

SNXH150B95H3Q2F2PG-N

Product Preview Q2BOOST

This high-density, integrated power module combines high-performance IGBTs with rugged anti-parallel diodes.

Features

- Extremely Efficient Trench with Field Stop Technology
- Low Switching Loss Reduces System Power Dissipation
- Module Design Offers High Power Density
- Low Inductive Layout
- Q2BOOST Package with Press-Fit Pins

Typical Applications

- Solar Inverters
- Uninterruptable Power Supplies Systems

Table 1. ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
IGBT (T1, T2, T4,T5)			
Collector-emitter Voltage	V_{CES}	950	V
Collector current @ $T_h = 80^\circ\text{C}$ (per IGBT)	I_C	75	A
Pulsed Collector Current, T_{pulse} Limited by $T_{J\text{max}}$	I_{CM}	225	A
Power Dissipation per IGBT $T_J = T_{J\text{max}}$ $T_h = 80^\circ\text{C}$	P_{tot}	190	W
Gate-emitter voltage Positive transient gate-emitter voltage ($T_{\text{pulse}} = 5 \mu\text{s}$, $D < 0.10$)	V_{GE}	± 20 30	V
Maximum Junction Temperature	T_J	175	$^\circ\text{C}$

IGBT (T3, T6)

Collector-emitter voltage	V_{CES}	950	V
Collector current @ $T_h = 80^\circ\text{C}$ (per IGBT)	I_C	75	A
Pulsed Collector Current, T_{pulse} Limited by $T_{J\text{max}}$	I_{CM}	225	A
Power Dissipation per IGBT $T_J = T_{J\text{max}}$ $T_h = 80^\circ\text{C}$	P_{tot}	225	W
Gate-emitter voltage Positive transient gate-emitter voltage ($T_{\text{pulse}} = 5 \mu\text{s}$, $D < 0.10$)	V_{GE}	± 20 30	V
Maximum Junction Temperature	T_J	175	$^\circ\text{C}$

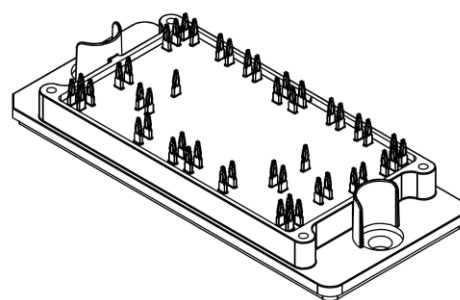
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



ON Semiconductor®

www.onsemi.com

160 A, 1200 V Module



Q2BOOST
CASE 180AR



SNXH150B95H3Q2F2PG-x
ATYYWW

A = Assembly Site
T = Test Site
YYWW = Year and Work Week Code
X = Die Options (N, N1, R, R1)

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

SNXH150B95H3Q2F2PG-N

Table 2. ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
TIGBT INVERSE DIODE (D1, D2, D3, D4, D5, D6)			
Peak Repetitive Reverse Voltage	V_{RRM}	1600	V
Forward Current , DC @ $T_h = 80^{\circ}\text{C}$ (per Diode)	I_F	35	A
Power Dissipation Per Diode $T_J = T_{Jmax}$ $T_h = 80^{\circ}\text{C}$	P_{tot}	42	W
Maximum Junction Temperature	T_J	150	$^{\circ}\text{C}$

DIODE (D7+D8, D9+D10)

Peak Repetitive Reverse Voltage	V_{RRM}	2000	V
Forward Current , DC @ $T_h = 80^{\circ}\text{C}$ (per Diode)	I_F	45	A
Power Dissipation Per Diode $T_J = T_{Jmax}$ $T_h = 80^{\circ}\text{C}$	P_{tot}	47	W
Maximum Junction Temperature	T_J	150	$^{\circ}\text{C}$

SILICON CARBIDE SCHOTTKY DIODE (D11, D12, D13, D14)

Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Forward Current, DC @ $T_h = 80^{\circ}\text{C}$ (per Diode)	I_F	30	A
Power Dissipation Per Diode $T_J = T_{Jmax}$ $T_h = 80^{\circ}\text{C}$	P_{tot}	94	W
Maximum Junction Temperature	T_J	175	$^{\circ}\text{C}$

DIODE (D15, D16)

Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Forward Current, DC @ $T_h = 80^{\circ}\text{C}$ (per Diode)	I_F	75	A
Peak Repetitive Forward Current (Rated VR, Square Wave, 20 kHz, $T_h = 80^{\circ}\text{C}$) Per diode	I_{FRM}	150	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	500	A
Power Dissipation Per Diode $T_J = T_{Jmax}$ $T_h = 80^{\circ}\text{C}$	P_{tot}	190	W
Maximum Junction Temperature	T_J	175	$^{\circ}\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 3. THERMAL PROPERTIES

Parameter	Symbol	Value	Unit
Operating Temperature under Switching Condition	$T_{VJ\text{ OP}}$	-40 to ($T_{Jmax} - 25$)	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-40 to +125	$^{\circ}\text{C}$

Table 4. INSULATION PROPERTIES

Parameter	Symbol	Value	Unit
Isolation Test Voltage, $t = 1$ min, 60 Hz	V_{is}	3400	V_{RMS}
Creepage Distance		12.7	mm
Comparative tracking index	CTI	>600	mm

SNXH150B95H3Q2F2PG-N

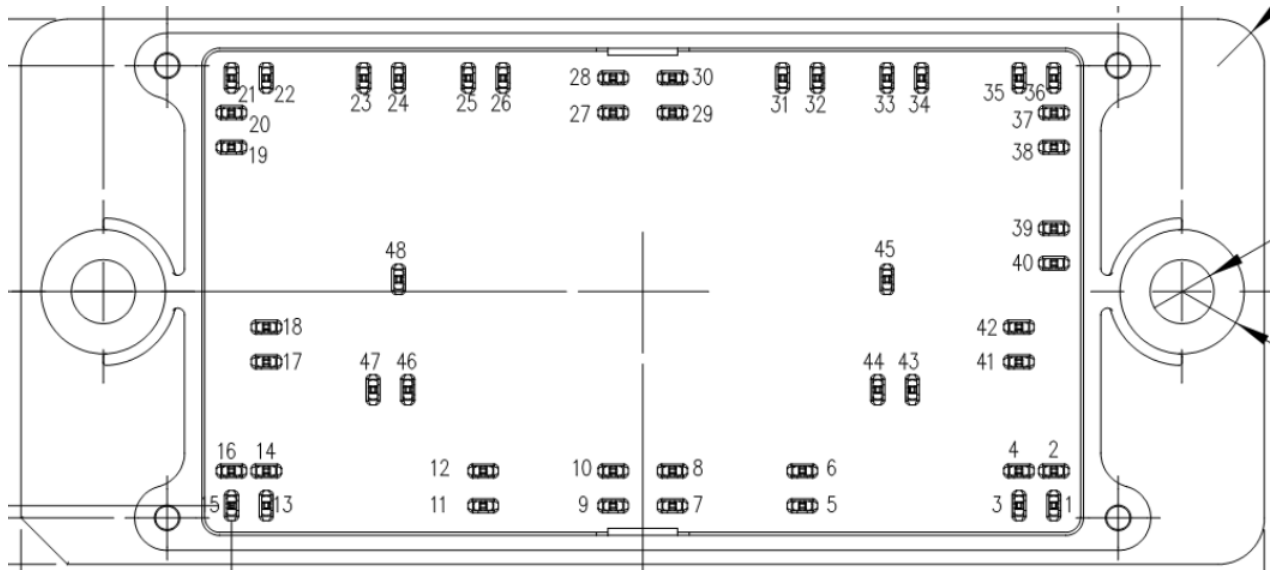


Figure 1. Pin Layout Q2BOOST

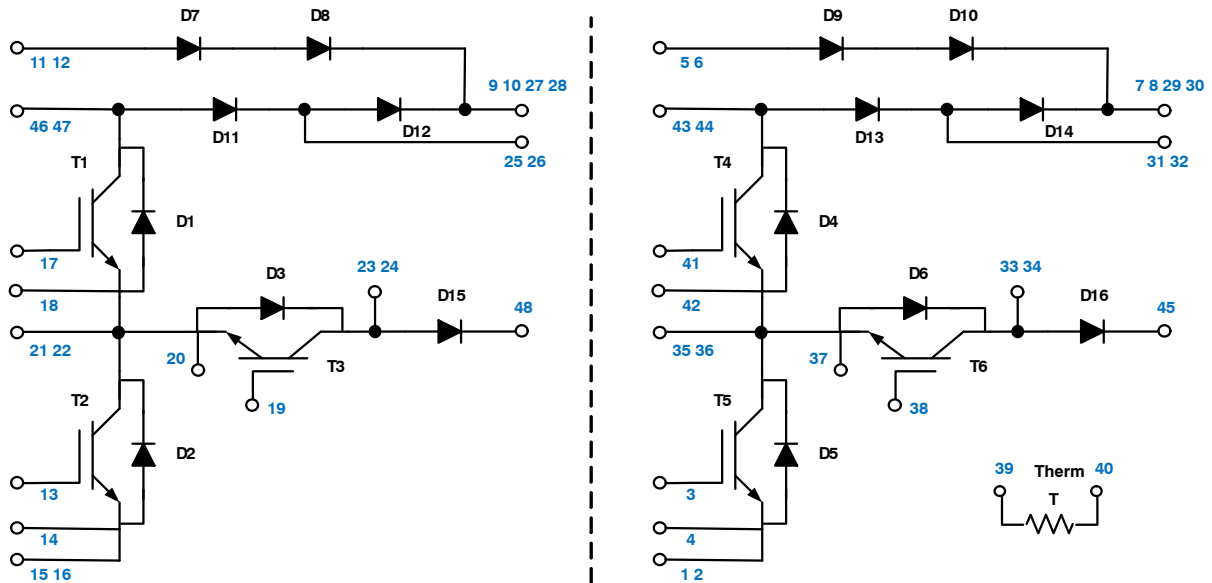


Figure 2. Schematic of Q2BOOST

SNXH150B95H3Q2F2PG-N

Table 5. ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
IGBT (T1, T2, T4, T5)						
Collector-emitter breakdown voltage	$V_{GE} = 0\text{ V}, I_C = 1\text{ mA}$	$V_{(BR)CES}$	950	—	—	V
Collector-emitter saturation voltage	$V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_J = 25^\circ\text{C}$ $V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_J = 150^\circ\text{C}$	$V_{CE(sat)}$	—	1.80 2.10	2.21 —	V
Gate-emitter threshold voltage	$V_{GE} = V_{CE}, I_C = 75\text{ mA}$	$V_{GE(TH)}$	4.1	4.65	5.7	V
Collector-emitter cutoff current	$V_{GE} = 0\text{ V}, V_{CE} = 950\text{ V}$	I_{CES}			300	μA
Gate leakage current	$V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	—	—	400	nA
Turn-on delay time	$T_J = 25^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 30\text{ A}$ $V_{GE} = +15, -8\text{ V}, R_G = 14\ \Omega$	$t_d(on)$	—	34.2	—	ns
Rise time		t_r	—	15	—	
Turn-off delay time		$t_d(off)$	—	180	—	
Fall time		t_f	—	20	—	
Turn on switching loss		E_{on}	—	0.38	—	mJ
Turn off switching loss		E_{off}	—	0.70	—	
Turn-on delay time	$T_J = 125^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 30\text{ A}$ $V_{GE} = +15, -8\text{ V}, R_G = 14\ \Omega$	$t_d(on)$	—	32	—	ns
Rise time		t_r	—	14	—	
Turn-off delay time		$t_d(off)$	—	216	—	
Fall time		t_f	—	64	—	
Turn on switching loss		E_{on}	—	0.48	—	mJ
Turn off switching loss		E_{off}	—	1.30	—	
Input capacitance	$V_{CE} = 20\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$	C_{ies}	—	4773	—	pF
Output capacitance		C_{oes}	—	121	—	
Reverse transfer capacitance		C_{res}	—	27	—	
Gate charge total	$V_{CE} = 600\text{ V}, I_C = 20\text{ A},$ $V_{GE} = 15\text{ V}$	Q_g	—	143	—	nC
Thermal Resistance – chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	R_{thJH}	—	0.782	—	$^\circ\text{C/W}$
IGBT (T3, T6)						
Collector-emitter breakdown voltage	$V_{GE} = 0\text{ V}, I_C = 1\text{ mA}$	$V_{(BR)CES}$	950	—	—	V
Collector-emitter saturation voltage	$V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_J = 25^\circ\text{C}$ $V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_J = 150^\circ\text{C}$	$V_{CE(sat)}$	—	1.45 1.51	2.01 —	V
Gate-emitter threshold voltage	$V_{GE} = V_{CE}, I_C = 75\text{ mA}$	$V_{GE(TH)}$	4.03	4.72	5.53	V
Collector-emitter cutoff current	$V_{GE} = 0\text{ V}, V_{CE} = 950\text{ V}$	I_{CES}			300	μA
Gate leakage current	$V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	—	—	400	nA
Turn-on delay time	$T_J = 25^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 30\text{ A}$ $V_{GE} = +15, -8\text{ V}, R_G = 14\ \Omega$	$t_d(on)$	—	40	—	ns
Rise time		t_r	—	16	—	
Turn-off delay time		$t_d(off)$	—	290	—	
Fall time		t_f	—	110	—	
Turn on switching loss		E_{on}	—	0.40	—	mJ
Turn off switching loss		E_{off}	—	0.80	—	

