Low Capacitance, Low Charge Injection, 4- / 8-Channel, Triple SPDT, ± 5 V / 12 V / 5 V / 3 V Analog Multiplexers

DESCRIPTION

The DGQ4051E, DGQ4052E, and DGQ4053E are high precision CMOS analog multiplexers. The DGQ4051E is an 8-channel multiplexer, the DGQ4052E is a dual 4-channel multiplexer, and the DGQ4053E is a triple 2-channel multiplexer or triple SPDT.

The DGQ4051E, DGQ4052E, and DGQ4053E feature low leakage, parasitic capacitance, and low charge injection of 0.3 pC over the full voltage range. These devices are ideal for high precision signal switching and multiplexing.

Designed to operate from a 3 V to 16 V single supply or from a ± 3 V to ± 8 V dual supplies, the DGQ4051E, DGQ4052E, and DGQ4053E are fully specified at 3 V, 5 V, 12 V and ± 5 V. All control logic inputs have guaranteed 2 V logic high limit when operating from 5 V or ± 5 V supplies and 1.4 V when operating from a 3 V supply.

All switches conduct equally well in both directions, offering rail to rail analog signal switching and can be used both as multiplexers as well as de-multiplexers.

The DGQ4051E, DGQ4052E, and DGQ4053E operating temperature is specified from -40 °C to +125 °C and are available in 16 pin TSSOP package.

BENEFITS

- Wide operation voltage range
- Low charge injection
- Low parasitic capacitance
- Compact package option

FEATURES

- Automotive product AEC-Q100 qualified (Grade 1)
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- 3 V to 16 V single supply or ± 3 to ± 8 V dual supply operation
- Low parasitic capacitance:
  $C_{D(ON)}$: 8.5 pF / typ. (DGQ4053E)
  $C_{S(OFF)}$: 2.0 pF / typ. (DGQ4053E)
- Less than 0.3 pC charge injection over the full signal swing range
- Low leakage: < 50 pA, typ.
- Fast switching t_{ON}: 35 ns, typ.
- 3 V logic compatible for control
- Bi-directional rail to rail signal switching
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

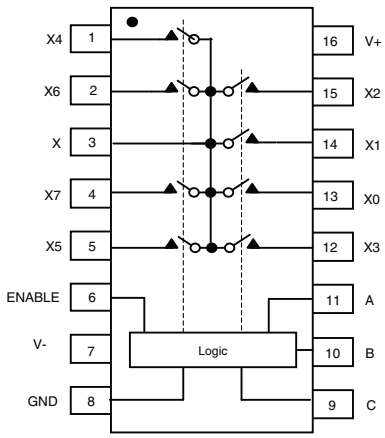
RoHS COMPLIANT

APPLICATIONS

- Automotive battery management systems
- Automotive infotainment and telematics
- Automotive analog and digital signal multiplexing / demultiplexing

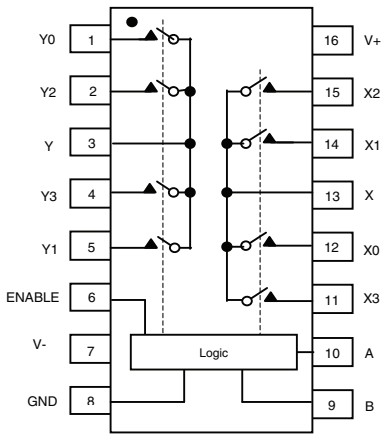
FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION

DGQ4051E
TSSOP16



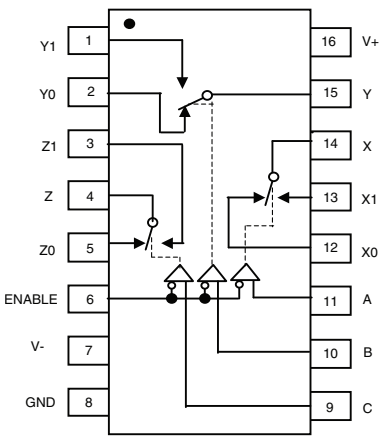
Top View

DGQ4052E
TSSOP16



Top View

DGQ4053E
TSSOP16



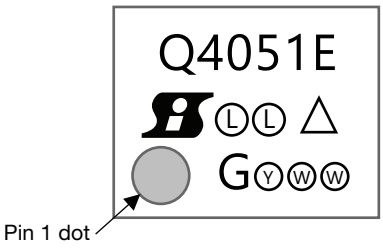
Top View

ENABLE = LO, all switches are controlled by addr pins.
ENABLE = HI, all switches are off.

For technical questions, contact: analogswitchtechsupport@vishay.com

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MARKING INFORMATION



Line 1: part number

Line 2: logo, lot number, and ESD sign

Line 3: facility and date code

TRUTH TABLE

ENABLE INPUT	SELECT INPUTS			ON SWITCHES		
	C	B	A	DGQ4051E	DGQ4052E	DGQ4053E
H	X	X	X	All switches open	All switches open	All switches open
L	L	L	L	X to X0	X to X0, Y to Y0	X to X0, Y to Y0, Z to Z0
L	L	L	H	X to X1	X to X1, Y to Y1	X to X1, Y to Y0, Z to Z0
L	L	H	L	X to X2	X to X2, Y to Y2	X to X0, Y to Y1, Z to Z0
L	L	H	H	X to X3	X to X3, Y to Y3	X to X1, Y to Y1, Z to Z0
L	H	L	L	X to X4	X to X0, Y to Y0	X to X0, Y to Y0, Z to Z1
L	H	L	H	X to X5	X to X1, Y to Y1	X to X1, Y to Y0, Z to Z1
L	H	H	L	X to X6	X to X2, Y to Y2	X to X0, Y to Y1, Z to Z1
L	H	H	H	X to X7	X to X3, Y to Y3	X to X1, Y to Y1, Z to Z1

ORDERING INFORMATION

ORDERING PART NUMBER	CONFIGURATION	MARKING	TEMPERATURE RANGE	PACKAGE	MIN. ORDER / PACKAGING QUANTITY
DGQ4051EEQ-T1-GE4	8:1 x 1	Q4051E	-40 °C to +125 °C [a]	16-pin TSSOP	Tape and reel 3000 units
DGQ4052EEQ-T1-GE4	4:1 x 2	Q4052E			
DGQ4053EEQ-T1-GE4	2:1 x3	Q4053E			

Note

a. -40 °C to +85 °C datasheet limits apply

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

PARAMETER		LIMIT	UNIT
V+ to V-		-0.3 to +18	V
GND to V-		-18	
Digital inputs [a], V_S, V_D		(V-) - 0.3 to (V+) + 0.3 or 30 mA, whichever occurs first	
Continuous current (any terminal)		30	mA
Peak current, S or D (pulsed 1 ms, 10 % duty cycle)		100	
Storage temperature		-65 to +150	°C
Power dissipation [b]	16-pin TSSOP [c]	450	mW
Thermal resistance [b]	16-pin TSSOP [c]	178	°C/W
ESD human body model (HBM); per AEC-Q100-002		2000	V
ESD charged device model (CDM), per AEC-Q100-011		750	V
Latch up current, per AEC-100-004 (JEDEC® class II)		100	mA

