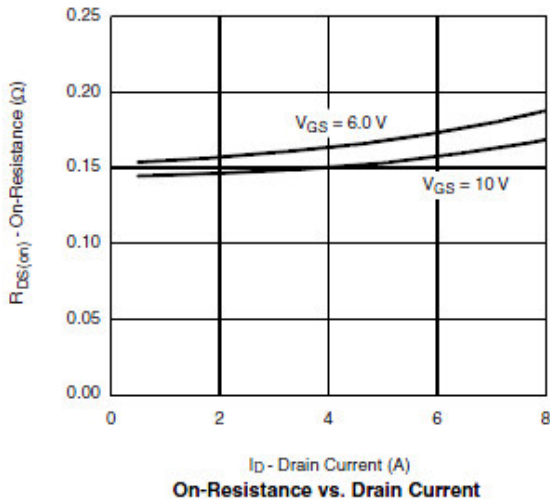
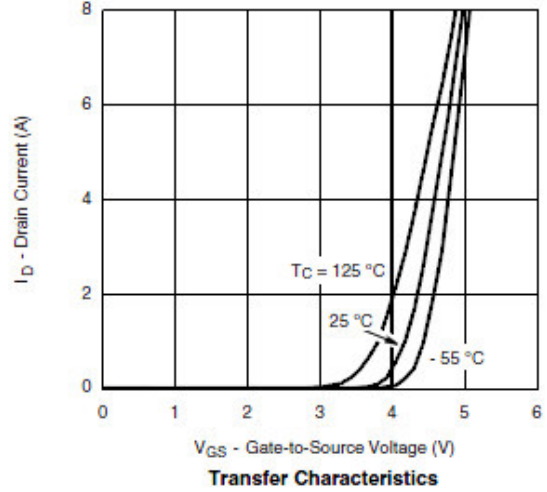
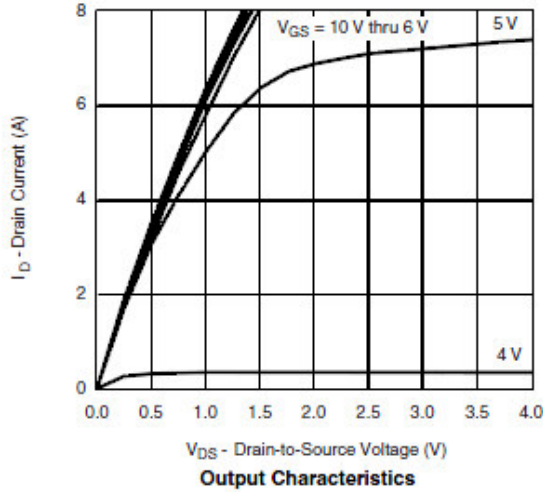
Electrical Characteristics (P-Channel)

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

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
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}	$V_{DS}=0V, V_{GS} = \pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -80V, V_{GS}=0V$			-1	uA
		$V_{DS} = -80V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq -10V, V_{GS} = -10V$	-18			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -5.0A$		167	190	m Ω
		$V_{GS} = -4.5V, I_D = -3.0A$		177	200	
Forward Transconductance	g_{FS}	$V_{DS} = -15V, I_D = -3.2A$		12		S
Diode Forward Voltage	V_{SD}	$I_S = -2A, V_{GS}=0V$		-0.8	-1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = -50V, V_{GS} = -4.5V$ $I_D = -4.0A$		12	20	nC
Gate-Source Charge	Q_{gs}			3.0		
Gate-Drain Charge	Q_{gd}			4.5		
Input Capacitance	C_{iss}	$V_{DS} = -50V, V_{GS} = 0V$ $f = 1\text{MHz}$		1100		pF
Output Capacitance	C_{oss}			70		
Reverse Transfer Capacitance	C_{rss}			45		
Turn-On Time	$t_{d(on)}$	$V_{DD} = -50V, R_L = 17\Omega$ $I_D = -2.8A, V_{GEN} = -10V$ $R_G = 1\Omega$		8	15	ns
	t_r			15	20	
Turn-Off Time	$t_{d(off)}$			35	50	
	t_f			10	25	

