Series G L-Frame

100–630A, 220–690V

Contents

Notes

The following curves meet the requirements of UL,T CSA,T IEC, CCC, and CE .

The following circuit breakers are derived from Eaton, Westinghouse,T or Cutler-HammerT brand .

Powering Business Worldwide

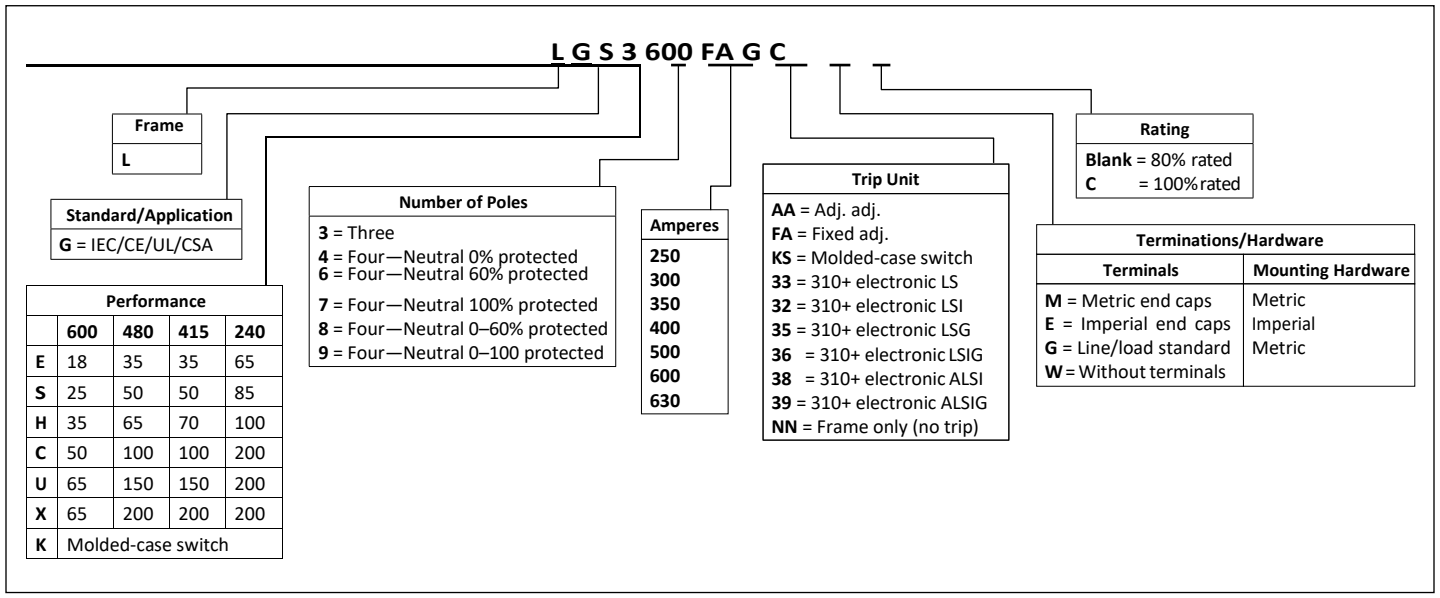
Note: Unless noted below, all curves remain unchanged from their prior revision.

Revision	Curve Number	Page	Date
Thermal Magnetic curve update	Figure 6	9	9/10/2019

Catalog number Selection

This information is presented only as an aid to understanding catalog numbers .
It is not to be used to build catalog numbers for circuit breakers or trip units .

Table 1. Series G—LG-Frame (250–630A)



Performance				
	600	**480**	**415**	**240**
E	18	35	35	65
S	25	50	50	85
H	35	65	70	100
C	50	100	100	200
U	65	150	150	200
X	65	200	200	200
K	Molded-case switch			

Table 2. Trip Unit

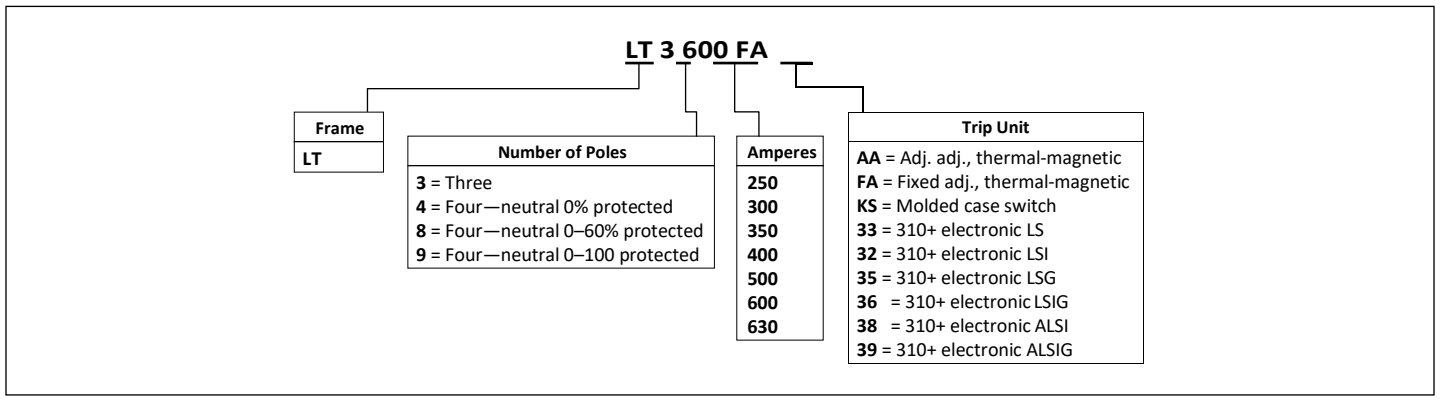
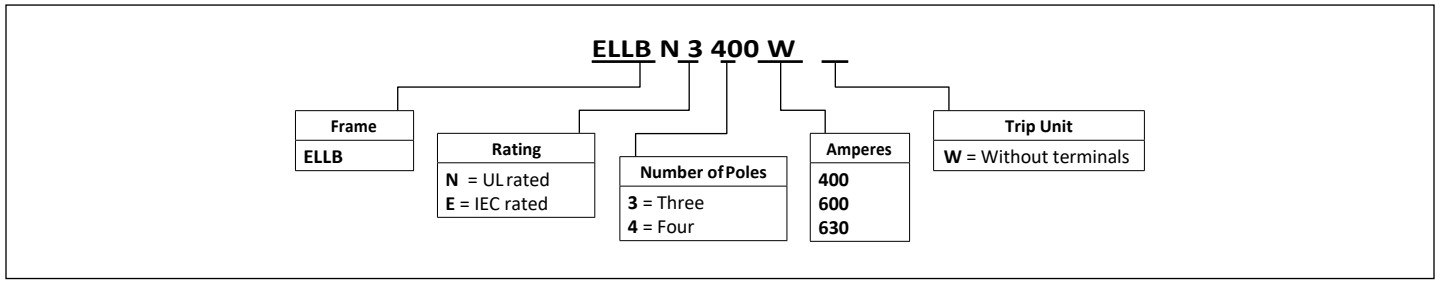
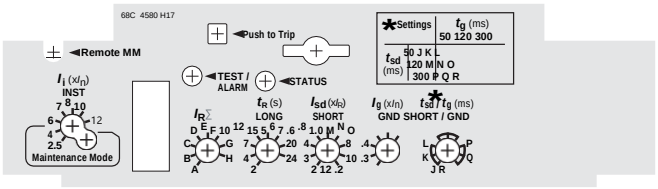


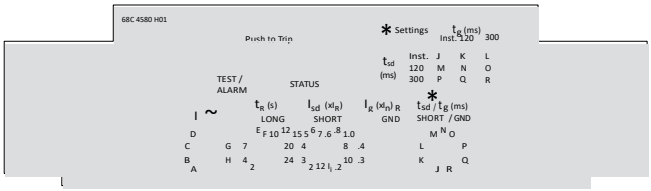
Table 3. Earth Leakage Modules



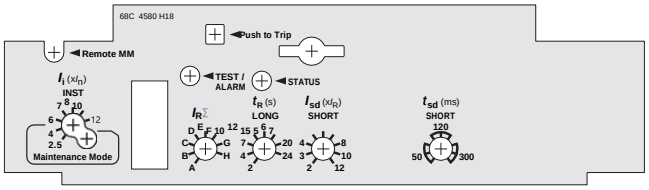
ALSIG (With Maintenance Mode)



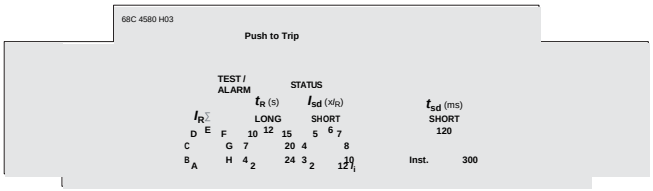
LSIG



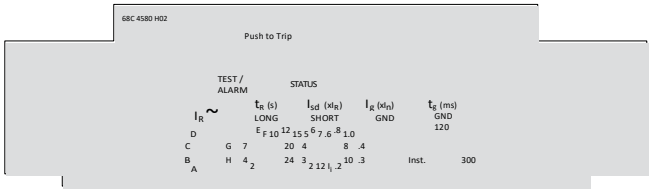
ALSI (With Maintenance Mode)



LSI



LSG



LS

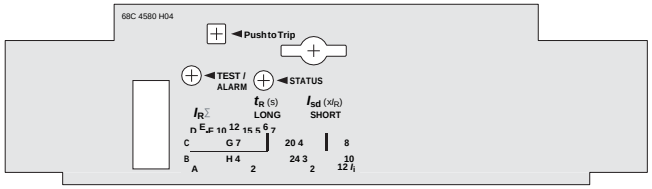
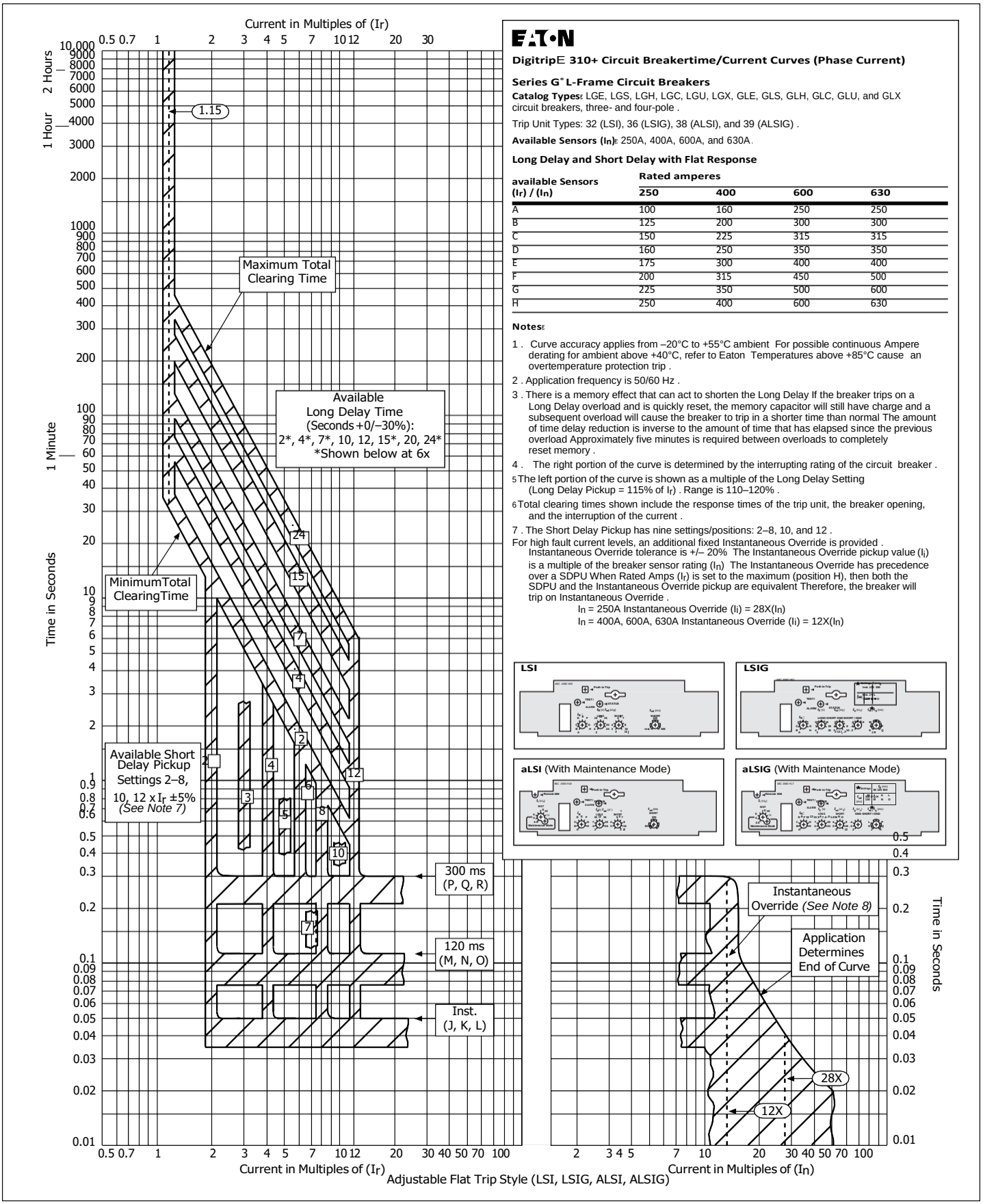


Figure 1. Digitrip 310+ Faceplates



Digitrip 310+ Circuit Breakertime/Current Curves (Phase Current)

Series G L-Frame Circuit Breakers

Catalog Types: LGE, LGS, LGH, LGC, LGU, LGX, GLE, GLS, GLH, GLC, GLU, and GLX circuit breakers, three- and four-pole .

Trip Unit Types: 32 (LSI), 36 (LSIG), 38 (ALSI), and 39 (ALSIG) .

Available Sensors (I_n): 250A, 400A, 600A, and 630A.

Long Delay and Short Delay with Flat Response

available Sensors (I_r) / (I_n)	Rated amperes 250	400	600	630
A	100	160	250	250
B	125	200	300	300
C	150	225	315	315
D	160	250	350	350
E	175	300	400	400
F	200	315	450	500
G	225	350	500	600
H	250	400	600	630

Notes:

1 . Curve accuracy applies from –20°C to +55°C ambient For possible continuous Ampere derating for ambient above +40°C, refer to Eaton Temperatures above +85°C cause an overtemperature protection trip .

2 . Application frequency is 50/60 Hz .

3 . There is a memory effect that can act to shorten the Long Delay If the breaker trips on a Long Delay overload and is quickly reset, the memory capacitor will still have charge and a subsequent overload will cause the breaker to trip in a shorter time than normal The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload Approximately five minutes is required between overloads to completely reset memory .

4 . The right portion of the curve is determined by the interrupting rating of the circuit breaker .

5 The left portion of the curve is shown as a multiple of the Long Delay Setting (Long Delay Pickup = 115% of I_r) . Range is 110–120% .

6 Total clearing times shown include the response times of the trip unit, the breaker opening, and the interruption of the current .

