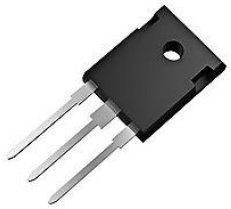
Insulated Gate Bipolar Transistor
1200V 80A 285W TO-247

MIG120N8016T247

MERITEK

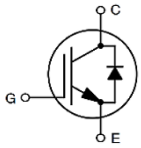
FEATURE

- Trench Gate and Field Stop Processes IGBT
- Low $V_{CE(sat)}$ and High Switching Speed
- Positive $V_{CE(sat)}$ Temperature Coefficient
- Application: Uninterruptible Power Supplies, Solar Converters, Welding Machine, and Motor Drives, etc.



MECHINAL DATA

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



RoHS

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Collector-to-Emitter Breakdown Voltage		V_{CES}	1200	V
Gate-to-Emitter Voltage		V_{GES}	±20	V
Gate-to-Emitter Transient Voltage (tp<5ms)			±25	
Collector Current – Continuous	T_C=25°C	I_C	80	A
	T_C=100°C		40	
Collector Current – Pulsed	tp limited by T_{jmax}	I_{CM}	160	A
Diode Forward Current – Continuous	T_C=25°C	I_F	48	A
	T_C=100°C		24	
Short Circuit Withstanding Time	V_{CC}≤200V, V_{GE}=15V, T_J=25°C	t_{SC}	10	μs
Power Dissipation		P_D	285	W
Thermal Resistance Junction to Case		$R_{\theta JC}$	0.44	°C/W
Operating Junction Temperature Range		T_J	-40 to 150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

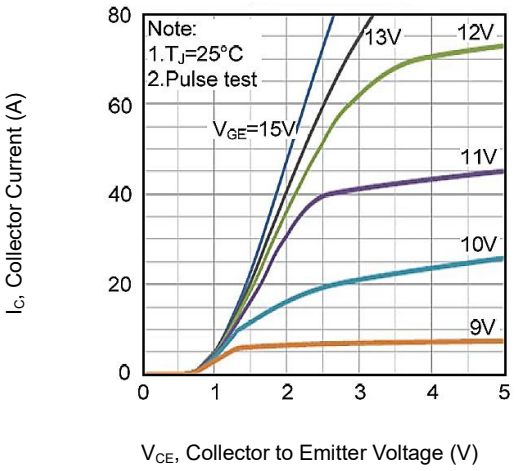
ELECTRICAL CHARACTERISTICS

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_{CE}=1200V, V_{GE}=0V	I_{CES}	--	--	5	μA
Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V	I_{GES}	--	--	±400	nA
Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=40A, T_C=25°C	$V_{CE(SAT)}$	--	1.85	2.2	V
	V_{GE}=15V, I_C=40A, T_C=125°C		--	2.3	--	
Gate-Emitter Threshold Voltage	V_{CE}=V_{GE}, I_C=250μA	$V_{GE(th)}$	4.5	--	7.5	V
Diode Forward Voltage	I_F=40A, T_A=25°C	V_F	--	--	2.5	V
Dynamic Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Total Gate Charge	V_{CE}=600V, V_{GE}=15V, I_C=40A	Q_g	--	107.7	--	nC
Gate-Emitter Charge		Q_{ge}	--	30.6	--	
Gate-Collector Charge		Q_{gc}	--	57.2	--	
Input Capacitance	V_{CE}=25V, V_{GE}=0V, F=1MHz	C_{ies}	--	2370	--	pF
Output Capacitance		C_{oes}	--	106.2	--	
Reverse Transfer Capacitance		C_{res}	--	34.4	--	
Switching Characteristics	**Conditions**	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Turn-On Delay Time	V_{CC}=600V, V_{GE}=0~15V, R_G=5Ω I_C=40A, L=500μH	$T_{d(on)}$	--	18.1	--	ns
Rise Time		T_r	--	34.6	--	
Turn-Off Delay Time		$T_{d(off)}$	--	100.1	--	
Fall Time		T_f	--	246.1	--	
Turn-On Switching Energy		E_{on}	--	2.67	--	mJ
Turn-Off Switching Energy		E_{off}	--	2.99	--	
Reverse Recovery Time	V_{CC}=600V, I_F=40A, di_F/dt=100A/μs	t_{rr}	--	48.7	--	ns
Reverse Recovery Charge		Q_{rr}	--	1.59	--	μC