SNXH150B95H3Q2F2PG-N

Table 5. ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified) (continued)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
IGBT (T3, T6)						
Turn-on delay time	$T_J = 125^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 30\text{ A}$ $V_{GE} = +15, -8\text{ V}, R_G = 4\ \Omega$	td(on)	—	42	—	ns
Rise time		tr	—	16	—	
Turn-off delay time		td(off)	—	349	—	
Fall time		tf	—	211	—	
Turn on switching loss		Eon	—	0.58	—	mJ
Turn off switching loss		Eoff	—	3.16	—	
Input capacitance	$V_{CE} = 20\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$	Cies	—	6377	—	pF
Output capacitance		Coes	—	157	—	
Reverse transfer capacitance		Cres	—	35	—	
Gate charge total	$V_{CE} = 600\text{ V}, I_C = 20\text{ A}, V_{GE} = 15\text{ V}$	Qg	—	180	—	nC
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	RthJH	—	0.668	—	$^\circ\text{C/W}$
IGBT INVERSE DIODE (D1, D2, D3, D4, D5, D6)						
Forward voltage	$I_F = 35\text{ A}, T_J = 25^\circ\text{C}$ $I_F = 35\text{ A}, T_J = 150^\circ\text{C}$	V _F	— —	1.16 1.12	2.20 —	V
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	RthJH		1.086		$^\circ\text{C/W}$
DIODE (D7+D8, D9+D10)						
Forward voltage	$I_F = 45\text{ A}, T_J = 25^\circ\text{C}$ $I_F = 45\text{ A}, T_J = 150^\circ\text{C}$	V _F	— —	2.27 2.17	2.75 —	V
Reverse leakage current	$V_R = 2000\text{ V}$	I _r	—	—	100	uA
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	RthJH	—	0.563	—	$^\circ\text{C/W}$
SIC DIODE (D11, D12, D13, D14)						
Forward voltage	$I_F = 30\text{ A}, T_J = 25^\circ\text{C}$ $I_F = 30\text{ A}, T_J = 175^\circ\text{C}$	V _F	— —	1.4 2.0	1.7 —	V
Reverse leakage current	$V_R = 1200\text{ V}$	I _r	—	—	600	uA
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	RthJH	—	5 0.669	—	$^\circ\text{C/W}$
DIODE (D15, D16)						
Forward voltage	$I_F = 75\text{ A}, T_J = 25^\circ\text{C}$ $I_F = 75\text{ A}, T_J = 150^\circ\text{C}$	V _F	— —	2.87 2.67	3.2 —	V
Reverse leakage current	$V_{CE} = 1200\text{ V}$	I _r	—	—	600	uA
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%, \lambda = 2.9\text{ W/mK}$	RthJH	—	0.741	—	$^\circ\text{C/W}$
THERMISTOR CHARACTERISTICS						
Nominal resistance	$T = 25^\circ\text{C}$	R ₂₅	—	22	—	k Ω
Nominal resistance	$T = 100^\circ\text{C}$	R ₁₀₀	—	1468	—	k Ω
Deviation of R100		DR/R	–5	—	5	%
Power dissipation		PD	—	200	—	mW
Power dissipation constant			—	2	—	mW/ $^\circ\text{C}$
B-value	B(25/50), tol $\pm 3\%$		—	—	3950	$^\circ\text{C}$
B-value	B(25/100), tol $\pm 3\%$		—	—	3998	$^\circ\text{C}$
NTC reference			—	—	B	

SNXH150B95H3Q2F2PG-N

ORDERING INFORMATION

Device	Marking	Package	Shipping
SNXH150B95H3Q2F2PG-N	SNXH150B95H3Q2F2PG-N	Q2BOOST (Pb-Free)	12 Units / Blister Tray

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS T1, T2, T4, T5

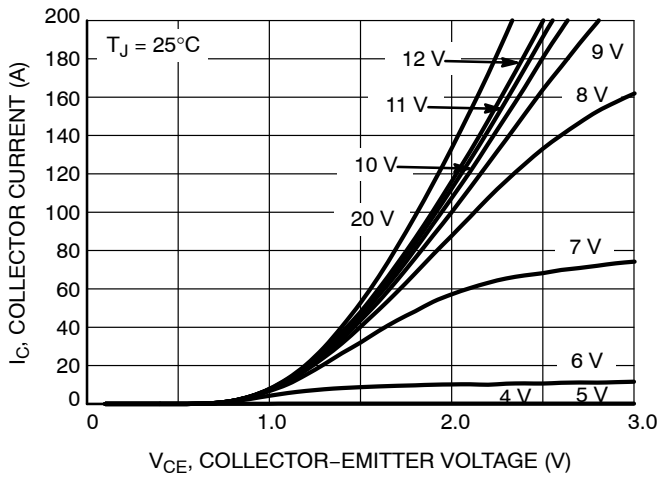


Figure 3. Typical Output Characteristics

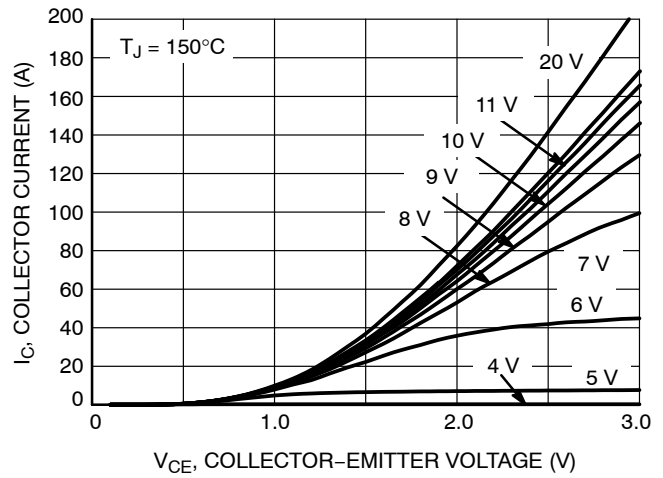


Figure 4. Typical Output Characteristics

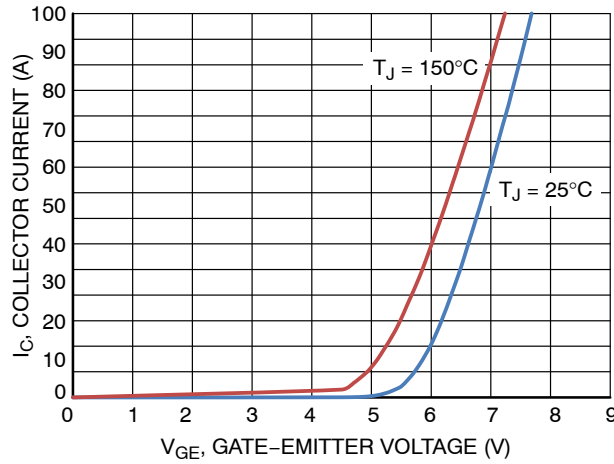


Figure 5. Typical Transfer Characteristics

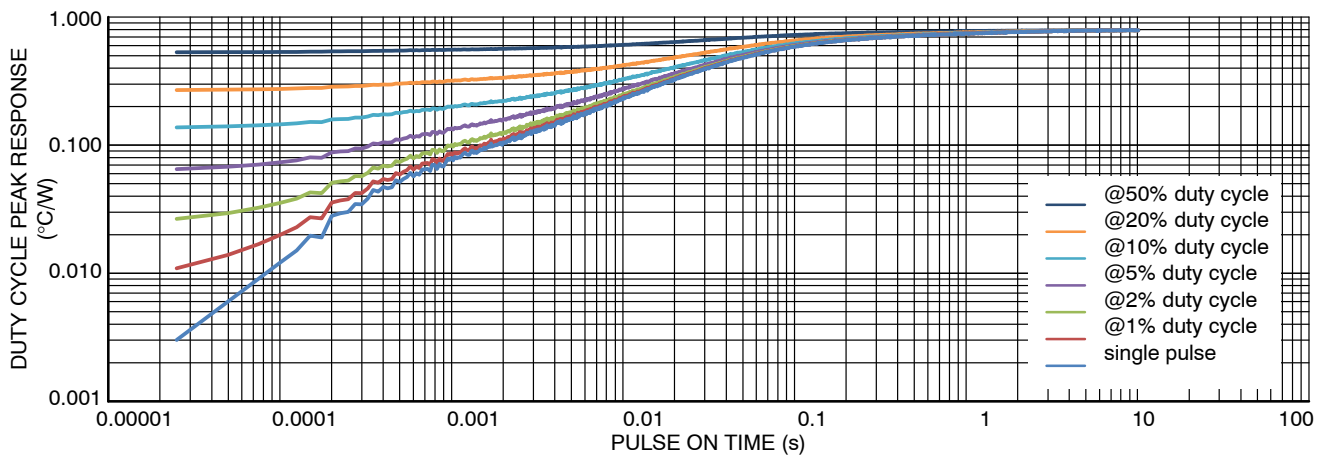


Figure 6. Transient Thermal Impedance (T1, T2, T4, T5)

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS T1, T2, T4, T5

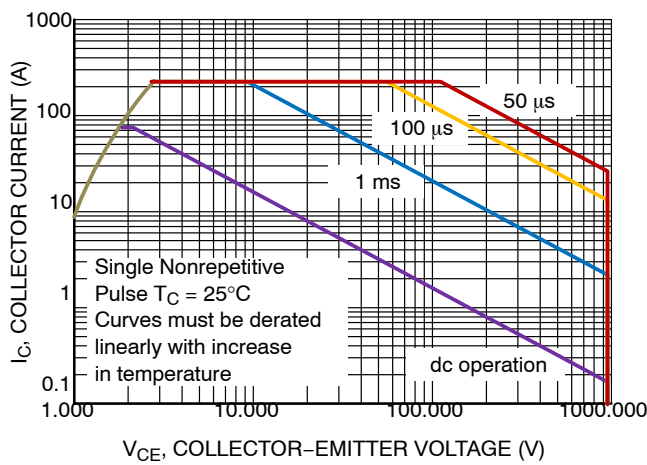


Figure 7. FSBOA (T1, T2, T4, T5)

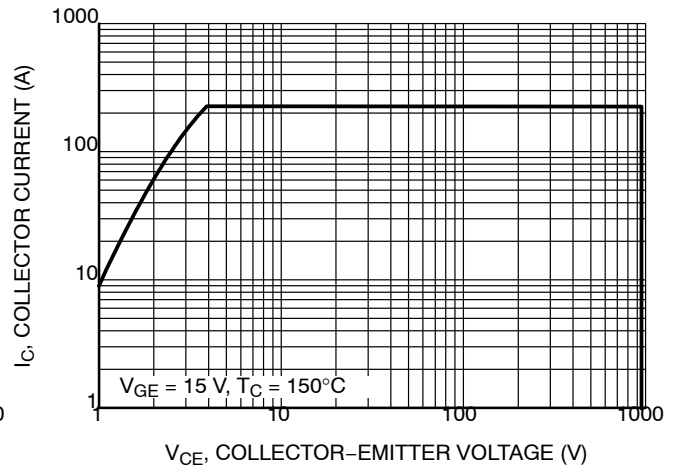


Figure 8. RBSOA (T1, T2, T4, T5)

TYPICAL CHARACTERISTICS (T3, T6)