Notes

a. Signals on SX, DX, or INX exceeding V+ or V- will be clamped by internal diodes. Limit forward diode current to maximum current ratings
b. All leads welded or soldered to PC board
c. Derate 5.6 mW/°C above 70 °C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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SPECIFICATIONS FOR DUAL SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 5 V, V- = -5 V $V_{IN(A, B, C, and\ enable)}$ = 2 V, 0.8 V [a]		TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
						MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Analog Switch										
Analog signal range [e]	V_{ANALOG}			Full	-	-5	5	-5	5	V
On-resistance	R_{ON}	I_S = 1 mA, V_D = -3 V, 0 V, 3 V		Room	68	-	78	-	78	Ω
				Full	-	-	106	-	97	
On-resistance match	ΔR_{ON}	I_S = 1 mA, V_D = ± 3 V		Room	0.91	-	6	-	6	
				Full	-	-	6	-	6	
On-resistance flatness	$R_{FLATNESS}$	I_S = 1 mA, V_D = -3 V, 0 V, 3 V		Room	10	-	17	-	17	
				Full	-	-	20	-	19	
Switch off leakage current	$I_{S(off)}$	V+ = 5.5 V, V- = -5.5 V, V_D = ± 4.5 V, V_S = ∓ 4.5 V		Room	± 0.05	-1	1	-1	1	nA
				Full	-	-50	50	-5	5	
	$I_{D(off)}$			Room	± 0.05	-1	1	-1	1	
				Full	-	-50	50	-5	5	
Channel on leakage current	$I_{D(on)}$	V+ = 5.5 V, V- = -5.5 V, V_S = V_D = ± 4.5 V		Room	± 0.05	-1	1	-1	1	
				Full	-	-50	50	-5	5	
Digital Control										
Input current, V_{IN} low	I_{IL}	$V_{IN(A, B, C, and\ enable)}$ under test = 0.6 V		Full	0.02	-1	1	-1	1	µA
Input current, V_{IN} high	I_{IH}	$V_{IN(A, B, C, and\ enable)}$ under test = 2 V		Full	0.02	-1	1	-1	1	
Input capacitance [e]	C_{IN}	f = 1 MHz		Room	3.4	-	-	-	-	pF
Dynamic Characteristics										
Off isolation [e]	OIRR	R_L = 50 Ω, C_L = 1 pF	f = 100 kHz	Room	-106	-	-	-	-	dB
			f = 10 MHz	Room	-68	-	-	-	-	
			f = 100 MHz	Room	-49	-	-	-	-	
Channel-to-channel crosstalk [e]	X_{TALK}		f = 100 kHz	Room	-105	-	-	-	-	
			f = 10 MHz	Room	-62	-	-	-	-	
			f = 100 MHz	Room	-51	-	-	-	-	
Bandwidth, 3 dB	BW	R_L = 50 Ω	DGQ4051E	Room	308	-	-	-	-	MHz
			DGQ4052E	Room	353	-	-	-	-	
			DGQ4053E	Room	930	-	-	-	-	
Transition time	t_{TRANS}	R_L = 300 Ω, C_L = 35 pF see Fig. 1, 2, 3		Room	72	-	112	-	112	ns
				Full	-	-	139	-	131	
Enable turn-on time	t_{ON}			Room	35	-	75	-	75	
				Full	-	-	86	-	80	
Enable turn-off time	t_{OFF}			Room	48	-	88	-	88	
				Full	-	-	97	-	95	
Break-before-make time delay	t_D			Room	-	1	-	1	-	
				Full	-	-	-	-	-	
Charge injection [e]	Q	V_g = 0 V, R_g = 0 Ω, C_L = 1 nF		Room	0.38	-	-	-	-	pC
Source off capacitance [e]	$C_{S(off)}$	f = 1 MHz	DGQ4051E	Room	2.2	-	-	-	-	pF
			DGQ4052E	Room	2.1	-	-	-	-	
			DGQ4053E	Room	2	-	-	-	-	
Drain off capacitance [e]	$C_{D(off)}$	f = 1 MHz	DGQ4051E	Room	9.2	-	-	-	-	
			DGQ4052E	Room	4.8	-	-	-	-	
			DGQ4053E	Room	3.1	-	-	-	-	
Channel on capacitance [e]	$C_{D(on)}$	f = 1 MHz	DGQ4051E	Room	14.9	-	-	-	-	
			DGQ4052E	Room	10	-	-	-	-	
			DGQ4053E	Room	8.5	-	-	-	-	
Total harmonic distortion [e]	THD	Signal = 5 V_{RMS}, 20 Hz to 20 kHz, R_L = 600 Ω		Room	0.065	-	-	-	-	%

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SPECIFICATIONS FOR DUAL SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 5 V, V- = -5 V $V_{IN(A, B, C, and enable)}$ = 2 V, 0.8 V [a]	TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
					MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Power Supplies									
Power supply current	I+	V+ = 5 V, V- = -5 V $V_{IN(A, B, C, and enable)}$ = 0 V or 5 V	Room	0.05	-	1	-	1	µA
			Full	-	-	10	-	10	
Negative supply current	I-		Room	-0.05	-1	-	-1	-	
			Full	-	-10	-	-10	-	
Ground current	I_{GND}		Room	-0.05	-1	-	-1	-	
			Full	-	-10	-	-10	-	

SPECIFICATIONS FOR UNIPOLAR SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 12 V, V- = 0 V $V_{IN(A, B, C, AND ENABLE)}$ = 2 V, 0.8 V [A]	TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
					MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Analog Switch									
Analog signal Range [e]	V_{ANALOG}		Full	-	0	12	0	12	V
On-resistance	R_{ON}	I_S = 1 mA, V_D = 0.7 V, 11.3 V	Room	85	-	103	-	103	Ω
			Full	-	-	133	-	125	
On-resistance match	ΔR_{ON}	I_S = 1 mA, V_D = 11.3 V	Room	1.24	-	8	-	8	
			Full	-	-	8	-	8	
On-resistance flatness	$R_{FLATNESS}$	I_S = 1 mA, V_D = 0.7 V, 11.3 V	Room	27	-	37	-	37	
			Full	-	-	44	-	43	
Switch off leakage current	$I_{S(off)}$	V+ = 13.2 V, V- = 0 V V_D = 1 V / 12.2 V, V_S = 12.2 V / 1 V	Room	± 0.05	-1	1	-1	1	nA
			Full	-	-50	50	-5	5	
	$I_{D(off)}$		Room	± 0.05	-1	1	-1	1	
			Full	-	-50	50	-5	5	
Channel on leakage current	$I_{D(on)}$	V+ = 13.2 V, V- = 0 V V_D = V_S = 1 V / 12.2 V	Room	± 0.05	-1	1	-1	1	
			Full	-	-50	50	-5	5	
Digital Control									
Input current, V_{IN} low	I_L	$V_{IN(A, B, C, and enable)}$ under test = 0.8 V	Full	0.02	-1	1	-1	1	µA
Input current, V_{IN} high	I_H	$V_{IN(A, B, C, and enable)}$ under test = 2 V	Full	0.02	-1	1	-1	1	
Dynamic Characteristics									
Transition time	t_{TRANS}	R_L = 300 Ω, C_L = 35 pF see Fig. 1, 2, 3	Room	43	-	83	-	83	ns
			Full	-	-	95	-	90	
Enable turn-on ime	t_{ON}		Room	22	-	62	-	62	
			Full	-	-	71	-	67	
Enable turn-off time	t_{OFF}		Room	47	-	87	-	87	
			Full	-	-	94	-	93	
Break-before-make time delay	t_D		Room	25	1	-	1	-	
			Full	-	-	-	-	-	
Charge injection [e]	Q	V_g = 0 V, R_g = 0 Ω, C_L = 1 nF	Full	-	-	-	-	-	pC
Off isolation [e]	O_{IRR}	R_L = 50 Ω, C_L = 1 pF f = 100 kHz	Room	-	-	-	-	-	dB
Channel-to-channel crosstalk [e]	X_{TALK}		Room	-	-	-	-	-	

