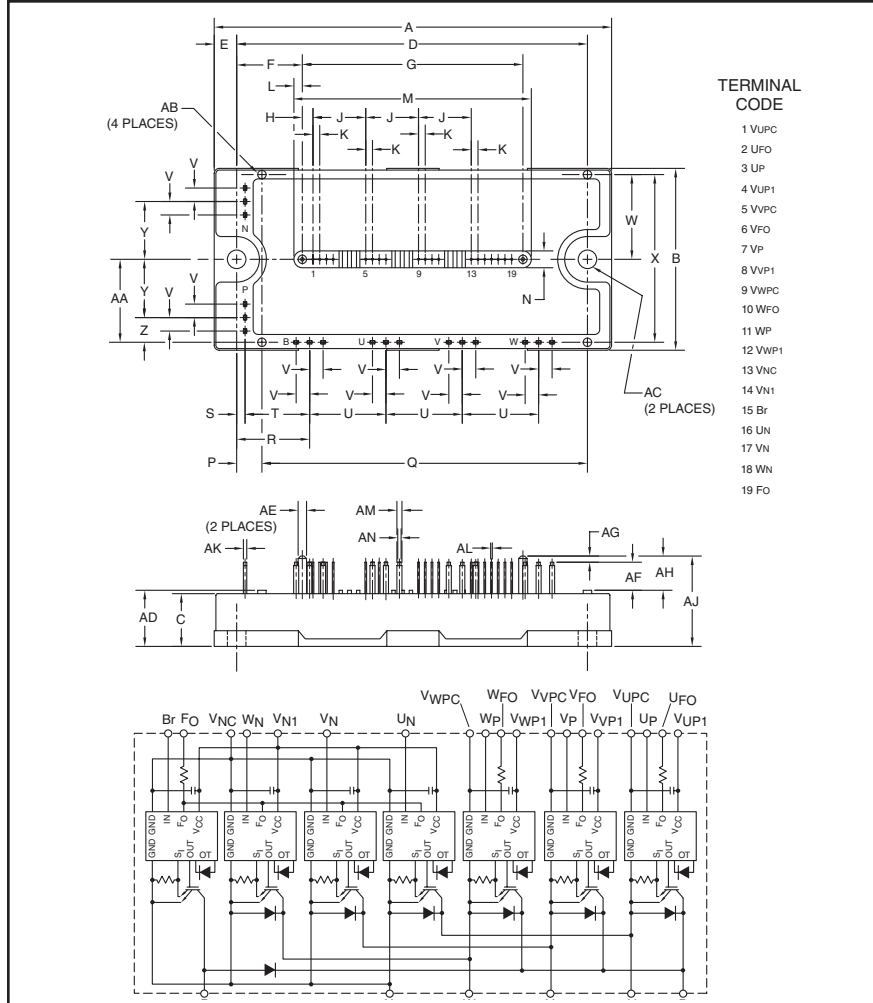
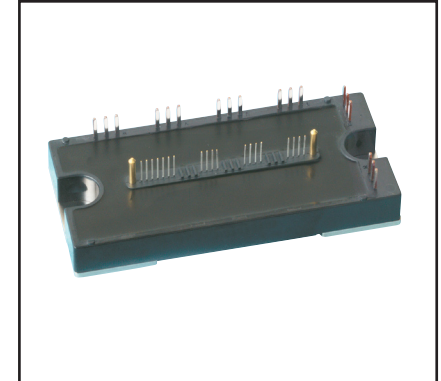


Intellimod™ L1-Series Three Phase IGBT Inverter + Brake 75 Amperes/1200 Volts



TERMINAL CODE

- 1 VUPC
- 2 UFO
- 3 UP
- 4 VUP1
- 5 VVPC
- 6 VFO
- 7 VP
- 8 VWP1
- 9 VVPC
- 10 WFO
- 11 WP
- 12 WWP1
- 13 VNC
- 14 VN1
- 15 Br
- 16 UN
- 17 VN
- 18 WN
- 19 FO



Description:

Powerex Intellimod™ Intelligent Power Modules are isolated base modules designed for power switching applications operating at frequencies to 20kHz. Built-in control circuits provide optimum gate drive and protection for the IGBT and free-wheel diode power devices.