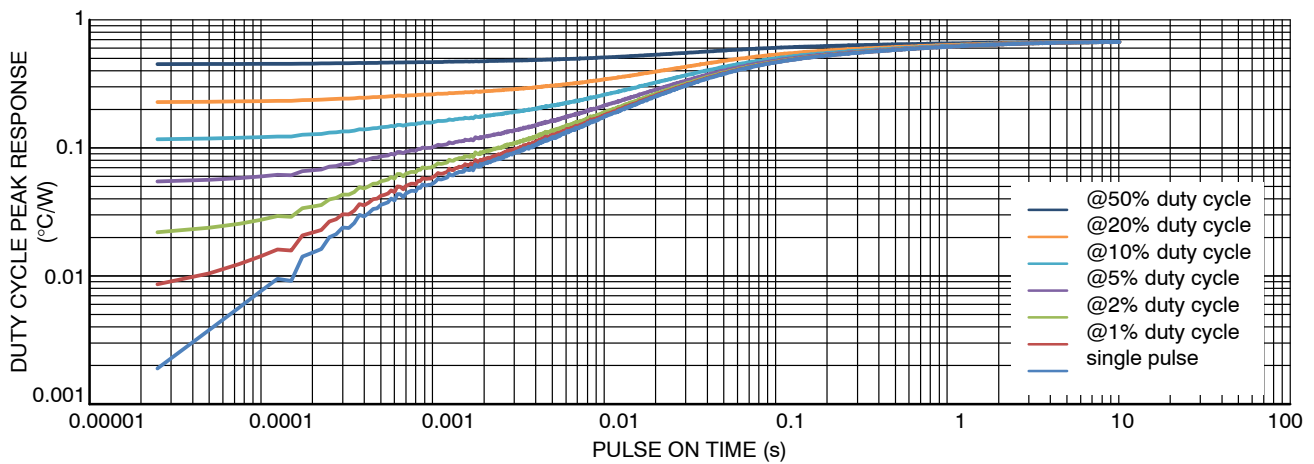


Figure 9. Transient Thermal Impedance (T3, T6)

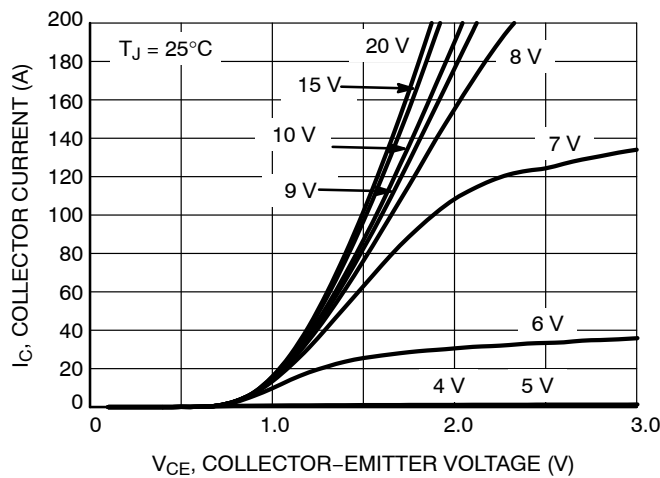


Figure 10. Typical Output Characteristics

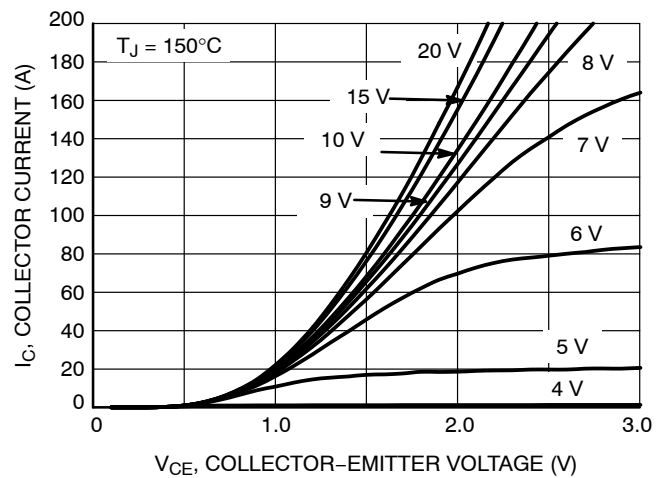


Figure 11. Typical Output Characteristics

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS T3, T6

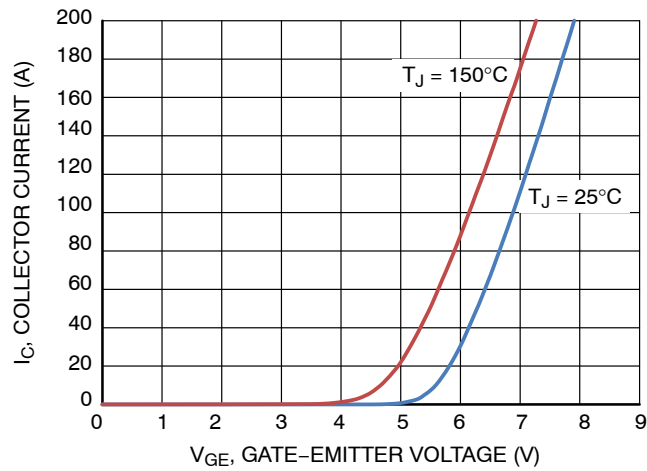


Figure 12. Typical Transfer Characteristics

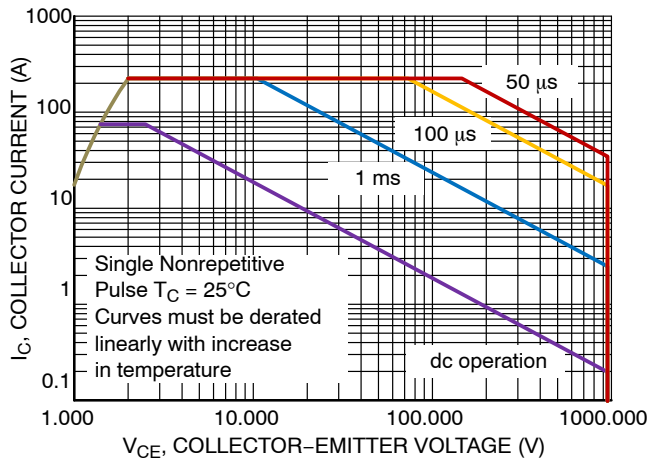


Figure 13. FSBOA (T3, T6)

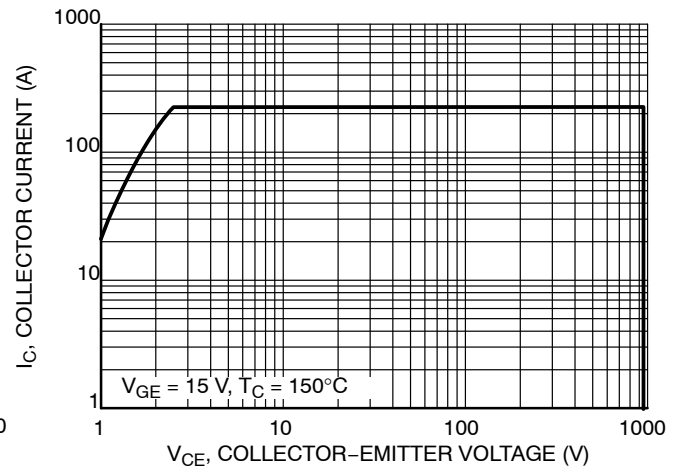


Figure 14. RBSOA (T3, T6)

TYPICAL CHARACTERISTICS D1 - D6

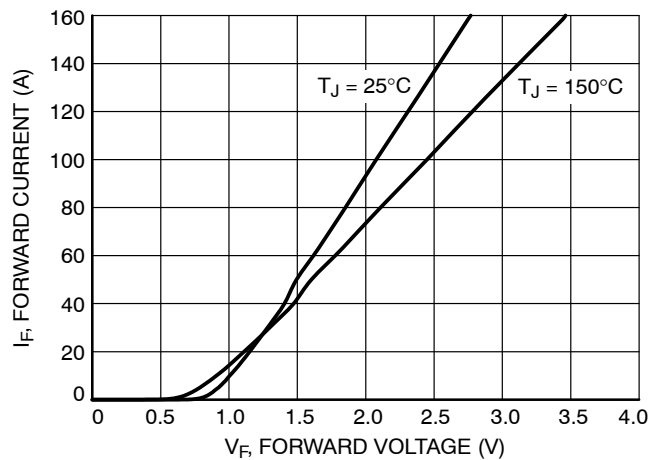


Figure 15. Inverse Diode Forward Characteristics

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS D1 – D6

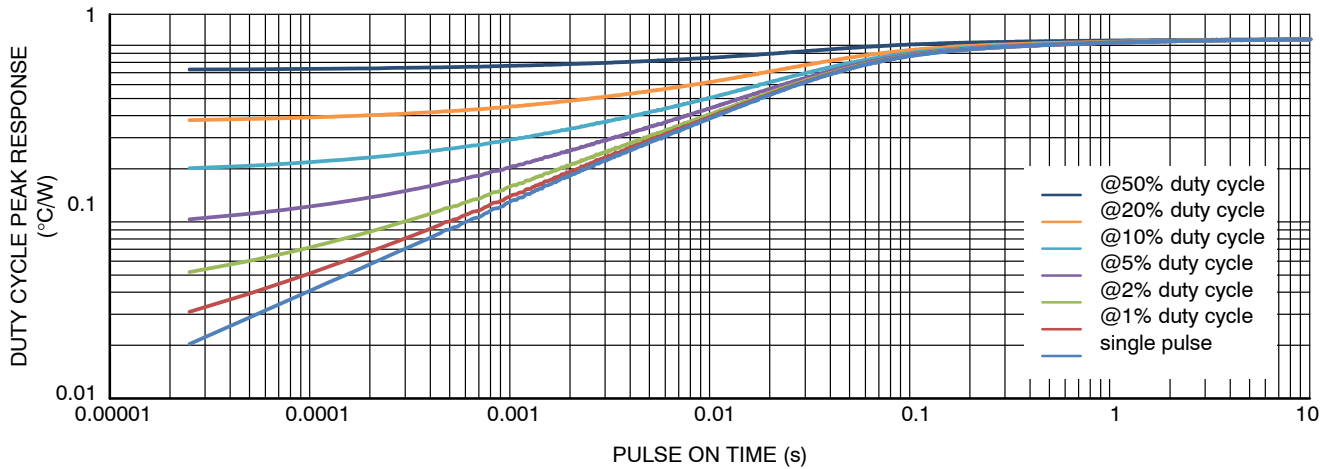


Figure 16. Transient Thermal Impedance (D1 – D6)

TYPICAL CHARACTERISTICS D7+D8, D9+D10

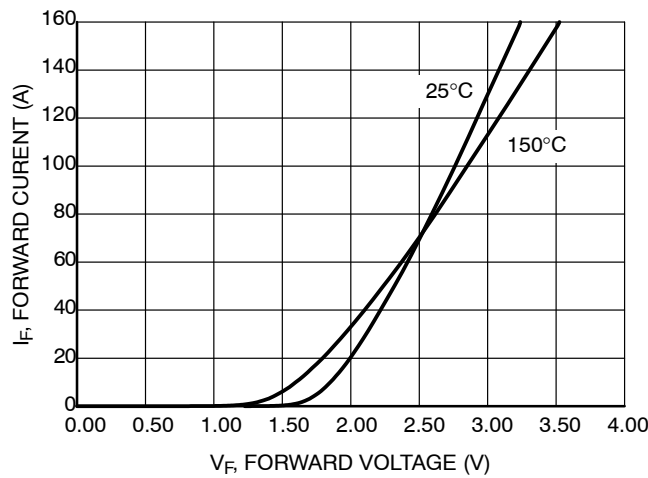


Figure 17. Diode Forward Characteristics

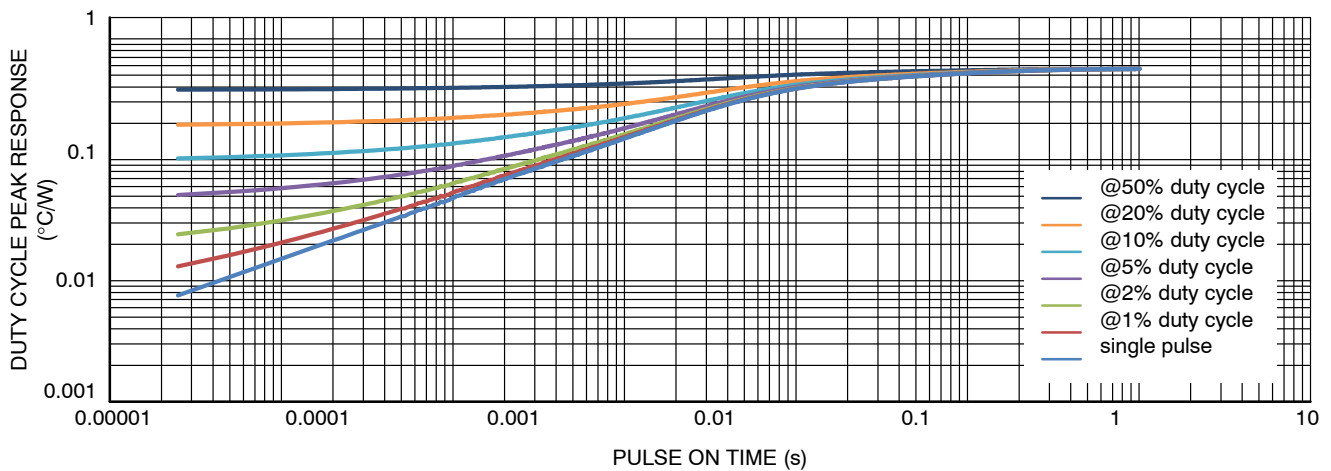


Figure 18. Transient Thermal Impedance (D7+D8, D9+D10)

