

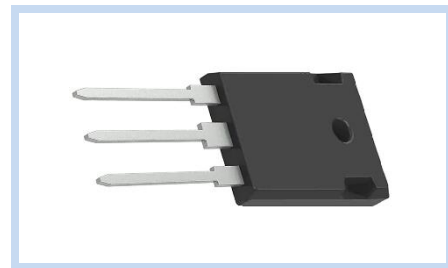
Insulated Gate Bipolar Transistor 1200V 150A 625W TO-247

MIG120N150T247

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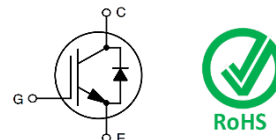
FEATURE

- Trench Gate and Field Stop Processes IGBT
- Low Saturation Collector-to-Emitter Voltage and High Switching Speed
- Positive Saturation Collector-to-Emitter Voltage Temperature Coefficient
- Soft and Fast Recover Antiparallel Diode
- 10 μ s of Short - Circuit Withstand Time



MECHANICAL DATA

- Case: TO-247 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Collector-to-Emitter Breakdown Voltage	V _{CEs}	1200	V
Gate-to-Emitter Voltage	V _{GE}	±20	V
Collector Current – Continuous	I _c	T _c =25°C	150
		T _c =100°C	75
Collector Current – Pulsed	I _{CM}	300	A
Maximum Power Dissipation	P _D	T _c =25°C	625
		T _c =100°C	349
Thermal Resistance Junction to Ambient	R _{θJA}	40	°C/W
Thermal Resistance Junction to Case	R _{θJC}	For IGBT	0.24
		For Diode	0.43
Operating Junction Temperature Range	T _J	-40 to 175	°C
Storage Temperature Range	T _{STG}	-55 to 150	°C

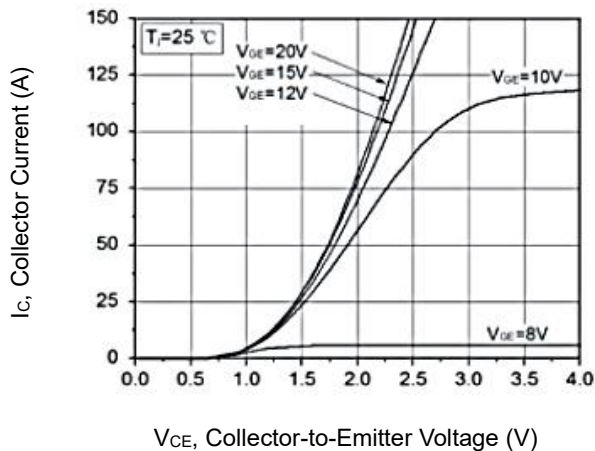
ELECTRICAL CHARACTERISTICS

Static Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	V _{GE} =0V, I _c =0.5mA	BV _{CEs}	1200	--	--	V
Zero Gate Voltage Collector Current	V _{CS} =1200V, V _{GE} =0V	I _{CEs}	--	--	1	μA
Gate-Body Leakage Current, Forward	V _{GE} =20V, V _{CS} =0V	I _{GESF}	--	--	200	nA
Gate-Body Leakage Current, Reverse	V _{GE} =-20V, V _{CS} =0V	I _{GESR}	--	--	-200	nA
Collector-Emitter Saturation Voltage	V _{GE} =20V, I _c =75A	V _{CE(SAT)}	--	1.9	2.2	V
Gate Threshold Voltage	V _{GE} =V _{DS} , I _c =250μA	V _{GE(th)}	5	--	6.6	V
Diode Forward Voltage	I _F =75A	V _F	--	2.2	3	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	V _{CC} =960V, V _{GE} =15V, I _c =75A	Q _g	--	589	--	nC
Gate-Emitter Charge		Q _{ge}	--	--	--	
Gate-Collector Charge		Q _{gc}	--	--	--	
Input Capacitance	V _{CE} =25V, V _{GE} =0V, F=1MHz	C _{ies}	--	19520	--	pF
Output Capacitance		C _{oes}	--	242	--	
Reverse Transfer Capacitance		C _{res}	--	131	--	
Switching Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Turn-On Delay Time	V _{CC} =600V, V _{GE} =15V, R _G =0.6Ω I _c =75A, T _c =25°C, Inductive Load	T _{d(on)}	--	42	--	ns
Rise Time		T _r	--	145	--	
Turn-Off Delay Time		T _{d(off)}	--	122	--	
Fall Time		T _f	--	103	--	
Turn-On Switching Loss		E _{on}	--	4.1	--	
Turn-Off Switching Loss	E _{off}	--	2.4	--		
Reverse Recovery Time	I _F =75A, di _F /dt = 100A/μs	t _{rr}	--	210	--	ns
Reverse Recovery Charge		Q _{rr}	--	2.9	--	μC
Peak Reverse Recovery Current		I _{rr}	--	26	--	A

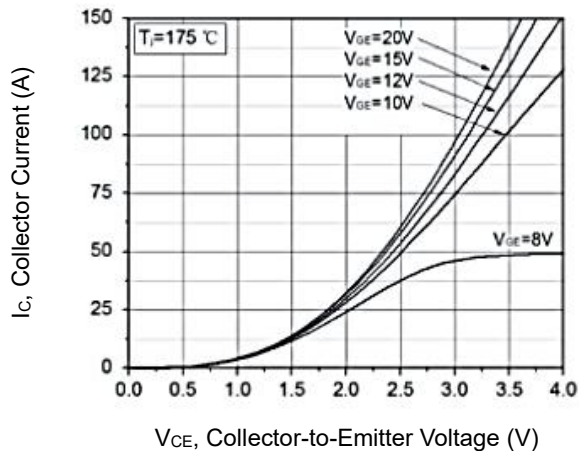
Note: 1. T_c = 25 °C unless otherwise noted. 2. Pulse width < 300μs, Duty cycle < 2%

CHARACTERISTIC CURVES

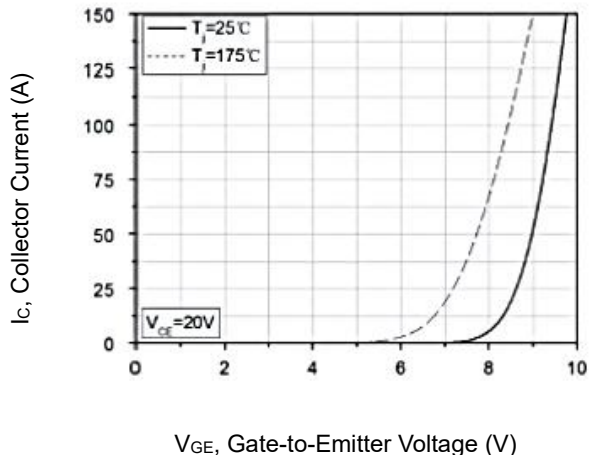
Output Characteristics



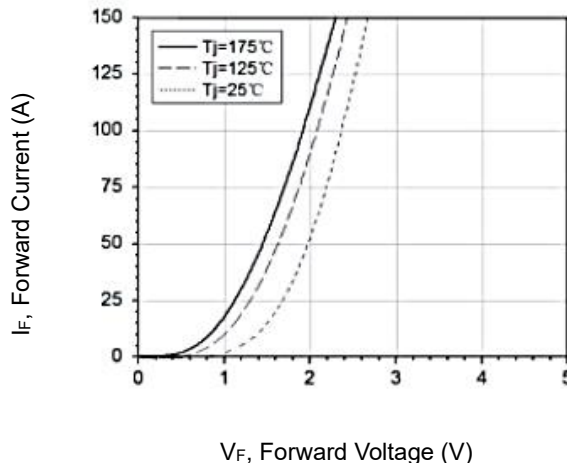
Output Characteristics



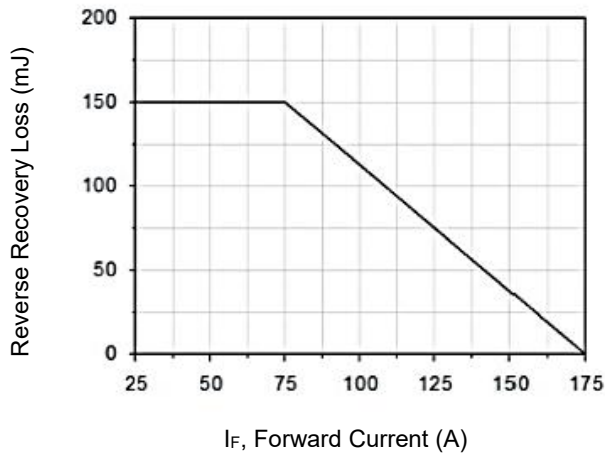
Transfer Characteristics



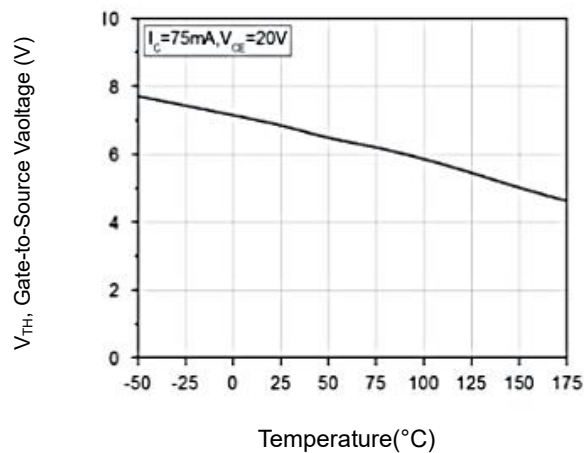
Diode Forward Characteristics



Reverse Recovery Loss vs Forward Current



Gate Threshold Voltage Variation



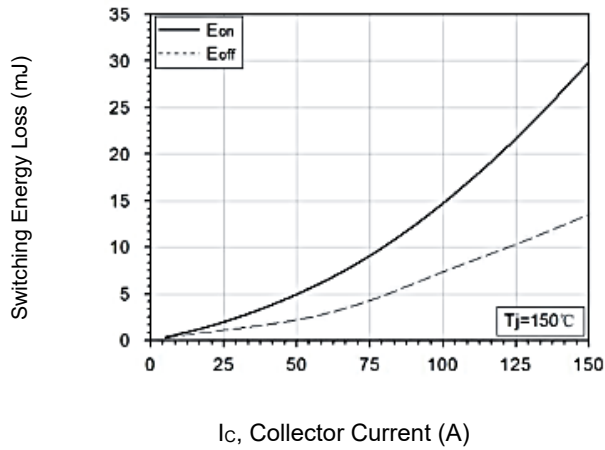
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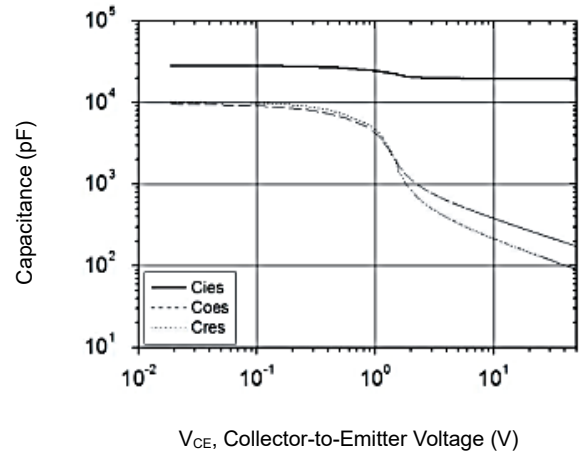
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CHARACTERISTIC CURVES

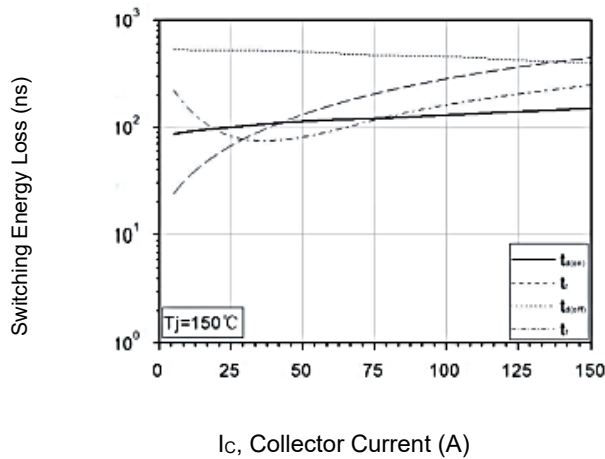
Switching Energy Loss vs Collector Current



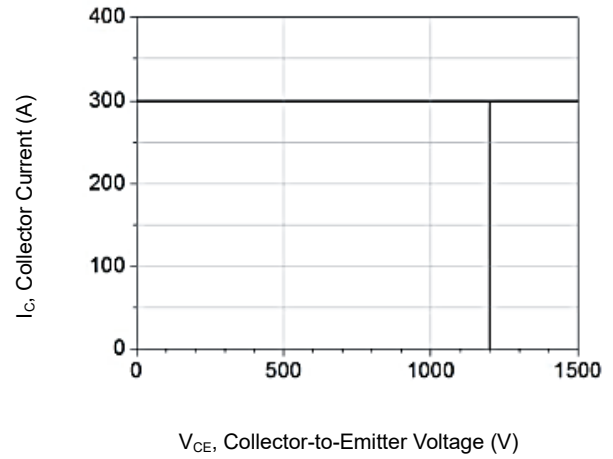
Capacitance Characteristics



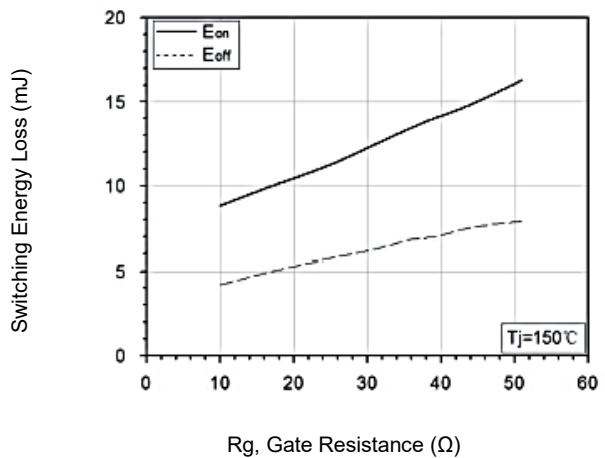
Switching Time vs Collector Current



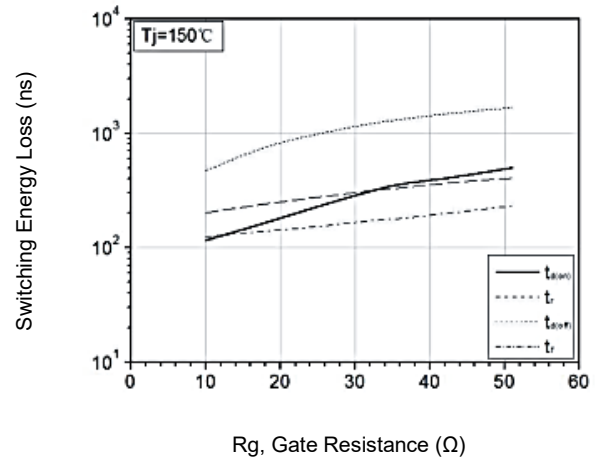
Forward Bias Safe Operating Area



Switching Energy Loss vs Gate Resistances



Switching Time vs Gate Resistances



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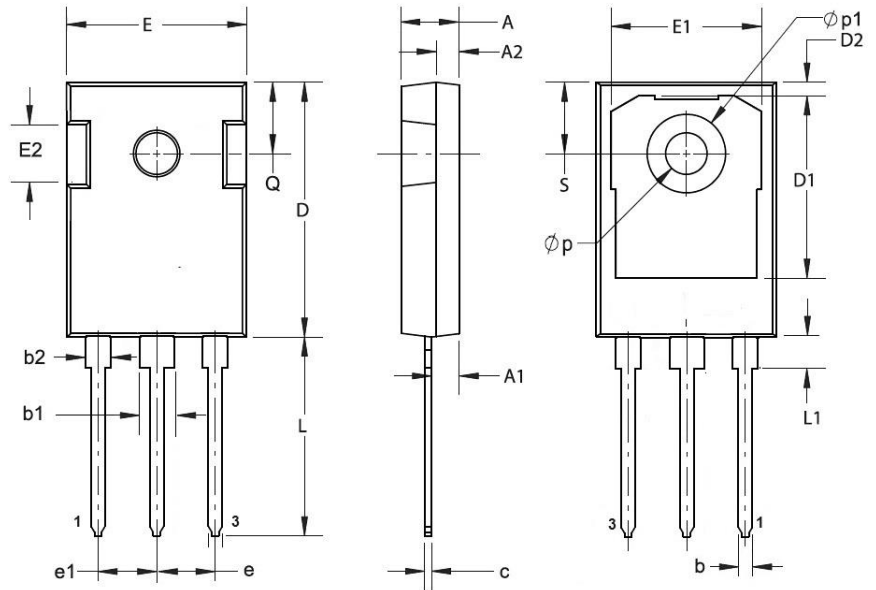
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DIMENSIONS

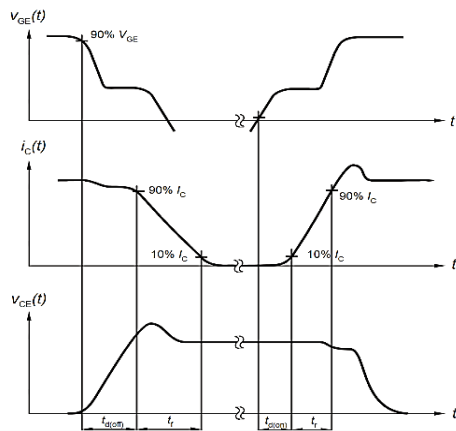
TO-247	Min	Max
A	4.60	5.20
A1	1.90	2.16
A2	2.20	2.60
b	0.90	1.40
b1	2.80	3.35
b2	1.75	2.15
c	0.50	0.70
D	20.60	21.30
D1	16.35	16.75
e	5.45	
e1	5.45	
E	15.50	16.10
E1	13.10	13.40
E2	3.80	5.30
L	19.00	20.50
L1	3.90	4.60
p	3.30	3.70
p1	6.90	7.30
Q	5.20	6.00
S	5.20	6.00

Note: 1: Gate(G), 2: Collector(C), 3: Emitter (E).

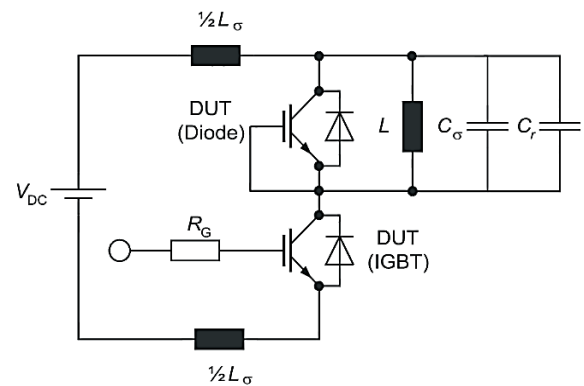


TEST CONDITION

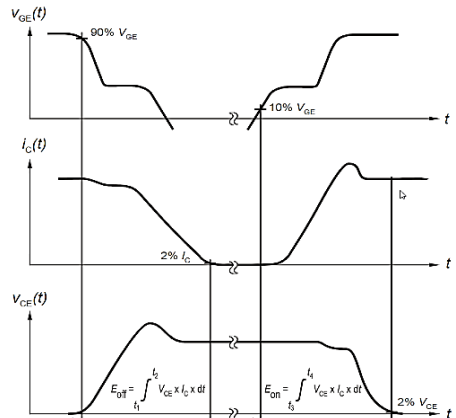
Switching Time Waveform



Switching Test Circuit



Switching Losses Waveform



Diode Switching Characteristics