Features:

- Complete Output Power Circuit
- Gate Drive Circuit
- Protection Logic
 - Short Circuit
 - Over Temperature Using On-chip Temperature Sensing
 - Under Voltage
- Low Loss Using Full Gate CSTBT™ IGBT Chip

Applications:

- Inverters
- UPS
- Motion/Servo Control
- Power Supplies

Ordering Information:

Example: Select the complete part number from the table below -i.e. PM75RL1B120 is a 1200V, 75 Ampere Intellimod™ Intelligent Power Module.

Type	Current Rating Amperes	V _{CEs} Volts (x 10)
PM	75	120

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters	Dimensions	Inches	Millimeters
A	4.72	120.0	V	0.16	4.0
B	2.17	55.0	W	1.01	25.75
C	0.63	16.0	X	2.00	50.75
D	4.17	106.0	Y	0.69	17.5
E	0.28	7.0	Z	0.30	7.5
F	0.78	19.75	AA	0.98	25.0
G	2.62	66.5	AB	0.10 Dia.	Dia. 2.5
H	0.13	3.25	AC	0.22 Dia.	Dia. 5.5
J	0.63	16.0	AD	0.67	17.0
K	0.08	2.0	AE	0.10 Dia.	Dia. 2.5
L	0.10	2.5	AF	0.33	8.5
M	2.81	71.5	AG	0.08	2.0
N	0.20	5.0	AH	0.41	10.5
P	0.31	7.75	AJ	1.08	27.5
Q	3.87	98.25	AK	0.04	1.0
R	0.87	22.0	AL	0.02 Sq.	Sq. 0.5
S	0.10	2.5	AM	0.06	1.5
T	0.77	19.5	AN	0.04	1.0
U	0.91	23.0			

PM75RL1B120
Intellimod™ L1-Series
Three Phase IGBT Inverter + Brake
 75 Amperes/1200 Volts

Absolute Maximum Ratings, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	PM75RL1B120	Units
Power Device Junction Temperature	T_j	-20 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M5 Main Terminal Screws	—	31	in-lb
Module Weight (Typical)	—	380	Grams
Supply Voltage, Surge (Applied between P - N)	$V_{\text{CC(surge)}}$	1000	Volts
Self-protection Supply Voltage Limit (Short Circuit protection Capability)*	$V_{\text{CC(prot.)}}$	800	Volts
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

IGBT Inverter Sector

Collector-Emitter Voltage ($V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$)	V_{CES}	1200	Volts
Collector Current ($T_C = 25^\circ\text{C}$) (Note 1)	$\pm I_C$	75	Amperes
Peak Collector Current ($T_C = 25^\circ\text{C}$)	$\pm I_{\text{CP}}$	150	Amperes
Collector Dissipation ($T_C = 25^\circ\text{C}$) (Note 1)	P_C	595	Watts

IGBT Brake Sector

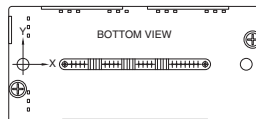
Collector-Emitter Voltage ($V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$)	V_{CES}	1200	Volts
Collector Current ($T_C = 25^\circ\text{C}$) (Note 1)	$\pm I_C$	50	Amperes
Peak Collector Current ($T_C = 25^\circ\text{C}$)	$\pm I_{\text{CP}}$	100	Amperes
Collector Dissipation ($T_C = 25^\circ\text{C}$) (Note 1)	P_C	462	Watts
Diode Forward Current	I_F	50	Amperes
Diode Rated DC Reverse Voltage ($T_C = 25^\circ\text{C}$)	$V_{\text{R(DC)}}$	1200	Volts