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SPECIFICATIONS FOR UNIPOLAR SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 12 V, V- = 0 V $V_{IN(A, B, C, AND ENABLE)}$ = 2 V, 0.8 V [A]		TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
						MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Dynamic Characteristics										
Source off capacitance [e]	$C_{S(off)}$	f = 1 MHz	DGQ4051E	Room	-	-	-	-	-	pF
			DGQ4052E	Room	-	-	-	-	-	
			DGQ4053E	Room	-	-	-	-	-	
Drain off capacitance [e]	$C_{D(off)}$	f = 1 MHz	DGQ4051E	Room	-	-	-	-	-	
			DGQ4052E	Room	-	-	-	-	-	
			DGQ4053E	Room	-	-	-	-	-	
Channel on capacitance [e]	$C_{D(on)}$	f = 1 MHz	DGQ4051E	Room	-	-	-	-	-	
			DGQ4052E	Room	-	-	-	-	-	
			DGQ4053E	Room	-	-	-	-	-	
Power Supplies										
Power supply current	I+	$V_{IN(A, B, C, and enable)}$ = 0 V or 5 V		Room	0.05	-	1	-	1	µA
				Full	-	-	10	-	10	
Negative supply current	I-			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	
Ground current	I_{GND}			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	

SPECIFICATIONS FOR UNIPOLAR SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 5 V, V- = 0 V $V_{IN(A, B, C, and enable)}$ = 2 V, 0.8 V [a]	TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
					MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Analog Switch									
Analog signal range [e]	V_{ANALOG}		Full	-	0	5	0	5	V
On-resistance	R_{ON}	I_S = 1 mA, V_D = 0 V, 3.5 V	Room	125	-	147	-	147	Ω
			Full	-	-	176	-	168	
On-resistance match	ΔR_{ON}	I_S = 1 mA, V_D = 3.5 V	Room	1.3	-	8	-	8	
			Full	-	-	8	-	8	
On-resistance flatness	$R_{FLATNESS}$	I_S = 1 mA, V_D = 0 V, 3 V	Room	21	-	31	-	31	
			Full	-	-	25	-	29	
Switch off leakage current	$I_{S(off)}$	V+ = 5.5 V, V- = 0 V V_D = 1 V / 4.5 V, V_S = 4.5 V / 1 V	Room	± 0.03	-1	1	-1	1	nA
			Full	-	-50	50	-5	5	
	$I_{D(off)}$		Room	± 0.03	-1	1	-1	1	
			Full	-	-50	50	-5	5	
Channel on leakage current	$I_{D(on)}$	V+ = 5.5 V, V- = 0 V V_D = V_S = 1 V / 4.5 V	Room	± 0.03	-1	1	-1	1	
			Full	-	-50	50	-5	5	
Digital Control									
Input current, V_{IN} low	I_L	$V_{IN(A, B, C, and enable)}$ under test = 0.6 V	Full	0.02	-1	1	-1	1	µA
Input current, V_{IN} high	I_H	$V_{IN(A, B, C, and enable)}$ under test = 2 V	Full	0.02	-1	1	-1	1	

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SPECIFICATIONS FOR UNIPOLAR SUPPLIES

PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 5 V, V- = 0 V $V_{IN(A, B, C, and enable)}$ = 2 V, 0.8 V [a]		TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
						MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Dynamic Characteristics										
Transition time	t_{TRANS}	R_L = 300 Ω, C_L = 35 pF see Fig. 1, 2, 3		Room	95	-	135	-	135	ns
				Full	-	-	169	-	148	
Enable turn-on time	t_{ON}			Room	56	-	96	-	96	
				Full	-	-	117	-	107	
Enable turn-off time	t_{OFF}			Room	55	-	95	-	95	
				Full	-	-	110	-	103	
Break-before-make time delay	t_D			Room	-	12	-	12	-	
				Full	-	-	-	-	-	
Charge injection [e]	Q	V_g = 0 V, R_g = 0 Ω, C_L = 1 nF		rull	0.32	-	-	-	-	pC
Off isolation [e]	OIRR	R_L = 50 Ω, C_L = 1 pF f = 100 kHz		Room	-86	-	-	-	-	dB
Channel-to-channel crosstalk [e]	X_{TALK}			Room	-105	-	-	-	-	
Source off capacitance [e]	$C_{S(off)}$	f = 1 MHz	DGQ4051E	Room	2.4	-	-	-	-	pF
			DGQ4052E	Room	2.4	-	-	-	-	
			DGQ4053E	Room	2.3	-	-	-	-	
Drain off capacitance [e]	$C_{D(off)}$	f = 1 MHz	DGQ4051E	Room	10.1	-	-	-	-	
			DGQ4052E	Room	5.3	-	-	-	-	
			DGQ4053E	Room	3.4	-	-	-	-	
Channel on capacitance [e]	$C_{D(on)}$	f = 1 MHz	DGQ4051E	Room	15.9	-	-	-	-	
			DGQ4052E	Room	10.6	-	-	-	-	
			DGQ4053E	Room	8.9	-	-	-	-	
Power Supplies										
Power supply current	I+	$V_{IN(A, B, C, and enable)}$ = 0 V or 5 V		Room	0.05	-	1	-	1	µA
				Full	-	-	10	-	10	
Negative supply current	I-			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	
Ground current	I_{GND}			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	

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SPECIFICATIONS FOR UNIPOLAR SUPPLIES