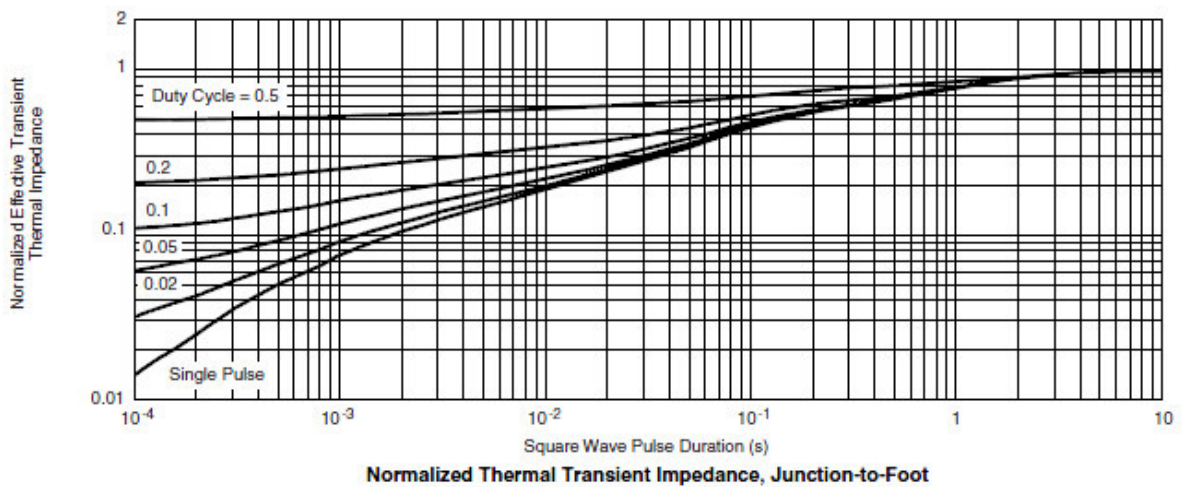
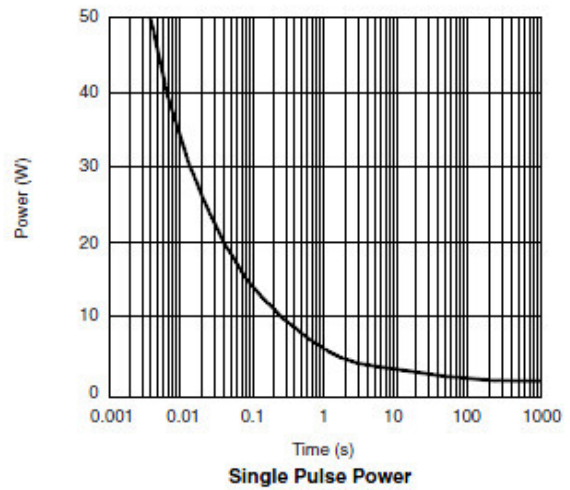
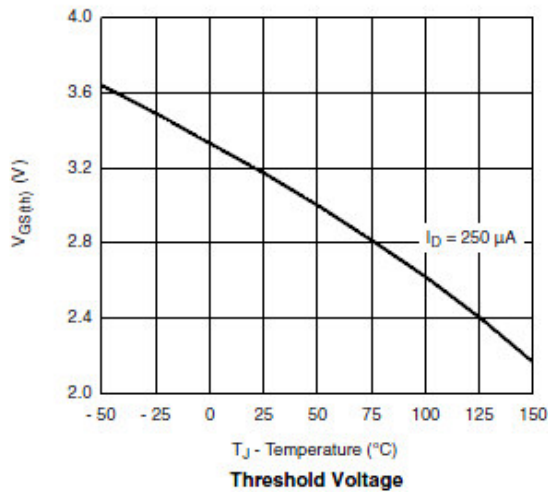
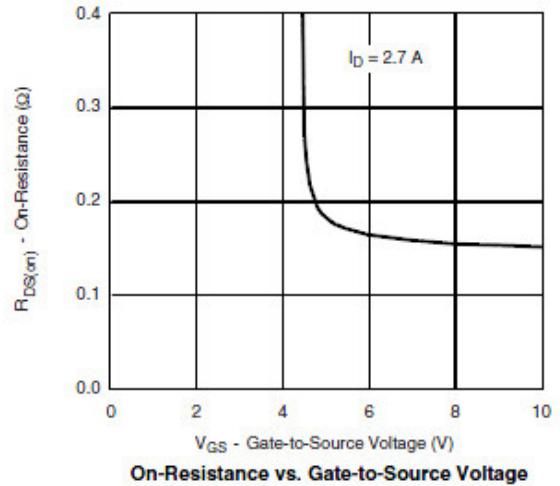
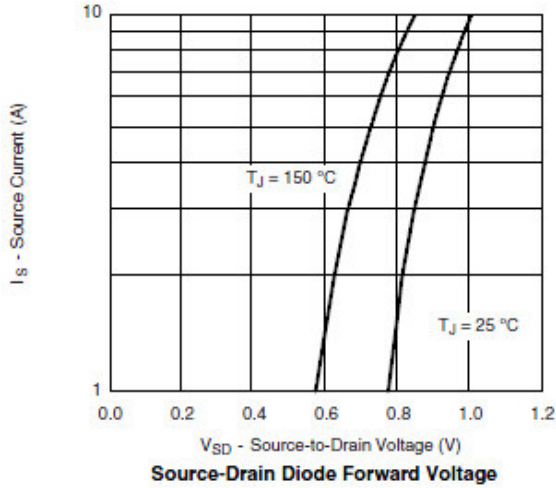


