TMPIM 35 A CIB/CI Module

Product Preview

NXH35C120L2C2SG/S1G

The NXH35C120L2C2SG is a transfer−molded power module containing a converter−inverter−brake circuit consisting of six 35 A, 1600 V rectifiers, six 35 A, 1200 V IGBTs with inverse diodes, one 35 A, 1200 V brake IGBT with brake diode and an NTC thermistor.

The NXH35C120L2C2S1G is a transfer−molded power module containing a converter−inverter circuit consisting of six 35 A, 1600 V rectifiers, six 35 A, 1200 V IGBTs with inverse diodes, and an NTC thermistor.

Features

- Low Thermal Resistance
- 6 mm Clearance Distance from Pin to Heatsink
- Compact 73 mm × 40 mm × 8 mm Package
- Solderable Pins
- Thermistor
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Industrial Motor Drives
- Servo Drives

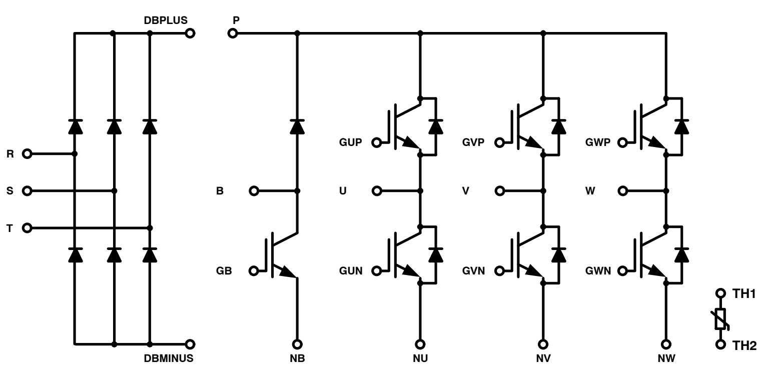

Figure 1. NXH35C120L2C2SG Schematic Diagram

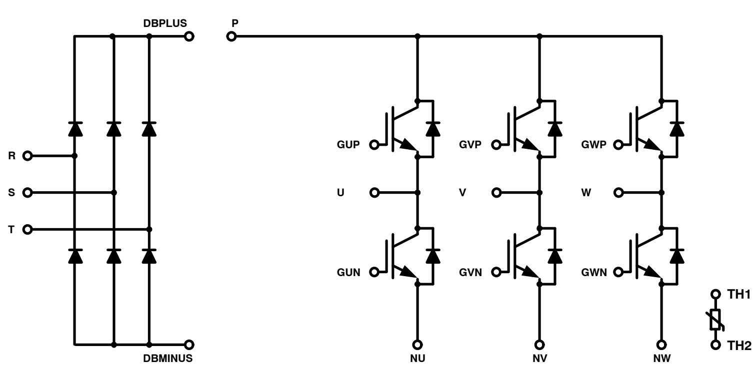

Figure 2. NXH35C120L2C2S1G Schematic Diagram

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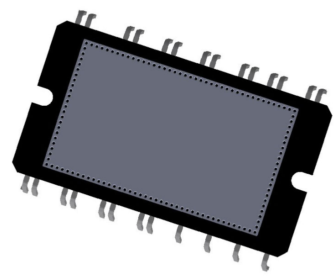
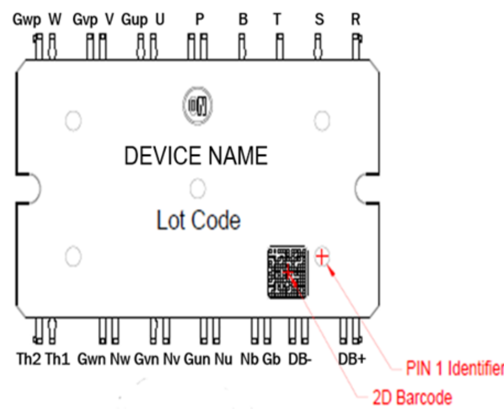


DIP26
CASE 181AD

MARKING DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping
NXH35C120L2C2SG	DIP26 (Pb−Free)	6 Units / Tube
NXH35C120L2C2S1G	DIP26 (Pb−Free)	6 Units / Tube

