

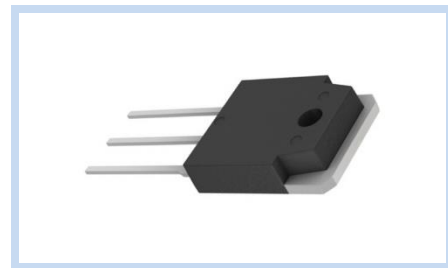
Insulated Gate Bipolar Transistor 1200V 30A 179W T3P

MIG120N30T3P

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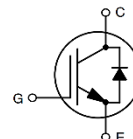
FEATURE

- Trench Gate and Field Stop Processes IGBT
- Low Saturation Collector-to-Emitter Voltage
- 10 μ s of Short - Circuit Withstand Time



MECHANICAL DATA

- Case: T3P Package
- Terminals: Solderable per MIL-STD-750, Method 2026



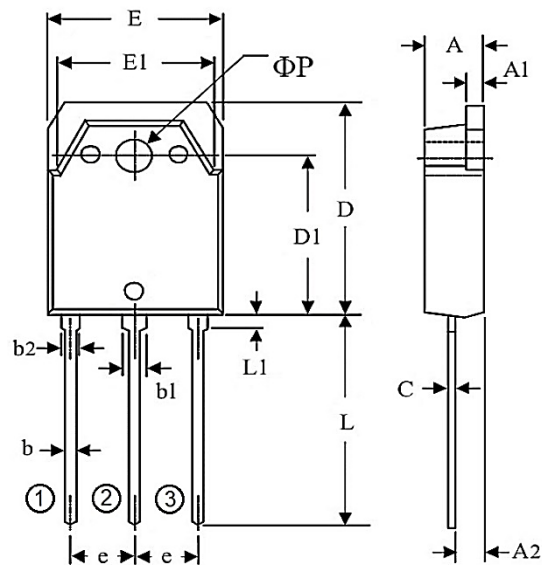
MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Collector-to-Emitter Breakdown Voltage	V_{CES}	1200	V
Gate-to-Emitter Voltage	V_{GE}	± 30	V
Collector Current – Continuous	I_C	$T_C=25^\circ\text{C}$	30
		$T_C=100^\circ\text{C}$	15
Collector Current – Pulsed	I_{CM}	45	A
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	179
		$T_C=100^\circ\text{C}$	71
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance Junction to Case For IGBT	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-40 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$

DIMENSIONS

TO-3P	Min. (mm)	Max. (mm)
A	4.50	5.10
A1	1.40	1.80
A2	2.20	2.60
b	0.80	1.20
b1	2.80	3.20
b2	1.80	2.20
C	0.50	0.70
D	19.20	20.30
D1	14.20	15.20
E	15.40	15.80
E1	13.40	13.80
e	5.45 BSC	
L	19.80	21.00
L1	3.10	3.85
P	3.20	3.50

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



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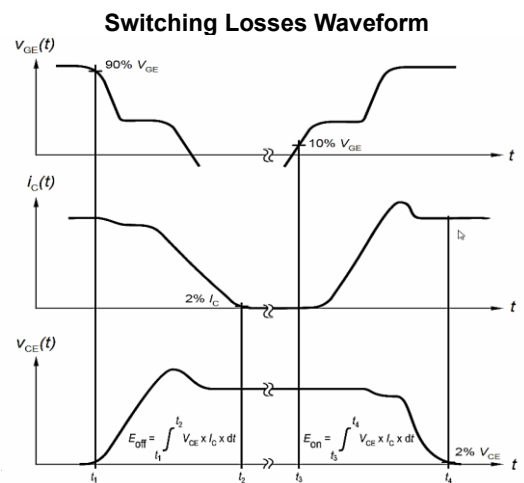
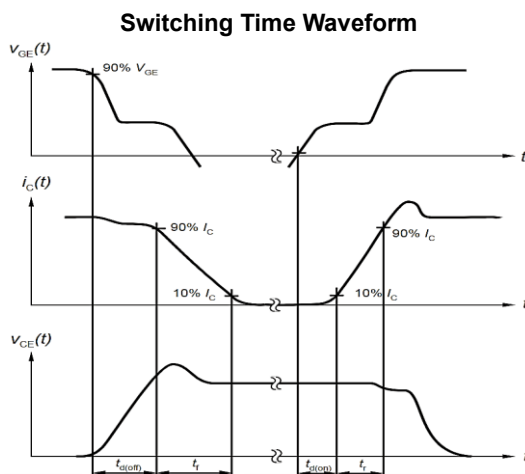
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ELECTRICAL CHARACTERISTICS

Static Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=1mA$	BV_{CES}	1200	--	--	V
Zero Gate Voltage Collector Current	$V_{CS}=1200V, V_{GE}=0V$	I_{CES}	--	--	1	μA
Gate-Body Leakage Current, Forward	$V_{GE}=30V, V_{CS}=0V$	I_{GESF}	--	--	200	nA
Gate-Body Leakage Current, Reverse	$V_{GE}=-30V, V_{CS}=0V$	I_{GESR}	--	--	-200	nA
Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=15A$	$V_{CE(SAT)}$	--	1.7	2.2	V
Gate Threshold Voltage	$V_{GE}=V_{DS}, I_C=1mA$	$V_{GE(th)}$	4.5	--	6.5	V
Diode Forward Voltage	$I_F=15A$	V_F	--	1.6	2.1	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{CC}=960V, V_{GE}=15V, I_C=15A$	Q_g	--	63	--	nC
Gate-Emitter Charge		Q_{ge}	--	4	--	
Gate-Collector Charge		Q_{gc}	--	41	--	
Input Capacitance	$V_{CE}=25V, V_{GE}=0V, F=1MHz$	C_{ies}	--	641	--	pF
Output Capacitance		C_{oes}	--	42	--	
Reverse Transfer Capacitance		C_{res}	--	22	--	
Switching Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Turn-On Delay Time	$V_{CC}=600V, V_{GE}=15V, R_G=5\Omega$ $I_C=15A, T_C=25^\circ C,$ Inductive Load	$T_{d(on)}$	--	26	--	ns
Rise Time		T_r	--	22	--	
Turn-Off Delay Time		$T_{d(off)}$	--	161	--	
Fall Time		T_f	--	218	--	
Turn-On Switching Loss		E_{on}	--	0.7	--	mJ
Turn-Off Switching Loss	E_{off}	--	1	--		
Reverse Recovery Time	$I_F=15A, di_F/dt = 100A/\mu s$	t_{rr}	--	177	--	ns
Reverse Recovery Charge		Q_{rr}	--	0.9	--	μC
Peak Reverse Recovery Current		I_{rr}	--	9.7	--	A

Note:

- $T_C = 25^\circ C$ unless otherwise noted
- Pulse width < 300 μs , Duty cycle < 2%



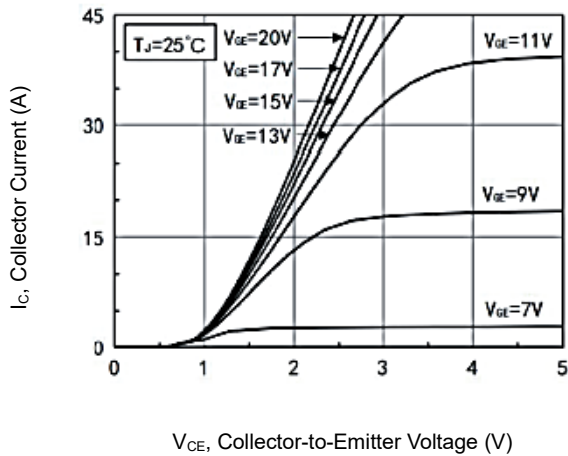
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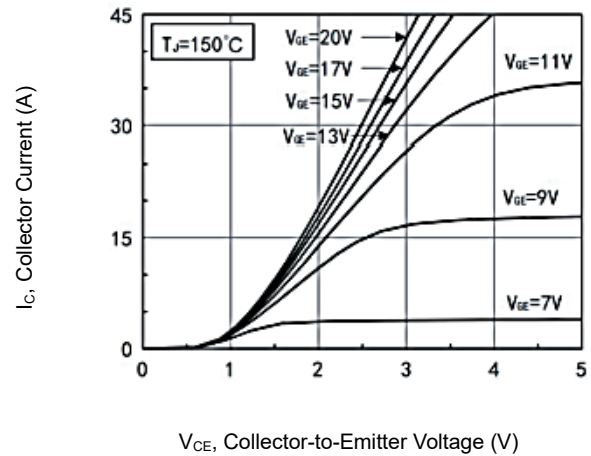
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CHARACTERISTIC CURVES