Typical Characteristics (N-Channel)



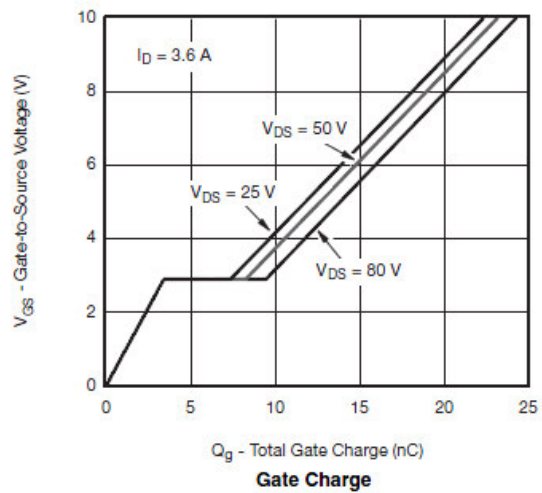
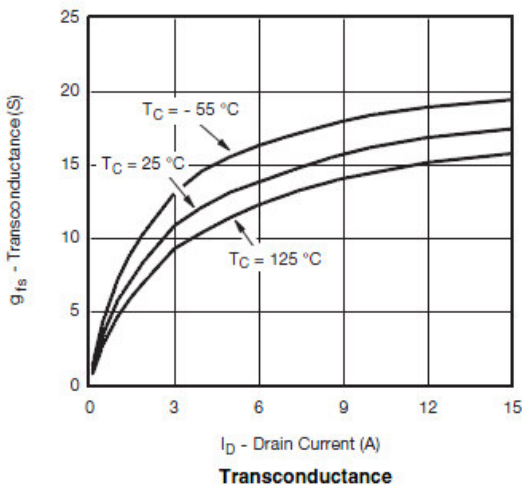
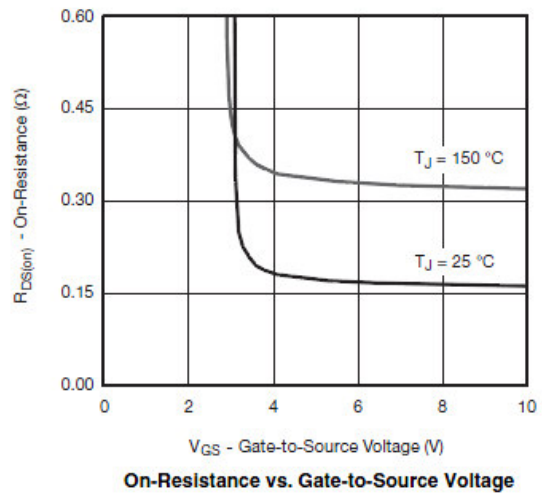
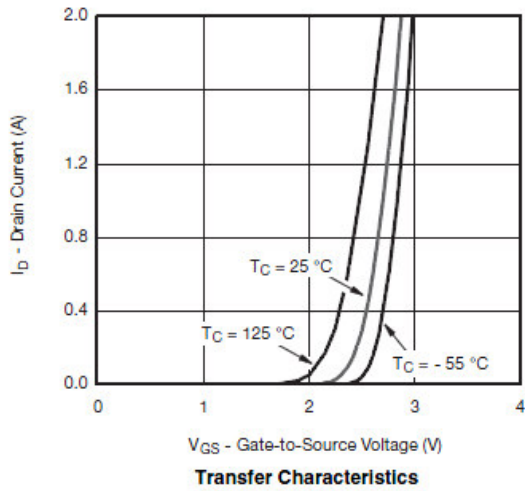
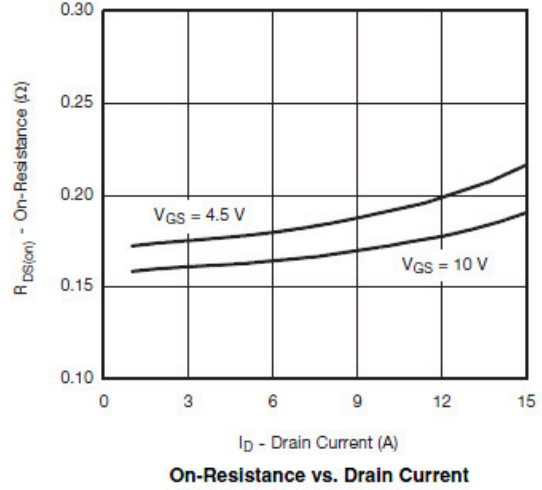
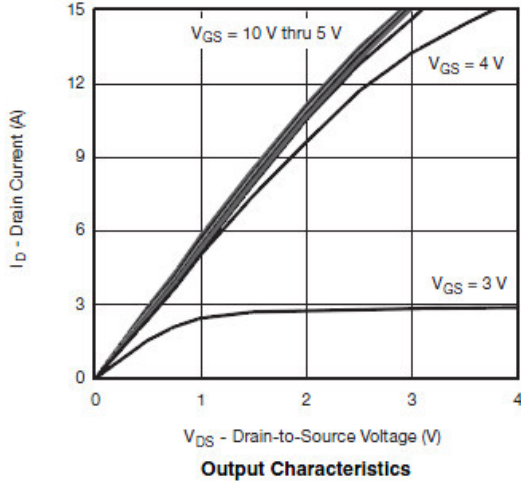