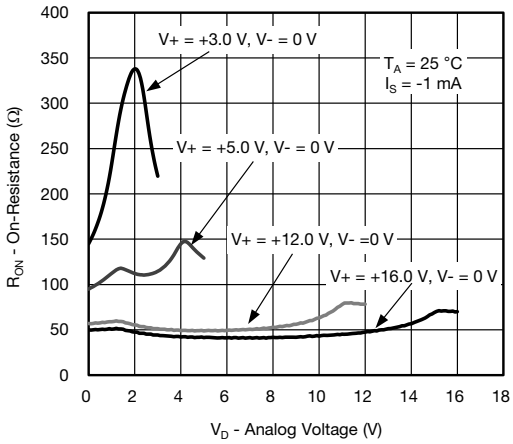
PARAMETER	SYMBOL	TEST CONDITIONS UNLESS OTHERWISE SPECIFIED V+ = 3 V, V- = 0 V $V_{IN(A, B, C, and enable)}$ = 1.4 V, 0.6 V [a]		TEMP. [b]	TYP. [c]	-40 °C to +125 °C		-40 °C to +85 °C		UNIT
						MIN. [d]	MAX. [d]	MIN. [d]	MAX. [d]	
Analog Switch										
Analog signal range [e]	V_{ANALOG}			Full	-	0	3	0	3	V
On-resistance	R_{ON}	I_S = 1 mA, V_D = 1.5 V		Room	221	-	-	-	-	Ω
				Full	-	-	-	-	-	
Switch off leakage current	$I_{S(off)}$	V+ = 3.3 V, V- = 0 V V_D = 0.3 V / 3 V, V_S = 3 V / 0.3 V		Room	± 0.02	-1	1	-1	1	nA
				Full	-	-50	50	-5	5	
	$I_{D(off)}$			Room	± 0.02	-1	1	-1	1	
				Full	-	-50	50	-5	5	
Channel on leakage current	$I_{D(on)}$	V+ = 3.3 V, V- = 0 V V_D = V_S = 0.3 V / 3 V		Room	± 0.02	-1	1	-1	1	
				Full	-	-50	50	-5	5	
Digital Control										
Input current, V_{IN} Low	I_L	$V_{IN(A, B, C, and enable)}$ under test = 0.6 V		Full	0.02	-1	1	-1	1	µA
Input current, V_{IN} High	I_H	$V_{IN(A, B, C, and enable)}$ under test = 1.4 V		Full	0.02	-1	1	-1	1	
Dynamic Characteristics										
Transition time	t_{TRANS}	R_L = 300 Ω, C_L = 35 pF see Fig. 1, 2, 3		Room	200	-	-	-	-	ns
				Full	-	-	-	-	-	
Enable turn-on time	t_{ON}			Room	130	-	-	-	-	
				Full	-	-	-	-	-	
Enable turn-off time	t_{OFF}			Room	78	-	-	-	-	
				Full	-	-	-	-	-	
Break-before-make time delay	t_D			Room	130	-	-	-	-	
				Full	-	-	-	-	-	
Charge injection [e]	Q	V_g = 0 V, R_g = 0 Ω, C_L = 1 nF		Room	0.34	-	-	-	-	pC
Off isolation [e]	OIRR	R_L = 50 Ω, C_L = 1 pF f = 100 kHz		Room	-88	-	-	-	-	dB
Channel-to-channel crosstalk [e]	X_{TALK}			Room	-105	-	-	-	-	
Source off capacitance [e]	$C_{S(off)}$	f = 1 MHz	DGQ4051E	Room	2.6	-	-	-	-	pF
			DGQ4052E	Room	2.6	-	-	-	-	
			DGQ4053E	Room	2.5	-	-	-	-	
Drain off capacitance [e]	$C_{D(off)}$	f = 1 MHz	DGQ4051E	Room	10.7	-	-	-	-	
			DGQ4052E	Room	5.7	-	-	-	-	
			DGQ4053E	Room	3.6	-	-	-	-	
Channel on capacitance [e]	$C_{D(on)}$	f = 1 MHz	DGQ4051E	Room	16.4	-	-	-	-	
			DGQ4052E	Room	10.9	-	-	-	-	
			DGQ4053E	Room	9.1	-	-	-	-	
Power Supplies										
Power supply current	I+	$V_{IN(A, B, C, and enable)}$ = 0 V or 3 V		Room	0.05	-	1	-	1	µA
				Full	-	-	10	-	10	
Negative supply current	I-			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	
Ground current	I_{GND}			Room	-0.05	-1	-	-1	-	
				Full	-	-10	-	-10	-	

Notes

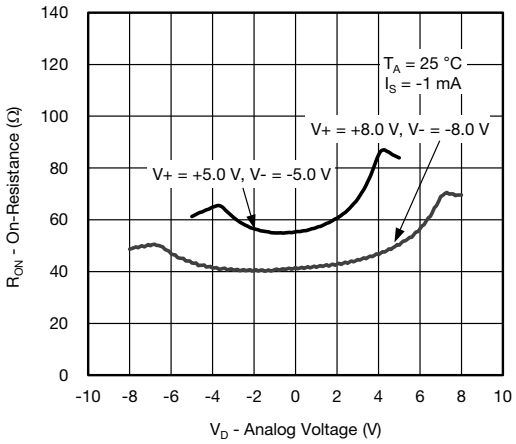
a. V_{IN} = input voltage to perform proper function
b. Room = 25 °C, full = as determined by the operating temperature suffix
c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing
d. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this datasheet
e. Guaranteed by design, not subject to production test

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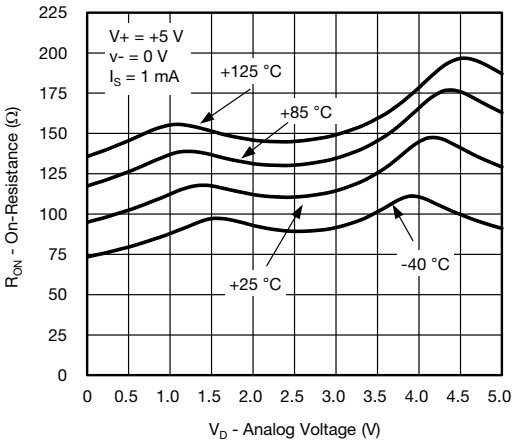
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



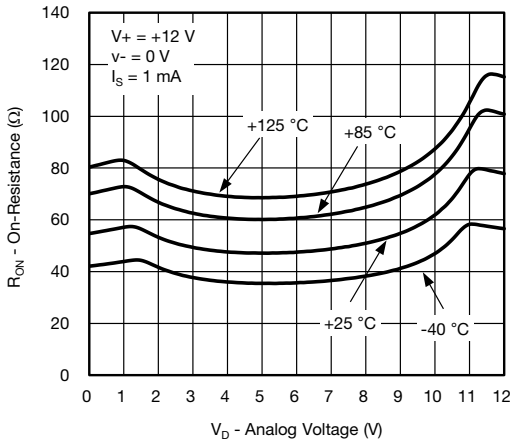
On-Resistance vs. Analog Voltage (Single Supply)