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS D11 – D14

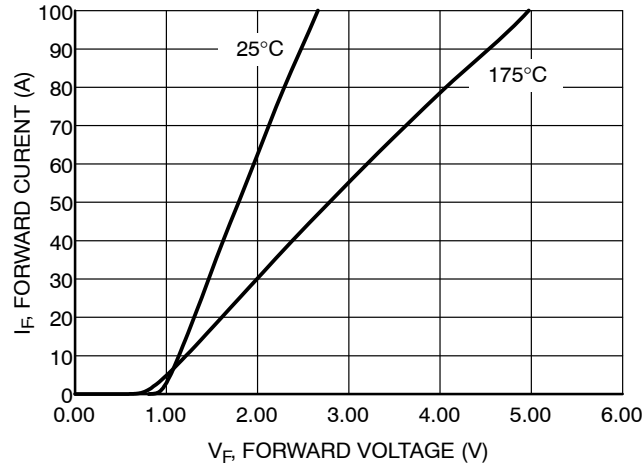


Figure 19. Diode Forward Characteristics

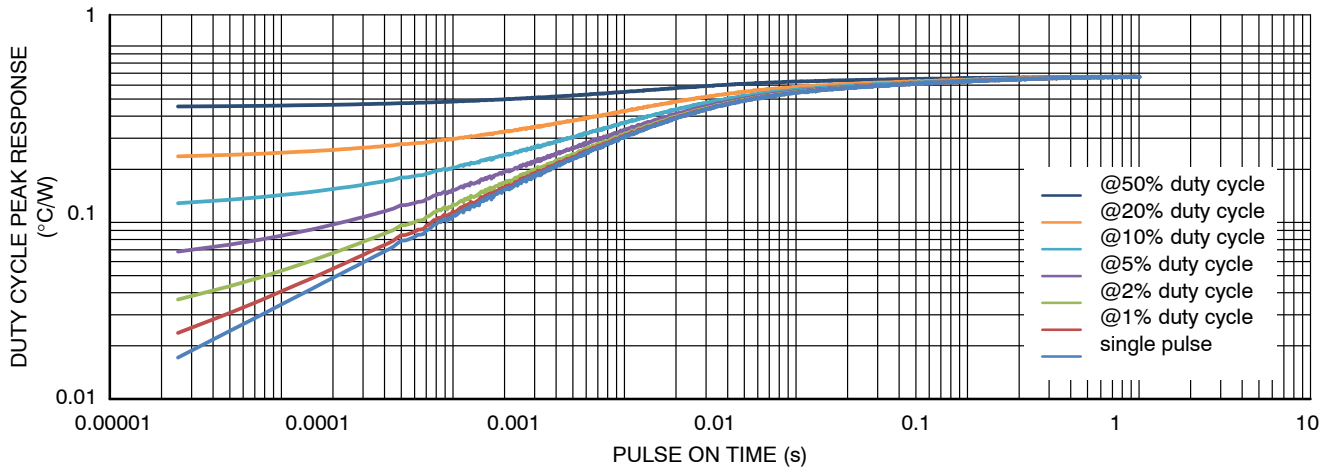


Figure 20. Transient Thermal Impedance (D11 – D14)

TYPICAL CHARACTERISTICS D15 – D16

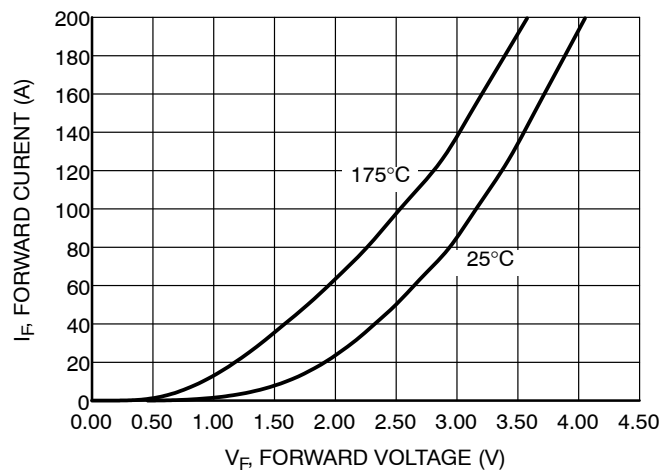


Figure 21. Diode Forward Characteristics

SNXH150B95H3Q2F2PG-N

TYPICAL CHARACTERISTICS D15 – D16

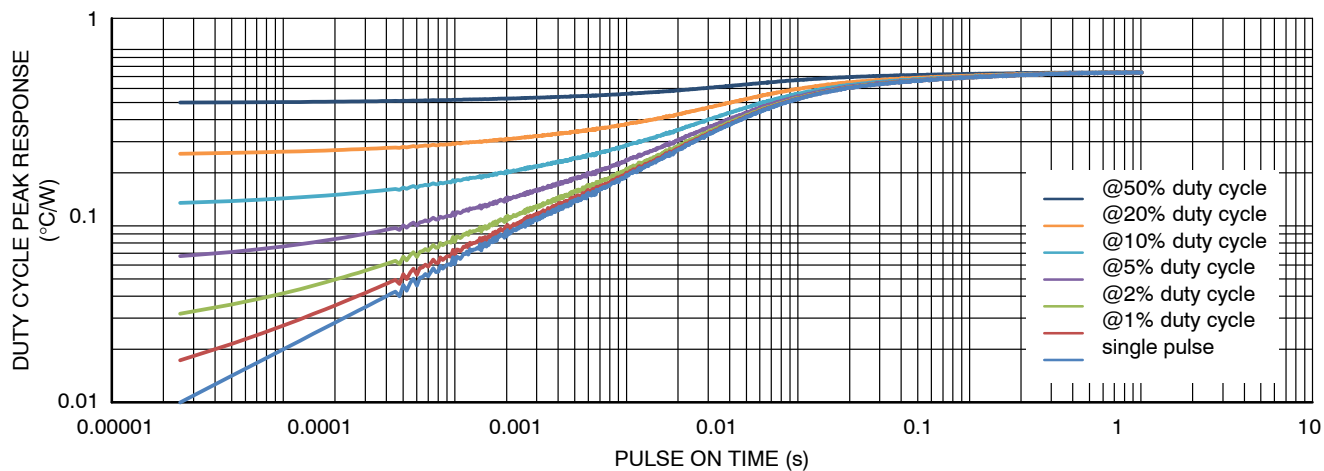


Figure 22. Transient Thermal Impedance (D15 – D16)

TYPICAL SWITCHING CHARACTERISTICS T1/T2 & T4/T5 IGBT COMUTATES D11/D13 DIODE

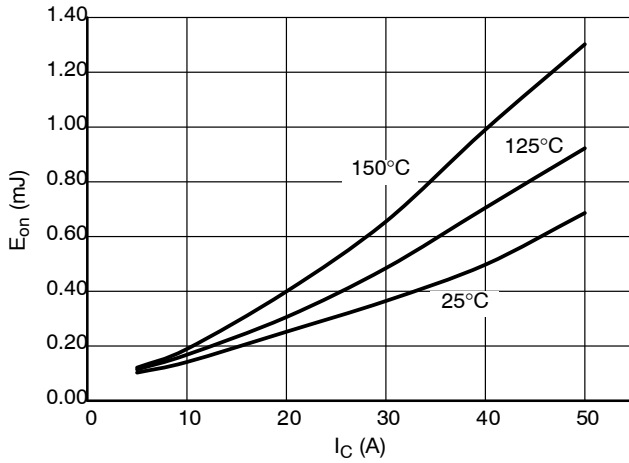


Figure 23. Typical Switching Loss E_{on} vs. I_C

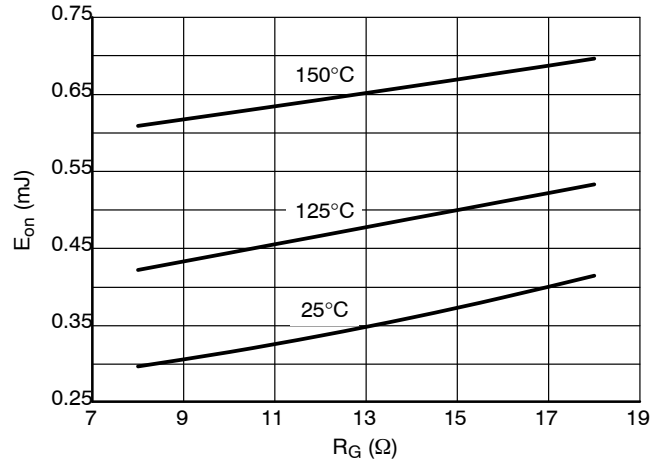


Figure 24. Typical Switching Loss E_{on} vs. R_G

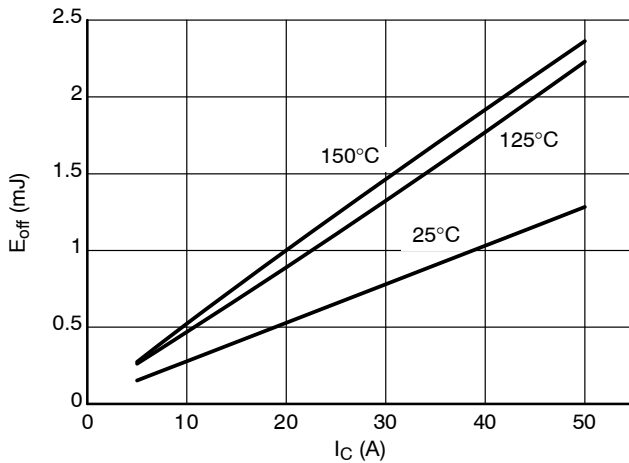


Figure 25. Typical Switching Loss E_{off} vs. I_C

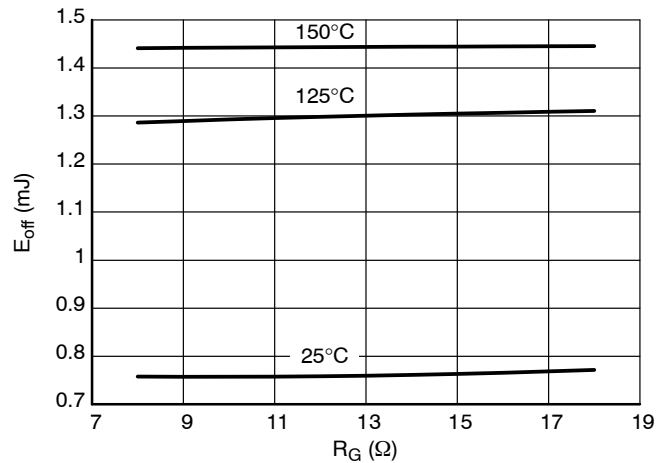


Figure 26. Typical Switching Loss E_{off} vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T1/T2 & T4/T5 IGBT COMUTATES D11/D13 DIODE