Control Sector

Supply Voltage (Applied between $V_{\text{UP1-VUPC}}$, $V_{\text{VP1-VVPC}}$, $V_{\text{WP1-VWPC}}$, $V_{\text{UN1-VNC}}$)	V_D	20	Volts
Input Voltage (Applied between U_P-V_{UPC} , V_P-V_{VPC} , W_P-V_{WPC} , $U_N-V_N-W_N-Br-V_{\text{NC}}$)	V_{CIN}	20	Volts
Fault Output Supply Voltage (Applied between $U_{\text{FO-VUPC}}$, $V_{\text{FO-VVPC}}$, $W_{\text{FO-VWPC}}$, F_O-V_{NC})	V_{FO}	20	Volts
Fault Output Current (U_{FO} , V_{FO} , W_{FO} , F_O Terminals)	I_{FO}	20	mA

* $V_D = 13.5 \sim 16.5\text{V}$, Inverter Part, $T_j = 125^\circ\text{C}$

Note 1: T_C (Under the Chip) Measurement Point



Axis \ Arm	UP		VP		WP		UN		VN		WN		Br	
	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi
X	27.8	27.8	65.4	65.4	87.4	87.4	38.7	38.7	54.5	54.5	76.5	76.5	18.5	18.5
Y	-8.0	0.0	-8.0	1.0	-8.0	1.0	-1.4	7.6	-1.4	7.6	-1.4	7.6	-9.9	5.4

PM75RL1B120
Intellimod™ L1-Series
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Electrical and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 75\text{A},$ $T_j = 25^\circ\text{C}$	—	1.65	2.15	Volts
		$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 75\text{A},$ $T_j = 125^\circ\text{C}$	—	1.85	2.35	Volts
Diode Forward Voltage	V_{EC}	$-I_C = 75\text{A}, V_{CIN} = 15\text{V}, V_D = 15\text{V}$	—	2.3	3.3	Volts
Inductive Load Switching Times	t_{on}		0.3	0.8	2.0	μs
	t_{rr}	$V_D = 15\text{V}, V_{CIN} = 0 \Leftrightarrow 15\text{V}$	—	0.3	0.8	μs
	$t_{C(on)}$	$V_{CC} = 600\text{V}, I_C = 75\text{A}$	—	0.4	1.0	μs
	t_{off}	$T_j = 125^\circ\text{C}$	—	1.2	2.8	μs
	$t_{C(off)}$		—	0.4	1.2	μs
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 25^\circ\text{C}$	—	—	1.0	mA
		$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 125^\circ\text{C}$	—	—	10	mA
IGBT Brake Sector						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 50\text{A},$ $T_j = 25^\circ\text{C}$	—	1.65	2.15	Volts
		$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 50\text{A},$ $T_j = 125^\circ\text{C}$	—	1.85	2.35	Volts
Forward Voltage	V_{FM}	$I_F = 50\text{A}$	—	2.3	3.3	Volts
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 25^\circ\text{C}$	—	—	1.0	mA
		$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 125^\circ\text{C}$	—	—	10	mA
Control Sector						
Circuit Current	I_D	$V_D = 15\text{V}, V_{CIN} = 15\text{V}, V_{N1}-V_{NC}$	—	8	16	mA
		$V_D = 15\text{V}, V_{CIN} = 15\text{V}, V_{XP1}-V_{XPC}$	—	2	4	mA
Input ON Threshold Voltage	$V_{th(on)}$	Applied between U_P-V_{UPC} ,	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{th(off)}$	$V_P-V_{VPC}, W_P-V_{WPC}, U_N- V_N- W_N-Br-V_{NC}$	1.7	2.0	2.3	Volts
Short Circuit Trip Level ($-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}, V_D = 15\text{V}$)	SC	Inverter Part	150	—	—	Amperes
		Brake Part	100	—	—	Amperes
Short Circuit Current Delay Time	$t_{off(SC)}$	$V_D = 15\text{V}$	—	0.2	—	μs
Over Temperature Protection (Detect T_j of IGBT Chip)	OT	Trip Level	135	—	—	$^\circ\text{C}$
		Reset Level	—	20	—	$^\circ\text{C}$
Supply Circuit Under-voltage Protection ($-20 \leq T_j \leq 125^\circ\text{C}$)	UV	Trip Level	11.5	12.0	12.5	Volts
		Reset Level	—	12.5	—	Volts
Fault Output Current*	$I_{FO(H)}$	$V_D = 15\text{V}, V_{CIN} = 15\text{V}$	—	—	0.01	mA
		$V_D = 15\text{V}, V_{CIN} = 15\text{V}$	—	10	15	mA
Fault Output Pulse Width*	t_{FO}	$V_D = 15\text{V}$	1.0	1.8	—	ms