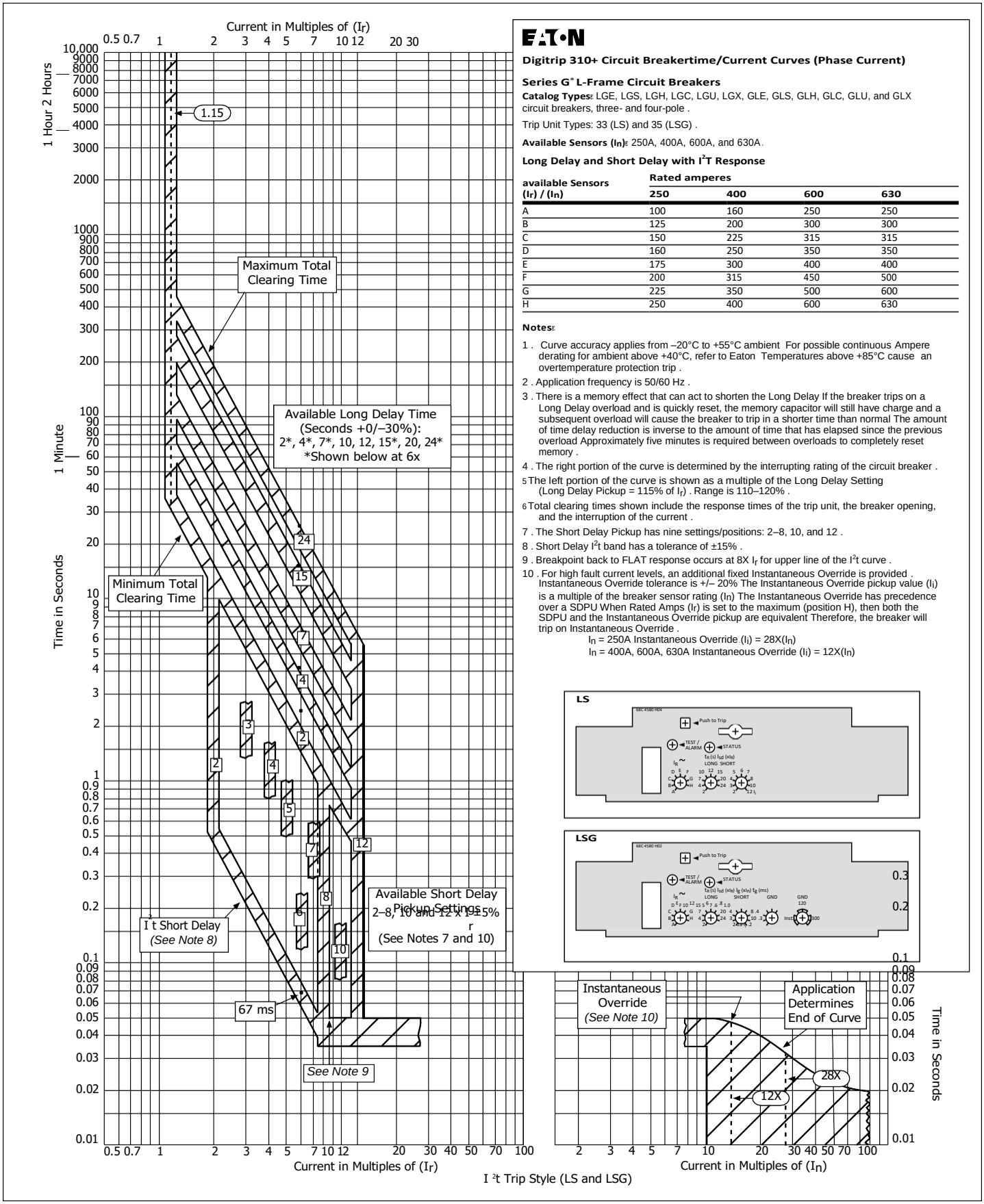
7 . The Short Delay Pickup has nine settings/positions: 2–8, 10, and 12 .

For high fault current levels, an additional fixed Instantaneous Override is provided . Instantaneous Override tolerance is +/– 20% The Instantaneous Override pickup value (I_i) is a multiple of the breaker sensor rating (I_n) The Instantaneous Override has precedence over a SDPU When Rated Amps (I_r) is set to the maximum (position H), then both the SDPU and the Instantaneous Override pickup are equivalent Therefore, the breaker will trip on Instantaneous Override .

I_n = 250A Instantaneous Override (I_i) = 28X(I_n)

I_n = 400A, 600A, 630A Instantaneous Override (I_i) = 12X(I_n)

Figure 2. Digitrip 310+ Long Delay Response and Short Delay with Flat Response Curve (LSI, LSIG, ALSI, ALSIG)— Curve Number TC01207004E, May 2008



Digitrip 310+ Circuit Breakertime/Current Curves (Phase Current)

Series G® L-Frame Circuit Breakers

Catalog Types: LGE, LGS, LGH, LGC, LGU, LGX, GLE, GLS, GLH, GLC, GLU, and GLX circuit breakers, three- and four-pole .

Trip Unit Types: 33 (LS) and 35 (LSG) .

Available Sensors (In): 250A, 400A, 600A, and 630A.

Long Delay and Short Delay with I^2T Response

available Sensors (Ir) / (In)	Rated amperes 250	400	600	630
A	100	160	250	250
B	125	200	300	300
C	150	225	315	315
D	160	250	350	350
E	175	300	400	400
F	200	315	450	500
G	225	350	500	600
H	250	400	600	630

Notes:

1 . Curve accuracy applies from –20°C to +55°C ambient For possible continuous Ampere derating for ambient above +40°C, refer to Eaton Temperatures above +85°C cause an overtemperature protection trip .

2 . Application frequency is 50/60 Hz .

3 . There is a memory effect that can act to shorten the Long Delay If the breaker trips on a Long Delay overload and is quickly reset, the memory capacitor will still have charge and a subsequent overload will cause the breaker to trip in a shorter time than normal The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload Approximately five minutes is required between overloads to completely reset memory .

4 . The right portion of the curve is determined by the interrupting rating of the circuit breaker .

5 The left portion of the curve is shown as a multiple of the Long Delay Setting (Long Delay Pickup = 115% of I_r) . Range is 110–120% .

6 Total clearing times shown include the response times of the trip unit, the breaker opening, and the interruption of the current .

7 . The Short Delay Pickup has nine settings/positions: 2–8, 10, and 12 .

8 . Short Delay I^2t band has a tolerance of ±15% .

9 . Breakpoint back to FLAT response occurs at 8X I_r for upper line of the I^2t curve .

10 . For high fault current levels, an additional fixed Instantaneous Override is provided . Instantaneous Override tolerance is +/– 20% The Instantaneous Override pickup value (I_i) is a multiple of the breaker sensor rating (I_n) The Instantaneous Override has precedence over a SDPU When Rated Amps (I_r) is set to the maximum (position H), then both the SDPU and the Instantaneous Override pickup are equivalent Therefore, the breaker will trip on Instantaneous Override .

I_n = 250A Instantaneous Override (I_i) = 28X(I_n)

I_n = 400A, 600A, 630A Instantaneous Override (I_i) = 12X(I_n)

Figure 3. Digitrip 310+ Long Delay Response and Short Delay with I^2t Response Curve (LS, LSG)— Curve Number TC01207005E, May 2008

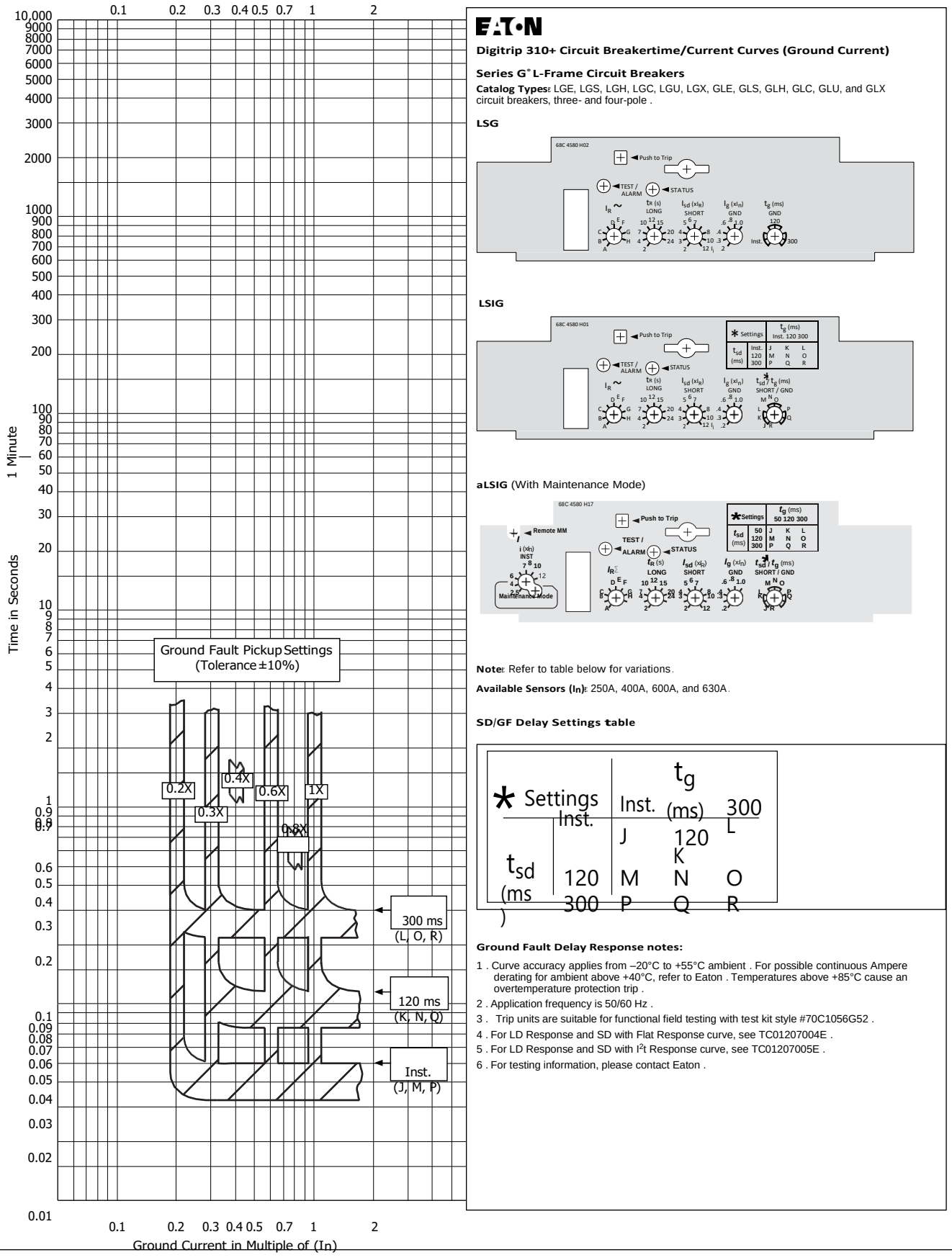


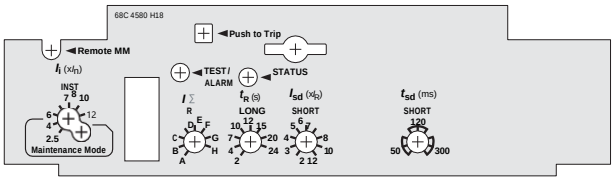
Figure 4. Ground Fault Delay Response Curve (LSG, LSIG, ALSIG)—Curve Number TC01207006E, May 2008

Digitrip 310+ Circuit Breakertime/Current Curves

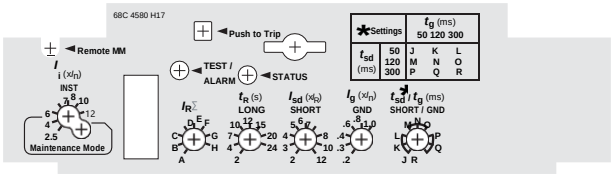
Maintenance Mode / Instantaneous Setting

Series G® L-Frame trip Unit nameplates

aLSI (With Maintenance Mode)

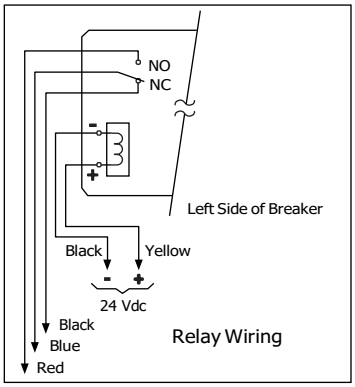


aLSIG (With Maintenance Mode)



Notes:

1. The Maintenance Mode feature must be ENABLED for these curves to apply, when in Maintenance Mode .
2. The Maintenance Mode is Enabled locally by turning the Maintenance Mode/INST dial to the 2 .5X or 4X position, or via remote signal . Enabling the Maintenance Mode via remote signal sets the pickup to 2 .5X regardless of Maintenance Mode/INST dial position .
3. The end of the curve is determined by the interrupting rating of the circuit breaker .
4. Total clearing times shown include the response times of the trip unit,the breaker opening, and the interruption of the current .
5. Nominal Values (Pickup) (Tolerance is ±15%) 2.5X I_n, 4X I_n, 6X I_n, 7X I_n, 8X I_n, 10X I_n, 12X I_n.
6. These curves are comprehensive for the complete family of Series G L-Frame electronic breakers, including all frame sizes, ratings, and constructions . The total clearing times shown are conservative and consider the maximum response times of the trip unit, the circuit breaker opening, and the interruption of the current in worst case conditions, such as maximum rated voltages, single-phase interruption, and minimum power factor . Faster clearing times are possible depending on the specific system conditions .
7. For L-Frame breakers with 250A sensors (I_n = 250A), an INST setting of 12 is equal to 28X (7000A) .
8. Contact Eaton for additional information .



This feature allows enabling of the maintenance mode remotely by applying 24 Vdc to the yellow (+) and black (–) wires that exit the left hand side of the breaker . The maintenance mode settings that is enabled is the 2 .5X setting .

There are two indicators that can verify that the trip unit has been remotely activated/enabled into the maintenance mode feature:

A . The blue LED (MM) located on the top left side of the trip unit will light .

AND/OR

B . The relay output is provided by three wires exiting the left hand side of the breaker: blue = C, red = NO, black = NC . The relay will change state when the maintenance mode is remotely enabled .

