TMPIM 25 A CIB Module

NXH25C120L2C2SG

The NXH25C120L2C2SG is a transfer−molded power module containing a converter−inverter−brake circuit consisting of six 25 A, 1600 V rectifiers, six 25 A, 1200 V IGBTs with inverse diodes, one 25 A, 1200 V brake IGBT with brake diode and an NTC thermistor.

Features

- Low Thermal Resistance
- 6 mm Clearance Distance between 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

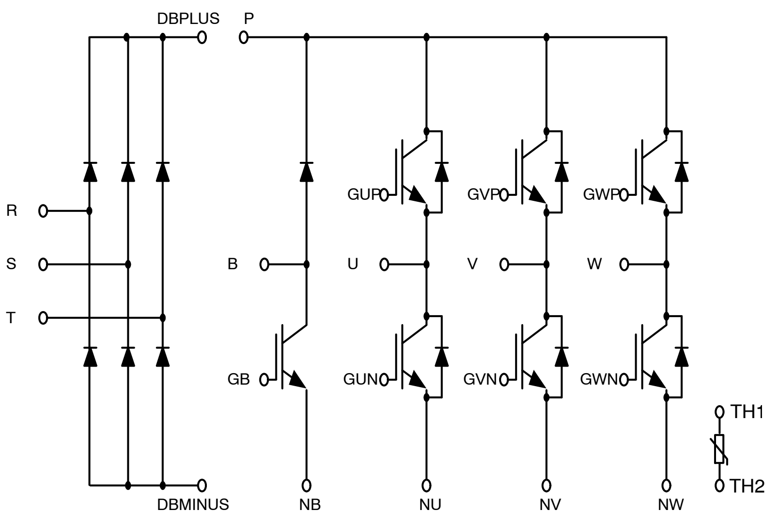

Figure 1. NXH25C120L2C2SG Schematic Diagram

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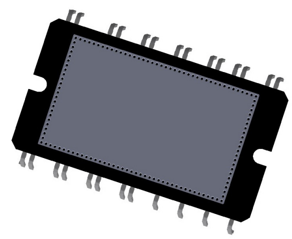


DIP26 67.8x40
CASE 181AD

MARKING DIAGRAM

NXH25C120L2C2SG
ZZZATYWW

NXH25C120L2C2SG	= Specific Device Code
ZZZ	= Assembly Lot Code
AT	= Assembly & Test Location
Y	= Year
WW	= Work Week