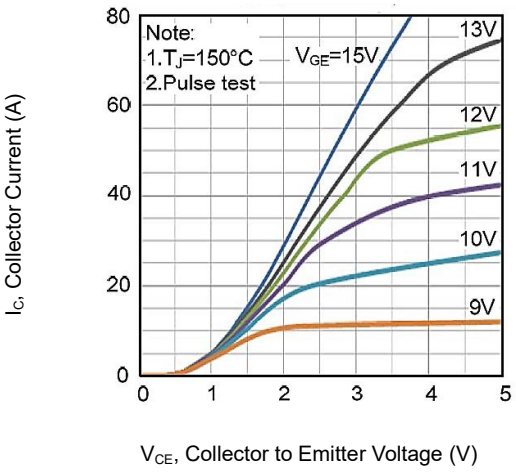
Note: 1. T_C=25°C unless otherwise noted. 2. Pulse width limited by maximum junction temperature.
3. Short circuit withstanding time allowed number of short circuits <1000; time between short circuits ≥1sec

CHARACTERISTIC CURVES

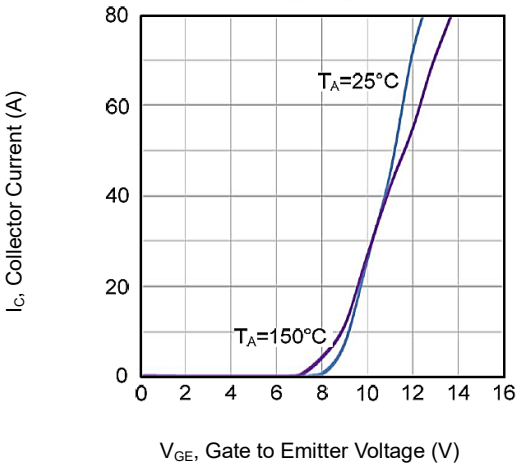
Output Characteristics (T_J =25°C)



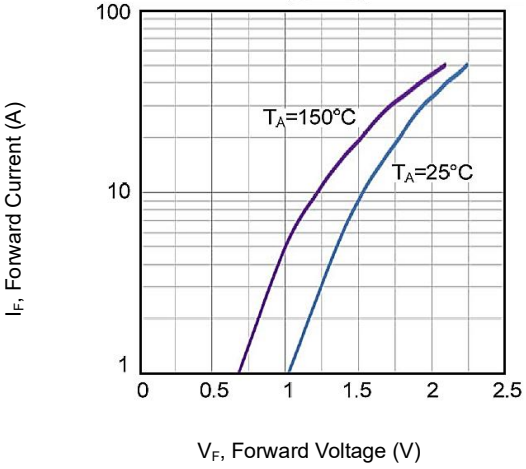
Output Characteristics (T_J =150°C)