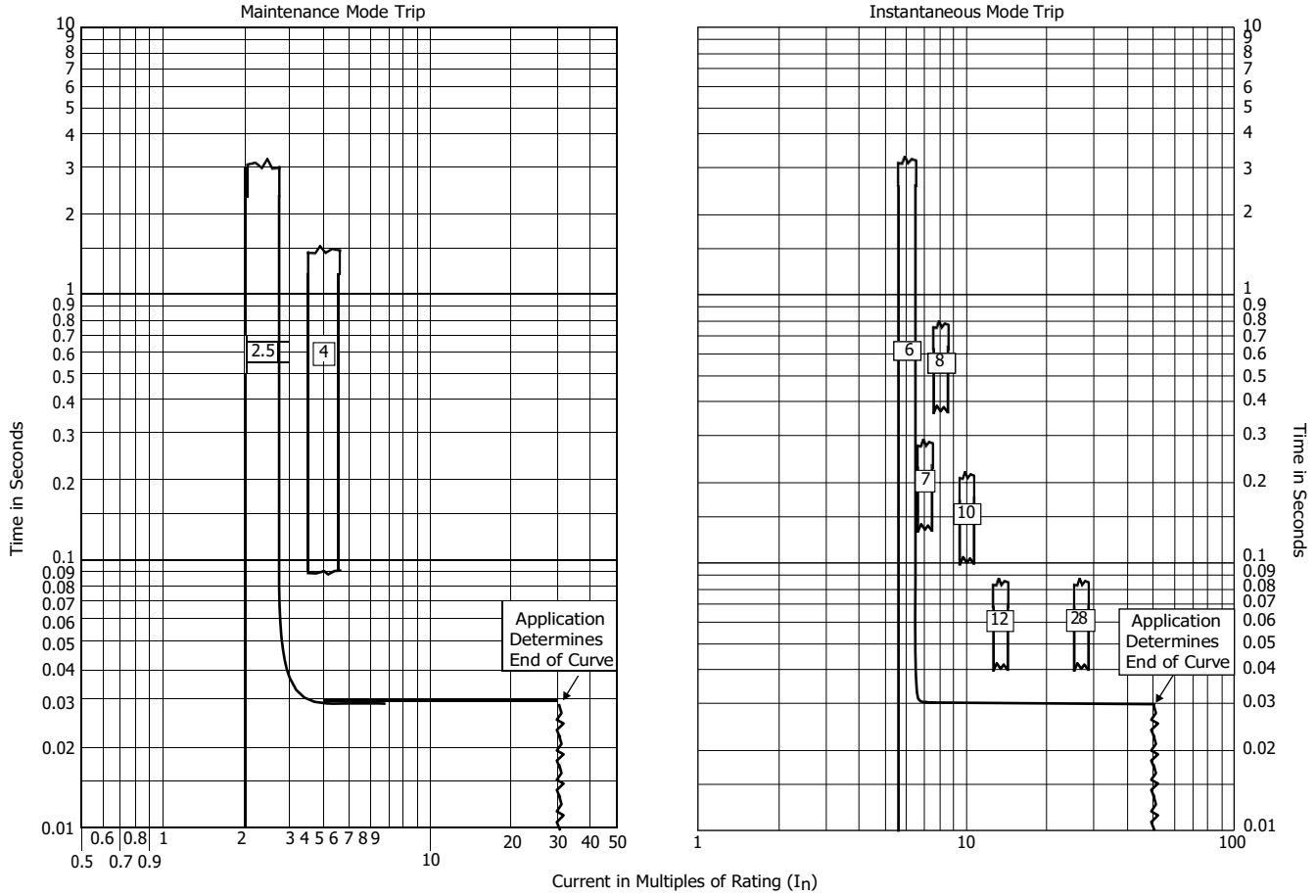
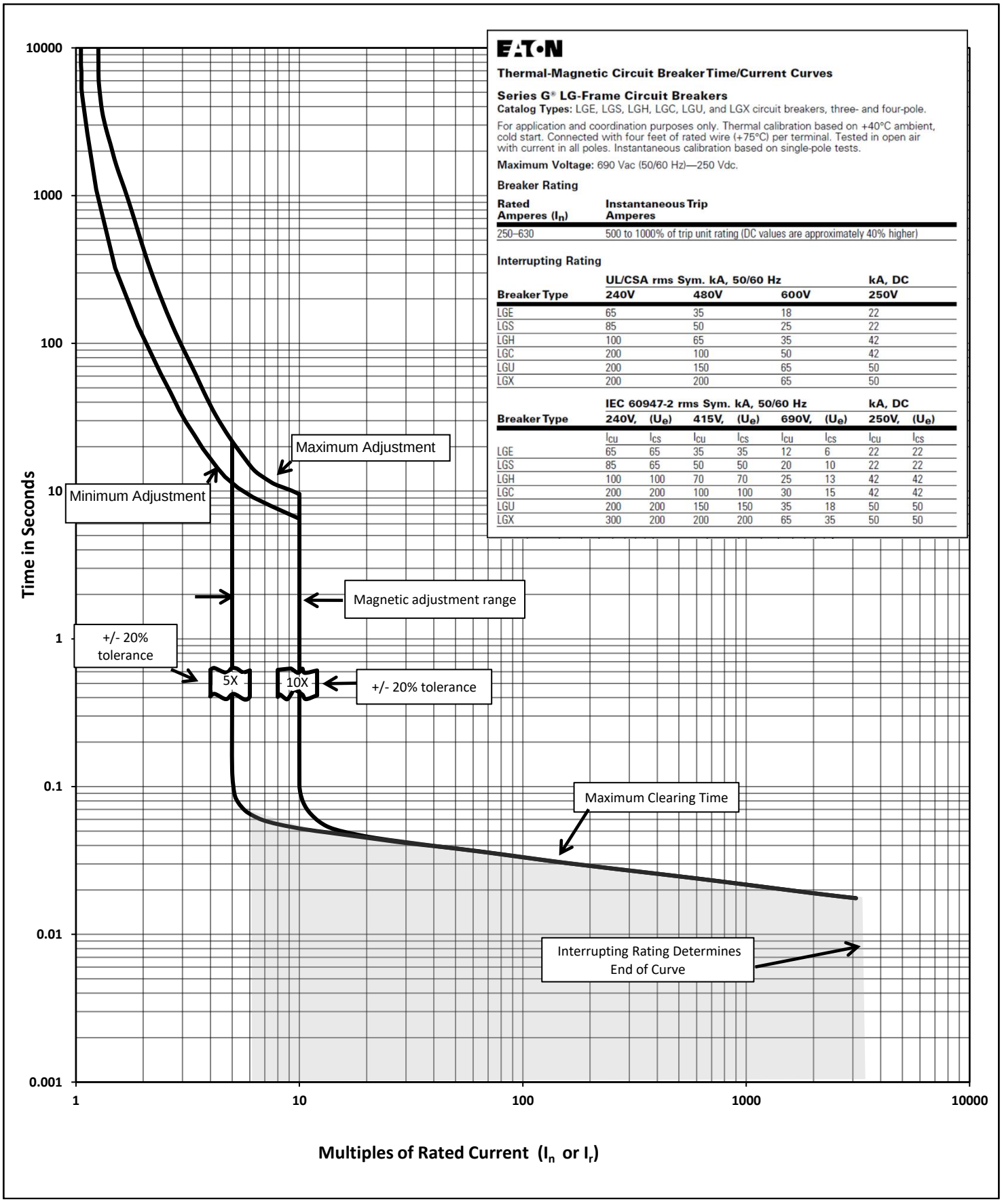


Figure 5. Maintenance Mode / Instantaneous Setting (ALSI, ALSIG)—Curve Number TC01207014E, May 2008



Thermal-Magnetic Circuit Breaker Time/Current Curves

Series G® LG-Frame Circuit Breakers

Catalog Types: LGE, LGS, LGH, LGC, LGU, and LGX circuit breakers, three- and four-pole.

For application and coordination purposes only. Thermal calibration based on +40°C ambient, cold start. Connected with four feet of rated wire (+75°C) per terminal. Tested in open air with current in all poles. Instantaneous calibration based on single-pole tests.

Maximum Voltage: 690 Vac (50/60 Hz)—250 Vdc.

Breaker Rating

Rated Amperes (I_n)	Instantaneous Trip Amperes
250–630	500 to 1000% of trip unit rating (DC values are approximately 40% higher)

Interrupting Rating

	UL/CSA rms Sym. kA, 50/60 Hz			kA, DC
Breaker Type	240V	480V	600V	250V
LGE	65	35	18	22
LGS	85	50	25	22
LGH	100	65	35	42
LGC	200	100	50	42
LGU	200	150	65	50
LGX	200	200	65	50

	IEC 60947-2 rms Sym. kA, 50/60 Hz						kA, DC	
Breaker Type	240V, (U_e)		415V, (U_e)		690V, (U_e)		250V, (U_e)	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
LGE	65	65	35	35	12	6	22	22
LGS	85	65	50	50	20	10	22	22
LGH	100	100	70	70	25	13	42	42
LGC	200	200	100	100	30	15	42	42
LGU	200	200	150	150	35	18	50	50
LGX	300	200	200	200	65	35	50	50

Figure 6. Thermal-Magnetic LGE, LGS, LGH, LGC, LGU, and LGX Circuit Breakers—Curve Number TC01208002E, September 2019

thermal-Magnetic Circuit Breakertime/Current Curves

Series G® LG-Frame Circuit Breakers

Catalog Types: LHH circuit breakers, three-pole.

For application and coordination purposes only . Thermal calibration based on 40°C ambient, cold start . Connected with four (feet of rated wire (+75°C) per terminal . Tested in open air with current in all poles . Instantaneous calibration based on single-pole tests .

Maximum Voltage: 690 Vac (50/60 Hz)—250 Vdc (2 poles in series).

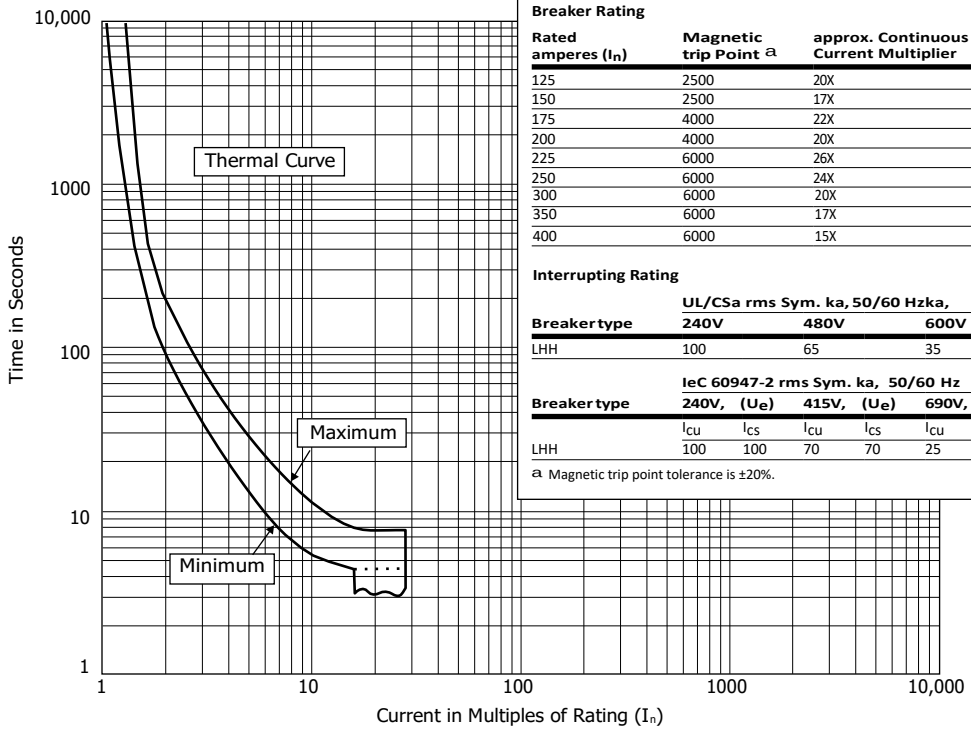
Breaker Rating

Rated amperes (I_n)	Magnetic trip Point [a]	approx. Continuous Current Multiplier	Instantaneous trip amperes
125	2500	20X	See curve below (DC values are approx. 40% higher) **Note:** Magnetic pickup tolerance is ±20%
150	2500	17X	
175	4000	22X	
200	4000	20X	
225	6000	26X	
250	6000	24X	
300	6000	20X	
350	6000	17X	
400	6000	15X	

Interrupting Rating

	UL/CSa rms Sym. ka, 50/60 Hzka,						DC	
Breaker type	**240V**		**480V**		**600V**		**250V**	
LHH	100		65		35		42	
	IeC 60947-2 rms Sym. ka, 50/60 Hz						**ka, DC**	
Breaker type	**240V, (U_e)**		**415V, (U_e)**		**690V, (U_e)**		**250V, (U_e)**	
	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
LHH	100	100	70	70	25	13	42	42

[a] Magnetic trip point tolerance is ±20%.



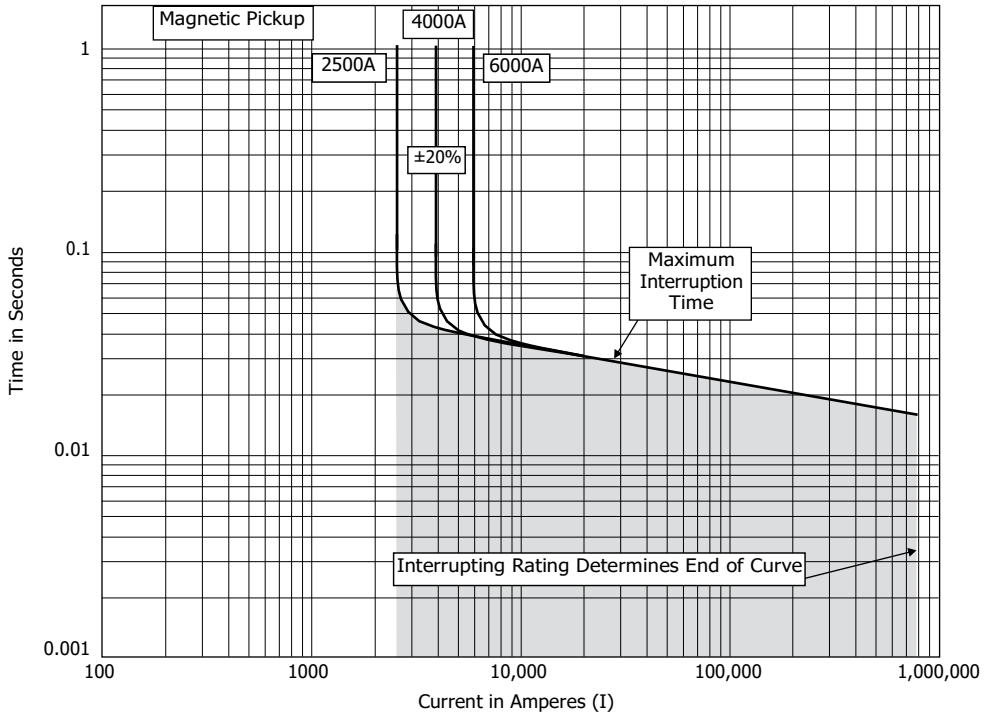


Figure 7. Thermal-Magnetic LHH High Instantaneous Circuit Breaker—Curve Number TC01206004E, September 2009