Typical Characteristics (N-Channel)



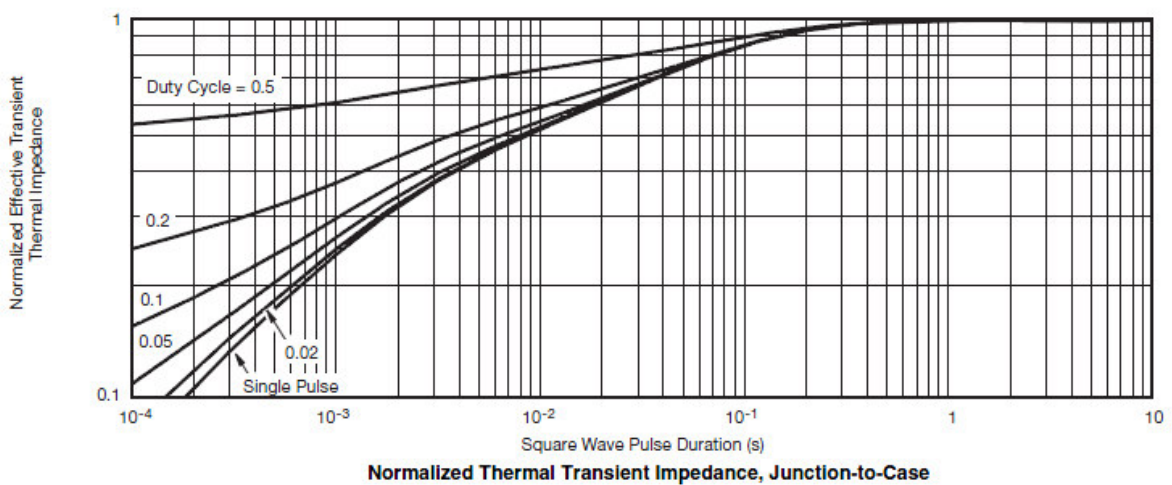
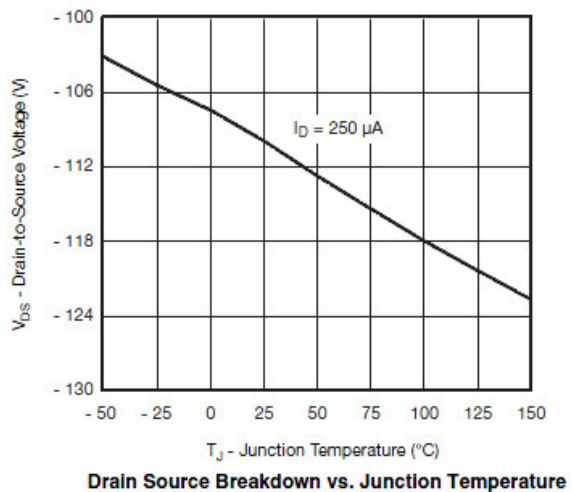
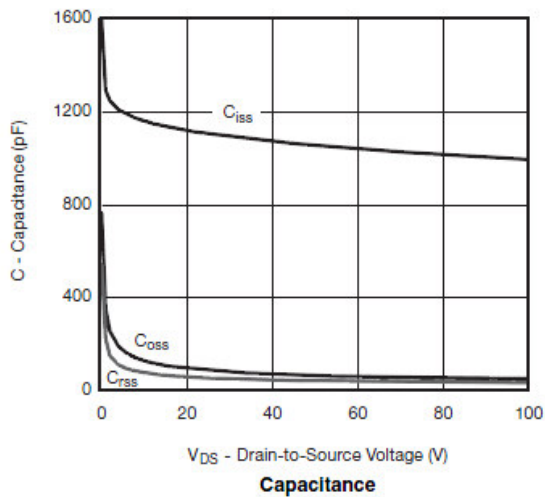
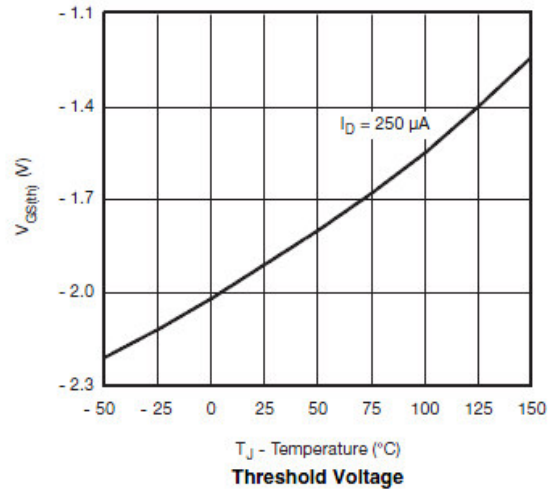
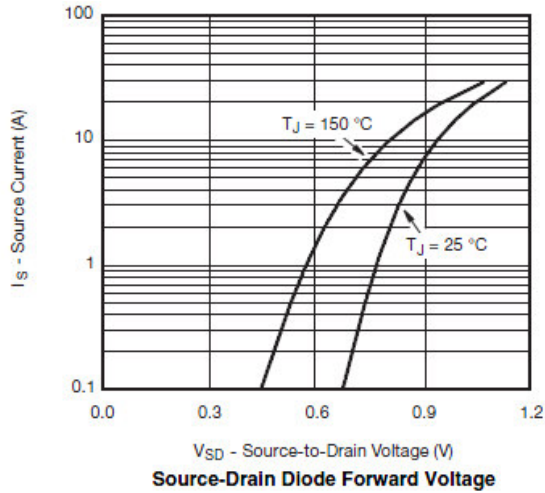