ORDERING INFORMATION

Device	Package	Shipping†
NXH25C120L2C2SG	DIP26 (Pb−Free)	6 Units / Tube

March, 2020 − Rev. 0

Publication Order Number:
NXH25C120L2C2SG/D

MAXIMUM RATINGS

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 (Tv_{Jmax} = 175°C)	I_C	25	A
Pulsed Collector Current	I_{Cpulse}	75	A
DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Continuous Forward Current @ T_C = 80°C (Tv_{Jmax} = 175°C)	I_F	25	A
Repetitive Peak Forward Current	I_{FRM}	75	A
RECTIFIER DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1600	V
Continuous Forward Current @ T_C = 80°C (Tv_{Jmax} = 150°C)	I_F	25	A
Repetitive Peak Forward Current	I_{FRM}	75	A
I^2t value (10 ms single half−sine wave) @ 25°C (10 ms single half−sine wave) @ 150°C	I^2t	680 360	A^2t
Surge current (10 ms sin180°) @ 25°C	IFSM	370	A
THERMAL PROPERTIES			
Storage Temperature range	T_{stg}	−40 to 125	°C
INSULATION PROPERTIES			
Isolation test voltage, t = 1 sec, 50 Hz	V_{is}	3000	V_{RMS}
Internal isolation		Al_2O_3	
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 = 25 A, T_J = 25°C	$V_{CE(sat)}$	–	1.7	2.4	V
	V_{GE} = 15 V, I_C = 25 A, T_J = 150°C		–	1.9	–	
Gate−Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C = 3.04 mA	$V_{GE(TH)}$	4.8	5.9	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 = 25 A V_{GE} = ±15 V, R_G = 20 Ω	$t_{d(on)}$	–	68	–	ns
Rise Time		t_r	–	63	–	
Turn−off Delay Time		$t_{d(off)}$	–	235	–	
Fall Time		t_f	–	48	–	
Turn−on Switching Loss per Pulse		E_{on}	–	2200	–	μJ
Turn off Switching Loss per Pulse		E_{off}	–	720	–	
Turn−on Delay Time	T_J = 125°C V_{CE} = 600 V, I_C = 25 A V_{GE} = ±15 V, R_G = 20 Ω	$t_{d(on)}$	–	72	–	ns
Rise Time		t_r	–	56	–	
Turn−off Delay Time		$t_{d(off)}$	–	266	–	
Fall Time		t_f	–	54	–	
Turn−on Switching Loss per Pulse		E_{on}	–	3050	–	μJ
Turn off Switching Loss per Pulse		E_{off}	–	1200	–	
Input Capacitance	V_{CE} = 20 V. V_{GE} = 0 V f = 100 kHz	C_{ies}	–	6200	–	pF
Output Capacitance		C_{oes}	–	212	–	
Reverse Transfer Capacitance		C_{res}	–	117	–	
Total Gate Charge	V_{CE} = 600 V, I_C = 25 A, V_{GE} = 0 V ~ +15 V	Q_g	–	269	–	nC
Temperature under switching conditions		Tvj op	−40		150	°C
Thermal Resistance − chip−to−case		RthJC	–	0.54	–	°C/W
DIODE CHARACTERISTICS						
Brake Diode Reverse Leakage Current	V_R = 1200 V	I_R	–	–	200	μA
Diode Forward Voltage	I_F = 25 A, T_J = 25°C	V_F	–	1.9	2.6	V
	I_F = 25 A, T_J = 150°C		–	1.7	–	
Reverse Recovery Charge	T_J = 25°C V_{CE} = 600 V, I_C = 25 A V_{GE} = ±15 V, R_G = 20 Ω	Q_{rr}	–	1.35	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	16	–	A
Reverse Recovery Energy		E_{rr}	–	350	–	μJ
Reverse Recovery Charge	T_J = 150 °C V_{CE} = 600 V, I_C = 25 A V_{GE} = ±15 V, R_G = 20 Ω	Q_{rr}	–	3.6	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	26	–	A
Reverse Recovery Energy		E_{rr}	–	1050	–	μJ
Temperature under switching conditions		Tvj op	−40		150	°C
Thermal Resistance − chip−to−case		RthJC	–	1.10	–	°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 = 25 A, T_J = 25°C	V_F	–	1	1.5	V
	I_F = 35 A, T_J = 150°C		–	1.1	–	
Temperature under switching conditions		Tvj op	–40		150	°C
Thermal Resistance – chip–to–case		R_{thJC}	–	0.86	–	°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

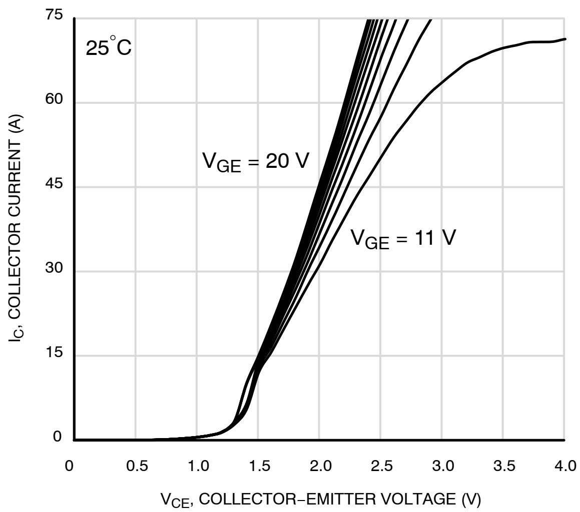


Figure 2. Inverter IGBT Typical Output Characteristic (25°C)