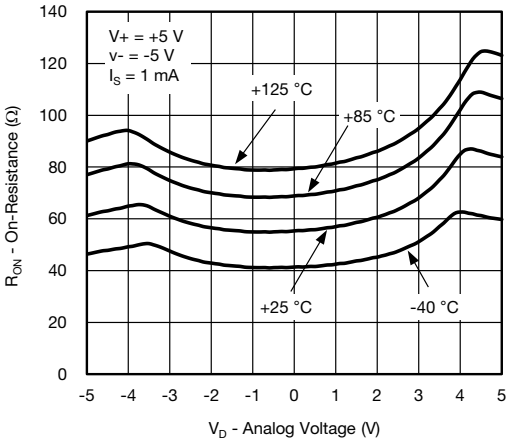
On-Resistance vs. Analog Voltage (Dual Supply)



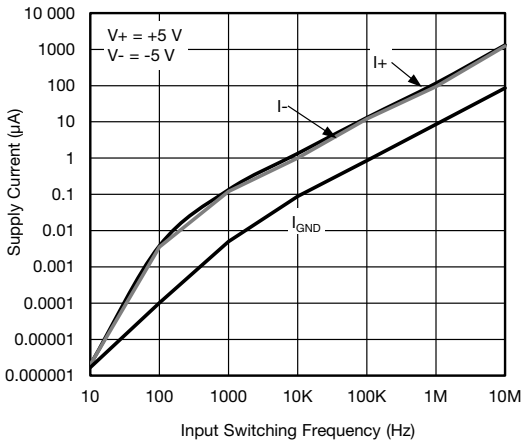
On-Resistance vs. Analog Voltage (Temperature)



On-Resistance vs. Analog Voltage (Temperature)



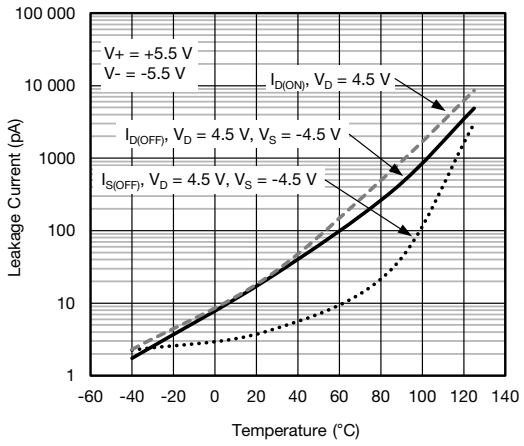
On-Resistance vs. Analog Voltage (Temperature)



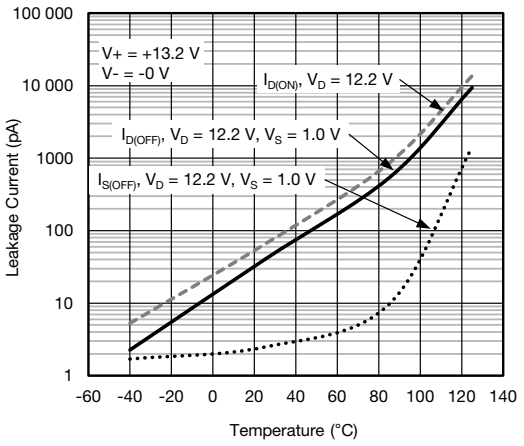
Supply Current vs. Input Switching Frequency

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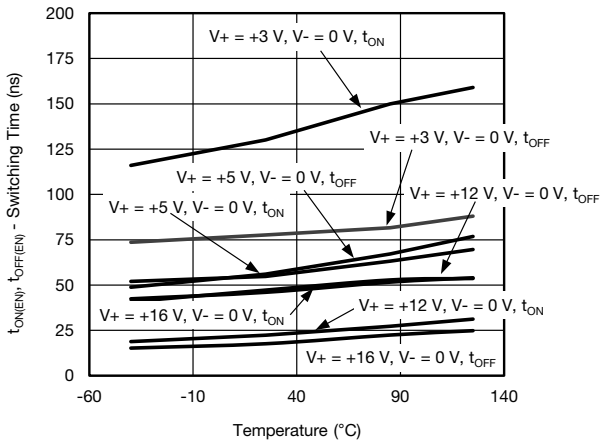
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



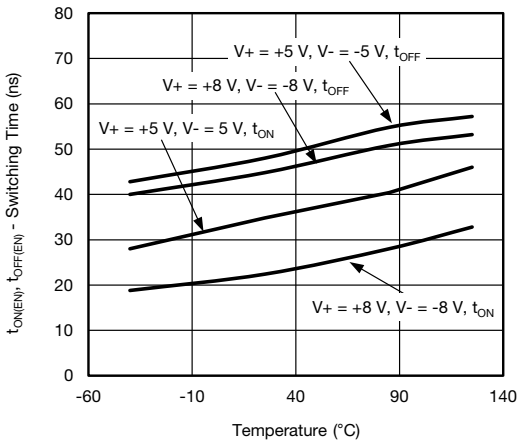
Leakage Current vs. Temperature



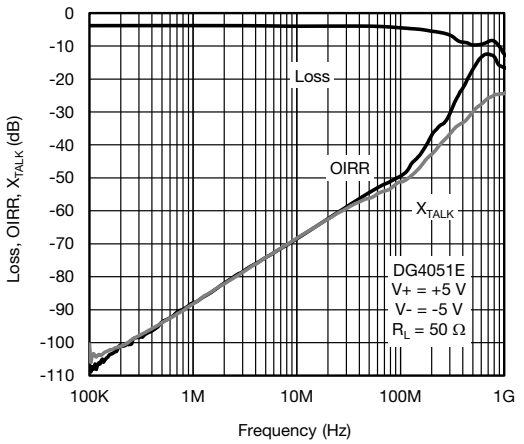
Leakage Current vs. Temperature



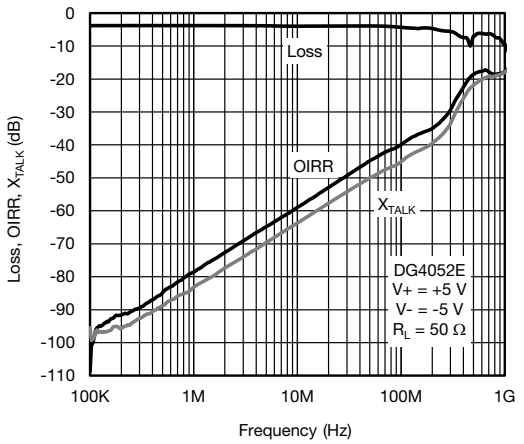
Switching Time vs. Temperature (Single Supply)



Switching Time vs. Temperature (Dual Supply)



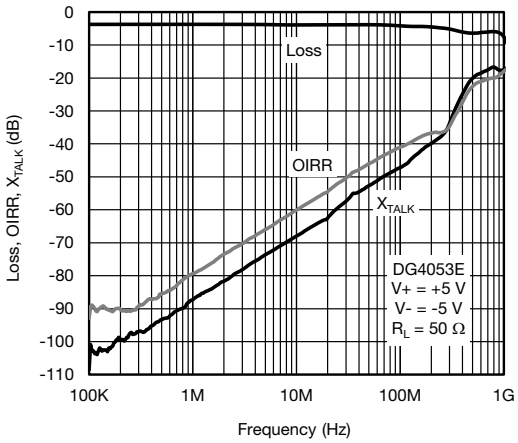
DGQ4051E Insertion Loss, Off-Isolation, Crosstalk vs. Frequency