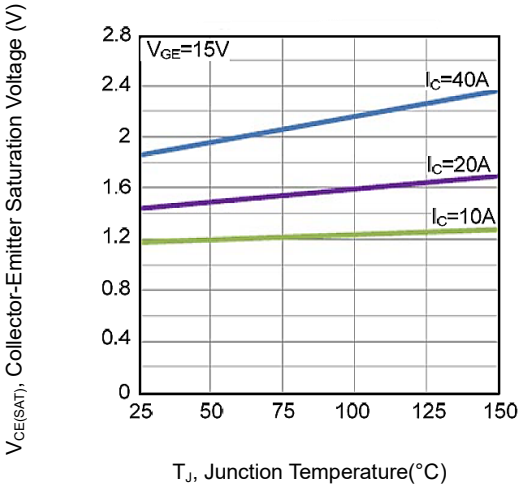
Transfer Characteristic



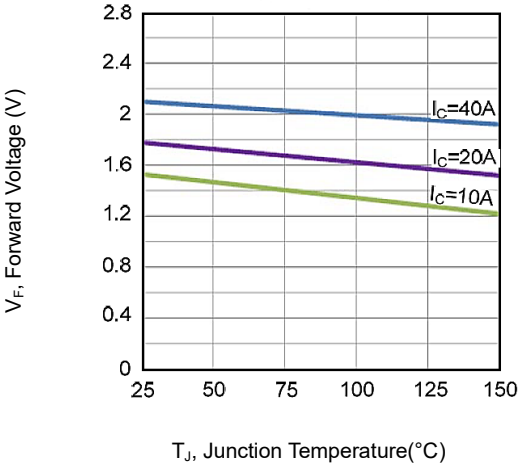
Diode Forward Characteristics



Collector-Emitter Saturation Voltage vs. Temperature

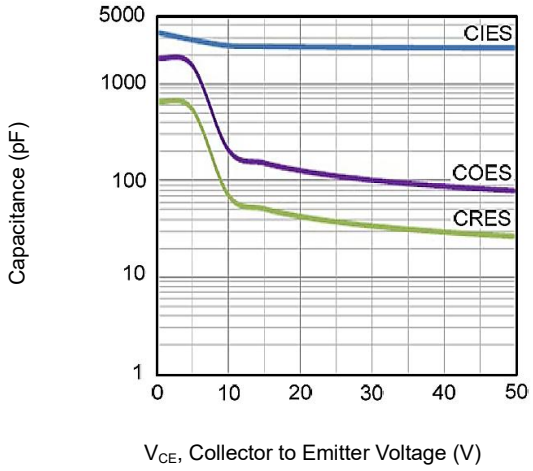


Diode Forward Voltage vs. Junction Temperature

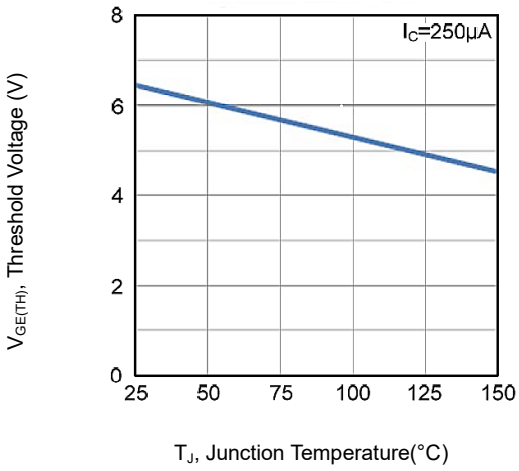


CHARACTERISTIC CURVES

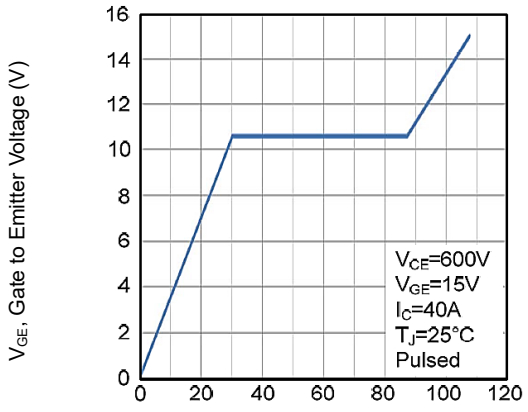
Capacitance Characteristics



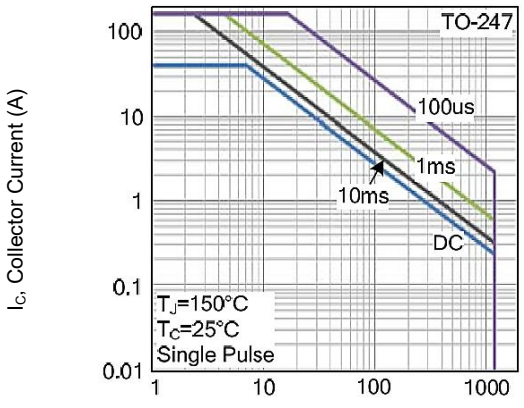
Threshold Voltage vs. Junction Temperature