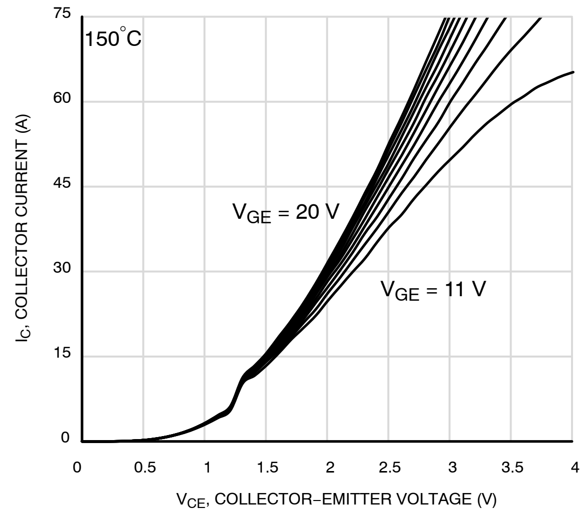


Figure 3. Inverter IGBT Typical Output Characteristic (150°C)

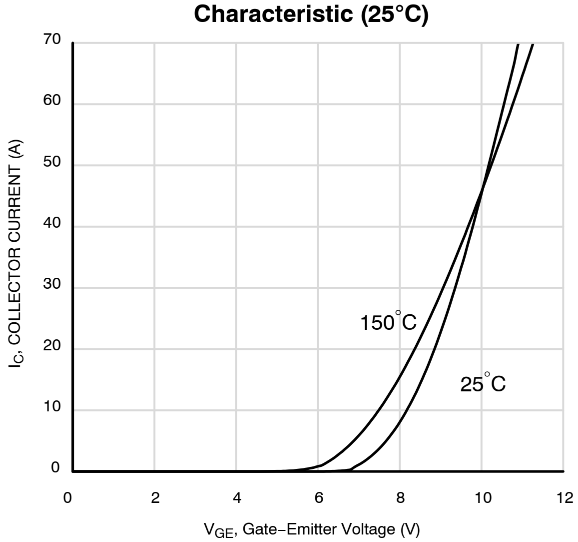


Figure 4. Inverter IGBT Typical Transfer Characteristic

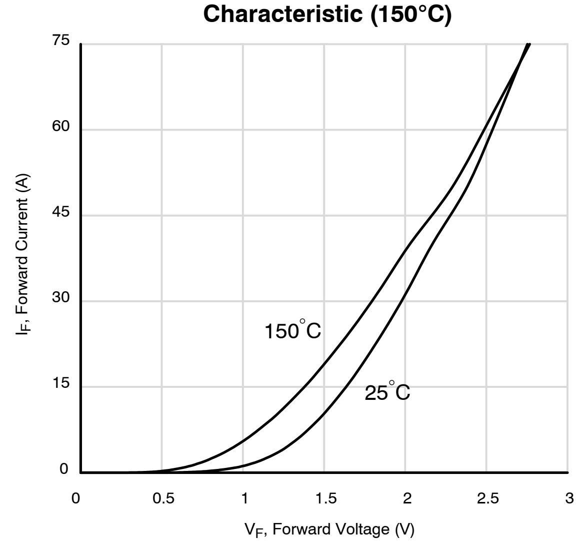


Figure 5. Inverter Diode Typical Forward Characteristic

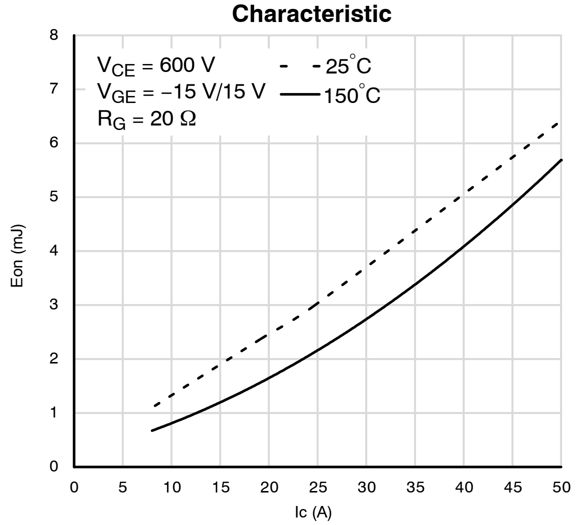


Figure 6. Inverter IGBT Typical Turn On Loss vs IC