*Fault output is given only when the internal SC, OT and UV protections schemes of either upper or lower arm device operates to protect it.



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PM75RL1B120
Intellimod™ L1-Series
Three Phase IGBT Inverter + Brake
 75 Amperes/1200 Volts

Electrical and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
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Thermal Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	IGBT (Per 1 Element) (Note 1)	—	—	0.21*	$^\circ\text{C}/\text{Watt}$
Inverter Part	$R_{th(j-c)D}$	FWDi (Per 1 Element) (Note 1)	—	—	0.36*	$^\circ\text{C}/\text{Watt}$
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	IGBT (Note 1)	—	—	0.27*	$^\circ\text{C}/\text{Watt}$
Brake Part	$R_{th(j-c)D}$	FWDi (Note 1)	—	—	0.47*	$^\circ\text{C}/\text{Watt}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied (Note 1)	—	—	0.038	$^\circ\text{C}/\text{Watt}$

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	≤ 800	Volts
Control Supply Voltage**	V_D	Applied between V_{UP1} - V_{UPC} , V_{VP1} - V_{VPC} , V_{WP1} - V_{WPC} , V_{N1} - V_{NC}	15.0 ± 1.5	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between U_P - V_{UPC} ,	≤ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$	V_P - V_{VPC} , W_P - V_{WPC} , U_N - V_{N1} , W_N - Br - V_{NC}	≥ 9.0	Volts
PWM Input Frequency	f_{PWM}	—	≤ 20	kHz
Arm Shoot-through Blocking Time	t_{DEAD}	Input Signal	≥ 2.5	μs