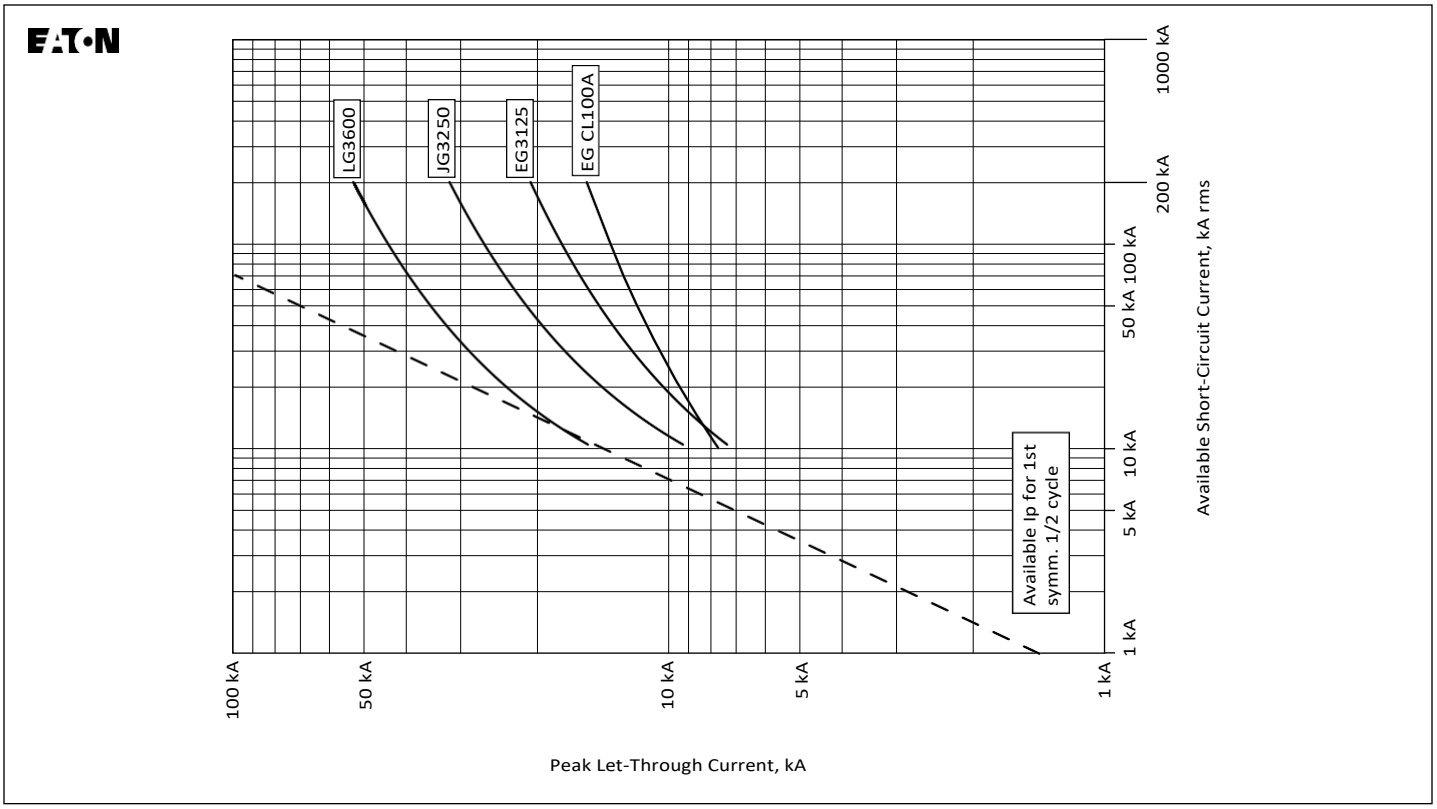


Figure 8. Peak Let-Through Current Series G Types LG, JG, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers— 240V— Curve Number TC01200001E-A, April 2012

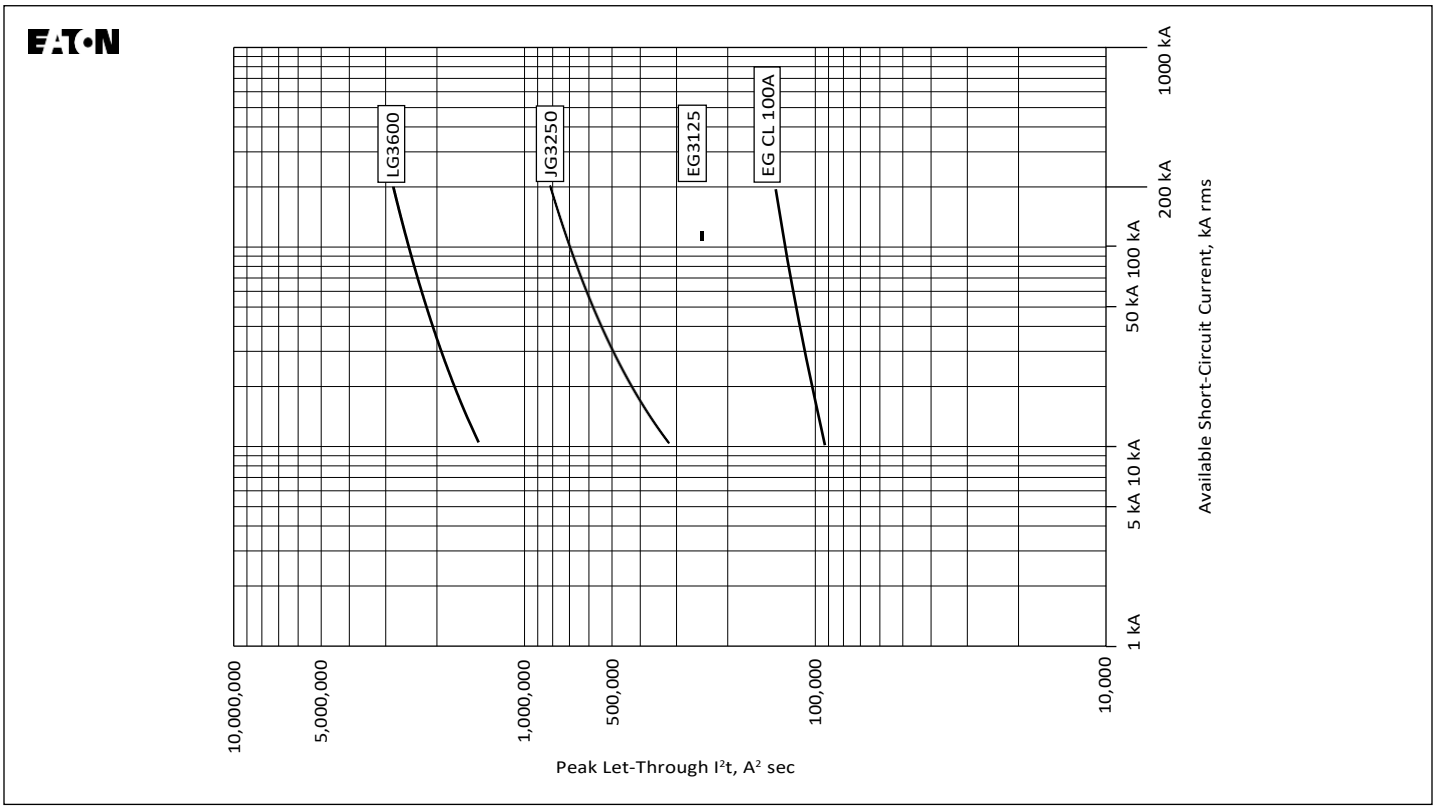


Figure 9. Peak Let-Through I^2t Series G Types LG, JG, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers— 240V—Curve Number TC01200001E-A, April 2012

Note: All values are typical.

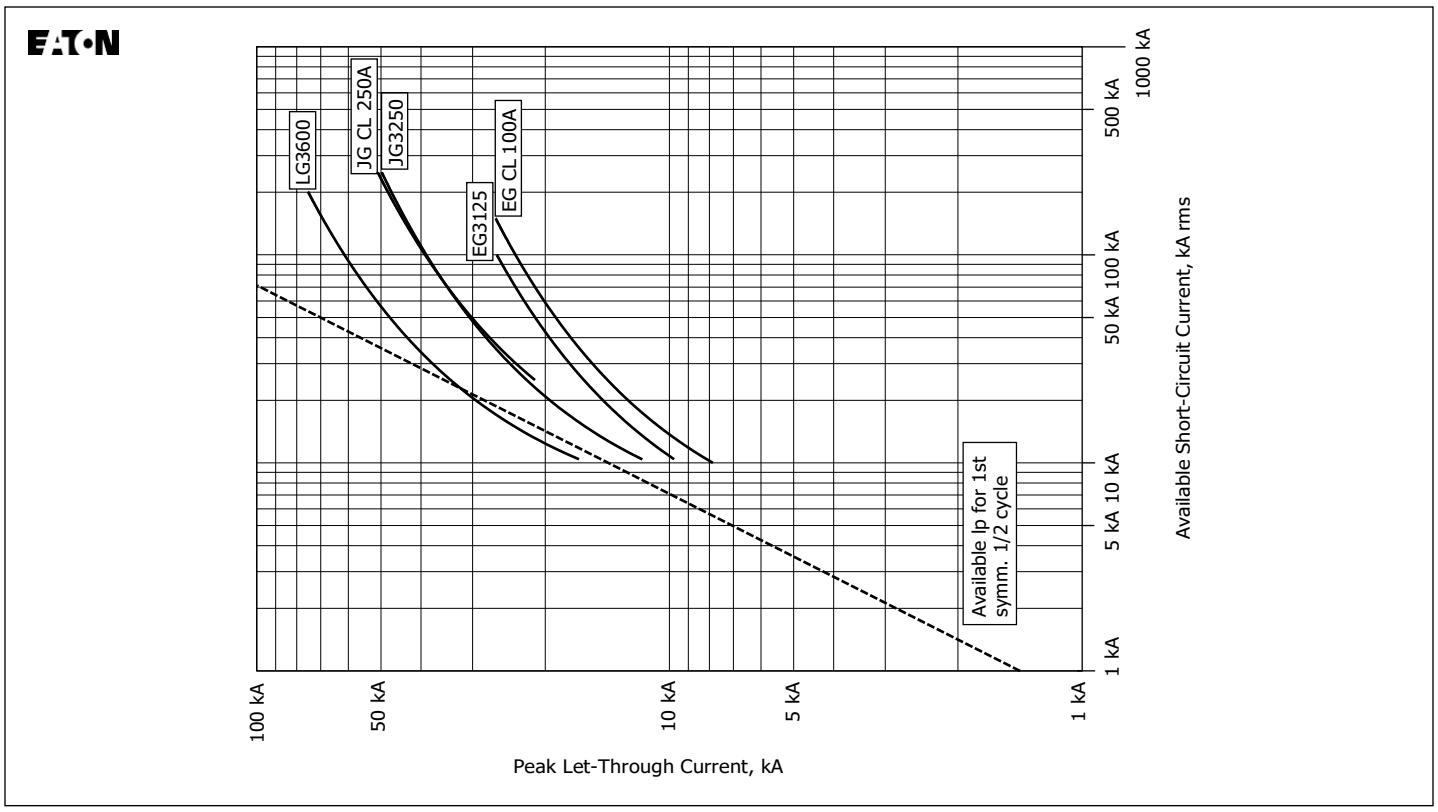


Figure 10. Peak Let-Through Current Series G Types LG, JG CL, JG, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-B, April 2012

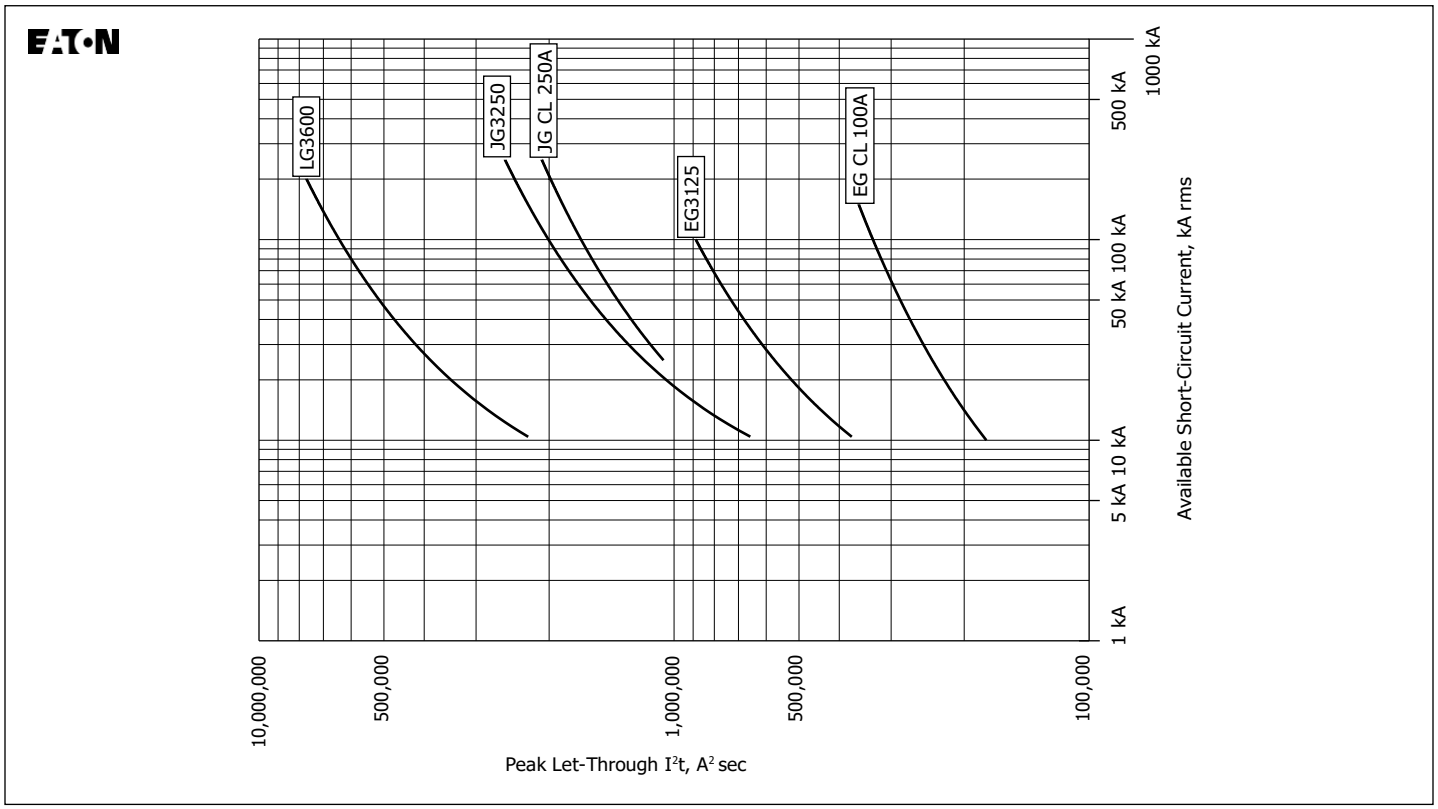


Figure 11. Peak Let-Through I^2t Series G Types LG, JG, JG CL, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-B, April 2012

Note: All values are typical.