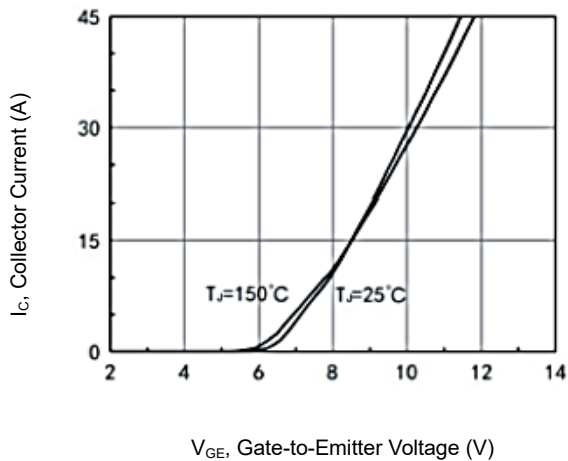
Output Characteristics



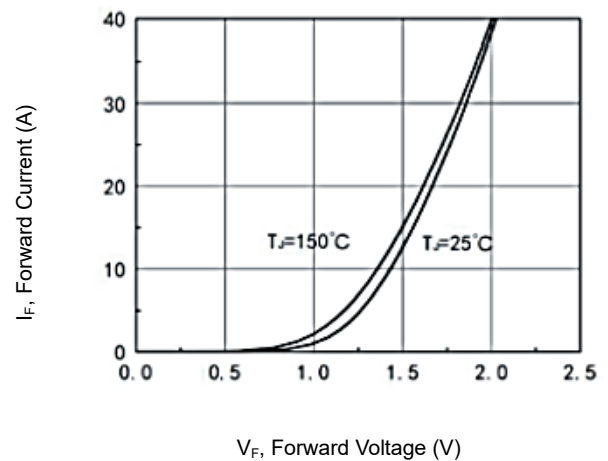
Output Characteristics



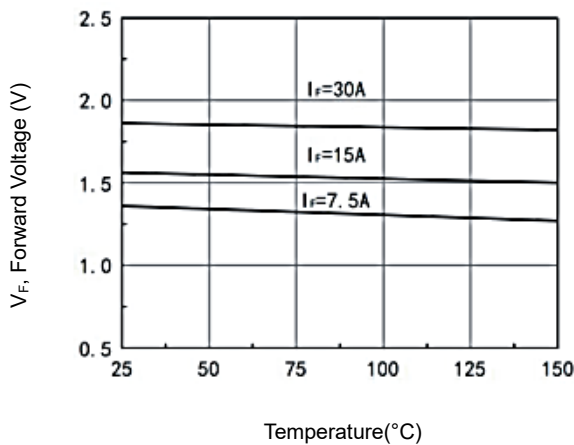
Transfer Characteristics



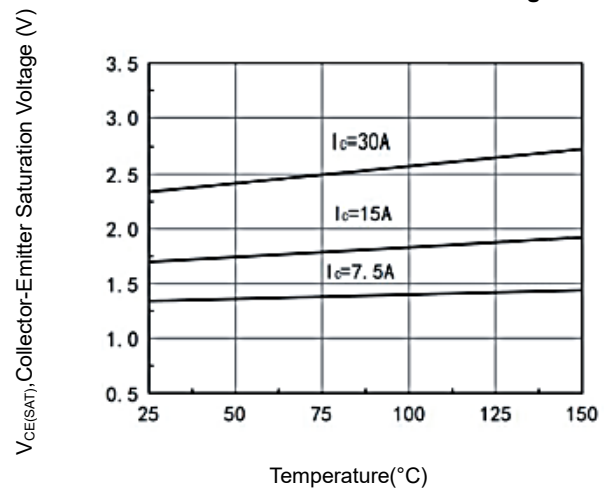
Diode Forward Characteristics



Forward Voltage Variation



Collector-Emitter Saturation Voltage



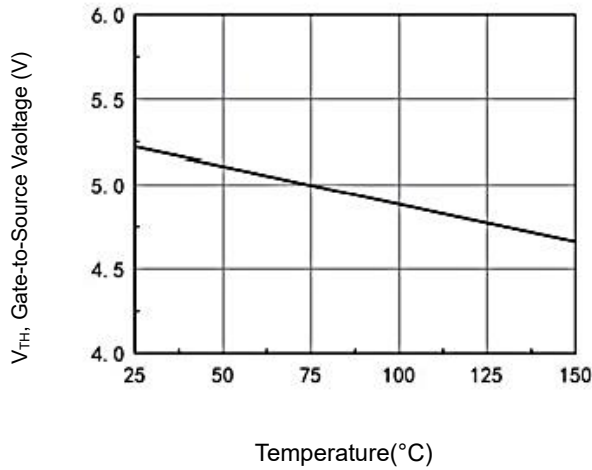
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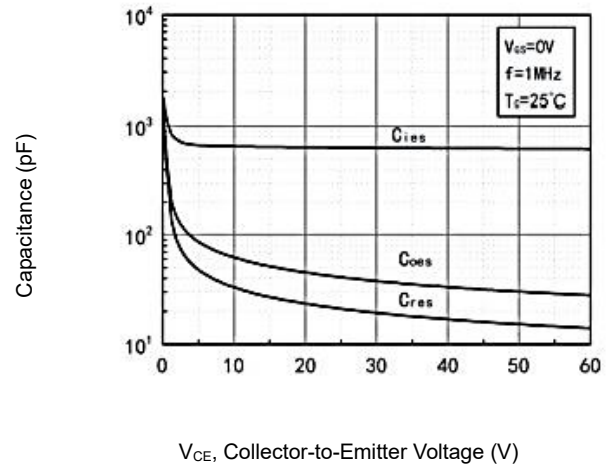
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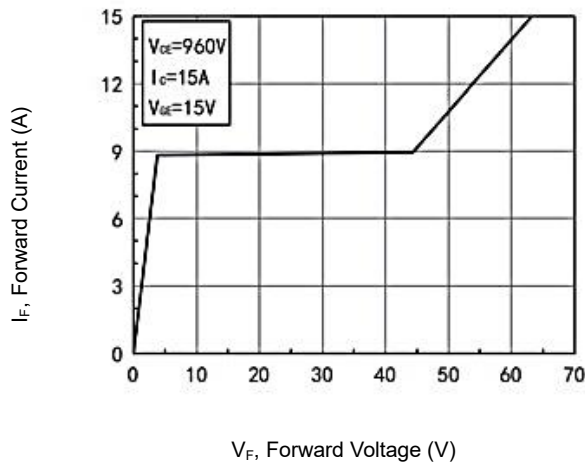
Gate Threshold Voltage Variation



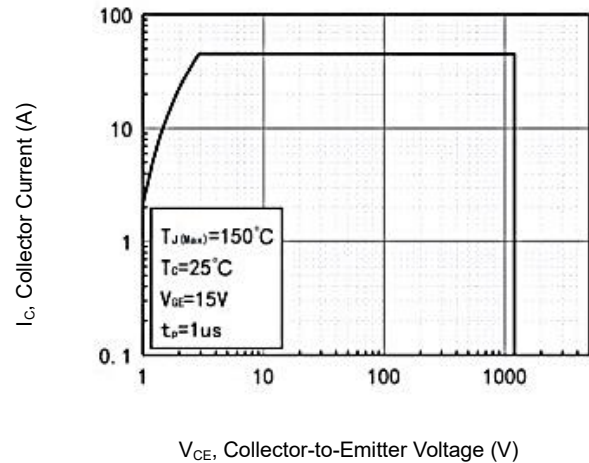
Capacitance Characteristics



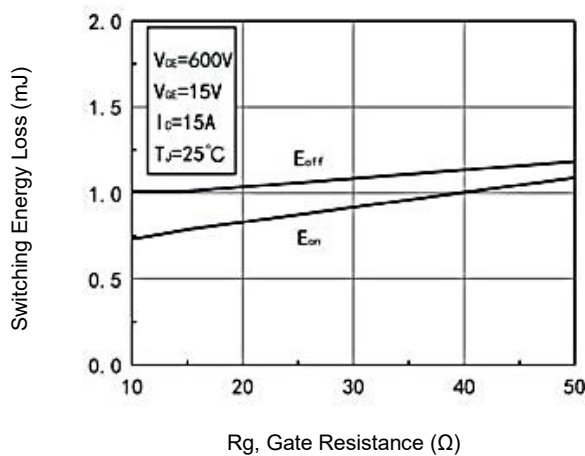
Gate-Charge Characteristics



Forward Bias Safe Operating Area



Switching Energy Loss vs Gate Resistances



Transient Thermal Resistance