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
IGBT			
Collector−Emitter Voltage	V_{CES}	1200	V
Gate−Emitter Voltage	V_{GE}	±20	V
Continuous Collector Current @ T_c = 80°C (T_{VJmax} = 175°C)	I_C	35	A
Pulsed Collector Current	I_{Cpulse}	105	A
DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Continuous Forward Current @ T_c = 80°C (T_{VJmax} = 175°C)	I_F	35	A
Repetitive Peak Forward Current (T_J = 175°C)	I_{FRM}	105	A
RECTIFIER DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1600	V
Continuous Forward Current @ T_c = 80°C (T_{VJmax} = 150°C)	I_F	35	A
Repetitive Peak Forward Current (T_J = 150°C)	I_{FRM}	105	A
I^2t Value (10 ms sin180°) @ 25°C (10 ms sin180°) @ 150°C	I^2t	 1126 510	A^2t
Surge Current (10 ms sin180°) @ 25°C	I_{FSM}	520	A
THERMAL PROPERTIES			
Storage Temperature Range	T_{stg}	−40 to +125	°C
INSULATION PROPERTIES			
Isolation Test Voltage, t = 1 s, 50 Hz	V_{is}	3000	V_{RMS}
Internal Isolation		Al2O3	
Creepage Distance		6.0	mm
Clearance Distance		6.0	mm
Comperative Tracking Index	CTI	> 400	

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.

1. Refer to ELECTRICAL CHARACTERISTICS, RECOMMENDED OPERATING RANGES and/or APPLICATION INFORMATION for Safe Operating parameters.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
IGBT CHARACTERISTICS						
Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} = 1200 V	I_{CES}	–	–	250	μA
Collector−Emitter Saturation Voltage	V_{GE} = 15 V, I_C = 35 A, T_J = 25°C	$V_{CE(sat)}$	–	1.8	2.4	V
	V_{GE} = 15 V, I_C = 35 A, T_J = 150°C		–	1.9	–	
Gate−Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C = 4.25 mA	$V_{GE(TH)}$	4.8	6	6.8	V
Gate Leakage Current	V_{GE} = 20 V, V_{CE} = 0 V	I_{GES}	–	–	400	nA
Turn−on Delay Time	T_J = 25°C V_{CE} = 600 V, I_C = 35 A V_{GE} = ±15 V, R_G = 15 Ω	$t_{d(on)}$	–	104	–	ns
Rise Time		t_r	–	64	–	
Turn−off Delay Time		$t_{d(off)}$	–	277	–	
Fall Time		t_f	–	53	–	
Turn−on Switching Loss per Pulse		E_{on}	–	2900	–	μJ
Turn−off Switching Loss per Pulse		E_{off}	–	1200	–	
Turn−on Delay Time	T_J = 150°C V_{CE} = 600 V, I_C = 35 A V_{GE} = ±15 V, R_G = 15 Ω	$t_{d(on)}$	–	168	–	ns
Rise Time		t_r	–	72	–	
Turn−off Delay Time		$t_{d(off)}$	–	320	–	
Fall Time		t_f	–	165	–	
Turn−on Switching Loss per Pulse		E_{on}	–	4030	–	μJ
Turn−off Switching Loss per Pulse		E_{off}	–	2200	–	
Input Capacitance	V_{CE} = 20 V, V_{GE} = 0 V, f = 100 kHz	C_{ies}	–	8333	–	pF
Output Capacitance		C_{oes}	–	298	–	
Reverse Transfer Capacitance		C_{res}	–	175	–	
Total Gate Charge	V_{CE} = 600 V, I_C = 35 A, V_{GE} = 0 V ~ +15 V	Q_g	–	360	–	nC
Temperature under Switching Conditions		Tvj op	−40	–	150	°C
Thermal Resistance − Chip−to−Case		R_{thJC}	–	0.57	–	°C/W
Thermal Resistance − Chip−to−Heatsink	Thermal grease, Thickness ≈ 3 mil, λ = 2.8 W/mK	R_{thJH}	–	0.97	–	°C/W
DIODE CHARACTERISTICS						
Brake Diode Reverse Leakage Current	V_R = 1200 V	I_R	–	–	200	μA
Diode Forward Voltage	I_F = 35 A, T_J = 25°C	V_F	–	2.2	2.7	V
	I_F = 35 A, T_J = 150°C		–	2	–	
Reverse Recovery Time	T_J = 25°C V_{CE} = 600 V, I_C = 35 A V_{GE} = ±15 V, R_G = 15 Ω	t_{rr}	–	224	–	ns
Reverse Recovery Charge		Q_{rr}	–	1.51	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	18	–	A
Reverse Recovery Energy		E_{rr}	–	410	–	μJ
Reverse Recovery Time	T_J = 150°C V_{CE} = 600 V, I_C = 35 A V_{GE} = ±15 V, R_G = 15 Ω	t_{rr}	–	532	–	ns
Reverse Recovery Charge		Q_{rr}	–	5.36	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	30	–	A
Reverse Recovery Energy		E_{rr}	–	1983	–	μJ
Temperature under Switching Conditions		Tvj op	−40	–	150	°C
Thermal Resistance − Chip−to−Case		R_{thJC}	–	0.94	–	°C/W
Thermal Resistance − Chip−to−Heatsink	Thermal grease, Thickness ≈ 3 mil, λ = 2.8 W/mK	R_{thJH}	–	1.5	–	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified) (continued)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
RECTIFIER DIODE CHARACTERISTICS						
Rectifier Reverse Leakage Current	V_R = 1600 V	I_R	–	–	200	μA
Rectifier Forward Voltage	I_F = 35 A, T_J = 25°C	V_F	–	1.1	1.5	V
	I_F = 35 A, T_J = 150°C		–	1	–	
Temperature under Switching Conditions		Tvj op	–40	–	150	°C
Thermal Resistance − Chip−to−Case		R_{thJC}	–	0.55	–	°C/W
Thermal Resistance − Chip−to−Heatsink	Thermal grease, Thickness ≈ 3 mil, λ = 2.8 W/mK	R_{thJH}	–	1.28	–	°C/W
THERMISTOR CHARACTERISTICS						
Nominal Resistance	T = 25°C	R_{25}	–	5	–	kΩ
Nominal Resistance	T = 100°C	R_{100}	–	493.3	–	Ω
Deviation of R25		ΔR/R	–5	–	5	%
Power Dissipation		P_D	–	20	–	mW
Power Dissipation Constant			–	1.4	–	mW/K
B−value	B(25/50), tolerance ±2%		–	3375	–	K
B−value	B(25/100), tolerance ±2%		–	3433	–	K

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS – INVERTER/BRAKE IGBT & DIODE

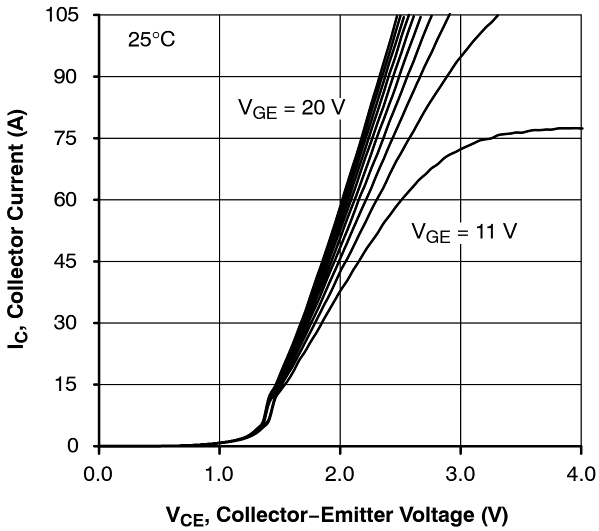


Figure 3. IGBT Typical Output Characteristic

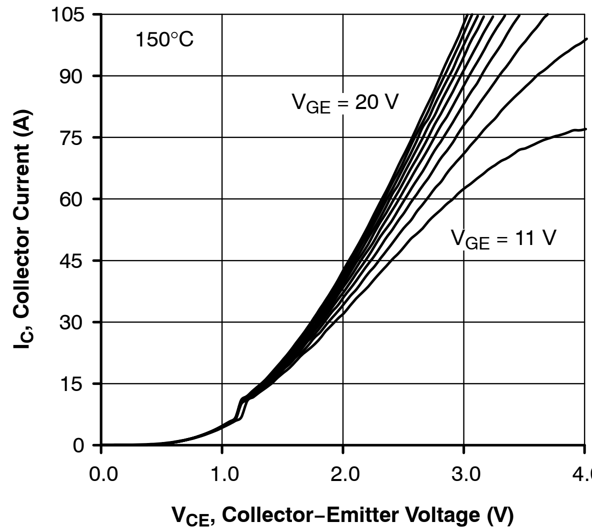


Figure 4. IGBT Typical Output Characteristic

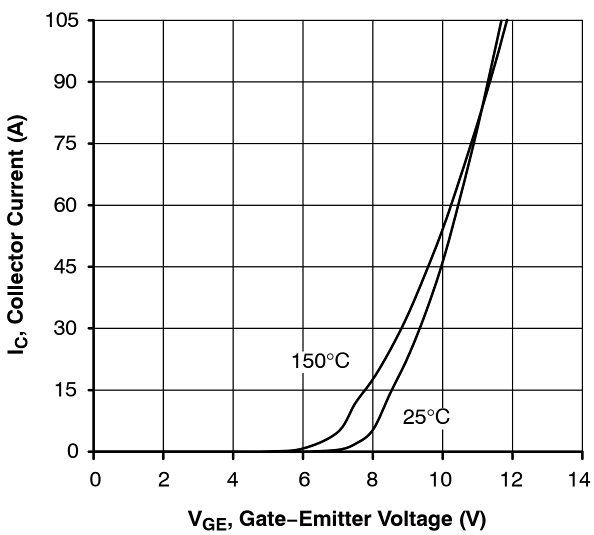


Figure 5. IGBT Typical Transfer Characteristic

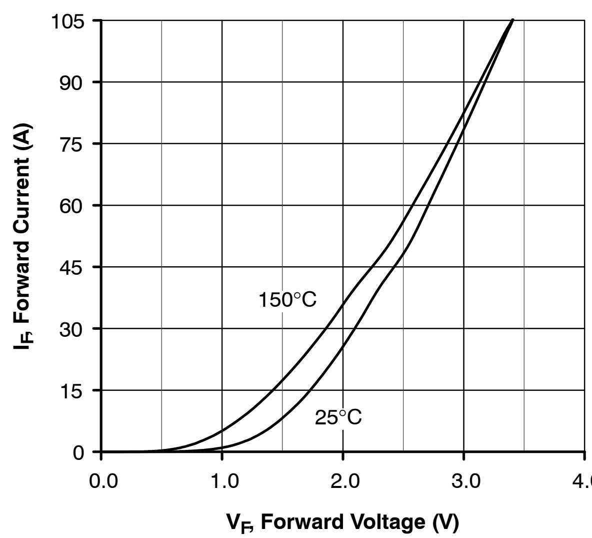


Figure 6. Diode Typical Forward Characteristic

TYPICAL CHARACTERISTICS – INVERTER/BRAKE IGBT & DIODE (Continued)

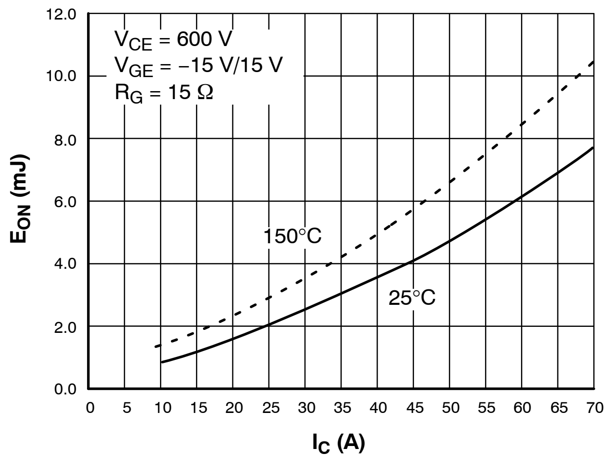


Figure 7. Typical Turn On Loss vs I_C

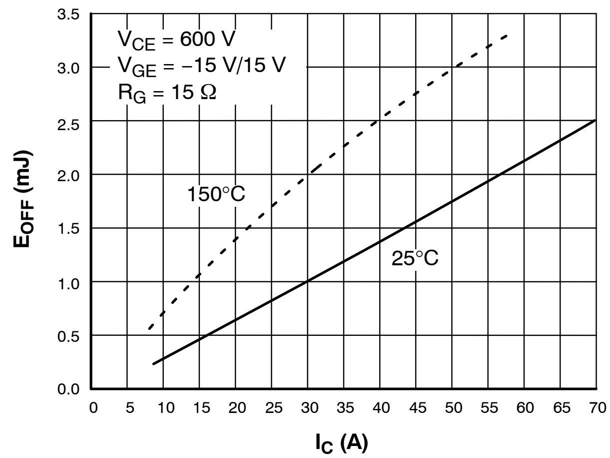


Figure 8. Typical Turn Off Loss vs I_C

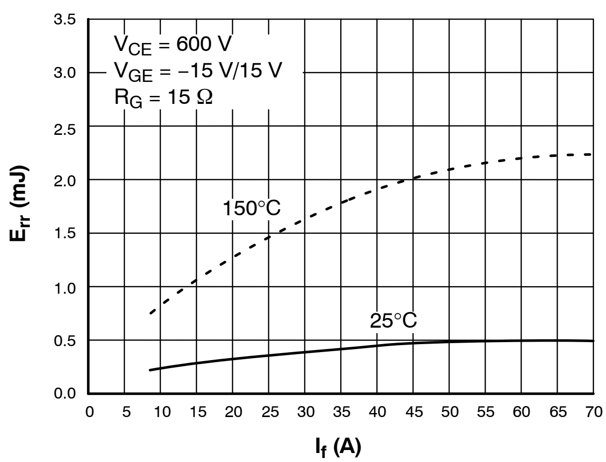


Figure 9. Typical Reverse Recovery Energy vs I_C

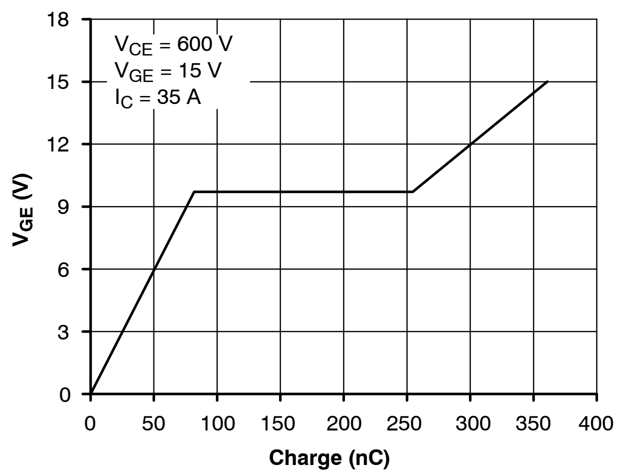


Figure 10. Gate Voltage vs. Gate Charge

TYPICAL CHARACTERISTICS – INVERTER/BRAKE IGBT & DIODE (Continued)

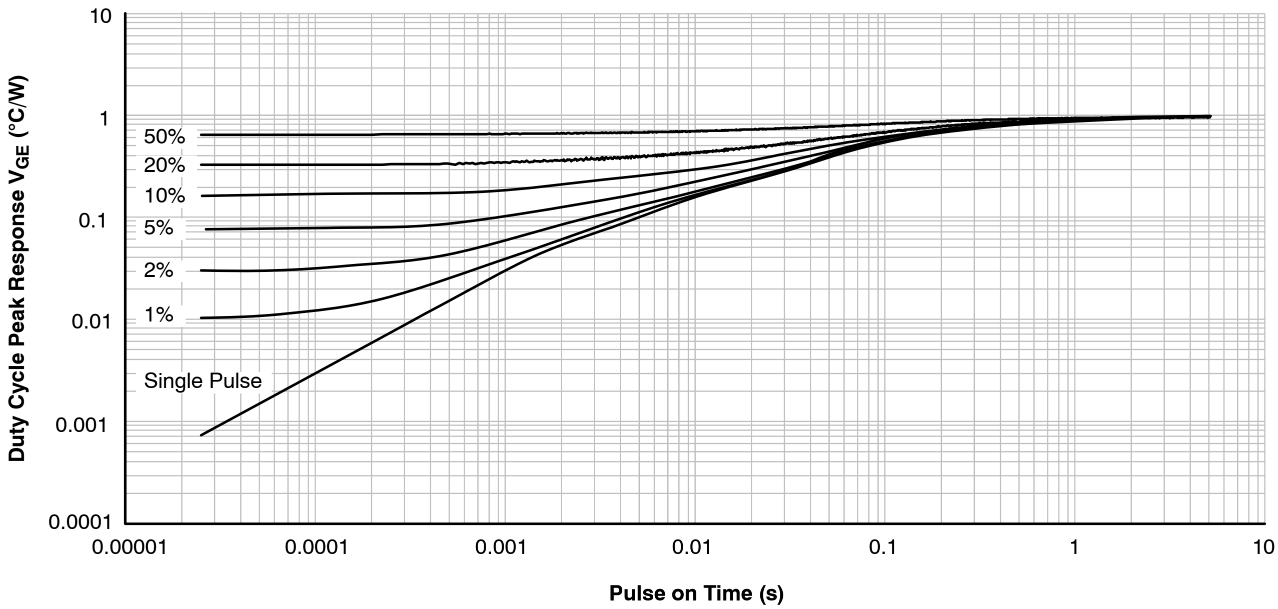


Figure 11. IGBT Junction−to−Heatsink Transient Thermal Impedance

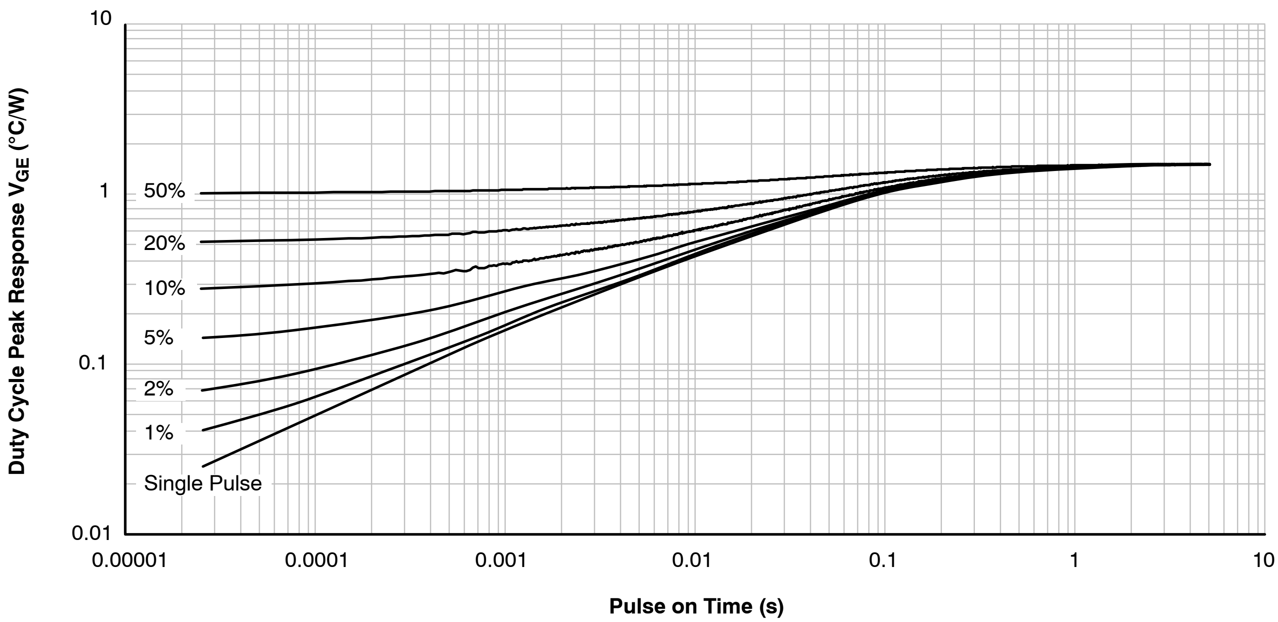


Figure 12. Diode Junction−to−Heatsink Transient Thermal Impedance

TYPICAL CHARACTERISTICS − RECTIFIER

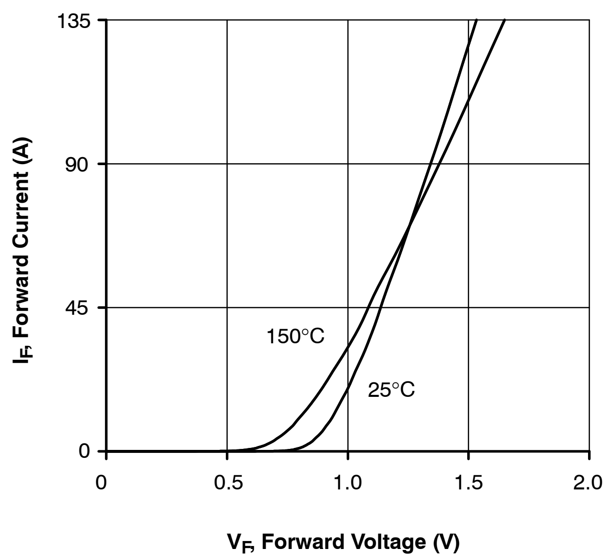


Figure 13. Rectifier Typical Forward Characteristic

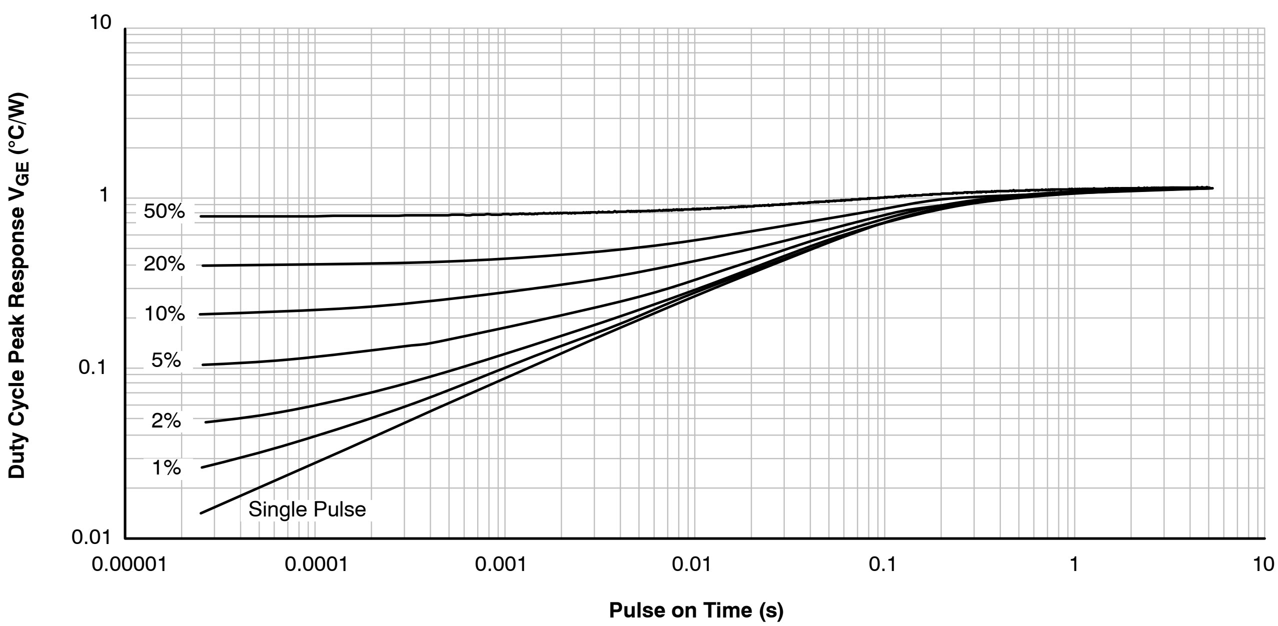
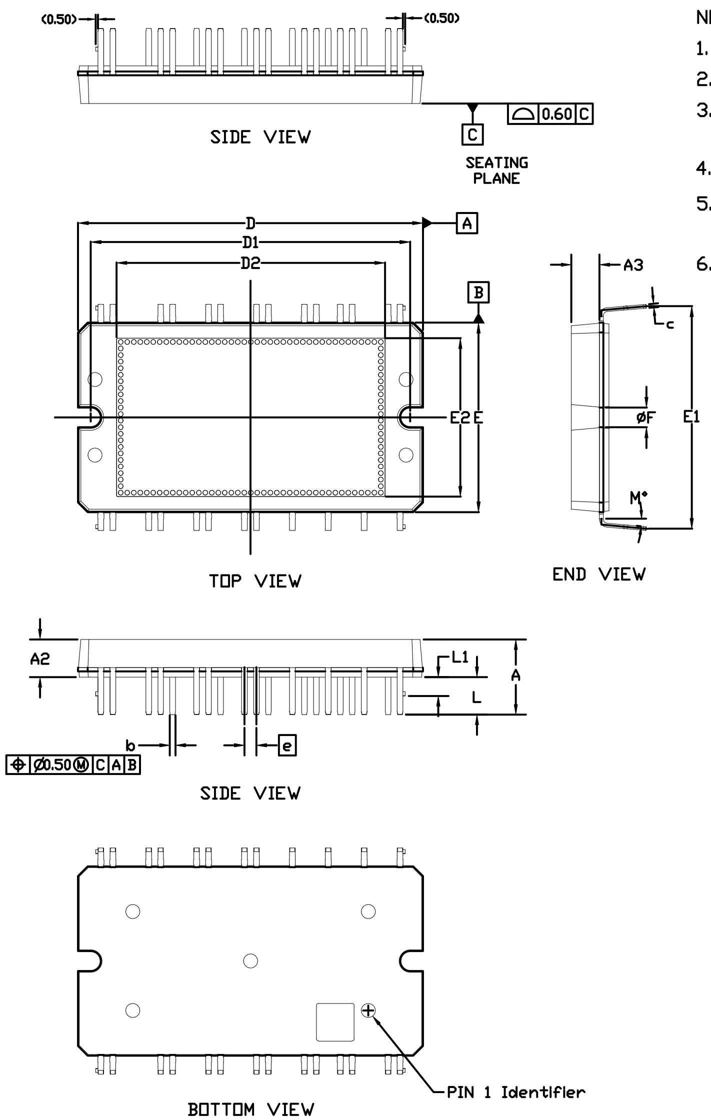


Figure 14. Rectifier Junction−to−Heatsink Transient Thermal Impedance

PACKAGE DIMENSIONS

DIP26 67.8x40
CASE 181AD
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
4. DIMENSIONS b AND c APPLY TO PLATED LEADS
5. POSITION OF THE LEADS IS DETERMINED AT THE ROOT OF THE LEAD WHERE IT EXITS THE PACKAGE BODY
6. MISSING PINS ARE 3,4,7,10,11,14,15,18,19,22,23,24,29, 30,33,34,37,38,41,42,44,45,47,48,50,51

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	15.50	16.00	16.50
A2	7.80	8.00	8.20
A3	6.00 REF		
b	1.10	1.20	1.30
c	0.70	0.80	0.90
D	72.70	73.20	73.70
D1	67.30	67.80	68.30
D2	57.30 REF		
E	39.70	40.20	40.70
E1	46.70	47.20	47.70
E2	33.87 REF		
e	2.54 BSC		
F	4.00	4.20	4.40
L	8.00 REF		
L1	3.50	4.00	4.50
M	4°	5°	6°

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