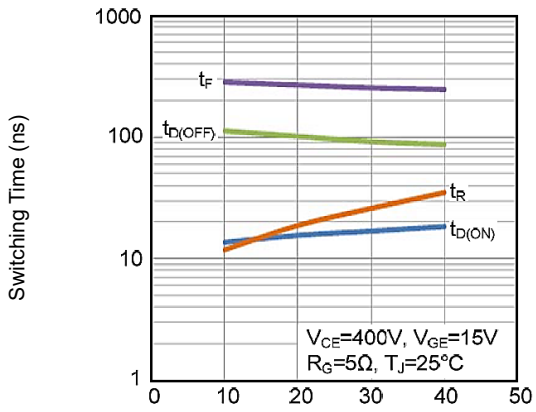
Gate Charge Characteristics



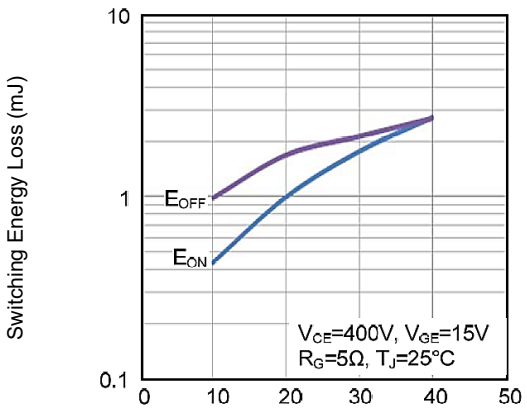
Forward Bias Safe Operating Area



Typical Switching Time vs. Collector Current

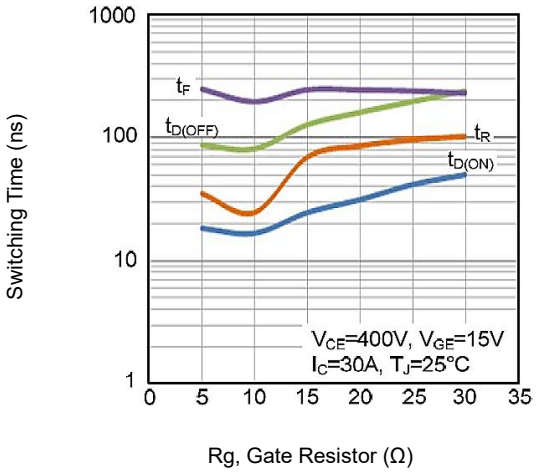


Typical Switching Energy Loss vs. Collector Current

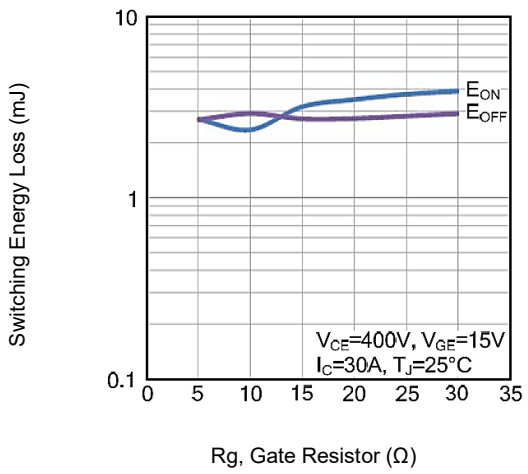


CHARACTERISTIC CURVES

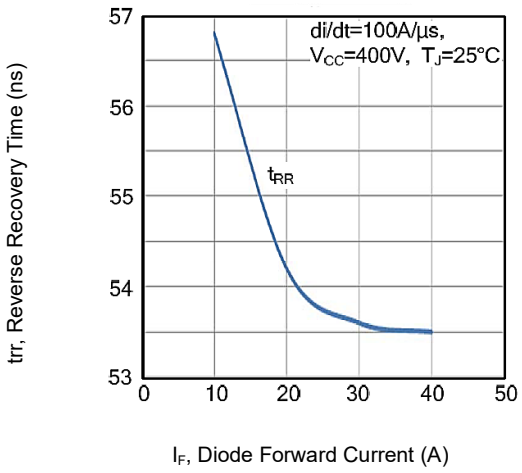
Typical Switching Time vs. Gate Resistor



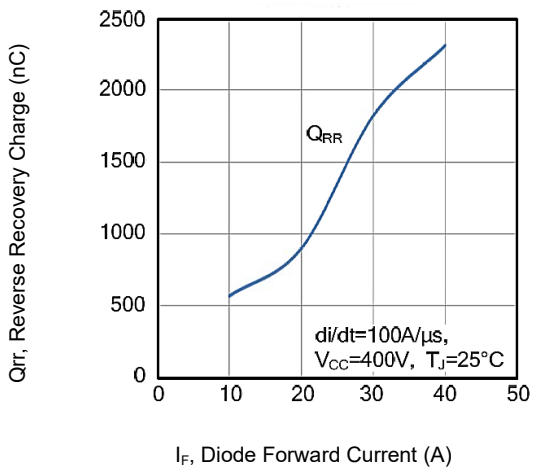
Typical Switching Energy Loss vs. Gate Resistor