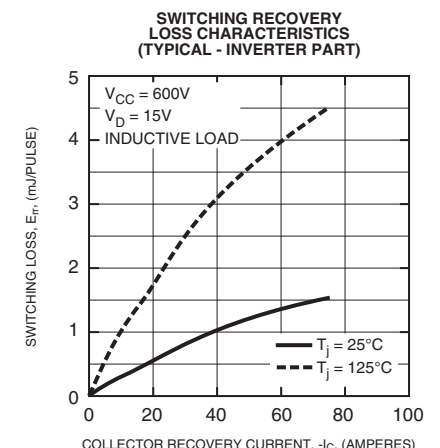
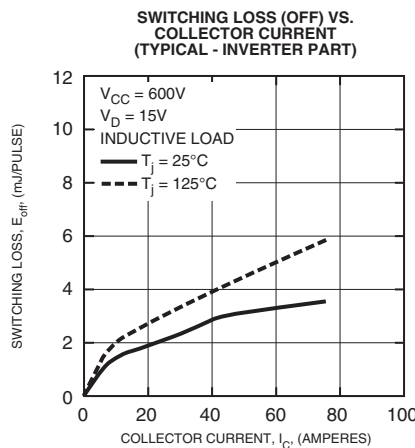
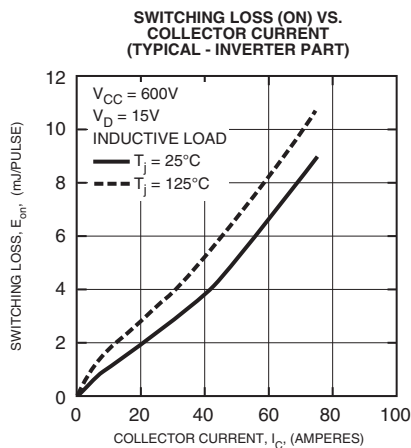
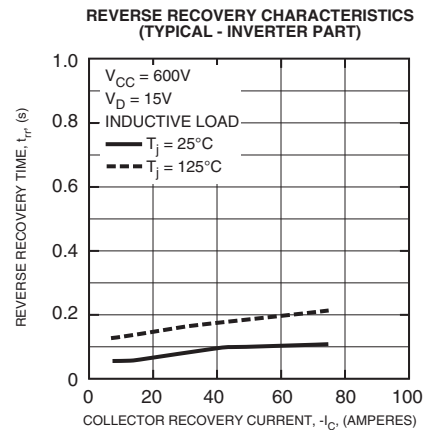
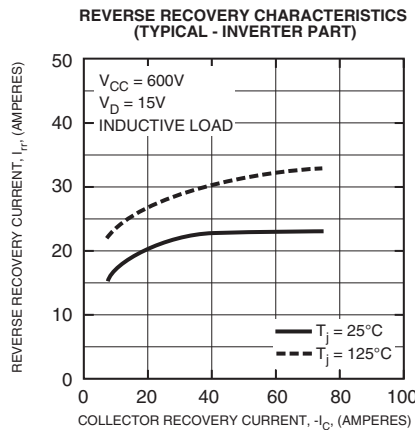
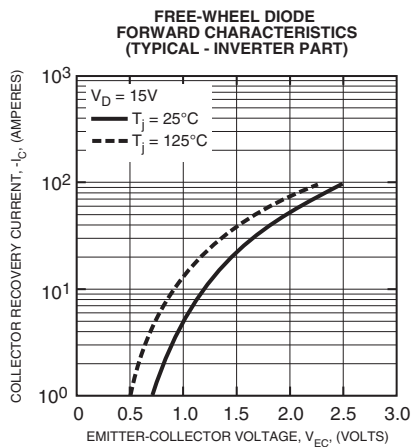
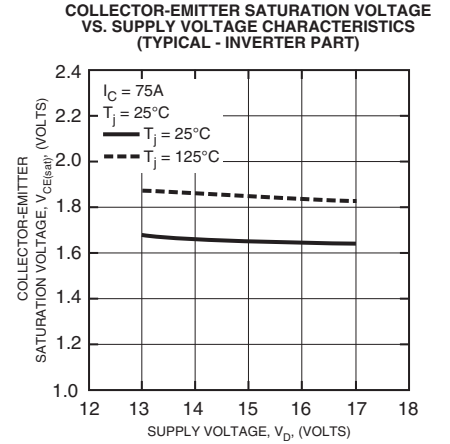
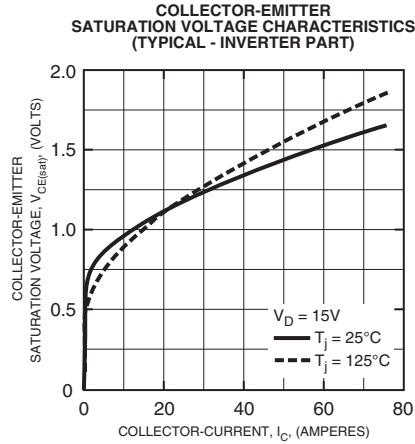
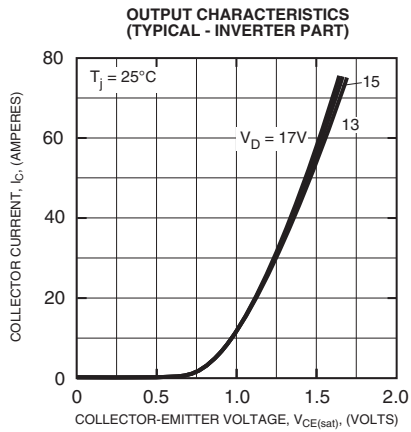
* If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

** With ripple satisfying the following conditions: dv/dt swing $\leq \pm 5V/\mu\text{s}$, Variation $\leq 2V$ peak to peak.