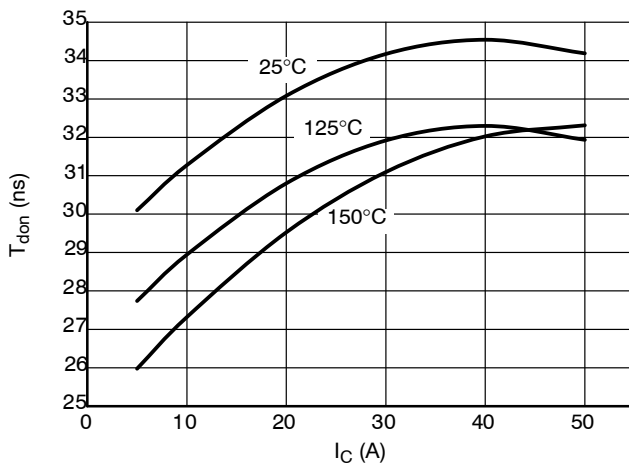


Figure 27. Typical Switching Time T_{don} vs. I_C

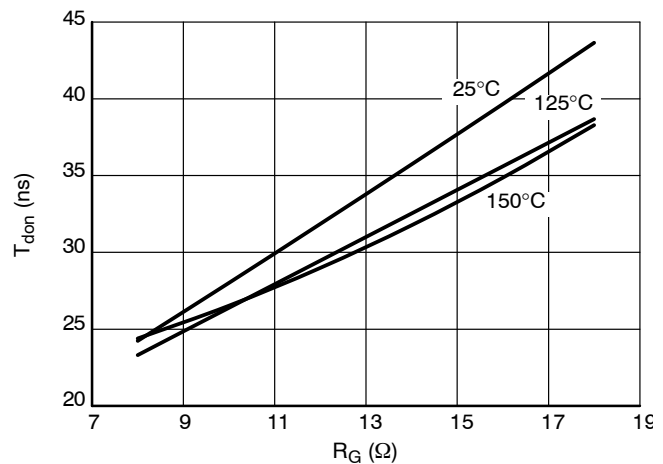


Figure 28. Typical Switching Time T_{don} vs. R_G

SNXH150B95H3Q2F2PG-N

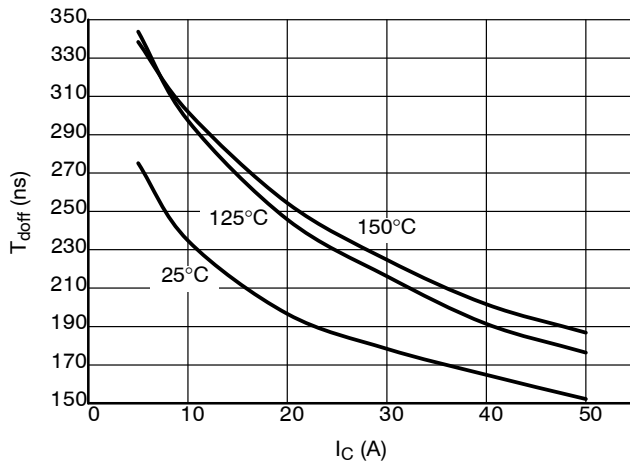


Figure 29. Typical Switching Time T_{doff} vs. I_C

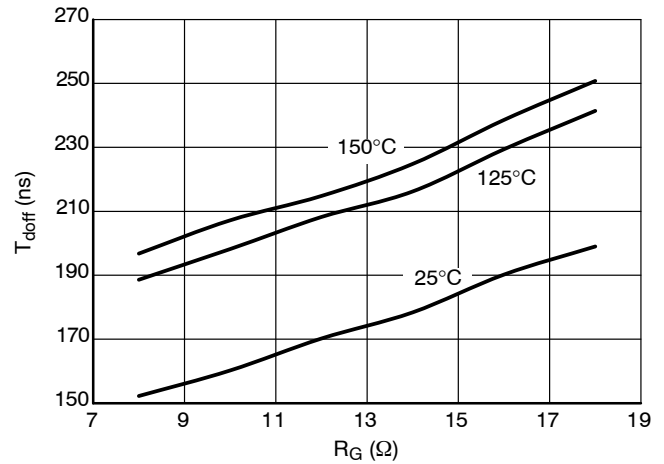


Figure 30. Typical Switching Time T_{doff} vs. R_G

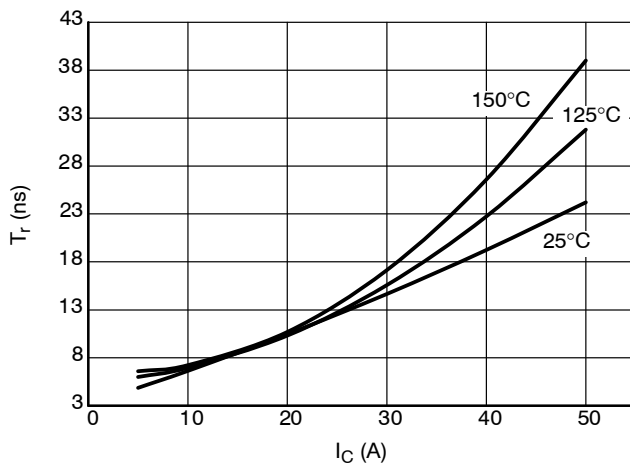


Figure 31. Typical Switching Time T_{ron} vs. I_C

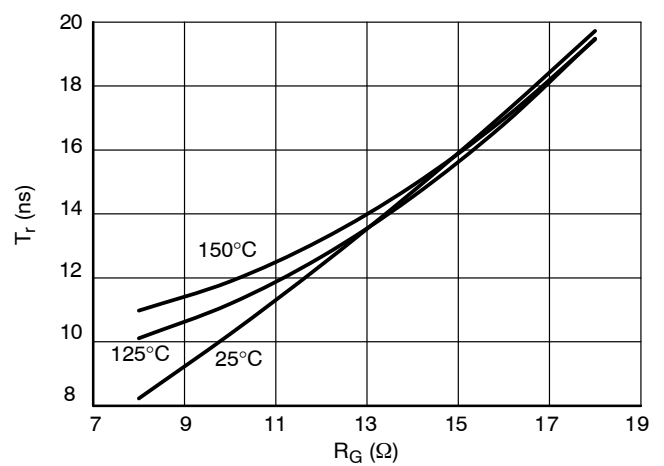


Figure 32. Typical Switching Time T_{ron} vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T1/T2 & T4/T5 IGBT COMUTATES D11/D13 DIODE

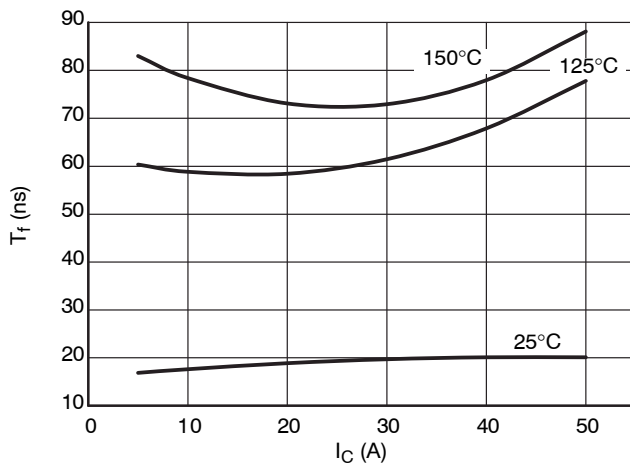


Figure 33. Typical Switching Time T_f vs. I_C

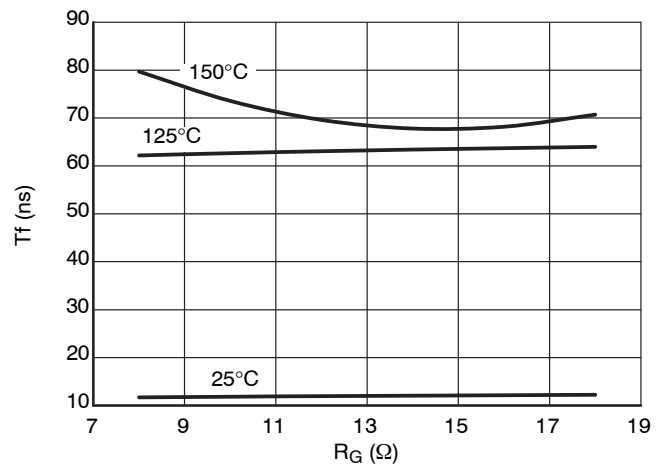


Figure 34. Typical Switching Time T_f vs. R_G

SNXH150B95H3Q2F2PG-N

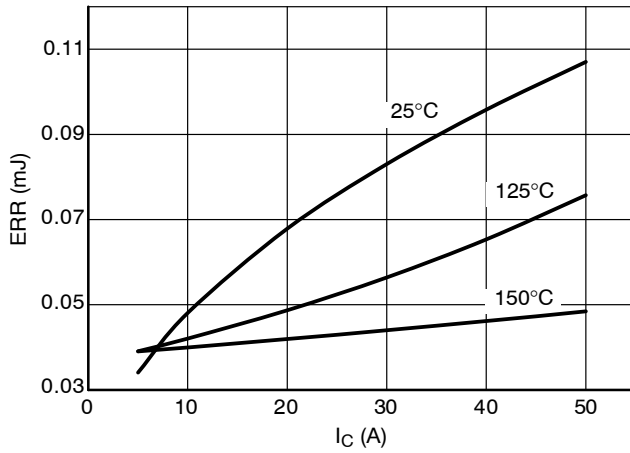


Figure 35. Typical Reverse Recovery Energy vs. I_C

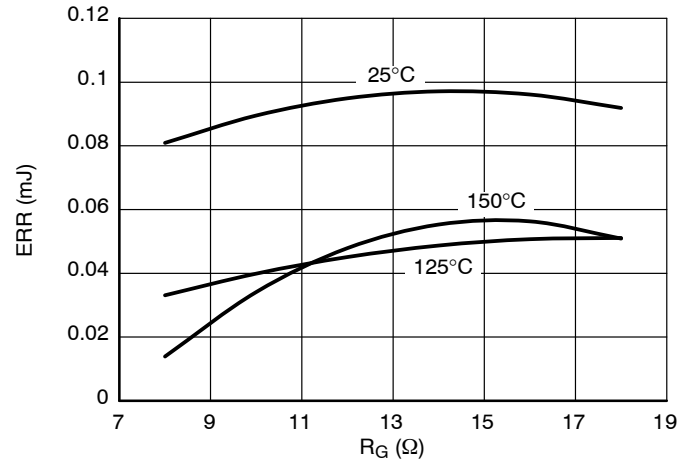


Figure 36. Typical Reverse Recovery Energy vs. R_G

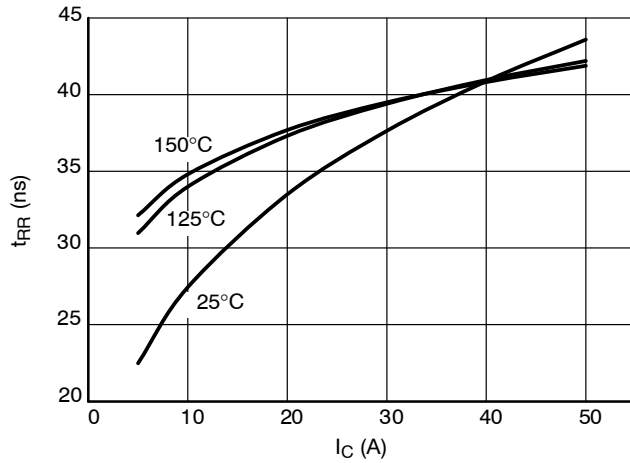


Figure 37. Typical Reverse Recovery Time vs. I_C

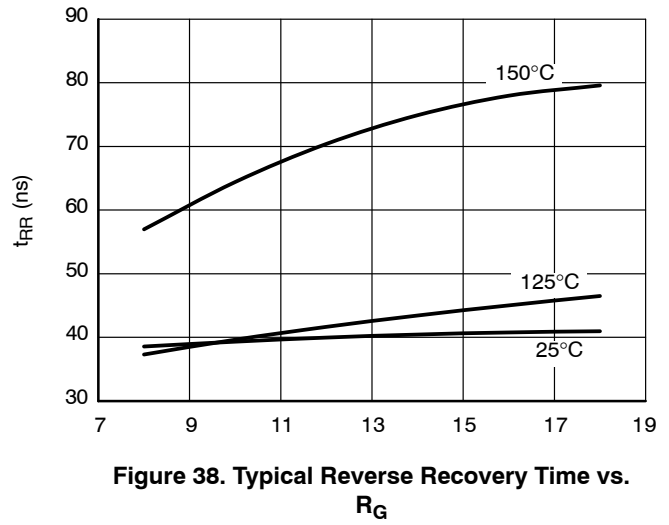


Figure 38. Typical Reverse Recovery Time vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T1/T2 & T4/T5 IGBT COMUTATES D11/D13 DIODE