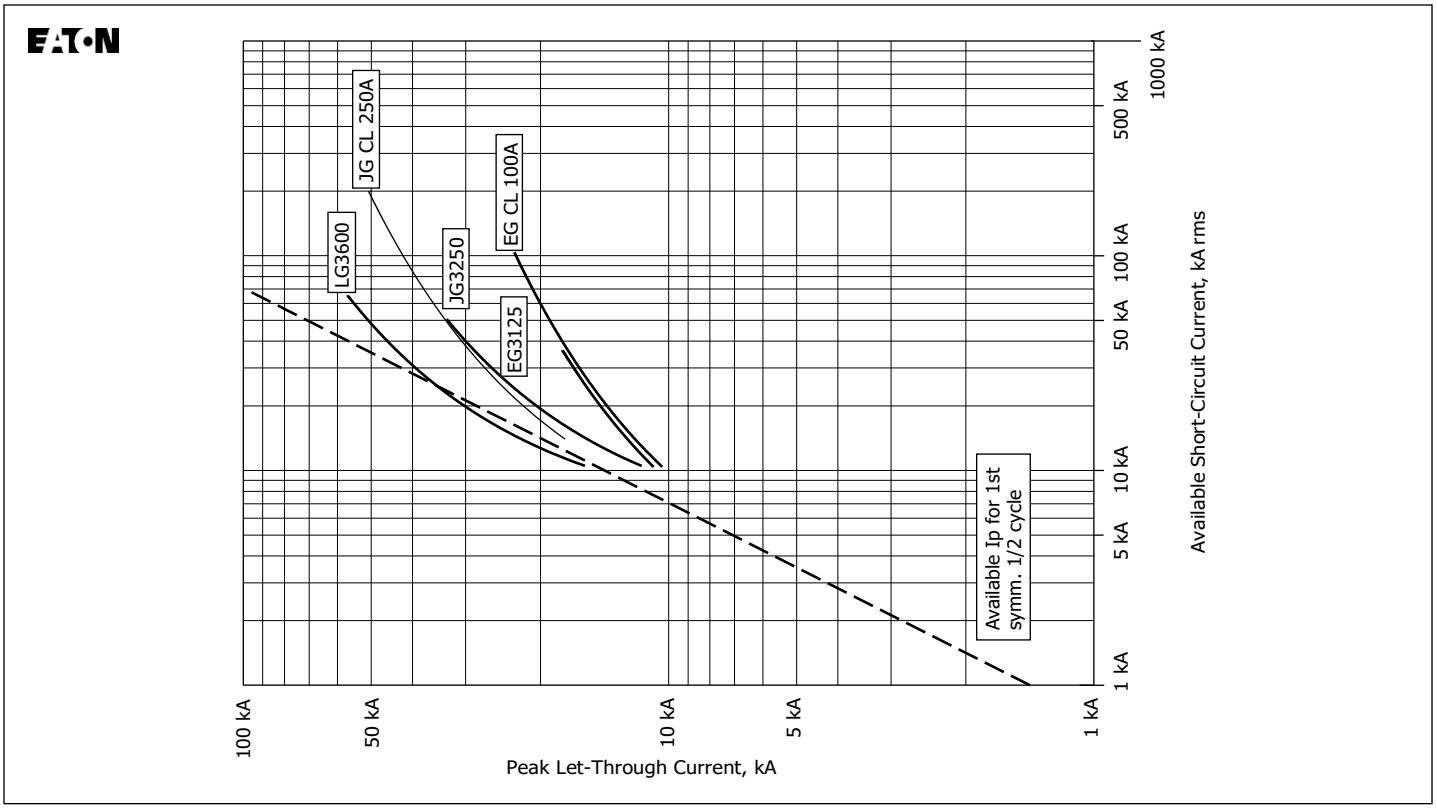


Figure 12. Peak Let-Through Current Series G Types LG, JG CL, JG, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-C, April 2012

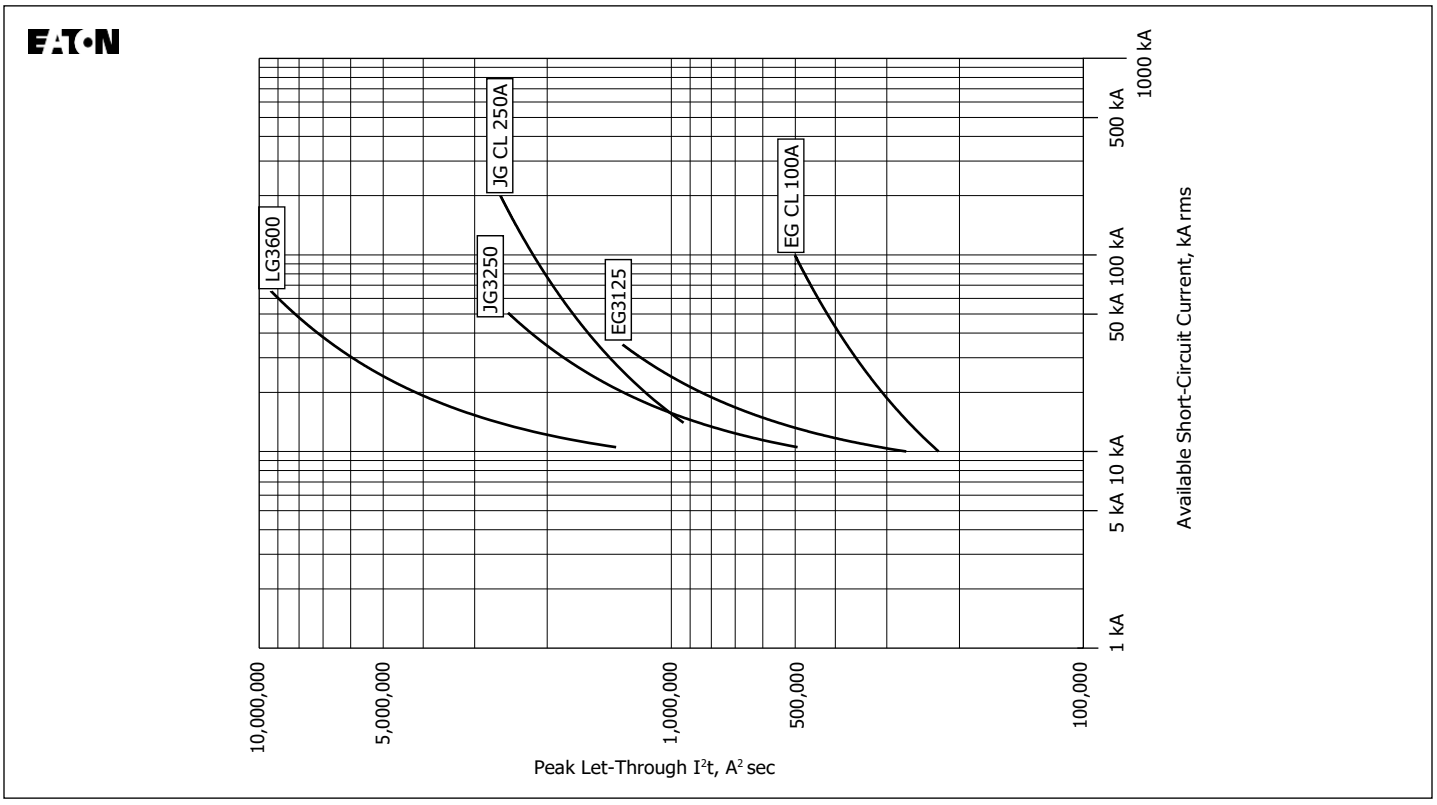


Figure 13. Peak Let-Through I^2t Series G Types LG, JG, JG CL, EG, and EG CL (with Current Limiter), Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-C, April 2012

Note: All values are typical.

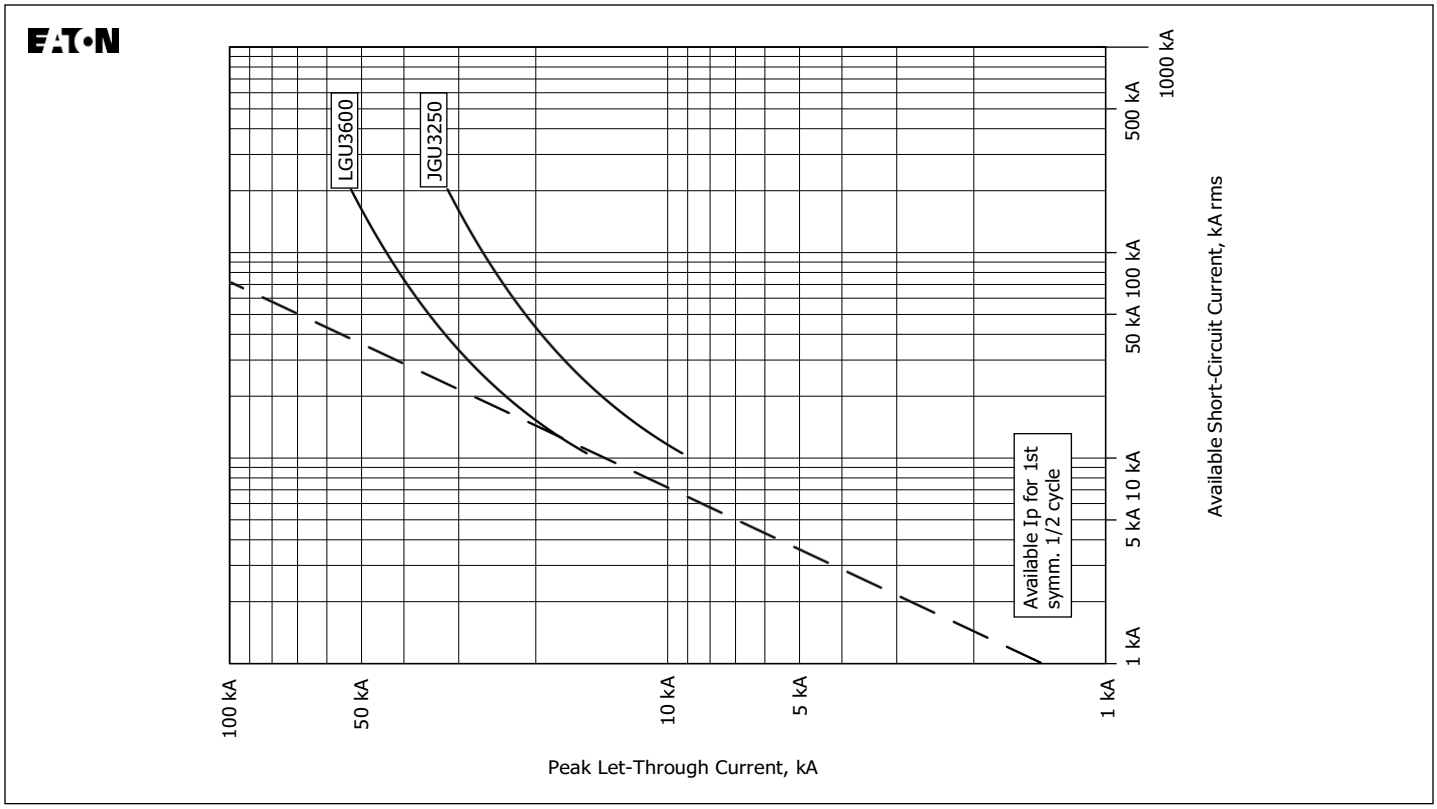


Figure 14. Peak Let-Through Current Series G Types LGU and JGU Molded-Case Circuit Breakers—240V—Curve Number TC01200001E-D, April 2012

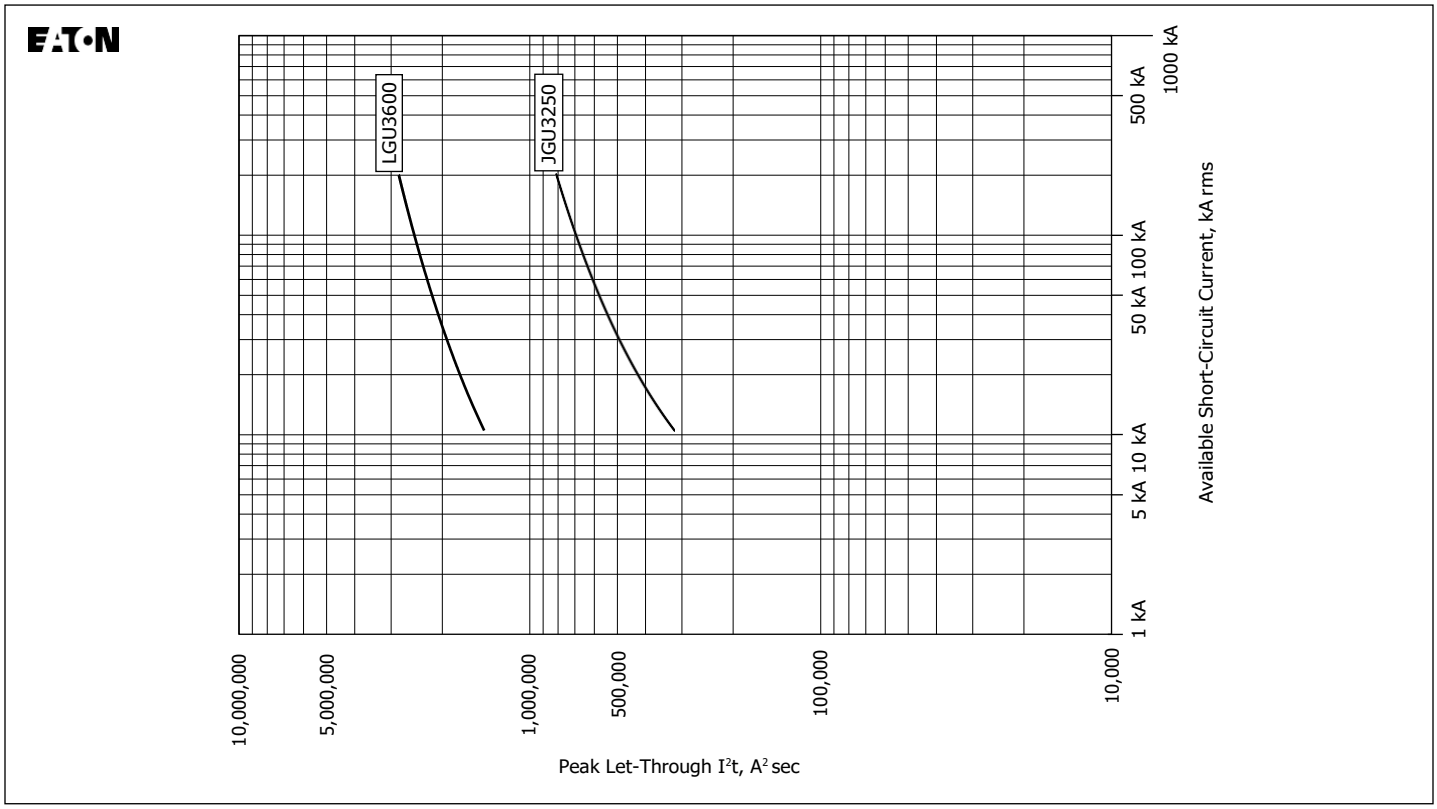


Figure 15. Peak Let-Through I^2t Series G Types LGU and JGU Molded-Case Circuit Breakers—240V—Curve Number TC01200001E-D, April 2012

Note: All values are typical.