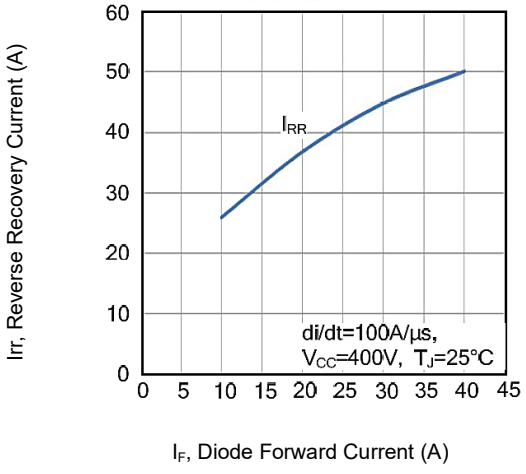
Reverse Recovery Time vs. Diode Forward Current



Reverse Recovery Charge vs. Diode Forward Current



Reverse Recovery Current vs. Diode Forward Current



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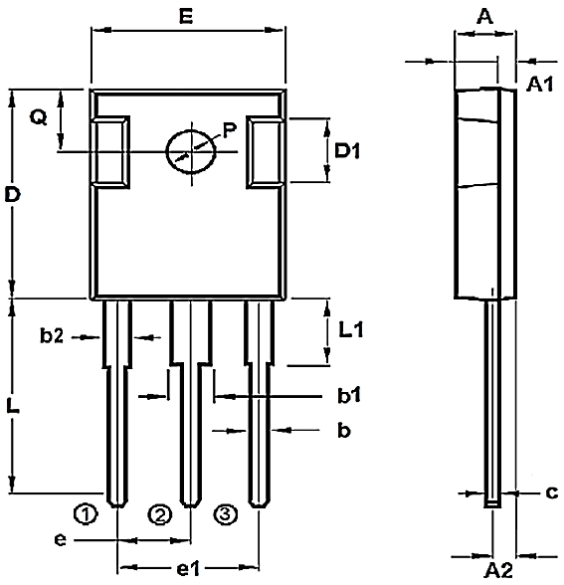
DIMENSIONS

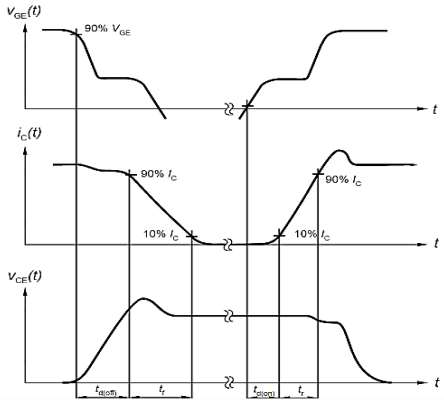
Item	Min (mm)	Max (mm)
A	4.70	5.31
A1	1.50	2.49
A2	2.18	2.59
b	1.10	1.35
b1	2.85	3.20
b2	1.90	2.20
c	0.38	0.89
D	20.70	21.46
D1	4.32	5.49
E	15.49	16.26
e	5.46	
e1	10.92	
L	19.62	20.32
L1	4.22	4.50
P	3.40	3.80
Q	5.38	6.20

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

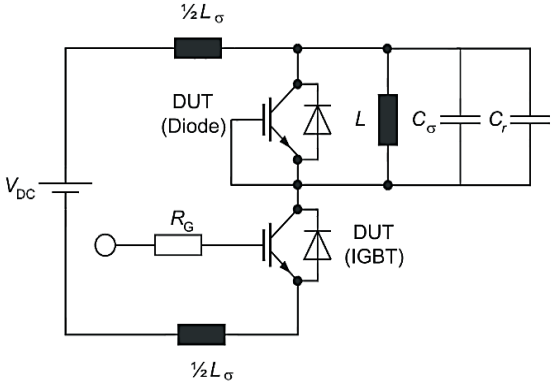


TEST CONDITION

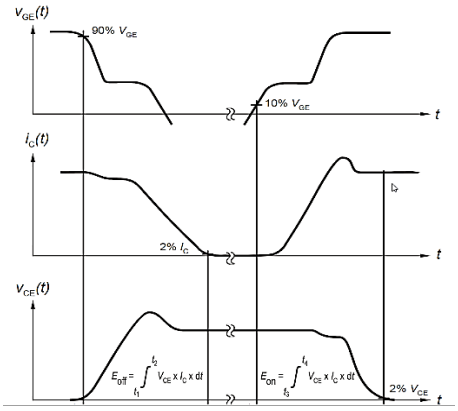
Switching Time Waveform



Switching Test Circuit



Switching Losses Waveform



Diode Switching Characteristics