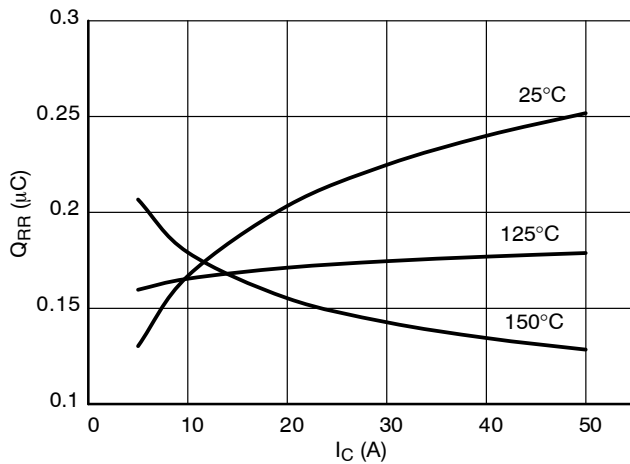


Figure 39. Typical Reverse Recovery Charge vs. I_C

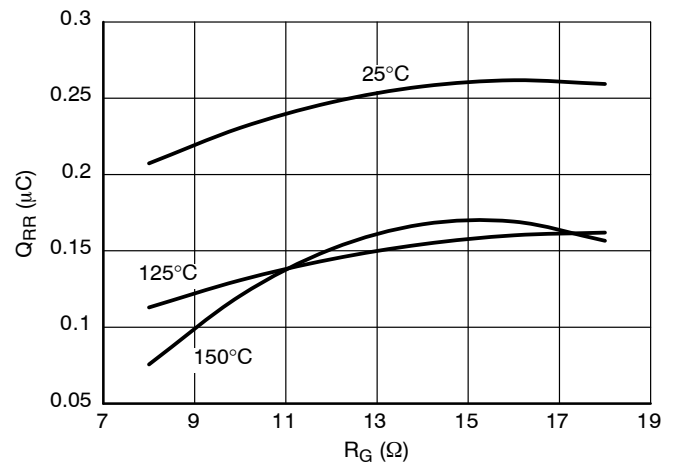


Figure 40. Typical Reverse Recovery Charge vs. R_G

SNXH150B95H3Q2F2PG-N

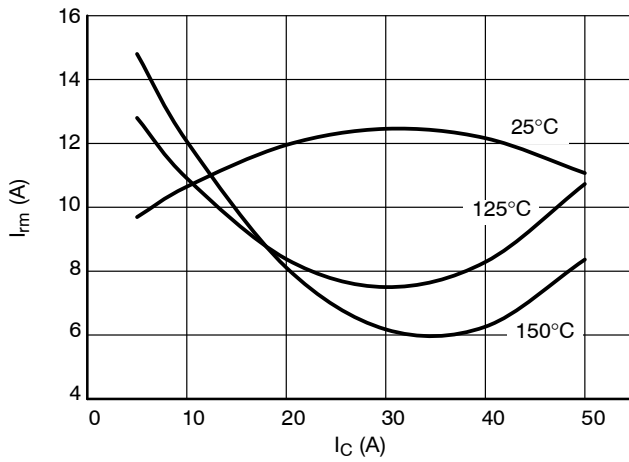


Figure 41. Typical Reverse Recovery Current vs. I_C

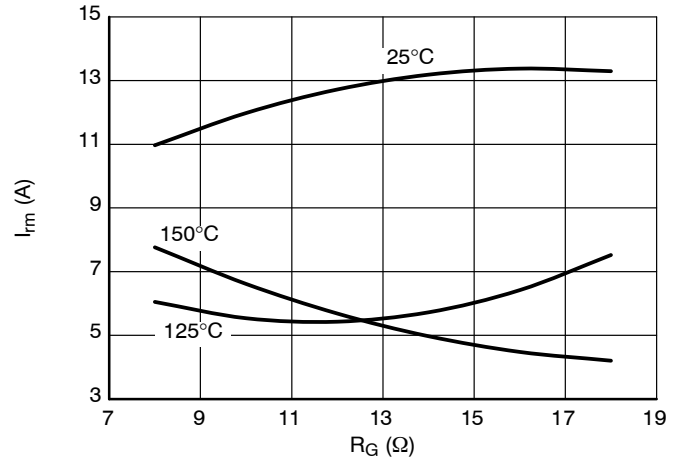


Figure 42. Typical Reverse Recovery Current vs. R_G

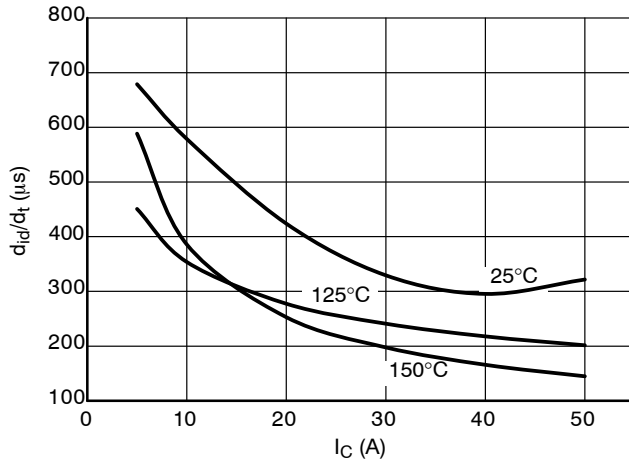


Figure 43. Typical d_{id}/d_t vs. I_C

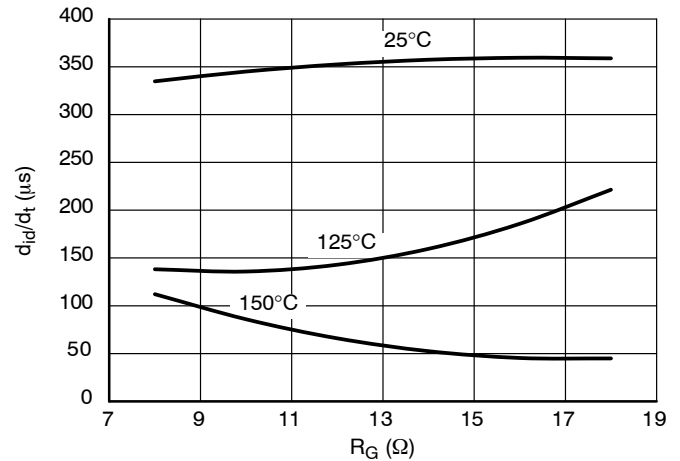


Figure 44. Typical d_{id}/d_t vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T3 IGBT COMMUTATES D12 DIODE

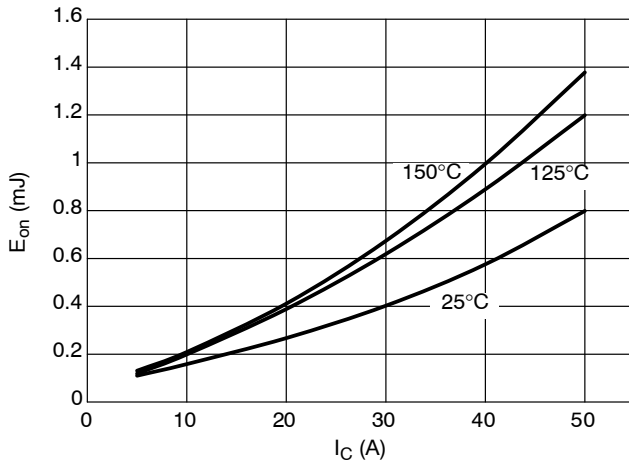


Figure 45. Typical Switching Loss E_{on} vs. I_C

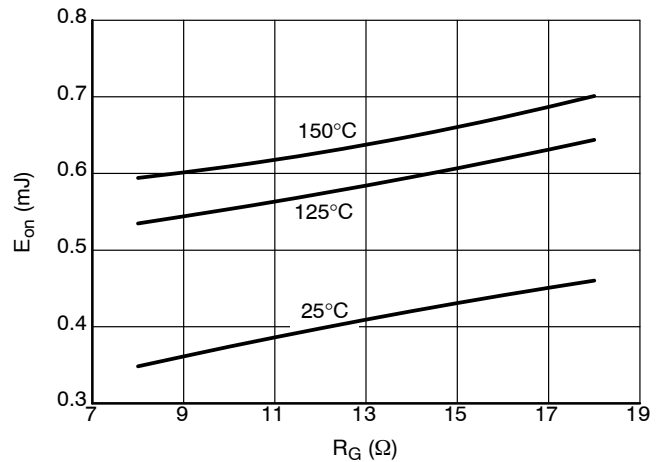


Figure 46. Typical Switching Loss E_{on} vs. R_G

SNXH150B95H3Q2F2PG-N

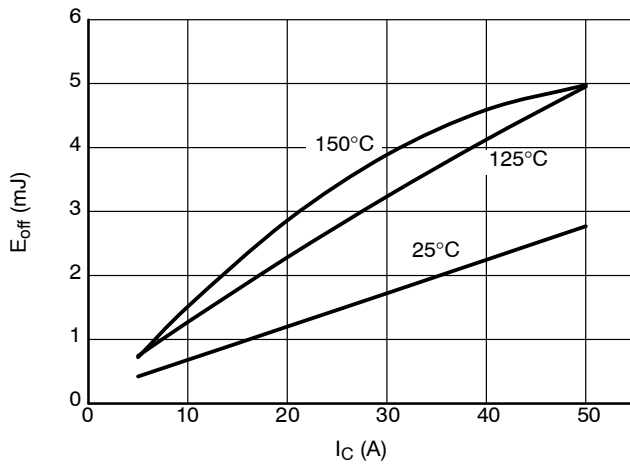


Figure 47. Typical Switching Loss E_{off} vs. I_C

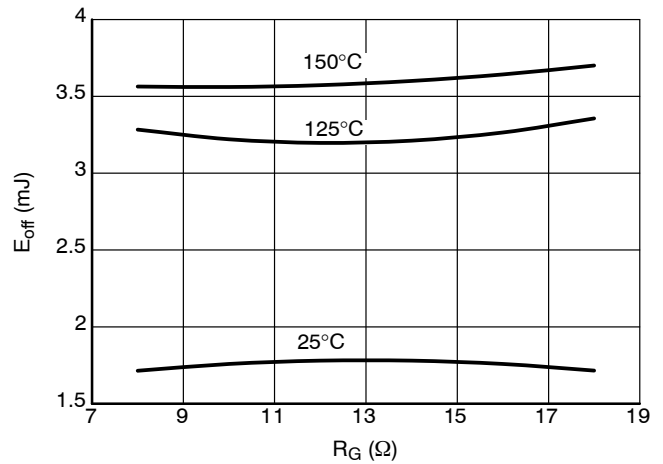


Figure 48. Typical Switching Loss E_{off} vs. R_G

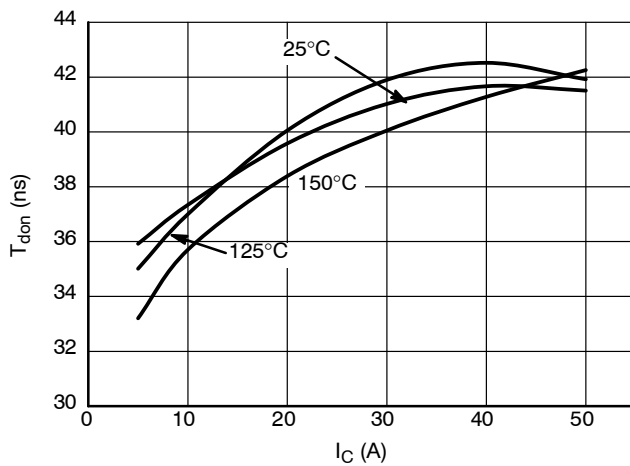


Figure 49. Typical Switching Time T_{don} vs. I_C

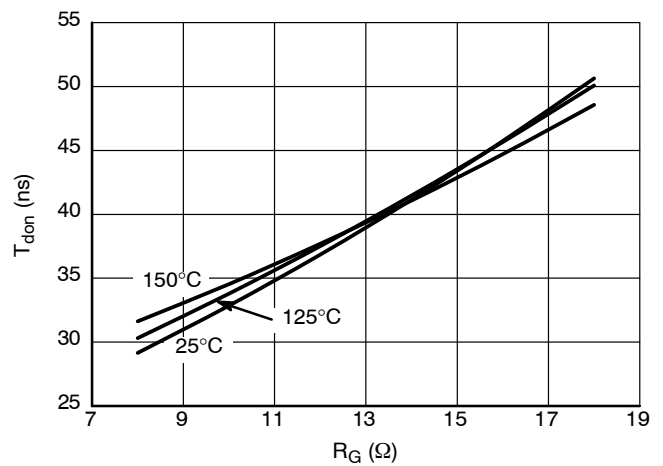


Figure 50. Typical Switching Time T_{don} vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T3 IGBT COMUTATES D12 DIODE