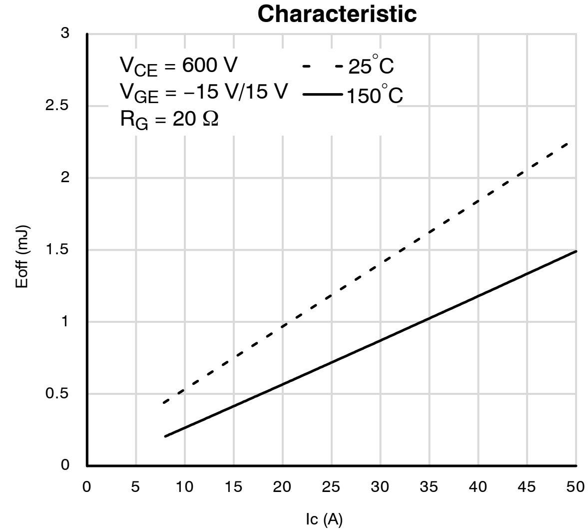


Figure 7. Inverter IGBT Typical Turn Off Loss vs IC

TYPICAL CHARACTERISTICS – INVERTER/BRAKE IGBT & DIODE

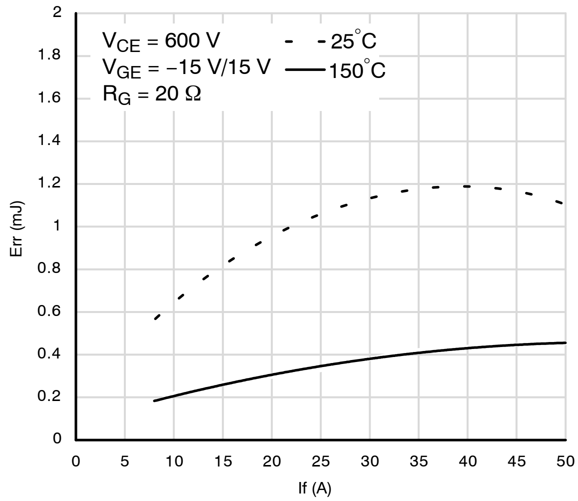


Figure 8. Inverter Diode Typical Reverse Recovery Energy vs IC

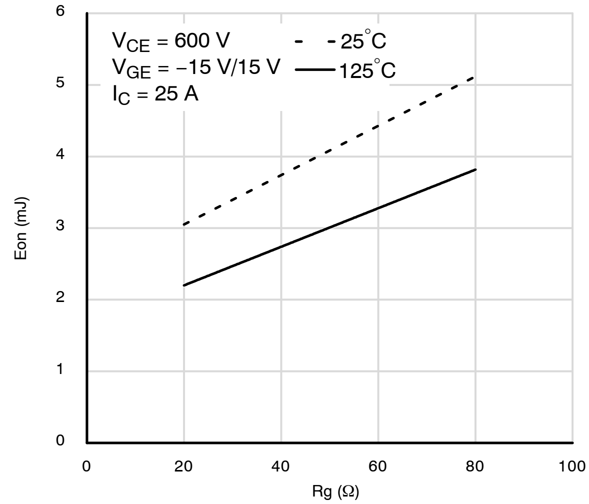


Figure 9. Inverter IGBT Typical Turn On Loss vs RG

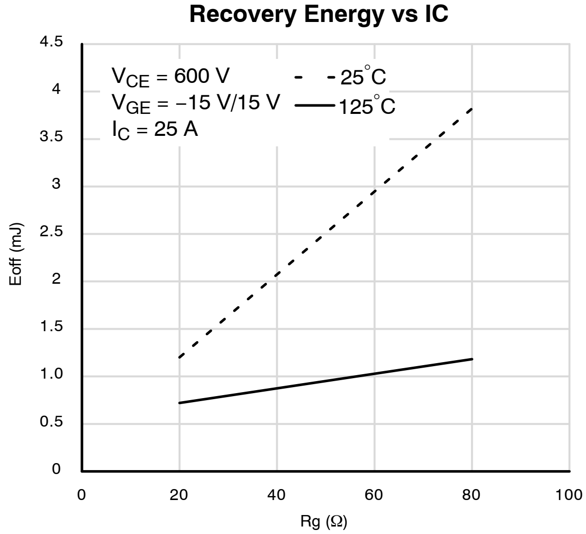