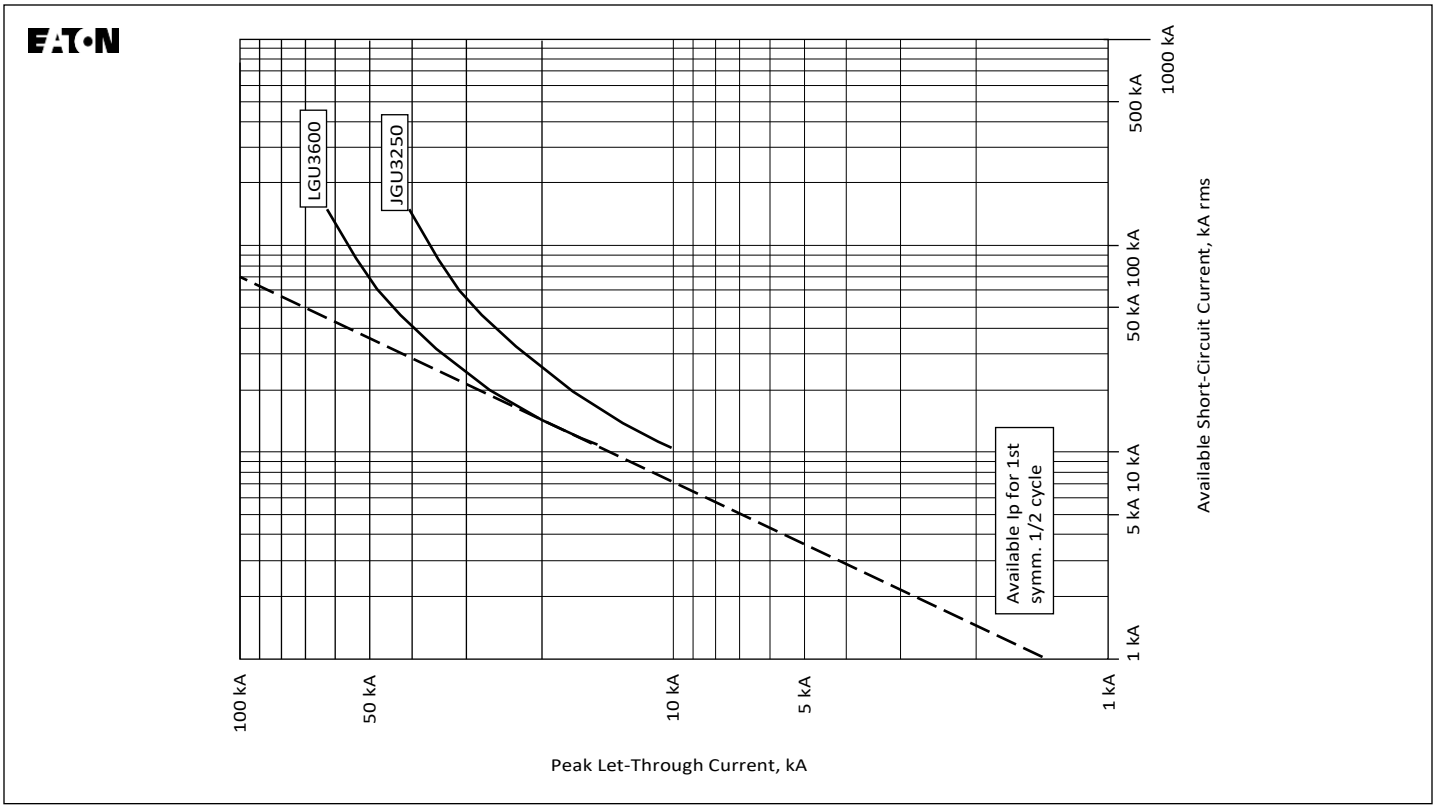


Figure 16. Peak Let-Through Current Series G Types LGU and JGU Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-E, April 2012

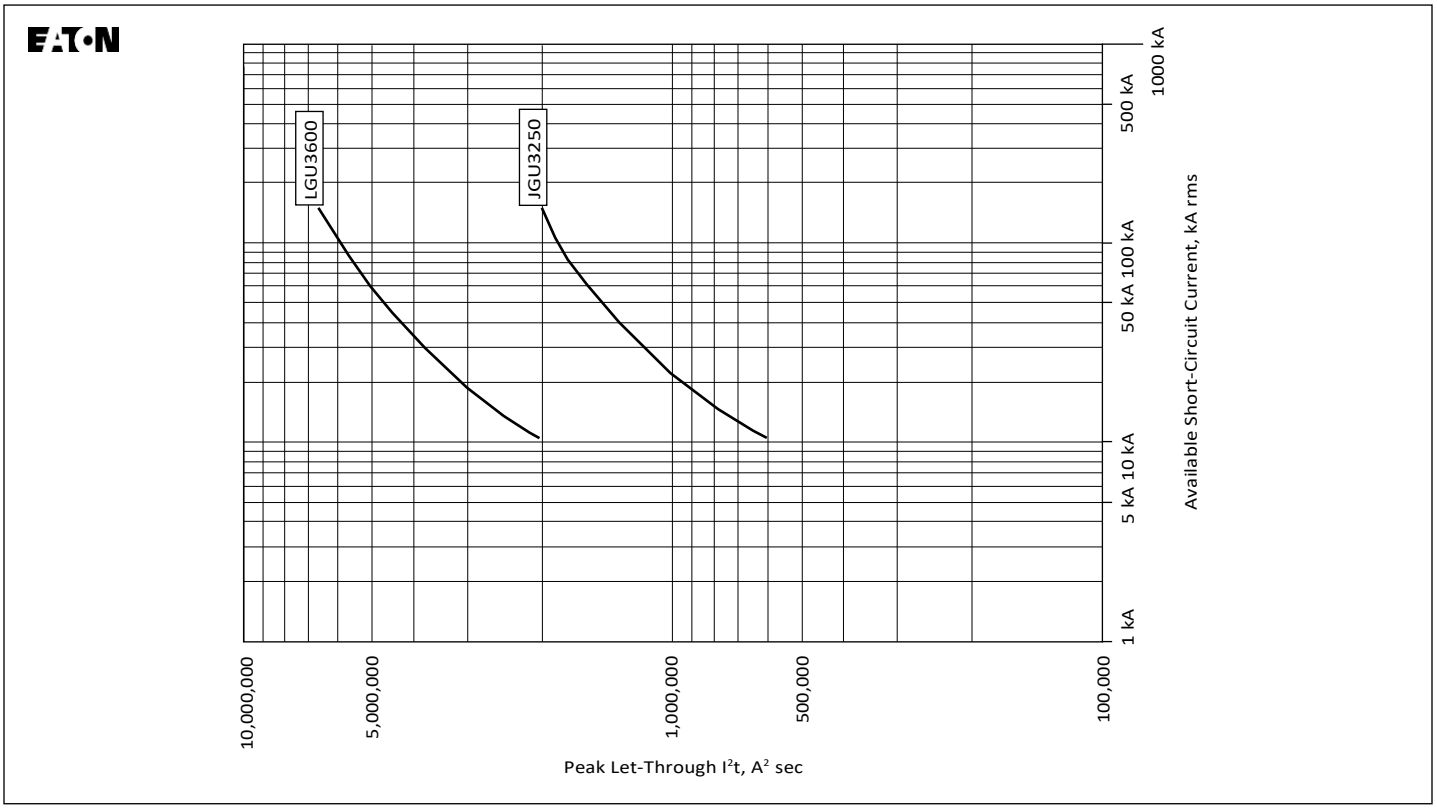


Figure 17. Peak Let-Through I^2t Series G Types LGU and JGU Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-E, April 2012

Note: All values are typical.

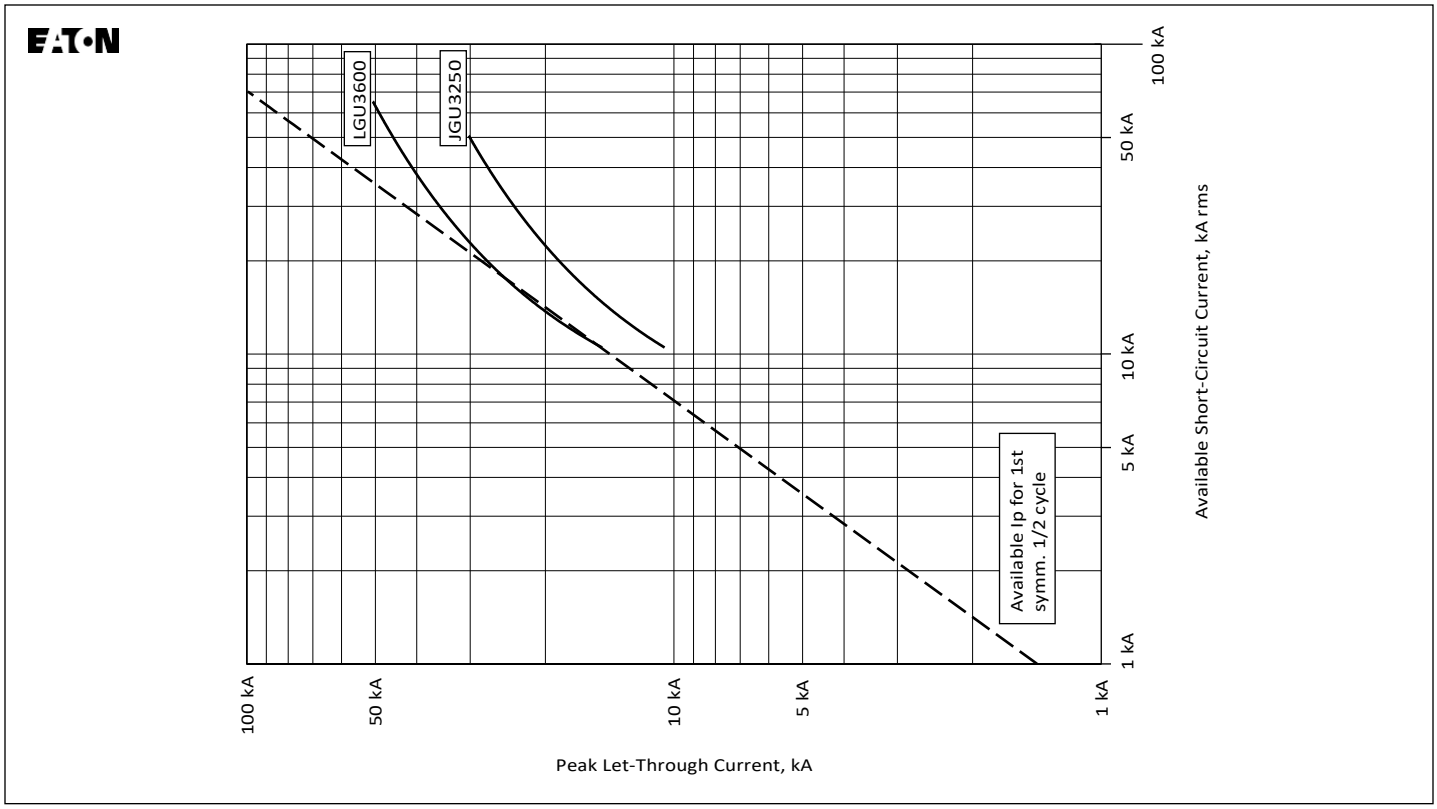


Figure 18. Peak Let-Through Current Series G Types LGU and JGU Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-F, April 2012

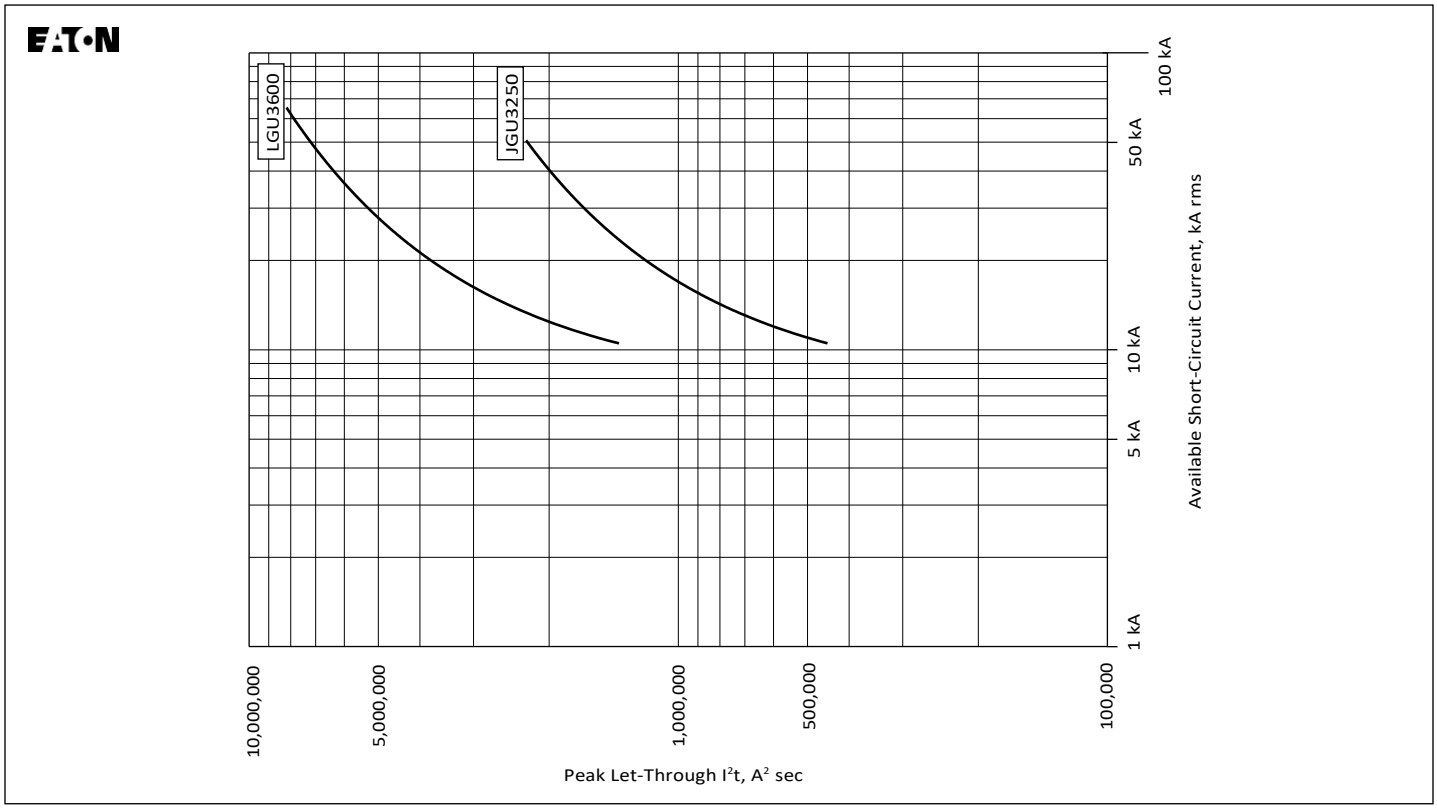


Figure 19. Peak Let-Through I^2t Series G Types LGU and JGU Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-F, April 2012

Note: All values are typical.