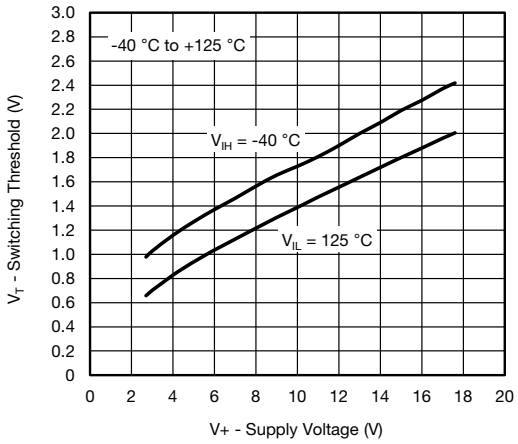
DGQ4052E Insertion Loss, Off-Isolation, Crosstalk vs. Frequency

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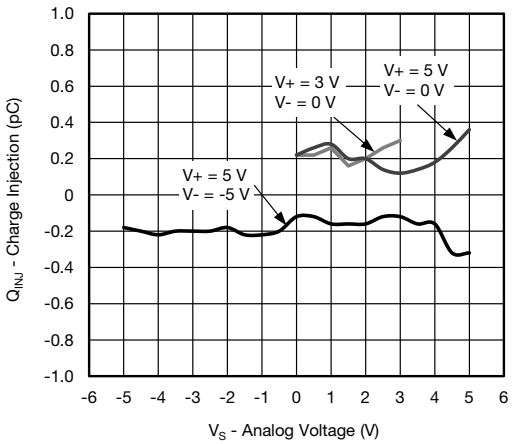
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



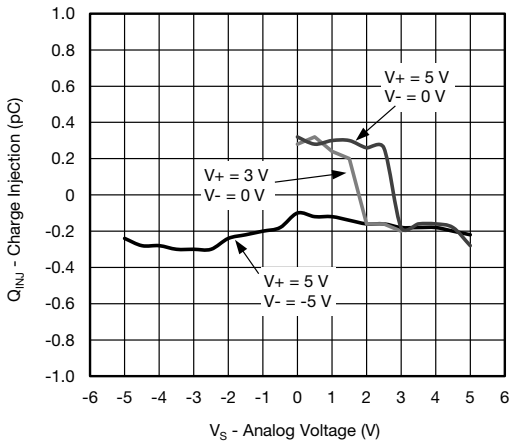
DGQ4053E Insertion Loss, Off-Isolation, Crosstalk vs. Frequency



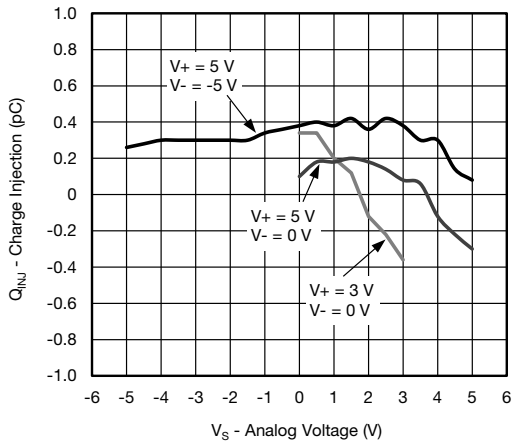
Switching Threshold vs. V+ Supply Voltage



DGQ4051E Charge Injection vs. Analog Voltage



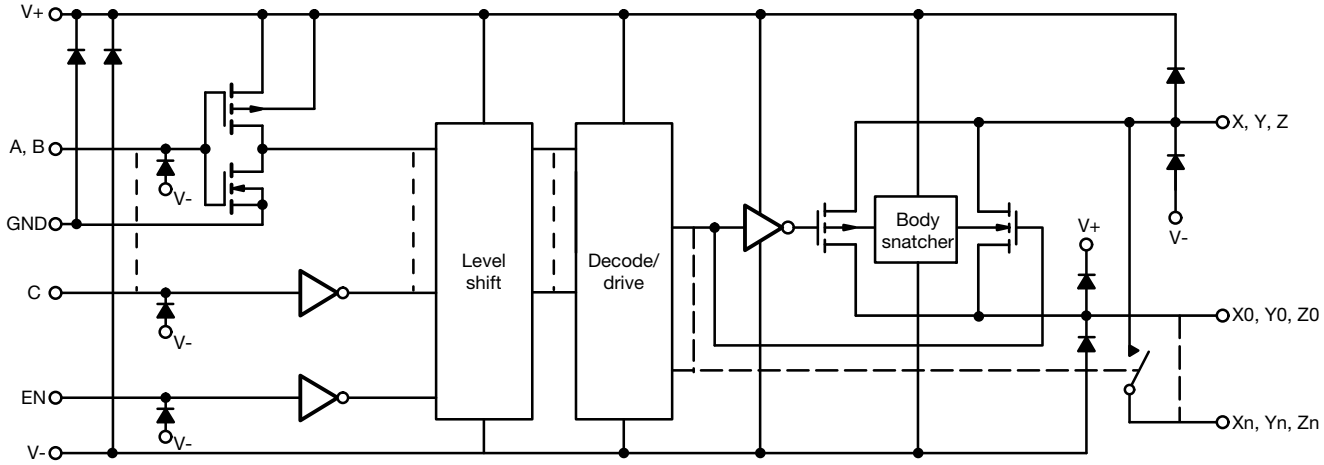
DGQ4053E Charge Injection vs. Analog Voltage



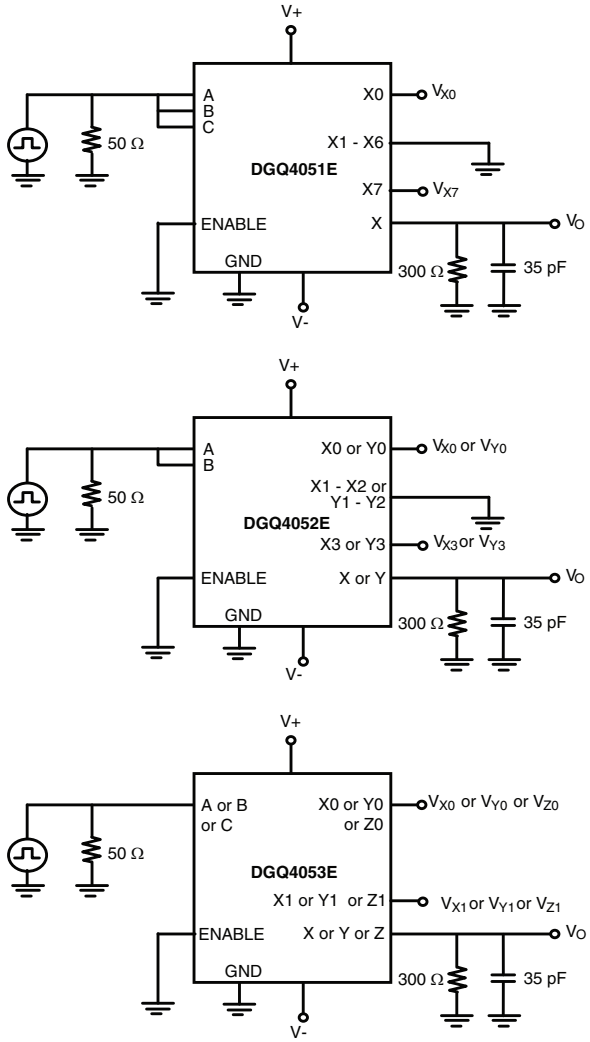
DGQ4052E Charge Injection vs. Analog Voltage

