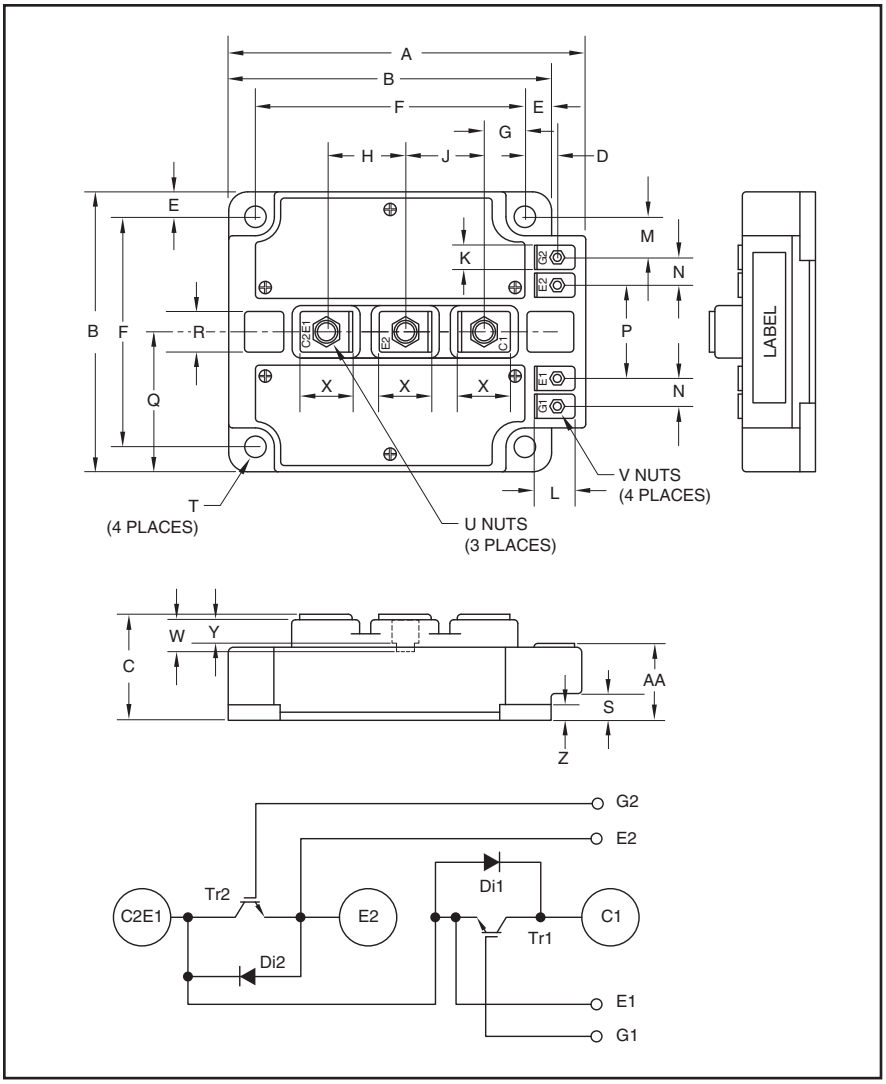
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

CM800DY-24S

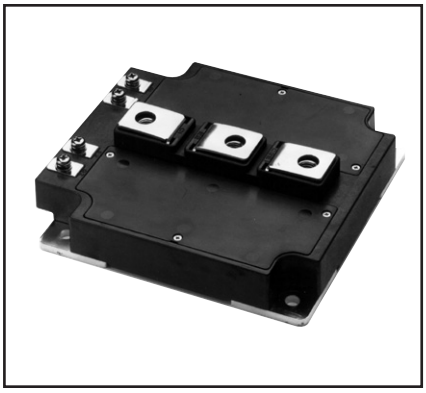
Dual IGBTMOD™ S-Series Module
800 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.51	140.0
B	5.12	130.0
C	1.38+0.04/-0.02	35.0+1.0/-0.5
D	0.45	11.5
E	0.39	10.0
F	4.33±0.001	110.0±0.25
G	0.54	13.8
H	1.42	36.0
J	1.72	43.8
K	0.35	9.0
L	0.59	15.0
M	0.80	20.4
N	0.57	14.5

Dimensions	Inches	Millimeters
P	1.57	40.0
Q	2.56	65.0
R	0.79	20.0
S	0.32	8.0
T	0.26 Dia.	6.5 Dia.
U	M8 Metric	M8
V	M4 Metric	M4
W	0.43	11.1
X	1.02	26.0
Y	0.29	7.3
Z	0.16	4.0
AA	0.96+0.04/-0.02	24.5+1.0/-0.5



Description:
Powerex Dual IGBTMOD™ Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half-bridge configuration with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:
- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:
- ☐ AC Motor Control
- ☐ Motion/Servo Control
- ☐ UPS
- ☐ Welding Power Supplies
- ☐ Laser Power Supplies

Ordering Information:
Example: Select the complete module number you desire from the table - i.e. CM800DY-24S is a 1200V (V_{CES}), 800 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	800	24

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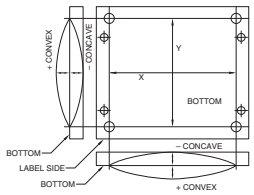
800 Amperes/1200 Volts

Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	CM800DY-24S	Units
Maximum Junction Temperature	$T_{j(max)}$	+175	°C
Operating Junction Temperature	$T_{j(op)}$	-40 ~ +150	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C
Case Temperature*2	T_C	-40 ~ +125	°C
Collector-Emitter Voltage (G-E SHORT)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	±20	Volts
Collector Current (DC, T_c = 117°C)*2,*8	I_C	790	Amperes
Peak Collector Current (Pulse, Repetitive)*3	I_{CRM}	1600	Amperes
Total Power Dissipation (T_c = 25°C)*2,*4	P_{tot}	5355	Watts
Emitter Current (FWDi Current, T_c = 25°C)*2,*4,*8	I_E*1	790	Amperes
Peak Emitter Current (FWDi Current, Pulse, Repetitive)*3	I_{ERM}*1	1600	Amperes
Mounting Torque, M8 Main Terminals	–	95	in-lb
Mounting Torque, M4 Auxiliary Terminals	–	15	in-lb
Mounting Torque, M6 Mounting to Heatsink	–	40	in-lb
Creepage Distance (Terminal to Terminal)	d_s	–	mm
Creepage Distance (Terminal to Baseplate)	d_s	–	mm
Clearance (Terminal to Terminal)	d_a	–	mm
Clearance (Terminal to Baseplate)	d_a	–	mm
Weight	–	1200	Grams
Flatness of Baseplate (On the Centerline X, Y)*7	e_c	-100 ~ +100	µm
Isolation Voltage (Terminals to Baseplate, RMS, f = 60Hz, AC 1 min.)	V_{iso}	2500	Volts

*1 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).
*2 Case temperature (T_C) and heatsink temperature (T_s) measured point is just under the chips.
*3 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.
*4 Junction temperature (T_j) should not increase beyond maximum junction temperature ($T_{j(max)}$) rating.
*6 Typical value is measured by using thermally conductive grease of λ = 0.9 W/(m•K).
*7 Baseplate flatness measurement point is as in the following figure.



*8 This module has 800A IGBT and FWDi chips. This limitation is based on a package limitation.

Static Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, V_{GE} = 0V	–	–	1	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	–	–	0.5	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 80mA, V_{CE} = 10V	5.4	6.0	6.6	Volts
Collector-Emitter Saturation Voltage (Terminal)	$V_{CE(sat)}$	I_C = 800A, V_{GE} = 15V, T_j = 25°C[*5]	–	1.95	2.40	Volts
		I_C = 800A, V_{GE} = 15V, T_j = 125°C[*5]	–	2.25	–	Volts
		I_C = 800A, V_{GE} = 15V, T_j = 150°C[*5]	–	2.35	–	Volts
Collector-Emitter Saturation Voltage (Chip)	$V_{CE(sat)}$	I_C = 800A, V_{GE} = 15V, T_j = 25°C	–	1.70	2.15	Volts
		I_C = 800A, V_{GE} = 15V, T_j = 125°C	–	1.90	–	Volts
		I_C = 800A, V_{GE} = 15V, T_j = 150°C	–	1.95	–	Volts
Gate Charge	Q_G	V_{CC} = 600V, I_C = 800A, V_{GE} = 15V	–	1868	–	nC
Emitter-Collector Voltage (Terminal)	V_{EC}[*1]	I_E = 800A, V_{GE} = 0V, T_j = 25°C[*5]	–	1.85	2.30	Volts
		I_E = 800A, V_{GE} = 0V, T_j = 125°C[*5]	–	1.85	–	Volts
		I_E = 800A, V_{GE} = 0V, T_j = 150°C[*5]	–	1.85	–	Volts
Emitter-Collector Voltage (Chip)	V_{EC}[*1]	I_E = 800A, V_{GE} = 0V, T_j = 25°C	–	1.70	2.15	Volts
		I_E = 800A, V_{GE} = 0V, T_j = 125°C	–	1.70	–	Volts
		I_E = 800A, V_{GE} = 0V, T_j = 150°C	–	1.70	–	Volts

Dynamic Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}	V_{CE} = 10V, V_{GE} = 0V	–	–	80.0	nF
Output Capacitance	C_{oes}		–	–	16.0	nF
Reverse Transfer Capacitance	C_{res}		–	–	1.32	nF
Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 800A,	–	–	800	ns
Rise Time	t_r	V_{GE} = 15V,	–	–	200	ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 0Ω,	–	–	600	ns
Fall Time	t_f	Inductive Load	–	–	300	ns
Reverse Recovery Time	t_{rr}[*1]	V_{CC} = 600V, I_E = 800A, V_{GE} = ±15V,	–	–	300	ns
Reverse Recovery Charge	Q_{rr}[*1]	R_G = 0Ω, Inductive Load	–	42.8	–	µC
Turn-on switching Energy (Per Pulse)	E_{on}	V_{CC} = 600V, $I_C = I_E$ = 800A,	–	107	–	mJ
Turn-off Switching Energy (Per Pulse)	E_{off}	V_{GE} = ±15V, R_G = 0Ω,	–	82	–	mJ
Reverse Recovery Energy (Per Pulse)	E_{rr}[*1]	T_j = 150°C, Inductive Load	–	71	–	mJ
Internal Lead resistance	$R_{CC' + EE'}$	Main Terminals-Chip, Per Switch, T_C = 25°C[*2]	–	–	0.4	mΩ
Internal Gate Resistance	r_g	Per Switch	–	2.45	–	Ω

*1 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).
*2 Case temperature (T_C) and heatsink temperature (T_s) measured point is just under the chips.
*5 Pulse width and repetition rate should be such as to cause negligible temperature rise.

Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case*2	$R_{th(j-c)}Q$	Per IGBT	–	–	0.028	°C/W
Thermal Resistance, Junction to Case*2	$R_{th(j-c)}R$	Per FWDi	–	–	0.045	°C/W
Contact Thermal Resistance*2	$R_{th(c-s)}$	Case to Heatsink,Per 1/2 Module, Thermal Grease Applied*6	–	0.015	–	°C/W

Recommended Operating Conditions, T_a = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
DC Supply Voltage	V_{CC}	Applied Across C1-E2	–	600	850	Volts
Gate (-Emitter Drive) Voltage	$V_{GE(on)}$	Applied Across G1-Es1/G2-Es2	13.5	15.0	16.5	Volts
External Gate Resistance	R_G	Per Switch	0	–	5.1	Ω

*2 Case temperature (T_C) and heatsink temperature (T_s) measured point is just under the chips.
*6 Typical value is measured by using thermally conductive grease of λ = 0.9 W/(m•K).

CM800DY-24S
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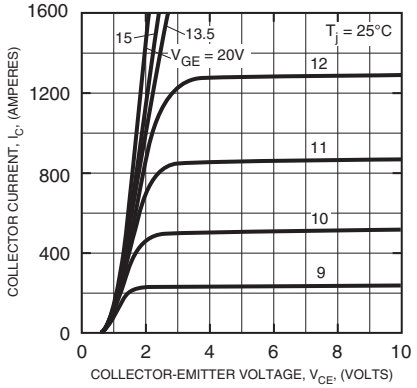
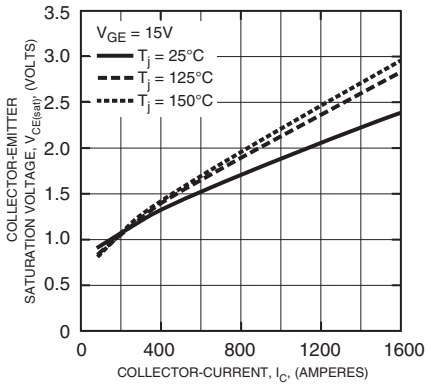
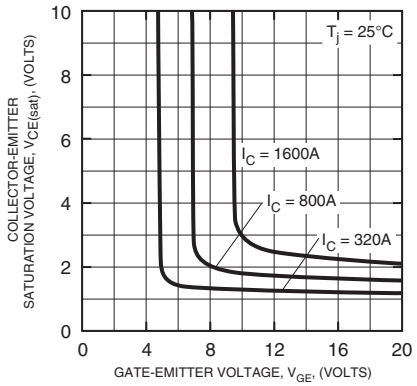
OUTPUT CHARACTERISTICS (TYPICAL)



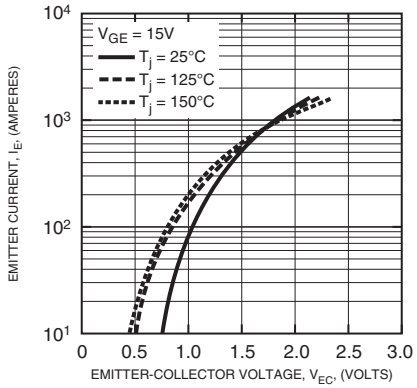
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



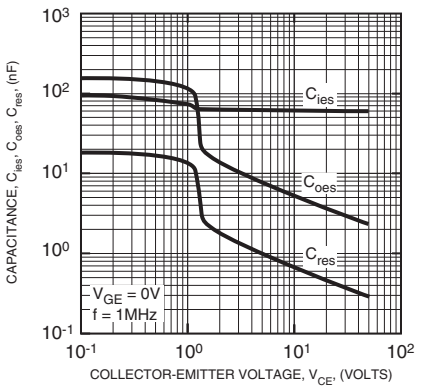
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



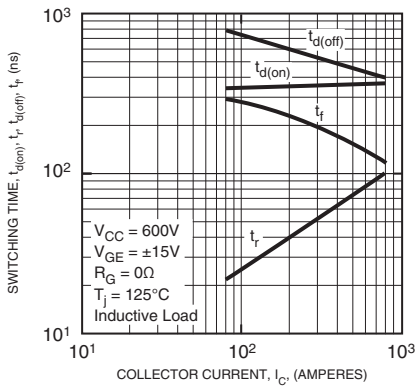
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



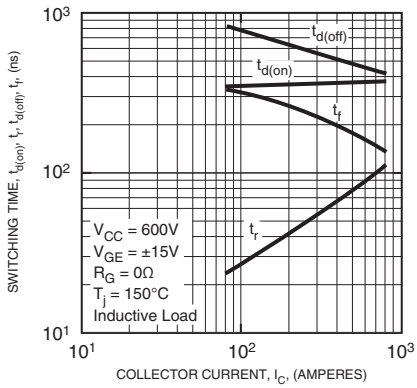
CAPACITANCE VS. V_{CE} (TYPICAL)



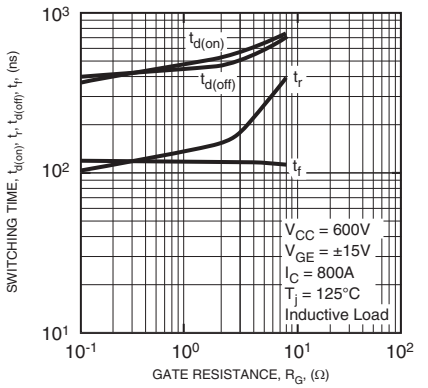
SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)



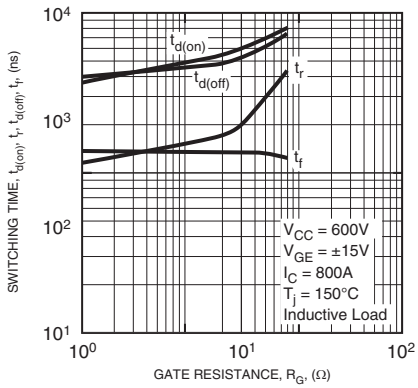
SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)



SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)



SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)



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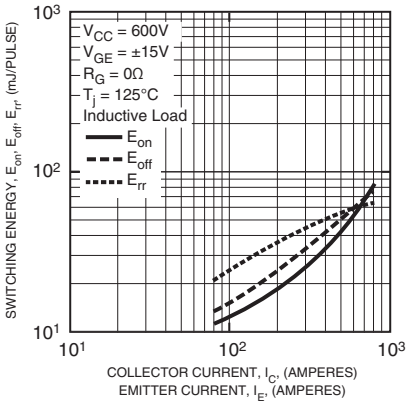
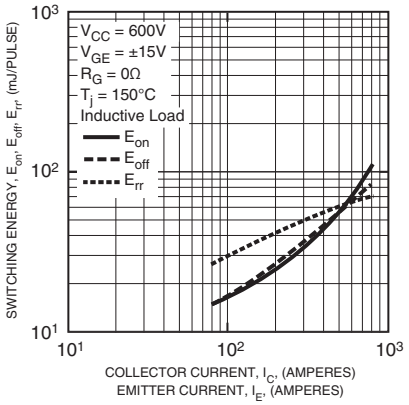
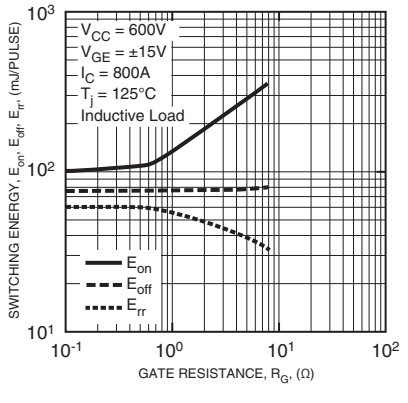
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



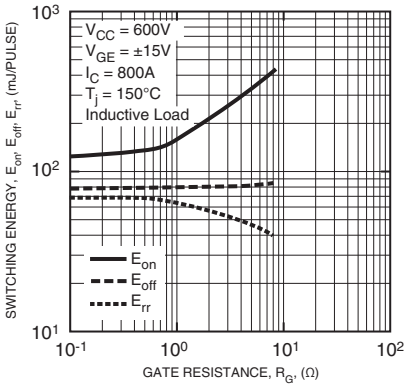
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



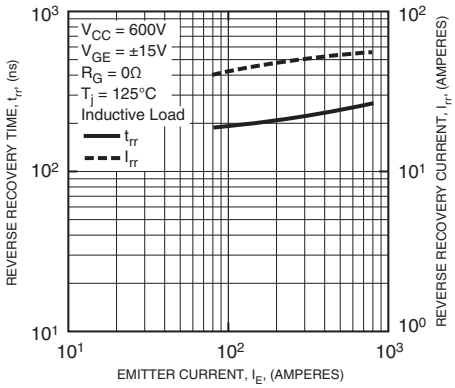
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



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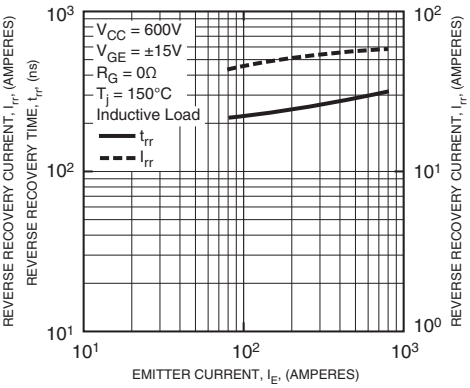
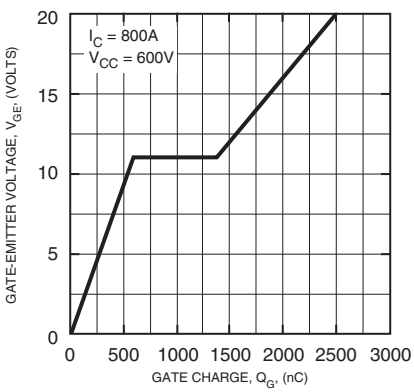
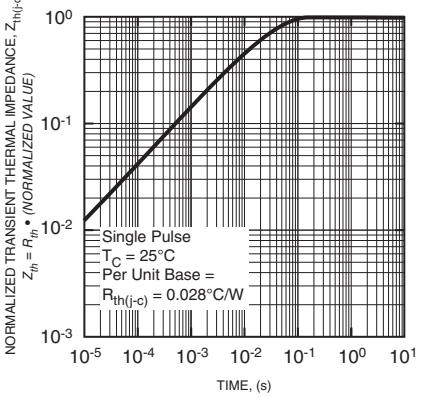


GATE CHARGE, V_{GE}



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT Part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi Part)