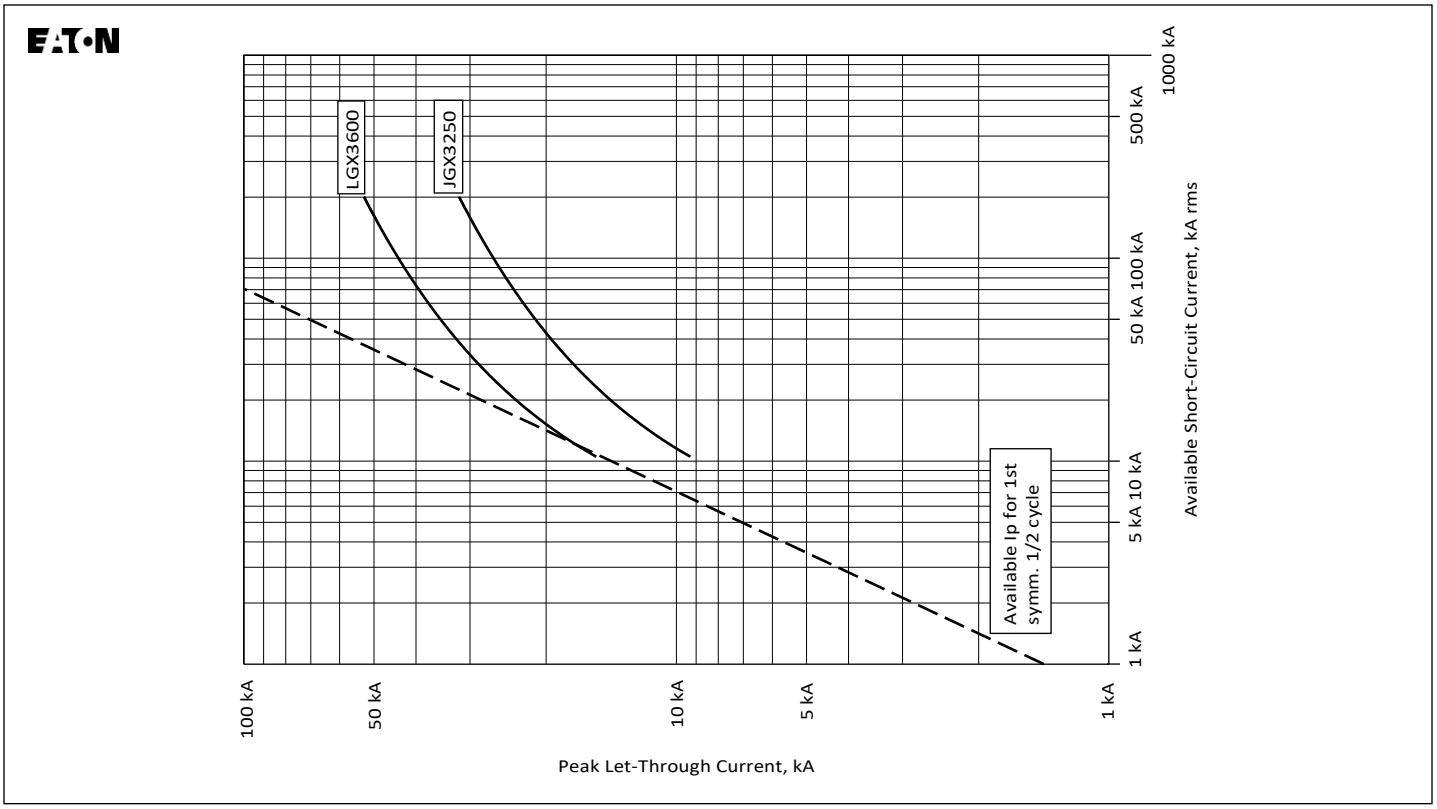


Figure 20. Peak Let-Through Current Series G Types LGX and JGX Molded-Case Circuit Breakers—240V—Curve Number TC01200001E-G, April 2012

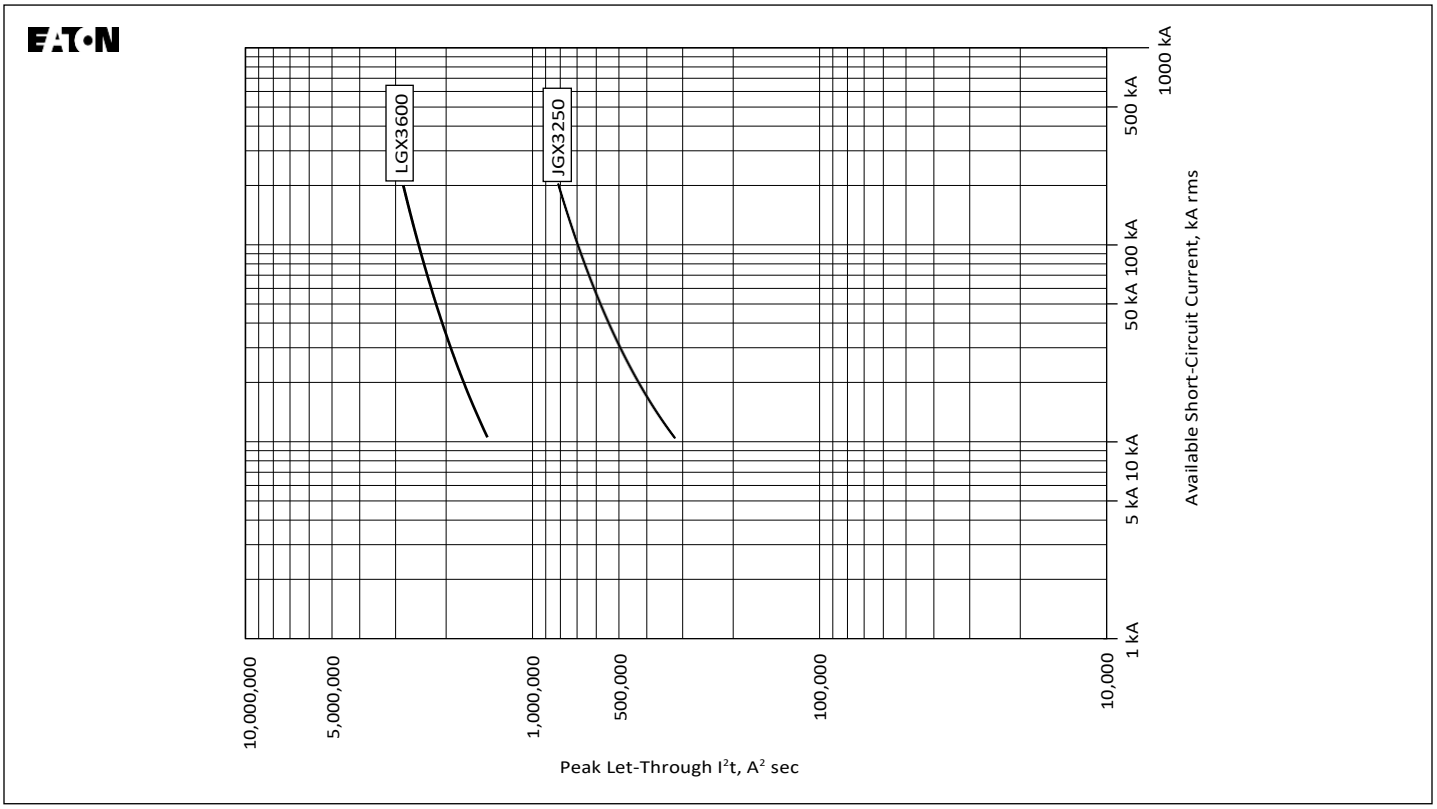


Figure 21. Peak Let-Through I^2t Series G Types LGX and JGX Molded-Case Circuit Breakers—240V—Curve Number TC01200001E-G, April 2012

Note: All values are typical.

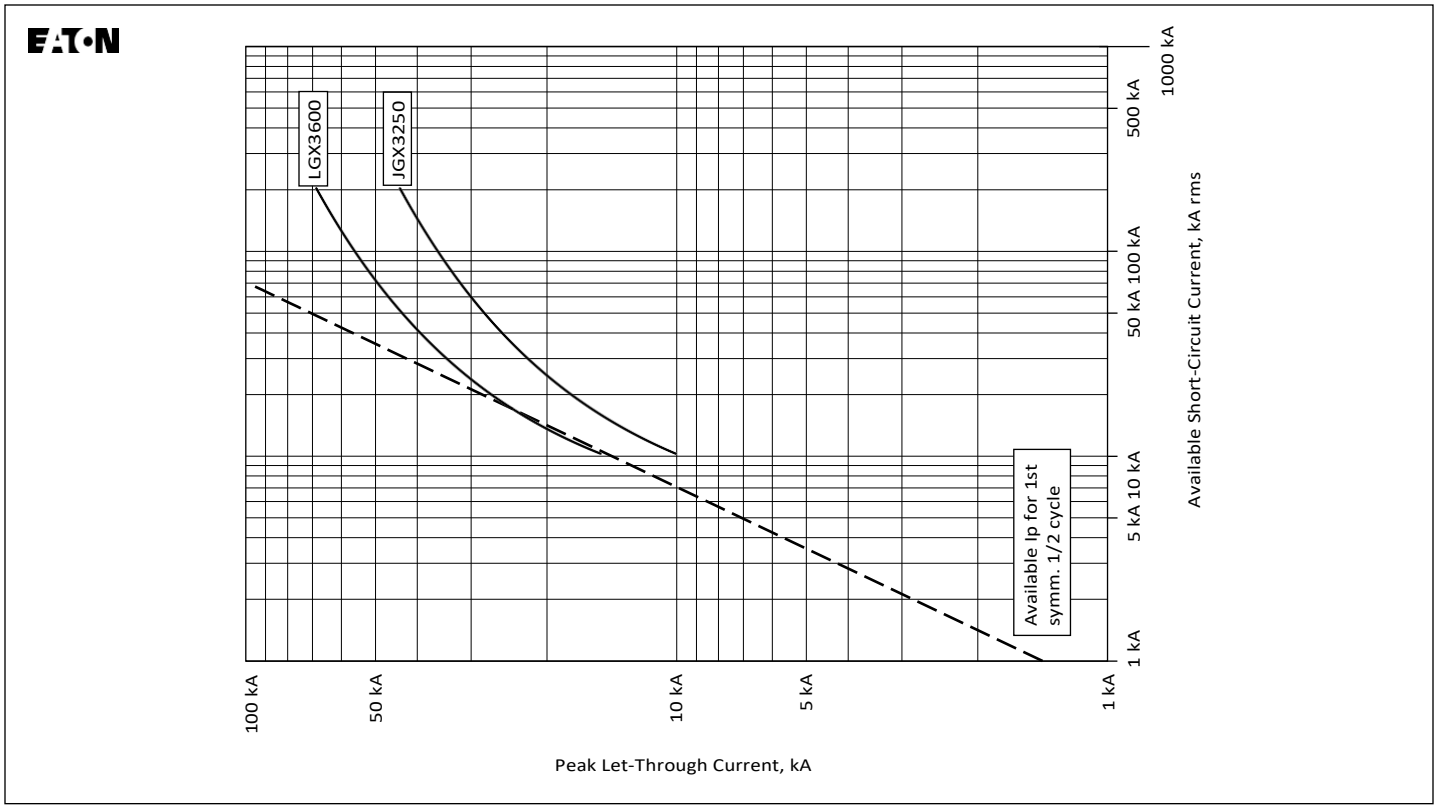


Figure 22. Peak Let-Through Current Series G Types LGX and JGX Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-H, April 2012

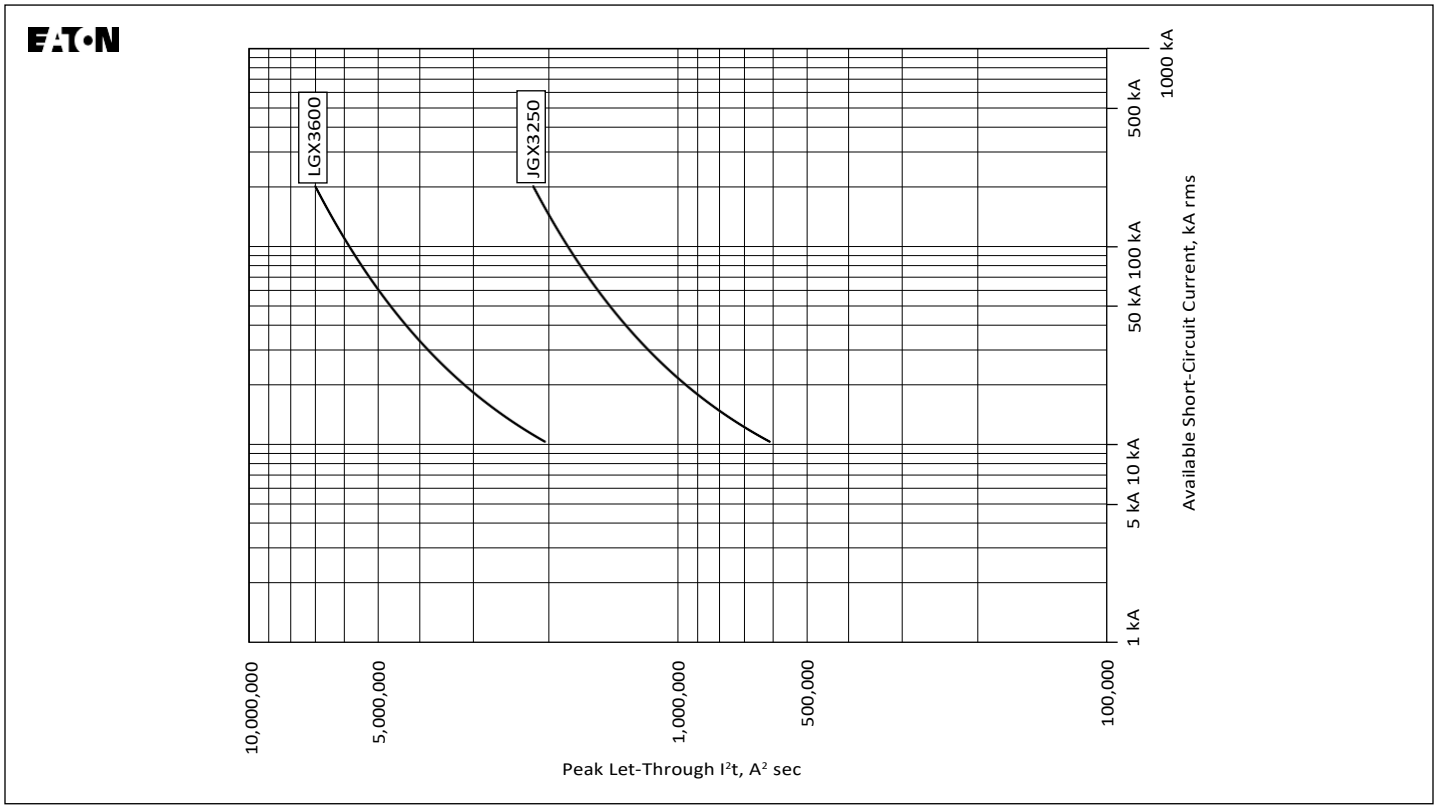


Figure 23. Peak Let-Through I^2t Series G Types LGX and JGX Molded-Case Circuit Breakers—480V—Curve Number TC01200001E-H, April 2012

Note: All values are typical.