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SCHEMATIC DIAGRAM (Typical Channel)



TEST CIRCUITS



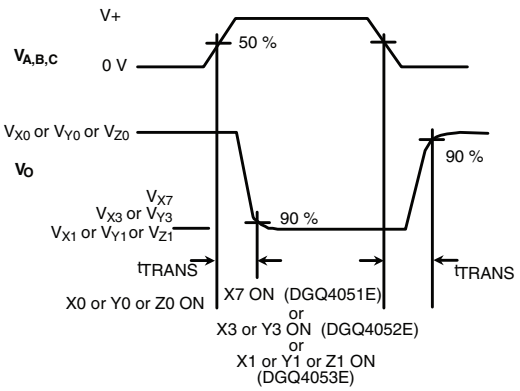


Fig. 1 - Transition Time

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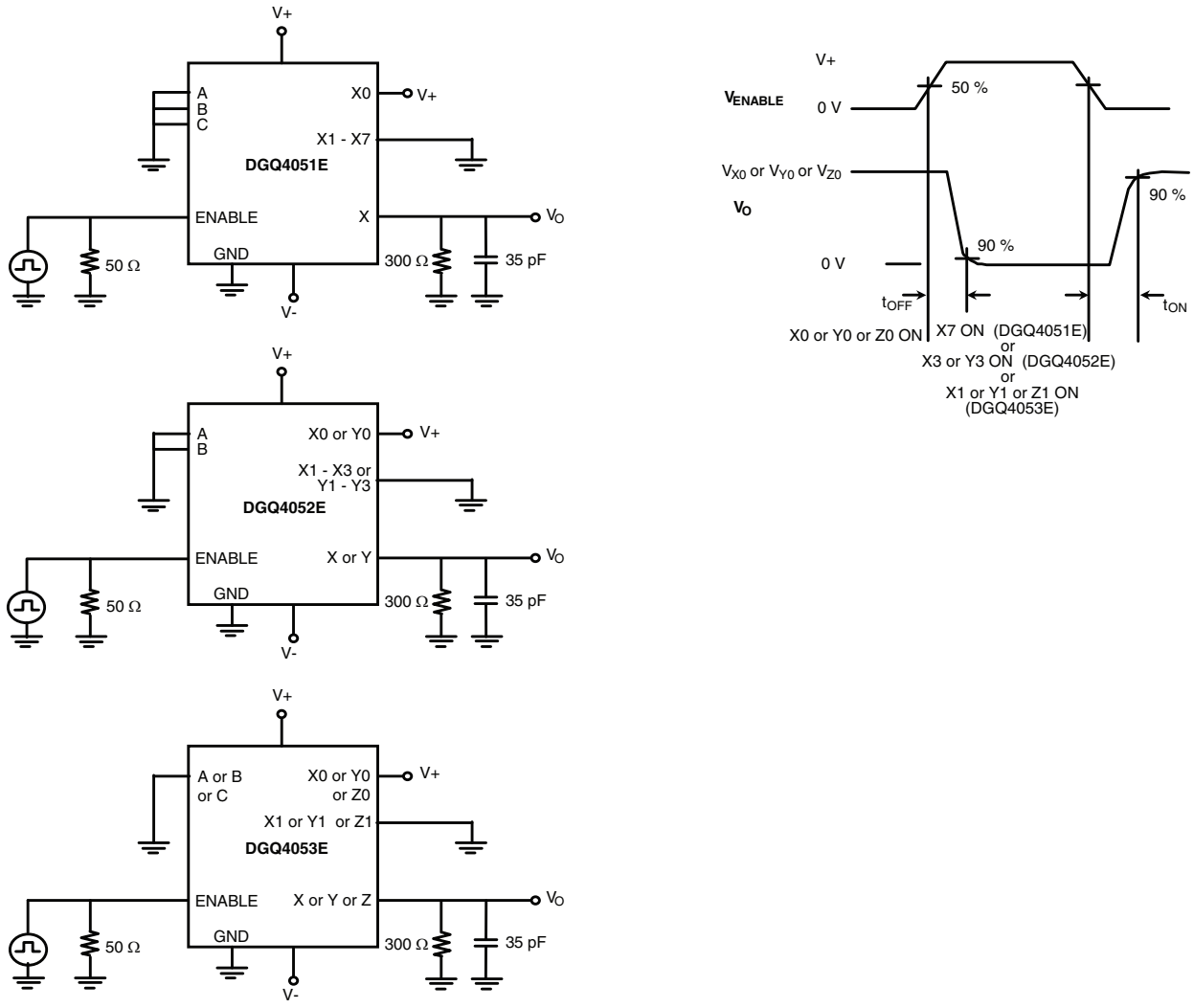