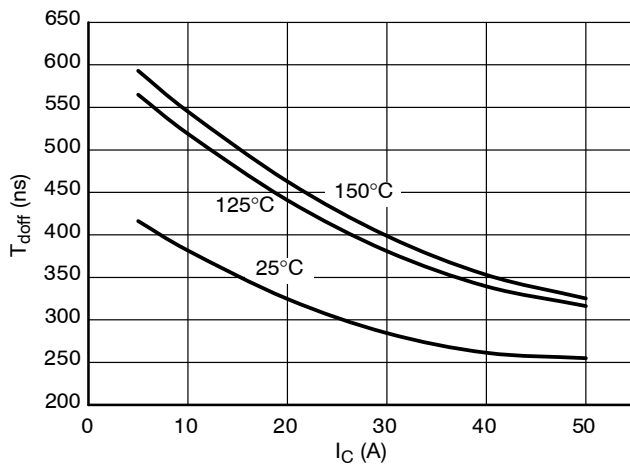


Figure 51. Typical Switching Time T_{doff} vs. I_C

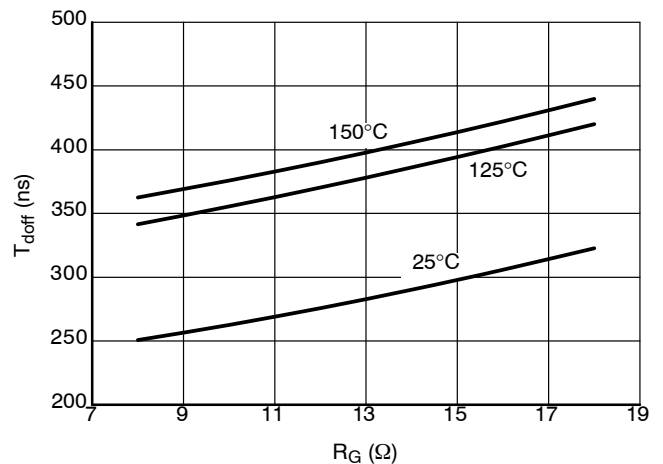


Figure 52. Typical Switching Time T_{doff} vs. R_G

SNXH150B95H3Q2F2PG-N

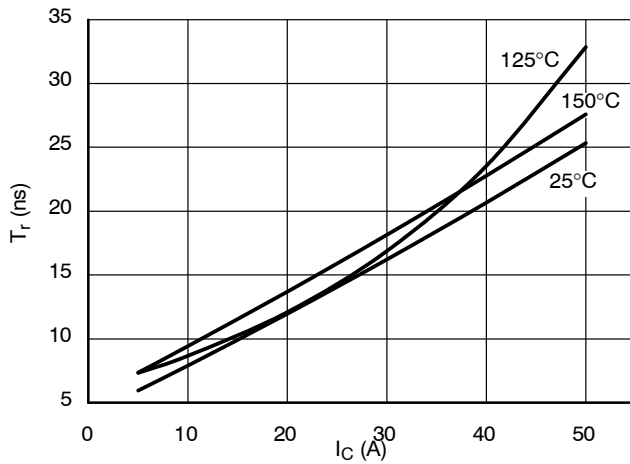


Figure 53. Typical Switching Time T_{ron} vs. I_C

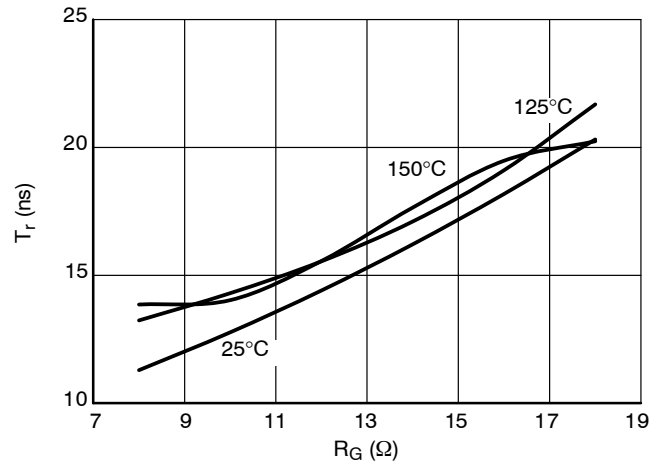


Figure 54. Typical Switching Time T_{ron} vs. R_G

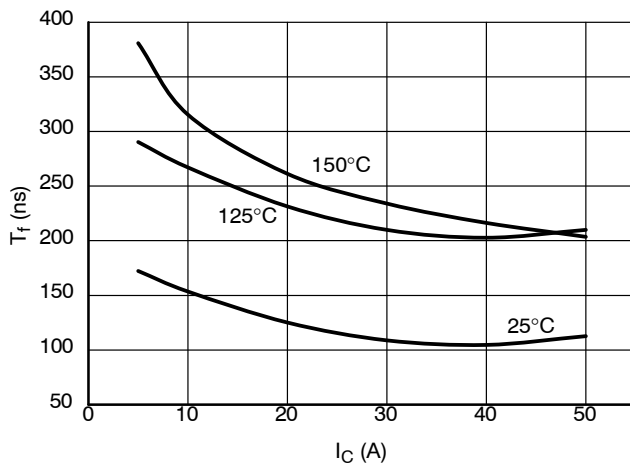


Figure 55. Typical Switching Time T_f vs. I_C

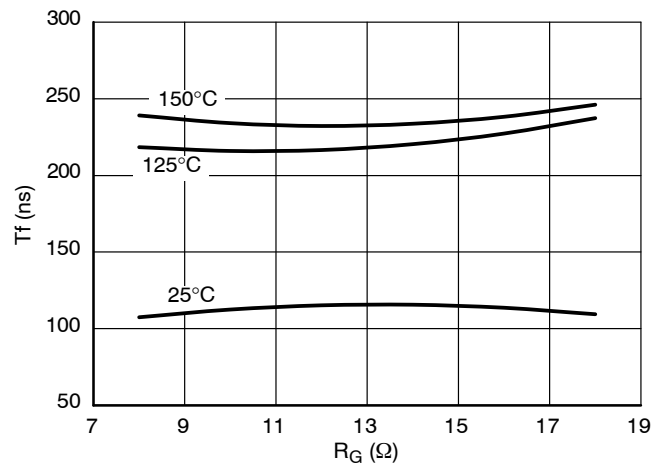


Figure 56. Typical Switching Time T_f vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T3 IGBT COMMUTATES D12 DIODE