Typical Characteristics (P-Channel)





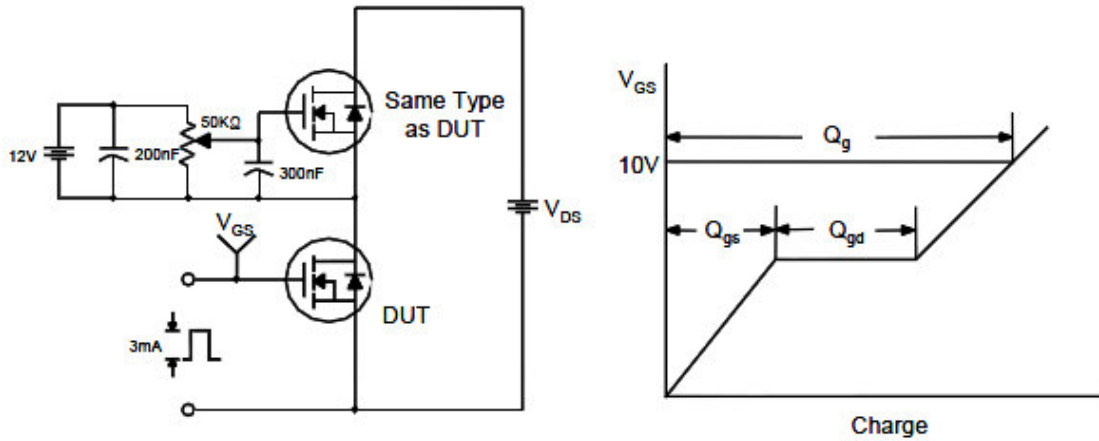
Typical Characteristics (P-Channel)