Figure 10. Inverter IGBT Typical Turn Off Loss vs RG

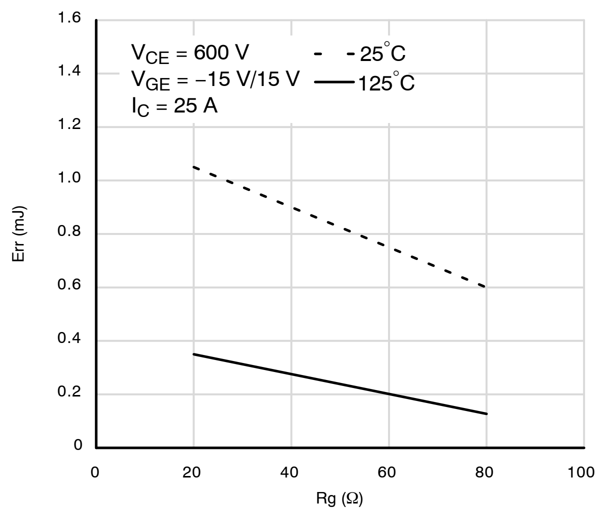


Figure 11. Inverter Diode Typical Reverse Recovery Energy vs RG

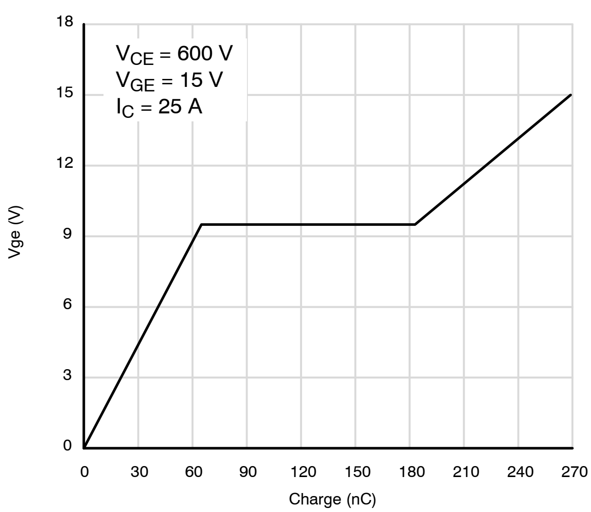


Figure 12. Inverter IGBT Gate Voltage vs Gate Charge

TYPICAL CHARACTERISTICS – INVERTER/BRAKE IGBT & DIODE

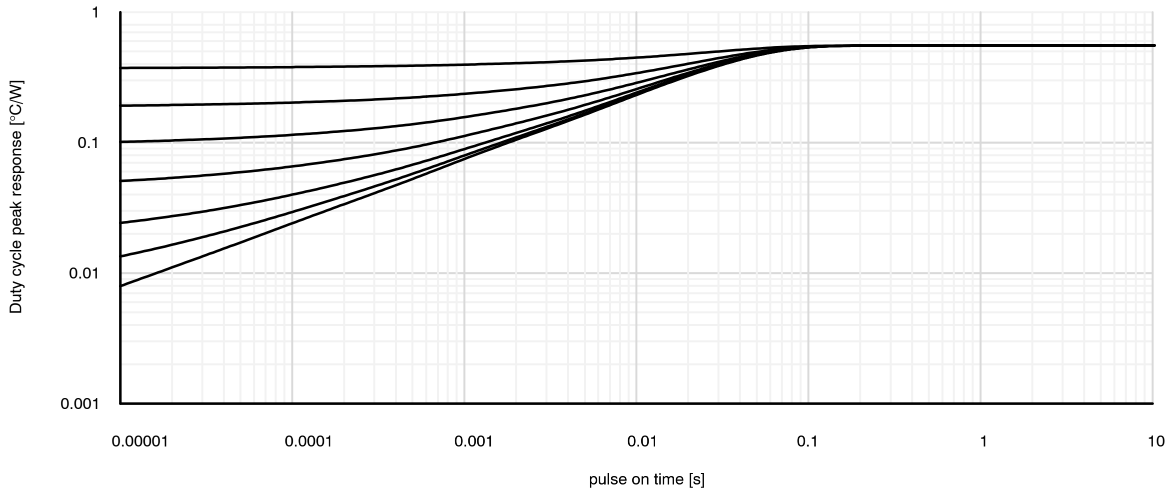