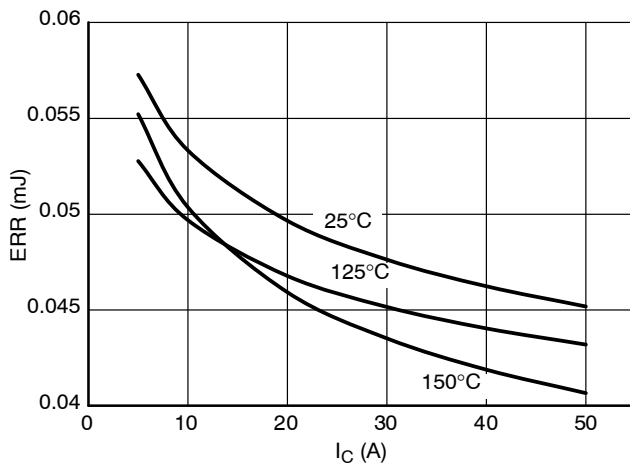


Figure 57. Typical Reverse Recovery Energy vs. I_C

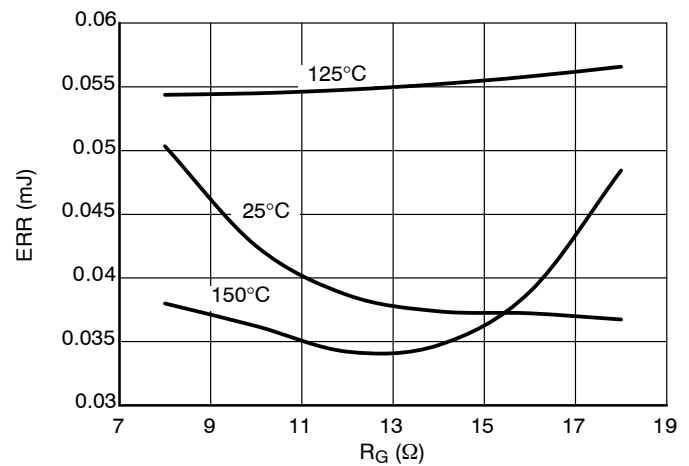


Figure 58. Typical Reverse Recovery Energy vs. R_G

SNXH150B95H3Q2F2PG-N

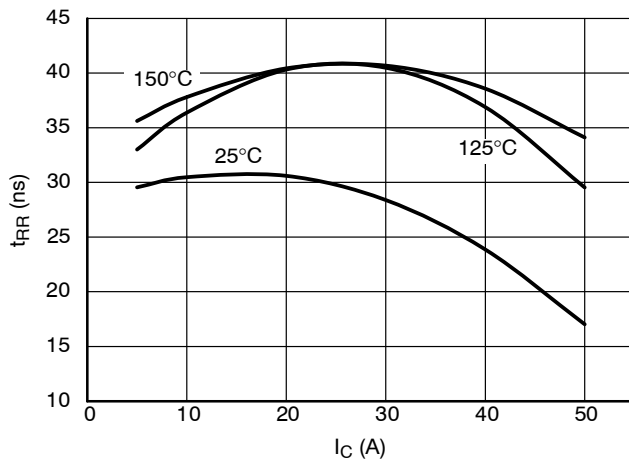


Figure 59. Typical Reverse Recovery Time vs. I_C

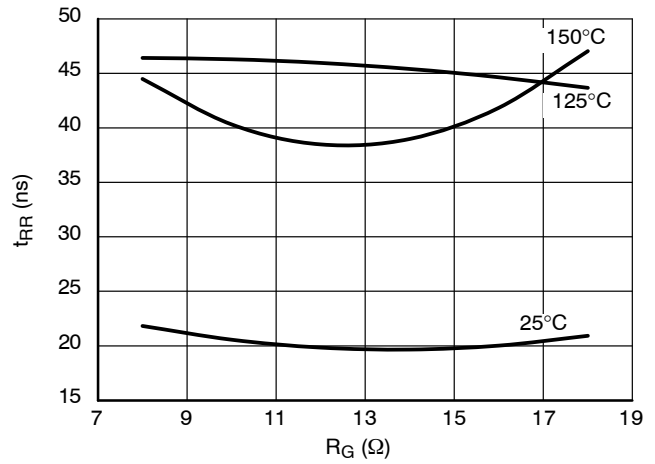


Figure 60. Typical Reverse Recovery Time vs. R_G

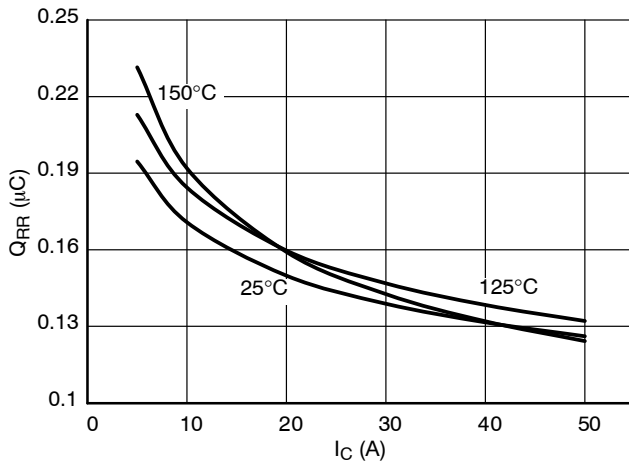


Figure 61. Typical Reverse Recovery Charge vs. I_C

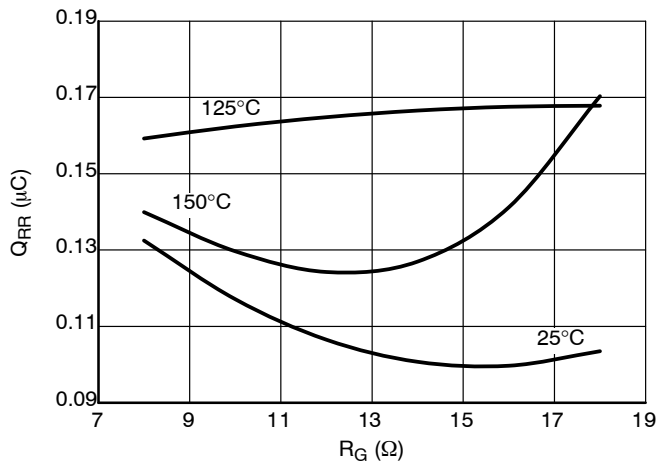


Figure 62. Typical Reverse Recovery Charge vs. R_G

TYPICAL SWITCHING CHARACTERISTICS T3 IGBT COMMUTATES D12 DIODE

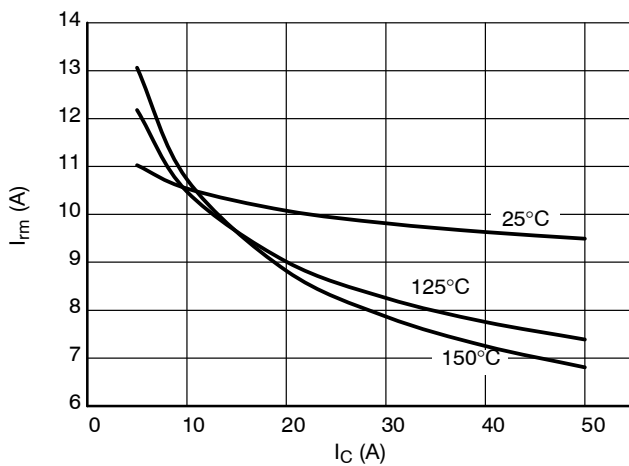


Figure 63. Typical Reverse Recovery Current vs. I_C

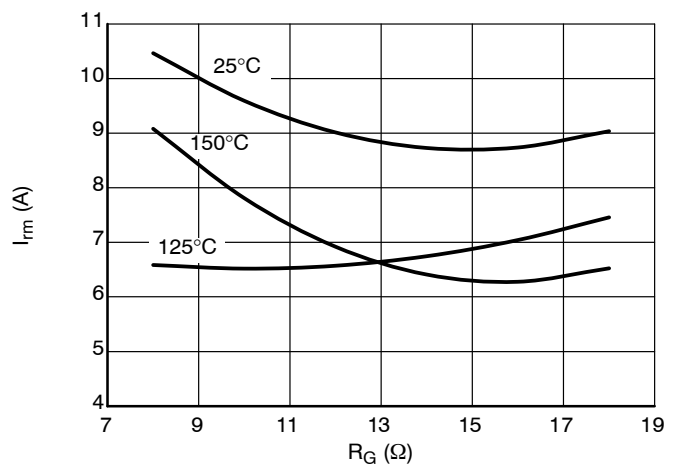


Figure 64. Typical Reverse Recovery Current vs. R_G

SNXH150B95H3Q2F2PG-N

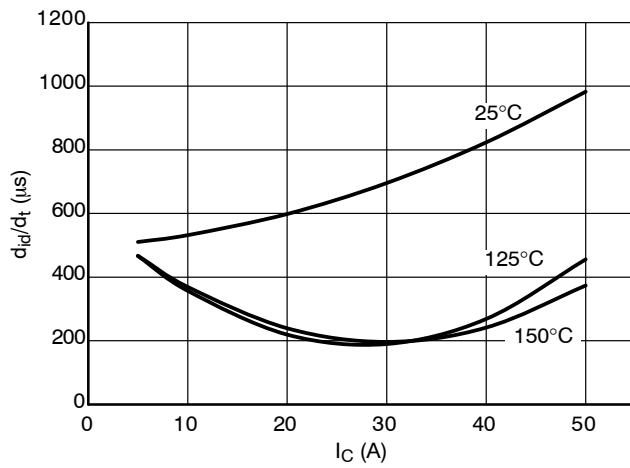


Figure 65. Typical d_{id}/d_t vs. I_C

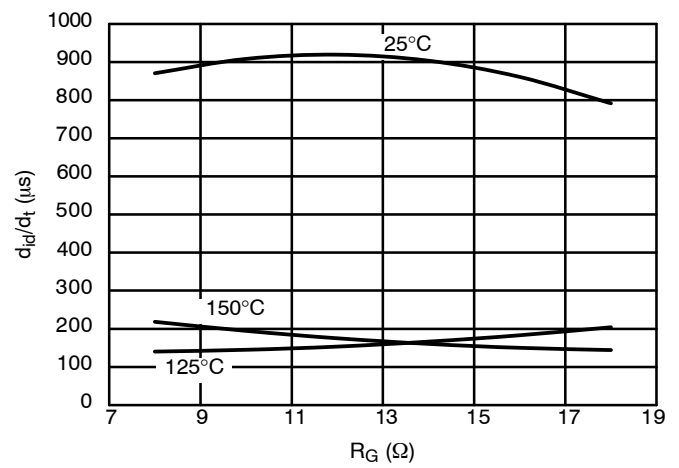


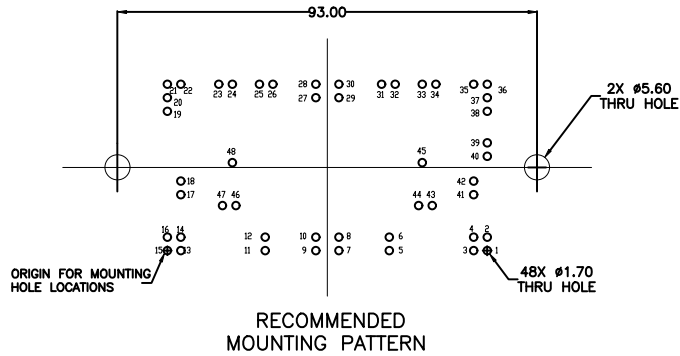
Figure 66. Typical d_{id}/d_t vs. R_G

SNXH150B95H3Q2F2PG-N

PACKAGE DIMENSIONS

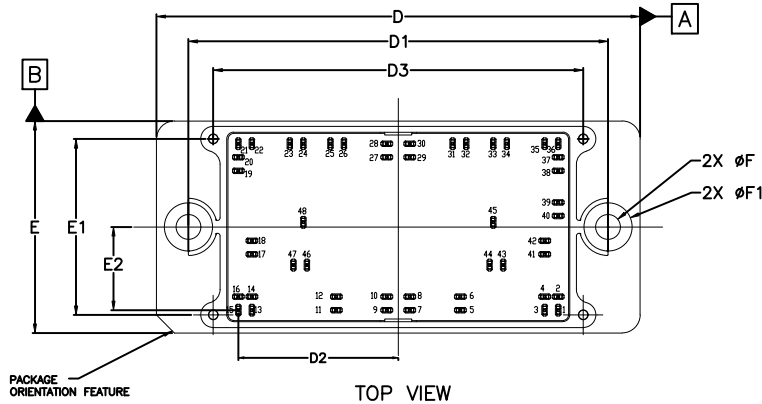
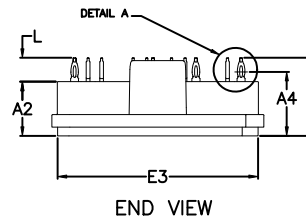
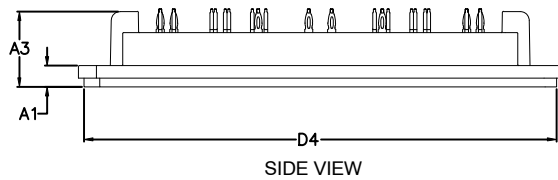
PIM48 107.2x47
CASE 180AR
ISSUE O

DATE 08 JUN 2018

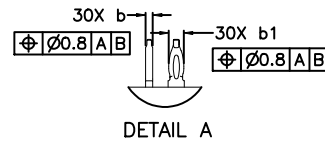


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS b AND b1 APPLY TO THE PLATED TERMINALS AND ARE MEASURED AT DIMENSION A4.
4. POSITION OF THE CENTER OF THE TERMINALS IS DETERMINED FROM PIN 15. POSITIONAL TOLERANCE, AS NOTED IN DRAWING, APPLIES TO EACH TERMINAL IN BOTH DIRECTIONS.
5. PACKAGE MARKING IS LOCATED AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	16.90	17.30	17.70
A1	4.50	4.70	4.90
A2	11.70	12.00	12.30
A3	16.40	16.70	17.00
A4	13.97	14.18	14.39
b	0.60	0.80	1.00
b1	1.61	1.66	1.71
D	106.80	107.20	107.60
D1	92.90	93.00	93.10
D2	35.45 REF		
D3	81.80	82.00	82.20
D4	104.35	104.75	105.15
E	46.60	47.00	47.40
E1	38.80	39.00	39.20
E2	18.45 REF		
E3	44.00	44.40	44.80
F	5.40	5.50	5.60
F1	5.35 REF		
L	4.90	5.30	5.70



NOTE 4

PIN	PIN POSITION		PIN	PIN POSITION		PIN	PIN POSITION	
	X	Y		X	Y		X	Y
1	70.9	0.0	17	3.0	12.4	33	56.5	36.9
2	70.9	3.0	18	3.0	15.4	34	59.5	36.9
3	67.9	0.0	19	0.0	30.9	35	67.9	36.9
4	67.9	3.0	20	0.0	33.9	36	70.9	36.9
5	49.2	0.0	21	0.0	36.9	37	70.9	33.9
6	49.2	3.0	22	3.0	36.9	38	70.9	30.9
7	38.0	0.0	23	11.4	36.9	39	70.9	23.9
8	38.0	3.0	24	14.4	36.9	40	70.9	20.9
9	32.9	0.0	25	20.4	36.9	41	67.9	12.4
10	32.9	3.0	26	23.4	36.9	42	67.9	15.4
11	21.7	0.0	27	32.9	33.9	43	58.7	10.0
12	21.7	3.0	28	32.9	36.9	44	55.7	10.0
13	3.0	0.0	29	38.0	33.9	45	56.5	19.5
14	3.0	3.0	30	38.0	36.9	46	15.2	10.0
15	0.0	0.0	31	47.5	36.9	47	12.2	10.0
16	0.0	3.0	32	50.5	36.9	48	14.4	19.5

MOUNTING HOLE POSITION			MOUNTING HOLE POSITION			MOUNTING HOLE POSITION		
PIN	X	Y	PIN	X	Y	PIN	X	Y
1	70.9	0.0	17	3.0	12.4	33	56.5	36.9
2	70.9	3.0	18	3.0	15.4	34	59.5	36.9
3	67.9	0.0	19	0.0	30.9	35	67.9	36.9
4	67.9	3.0	20	0.0	33.9	36	70.9	36.9
5	49.2	0.0	21	0.0	36.9	37	70.9	33.9
6	49.2	3.0	22	3.0	36.9	38	70.9	30.9
7	38.0	0.0	23	11.4	36.9	39	70.9	23.9
8	38.0	3.0	24	14.4	36.9	40	70.9	20.9
9	32.9	0.0	25	20.4	36.9	41	67.9	12.4
10	32.9	3.0	26	23.4	36.9	42	67.9	15.4
11	21.7	0.0	27	32.9	33.9	43	58.7	10.0
12	21.7	3.0	28	32.9	36.9	44	55.7	10.0
13	3.0	0.0	29	38.0	33.9	45	56.5	19.5
14	3.0	3.0	30	38.0	36.9	46	15.2	10.0
15	0.0	0.0	31	47.5	36.9	47	12.2	10.0
16	0.0	3.0	32	50.5	36.9	48	14.4	19.5

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative