MAXIMUM RATINGS (T_C = 25°C unless otherwise stated)

Parameter	Symbol	Value	Unit
Collector to Emitter Voltage	V_{CES}	650	V
Gate to Emitter Voltage Transient Gate to Emitter Voltage T_{pulse} = 5 μs, D < 0.10	V_{GES}	±20 ±30	V
Collector Current (Note 1) @T_C = 25°C @T_C = 100°C	I_C	 68 40	A
Pulsed Collector Current (Note 2)	I_{LM}	160	A
Pulsed Collector Current (Note 3)	I_{CM}	160	A
Diode Forward Current (Note 1) @T_C = 25°C @T_C = 100°C	I_F		

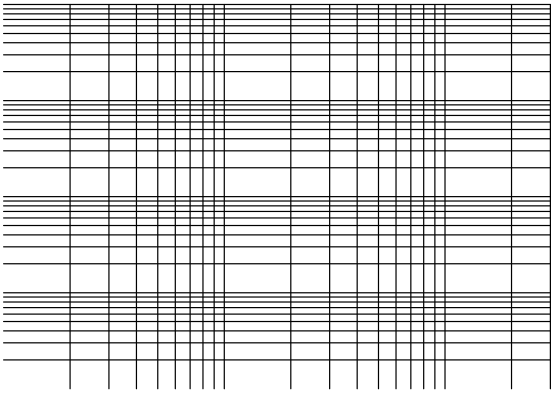
ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−to−Emitter Breakdown Voltage, Gate−Emitter Short−Circuited	BV_{CES}	V_{GE} = 0 V, I_C = 1 mA	650	−	−	V
Temperature Coefficient of Breakdown Voltage	$\Delta BV_{CES}/\Delta T_J$	V_{GE} = 0 V, I_C = 1 mA	−	0.62	−	V/°C
Collector−Emitter Cut−Off Current, Gate−Emitter Short−Circuited	I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0 V	−	−	30	μA
Gate Leakage Current, Collector−Emitter Short−Circuited	I_{GES}	V_{GE} = V_{GES}, V_{CE}				

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS, INDUCTIVE LOAD						
Turn-On Delay Time	$t_{d(on)}$	T_J = 175°C, V_{CC} = 400 V, I_C = 40 A, R_g = 3 Ω, V_{GE} = 15 V, Inductive Load	–	24	–	ns
Rise Time	t_r		–	51	–	
Turn-Off Delay Time	$t_{d(off)}$		–	80	–	
Fall Time	t_f		–	152	–	
Turn−On Switching Loss	E_{on}		–	1.71	–	mJ
Turn-Off Switching Loss	E_{off}		–	1.37	–	
Total Switching Loss	E_{ts}		–	3.08	–	
DIODE CHARACTERISTICS						
Diode Forward Voltage	V_F					

TYPICAL CHARACTERISTICS



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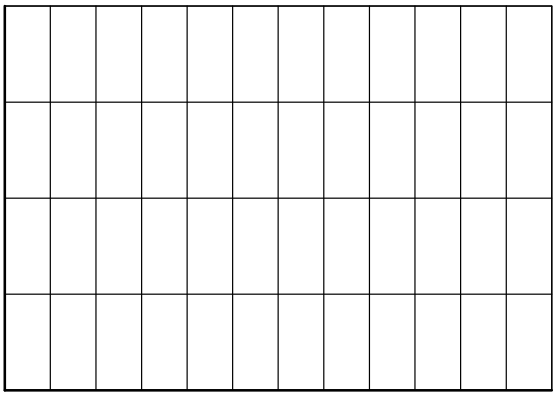
TYPICAL CHARACTERISTICS (Continued)



TYPICAL CHARACTERISTICS (Continued)

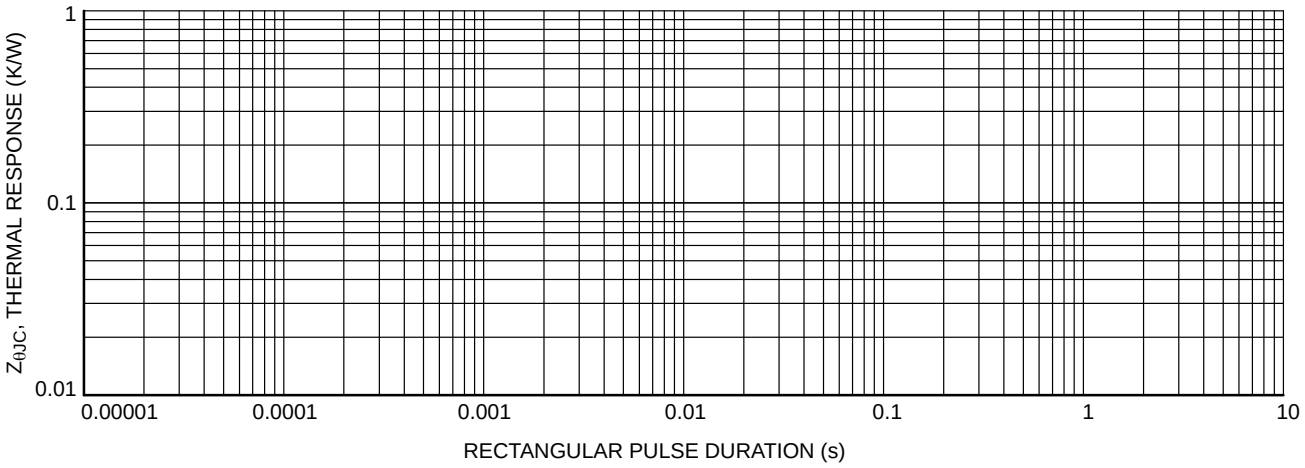


Figure 19. Transient Thermal Impedance of IGBT

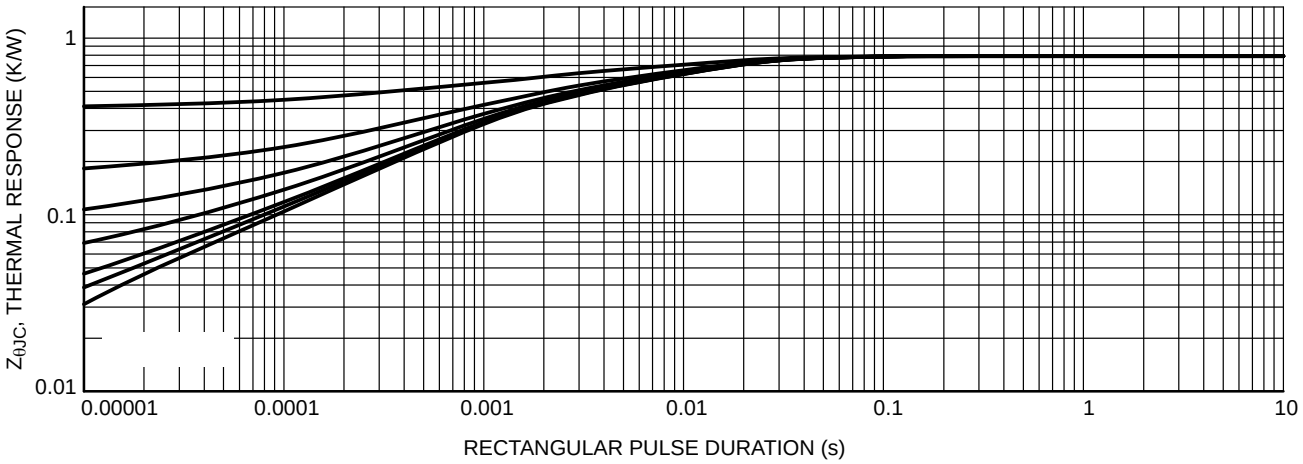


Figure 20. Transient Thermal Impedance of Diode

SCALE 1:1

D^2PAK-3 (TO−263, 3−LEAD)
CASE 418AJ
ISSUE F

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