Fig. 2 - Enable Switching Time

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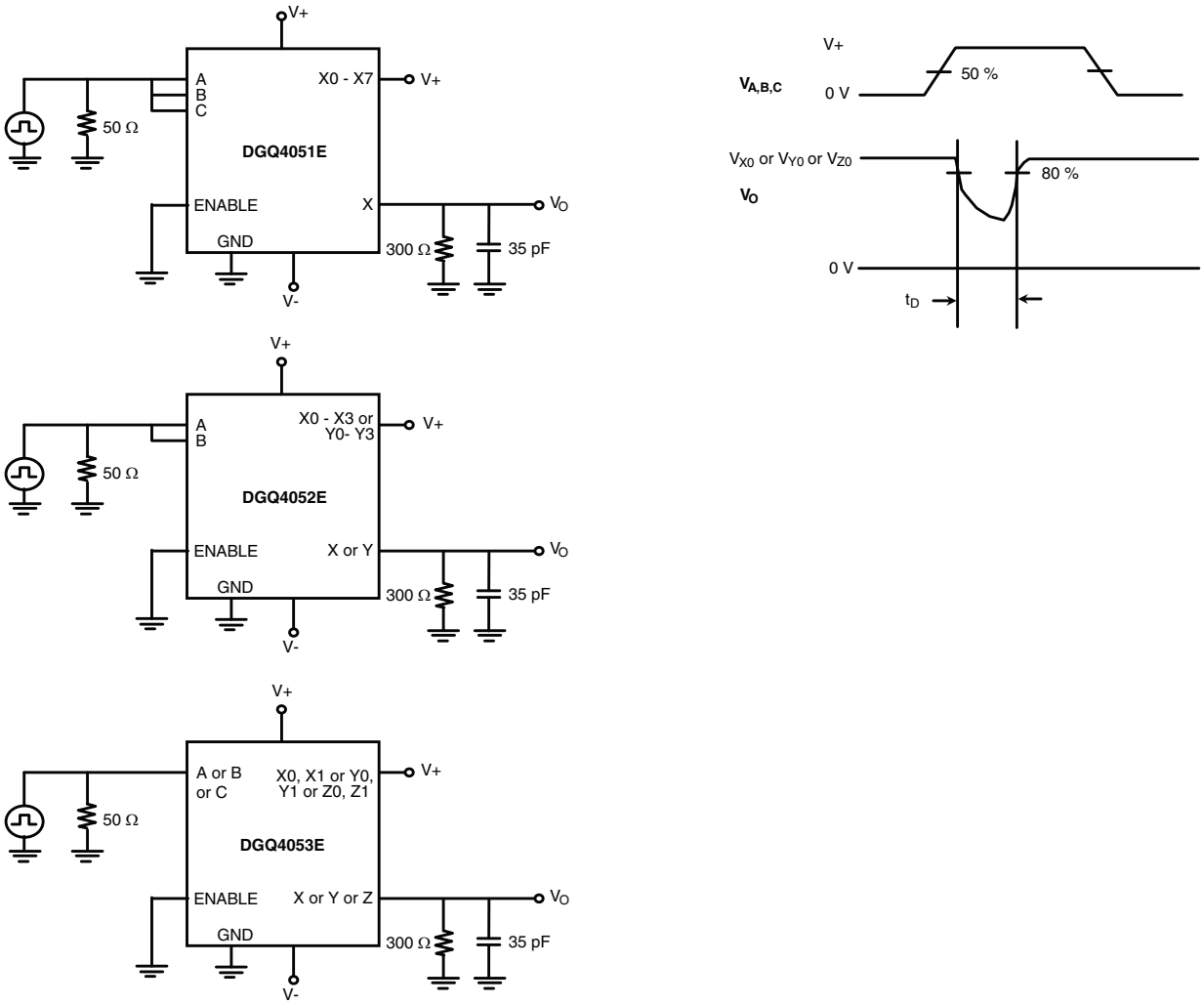


Fig. 3 - Break-Before-Make

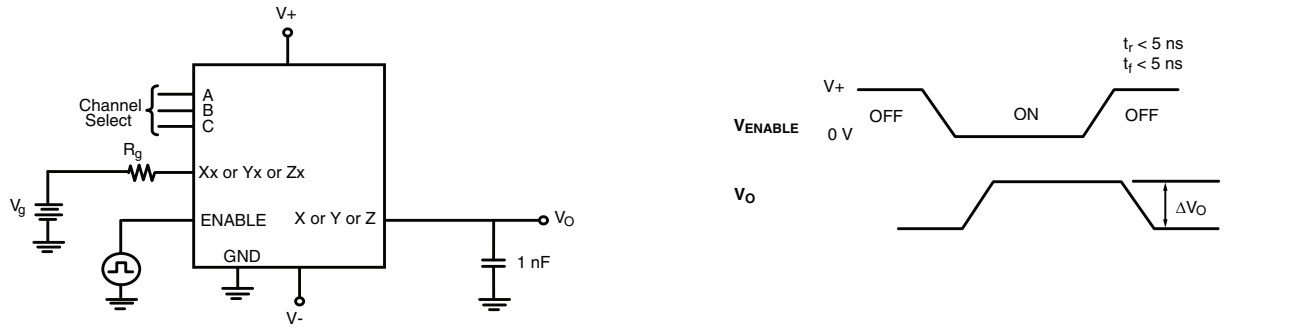


Fig. 4 - Charge Injection

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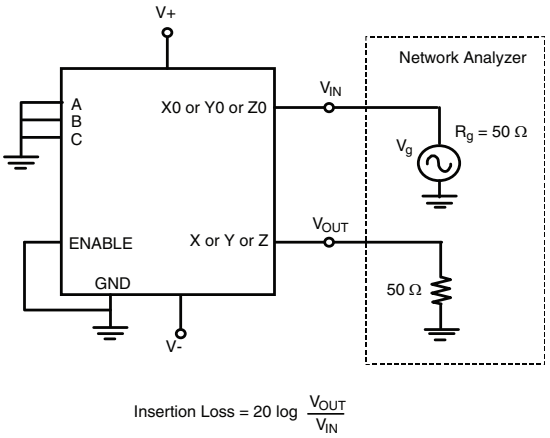


Fig. 5 - Insertion Loss

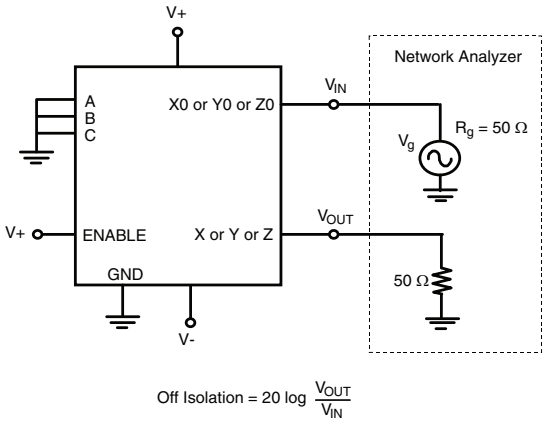


Fig. 7 - Off Isolation

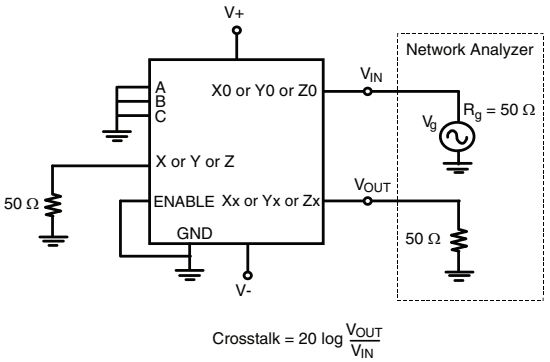


Fig. 6 - Crosstalk

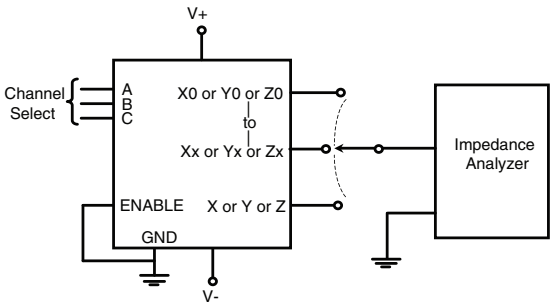


Fig. 8 - Source, Drain Capacitance

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