Figure 13. IGBT Junction−to−Case Transient Thermal Impedance

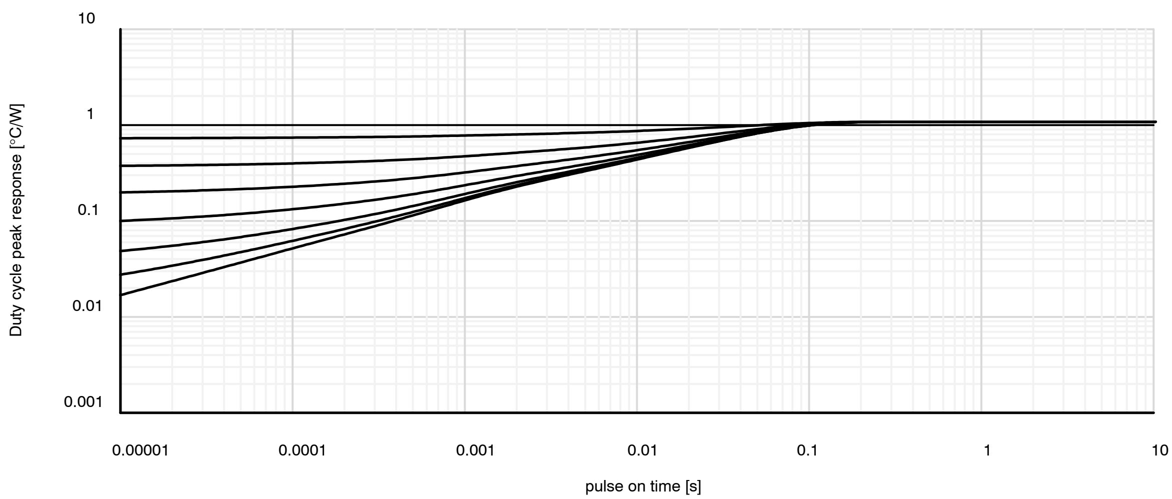


Figure 14. Diode Junction−to−Case Transient Thermal Impedance

TYPICAL CHARACTERISTICS – RECTIFIER

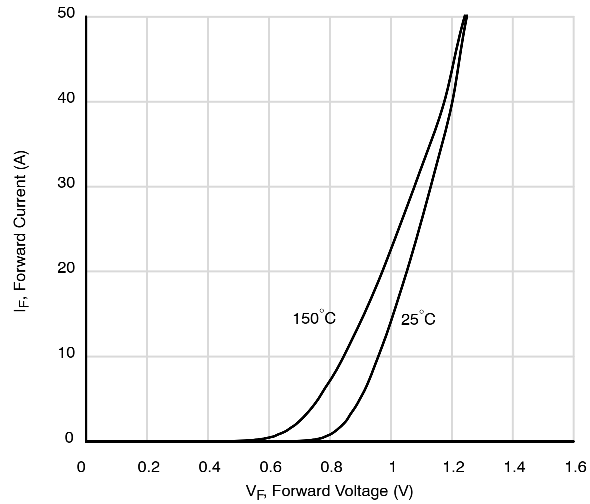


Figure 15. Rectifier Typical Forward Characteristic

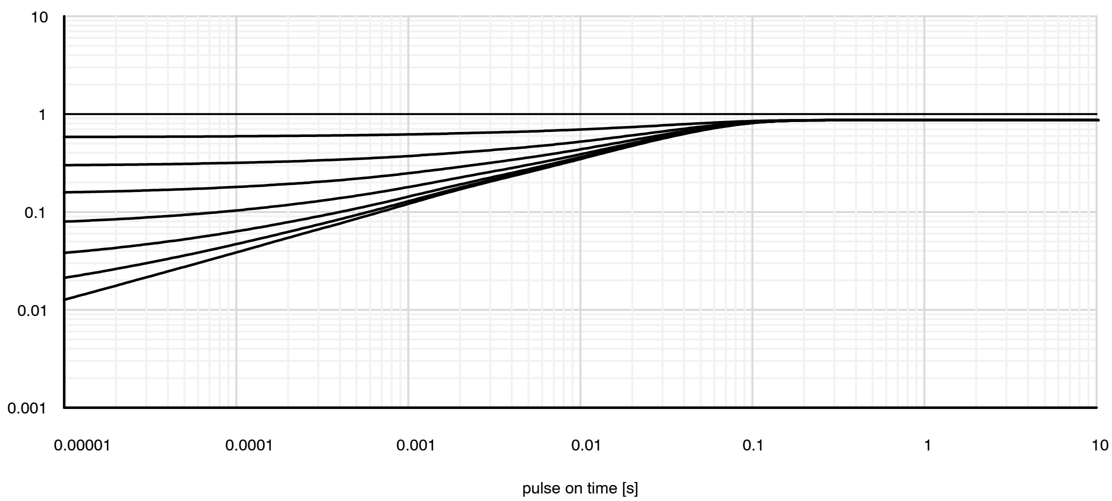
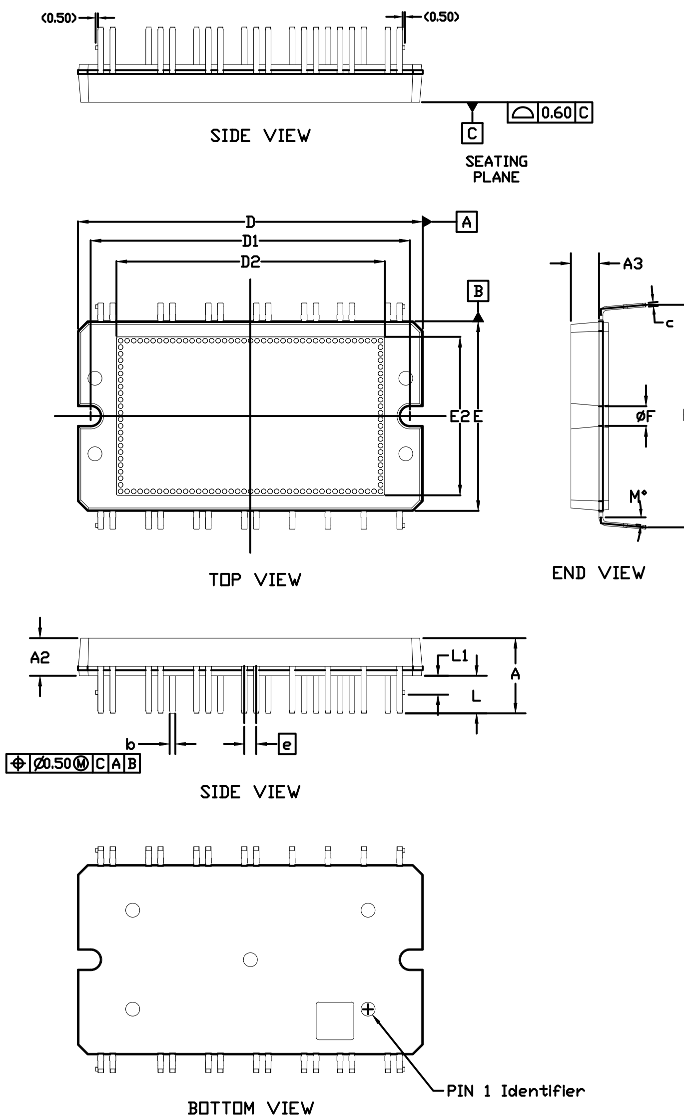


Figure 16. Rectifier Junction−to−Case Transient Thermal Impedance

DIP26 67.8x40
CASE 181AD
ISSUE A

DATE 25 FEB 2020



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°

GENERIC MARKING DIAGRAM*

XXXXXXXXXXXXXXXXXX
ZZZATYWW

XXX = Specific Device Code
ZZZ = Assembly Lot Code
AT = Assembly & Test Location
Y = Year
WW = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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