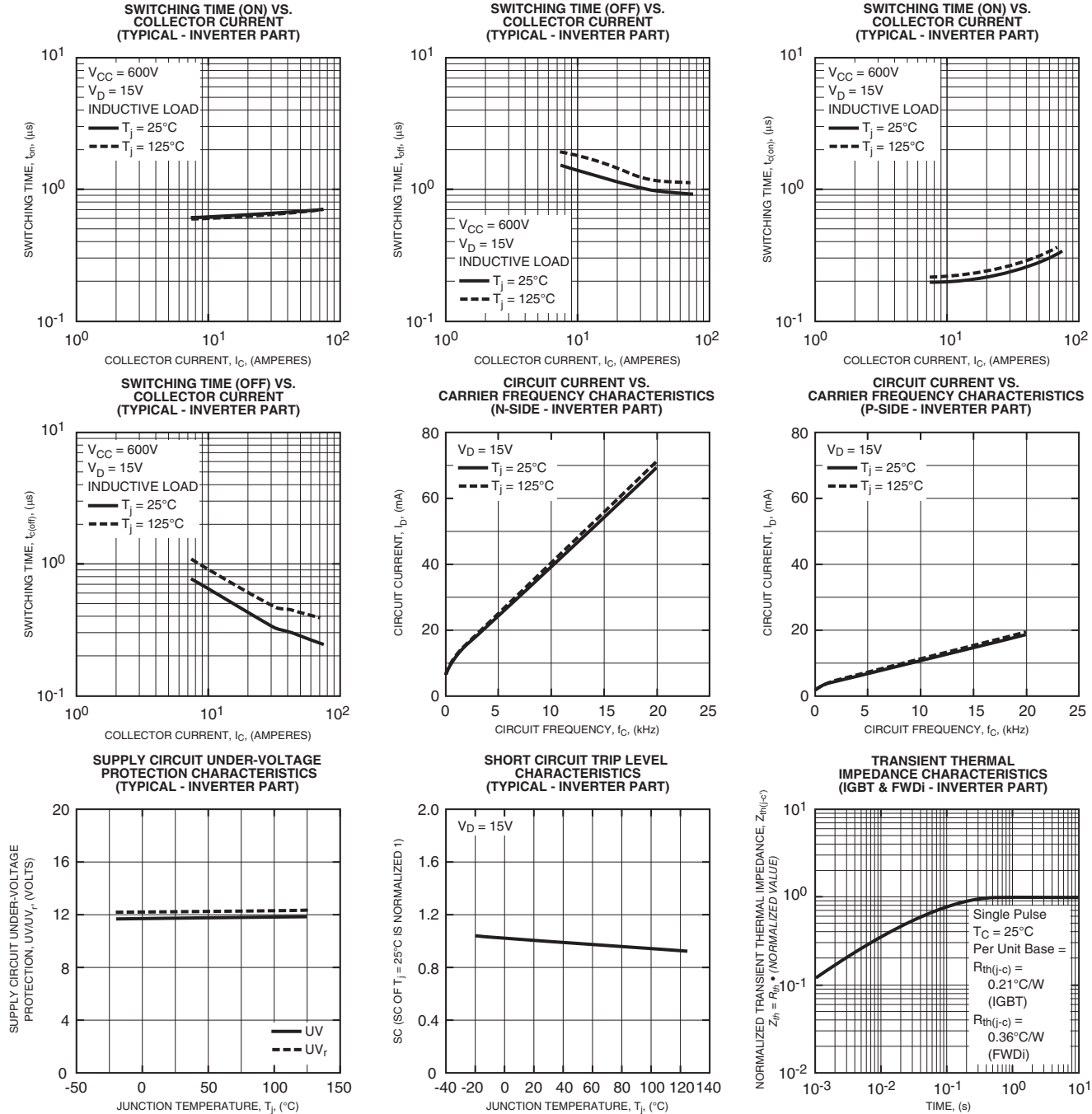


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