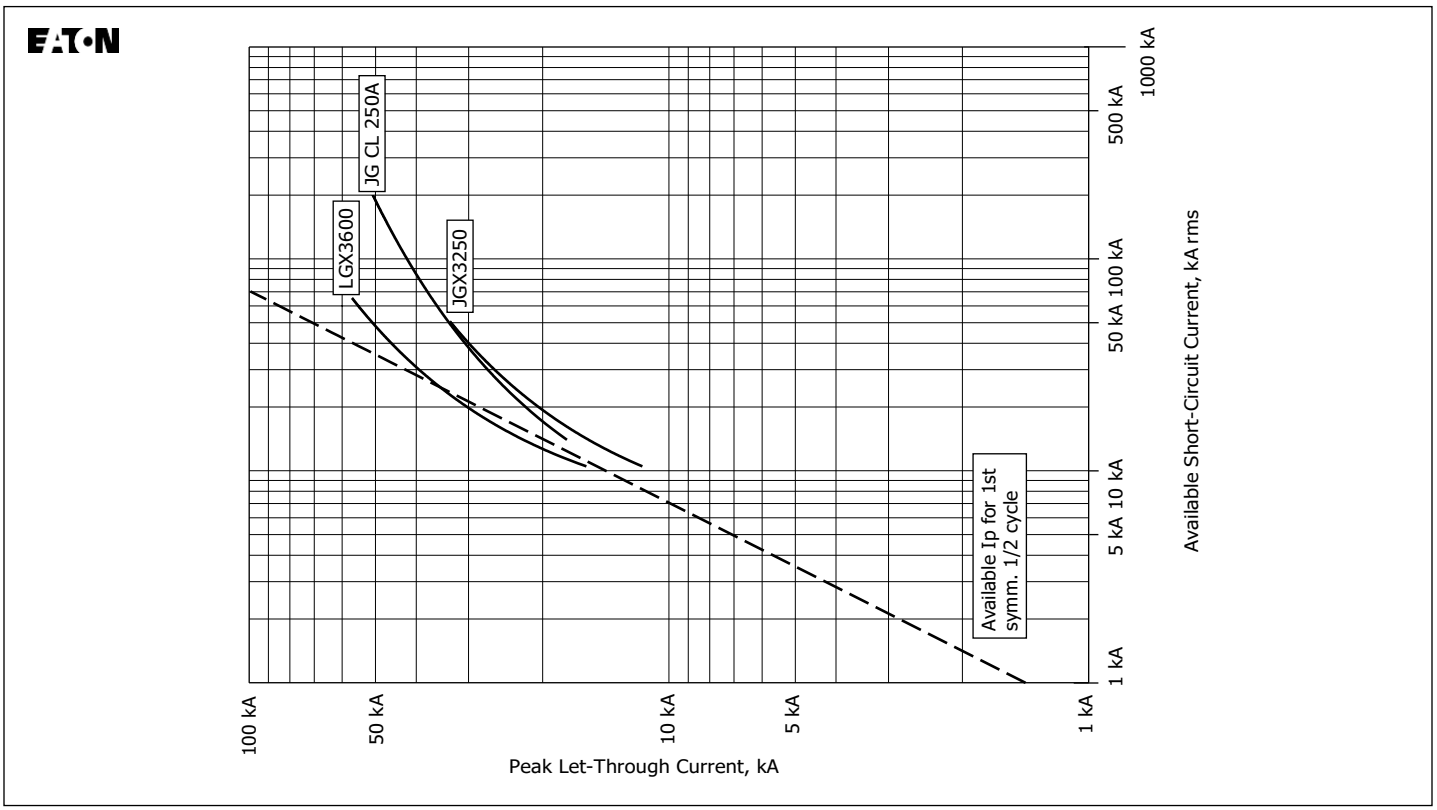


Figure 24. Peak Let-Through Current Series G Types LGX, JG CL and JGX Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-I, April 2012

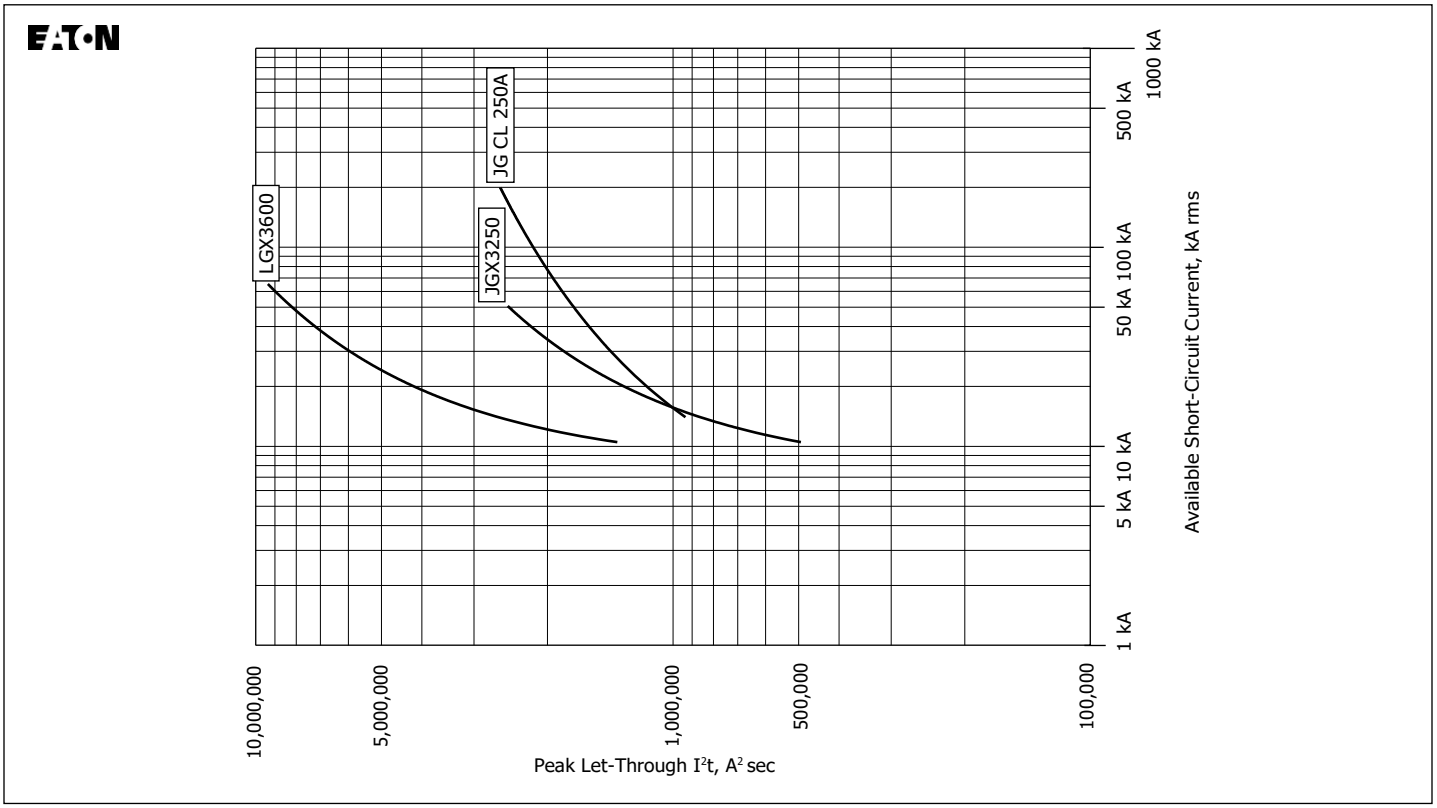


Figure 25. Peak Let-Through I²t Series G Types LGX, JG CL and JGX Molded-Case Circuit Breakers—600V—Curve Number TC01200001E-I, April 2012

Note: All values are typical.

Table 4. 240V Peak Let-Through (Ip) and Clearing (I^2t) Values for Series G High-Performance Breakers

	Maximum available Fault Current											
	35 ka		42 ka		65 ka		100 ka		150 ka		200 ka	
Frame/Max. amperes (UL)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)
LGC/600A	30	2,000,000	33	2,100,000	38	2,300,000	45	2,600,000	N/A	N/A	N/A	N/A
LGU/600A	30	2,000,000	33	2,100,000	38	2,300,000	45	2,600,000	48	2,800,000	N/A	N/A
LGX/600A	30	2,000,000	33	2,100,000	38	2,300,000	45	2,600,000	48	2,800,000	52	2,900,000

Table 5. 480V Peak Let-Through (Ip) and Clearing (I^2t) Values for Series G High-Performance Breakers

	Maximum available Fault Current											
	35 ka		50 ka		65 ka		100 ka		150 ka		200 ka	
Frame/Max. amperes (UL)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)
LGC/600A	37	4,300,000	42	5,000,000	48	5,500,000	55	6,000,000	N/A	N/A	N/A	N/A
LGU/600A	37	4,300,000	42	5,000,000	48	5,500,000	55	6,000,000	62	6,800,000	N/A	N/A
LGX/600A	37	4,300,000	42	5,000,000	48	5,500,000	55	6,000,000	62	6,800,000	69	7,000,000

Table 6. 600V Peak Let-Through (Ip) and Clearing (I^2t) Values for Series G High-Performance Breakers

	Maximum available Fault Current					
	35 ka		50 ka		65 ka	
Frame/Max. amperes (UL)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)	Ip (ka)	I^2t (a^2 sec)
LGC/600A	39	6,400,000	46	7,200,000	N/A	N/A
LGU/600A	39	6,400,000	46	7,200,000	50	8,000,000
LGX/600A	39	6,400,000	46	7,200,000	50	8,000,000

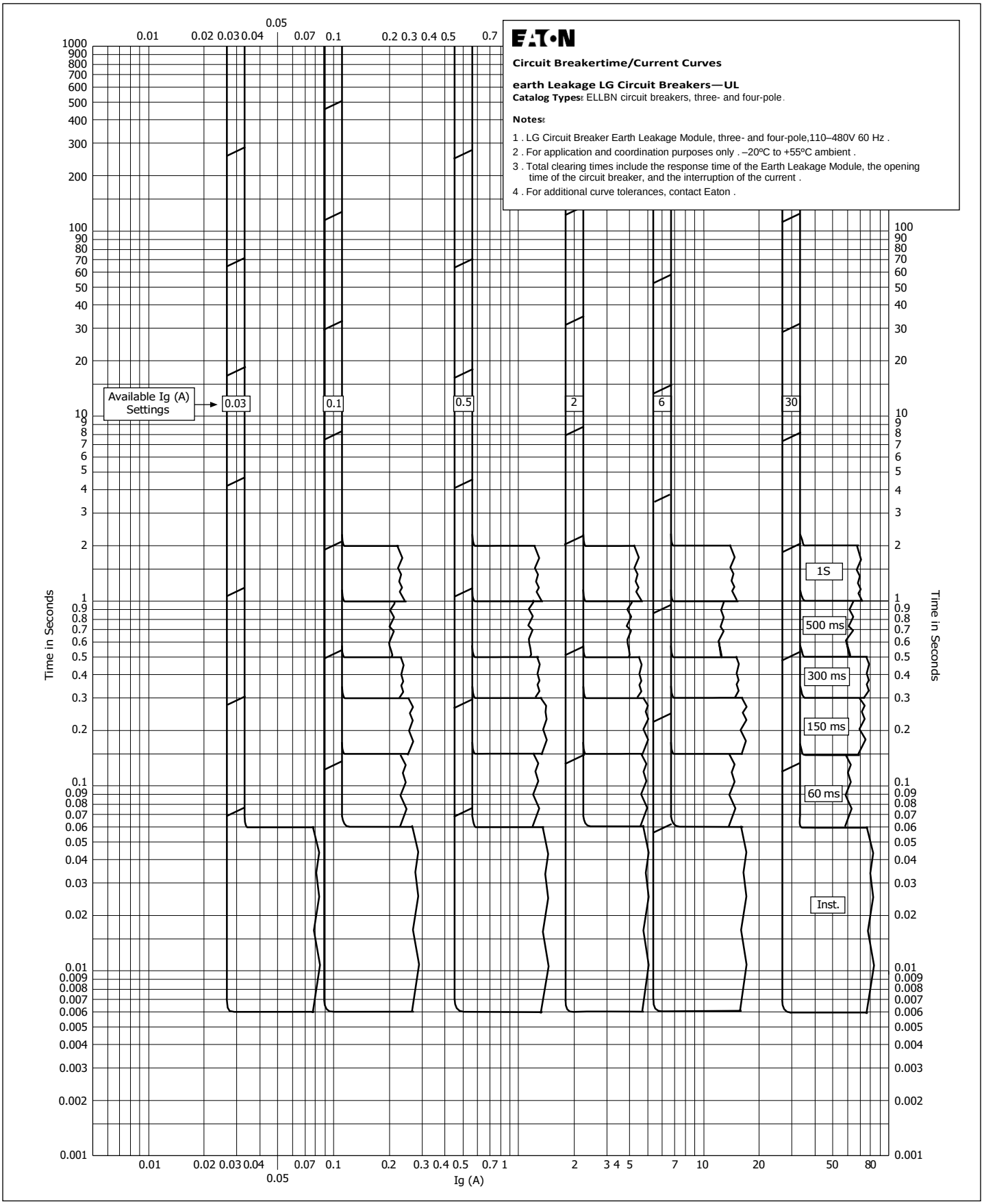


Figure 26. UL LG Circuit Breaker Earth Leakage Module, Three- and Four-Pole, 110–480V—Curve Number TC01212009E, September 2005

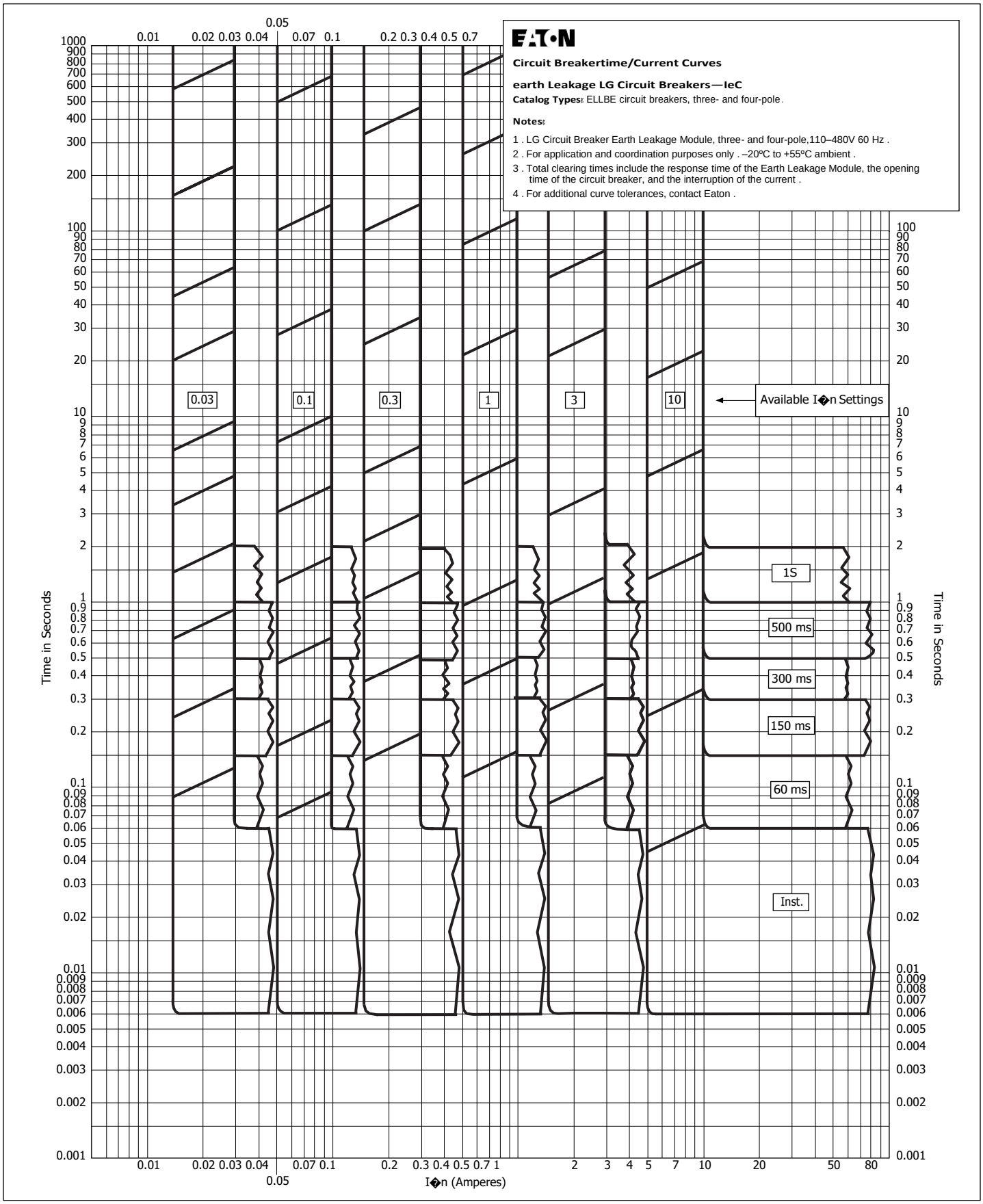


Figure 27. IEC LG Circuit Breaker Earth Leakage Module, Three- and Four-Pole, 110–480V—Curve Number TC01212008E, September 2005

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