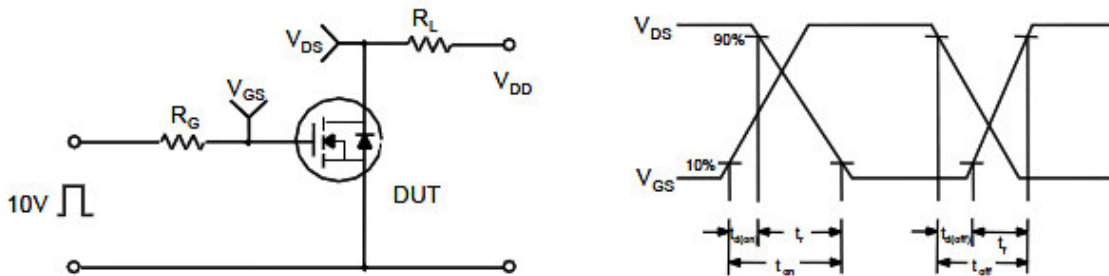


Typical Characteristics

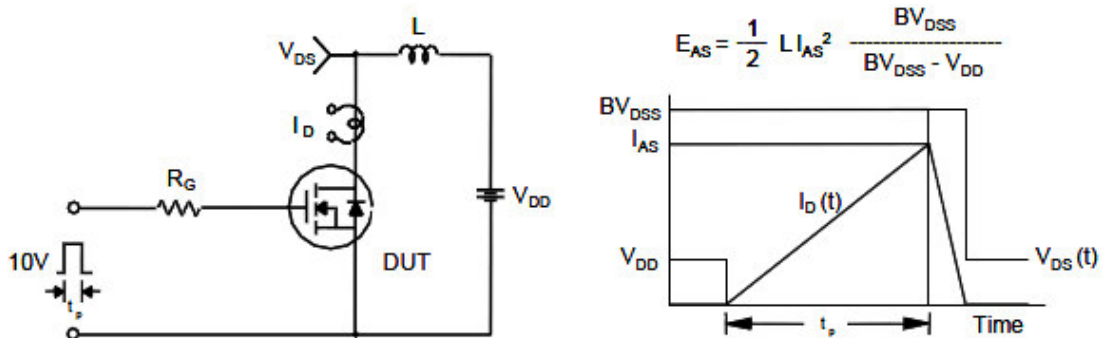
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

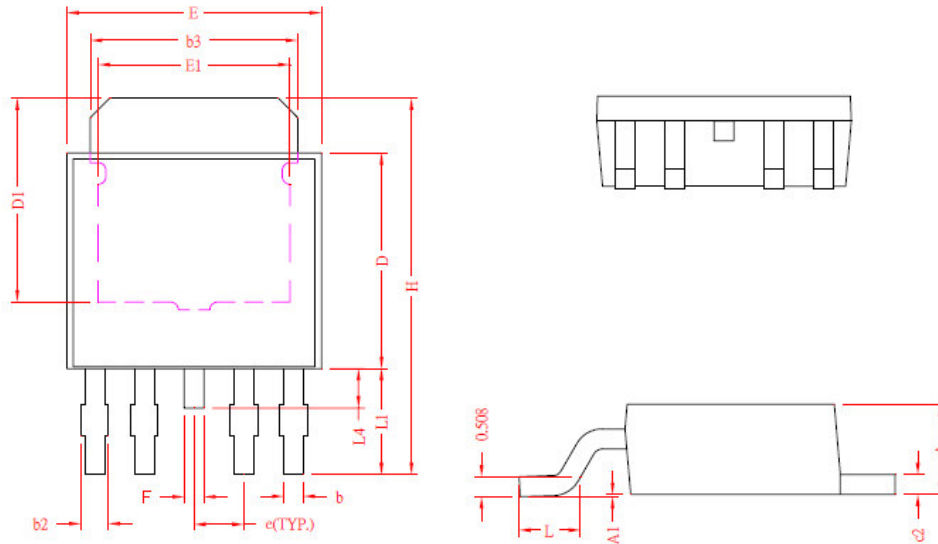


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (TO-252-4L)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.20	2.40	E	6.40	6.80
A1	0	0.15	E1	3.81	---
b	0.40	0.60	e	1.27 REF.	
b2	0.50	0.80	F	0.40	0.60
b3	5.20	5.50	H	9.40	10.20
c2	0.45	0.55	L	1.40	1.77
D	5.40	5.80	L1	2.40	3.00
D1	4.57	---	L4	0.80	1.20

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