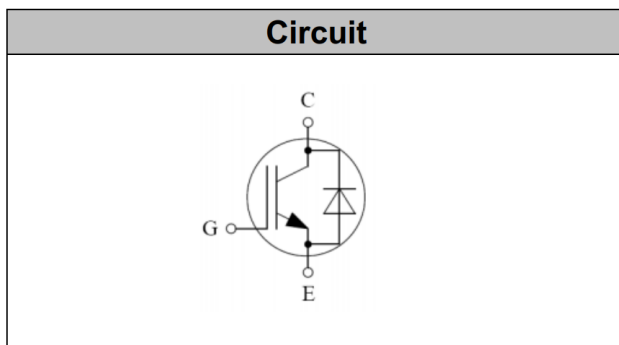


IGBT Discrete

V_{CE}	600	V
I_C	40	A
$V_{CE(SAT)} I_C=40A$	1.9	V



Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Features

- High breakdown voltage to 600V for improved reliability
- Maximum junction temperature 175°C
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)

Maximum Ratings ($T_j=25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	600	V
DC Collector Current, limited by T_{jmax} $T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	I_C	80 40	A
Diode Forward Current, limited by T_{jmax} $T_C=25^\circ\text{C}$ $T_C=100^\circ\text{C}$	I_F	80 40	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu\text{s}, D < 0.010$)	V_{GE}	± 30	V
Pulsed Collector Current, $V_{GE}=15\text{V}$, t_p limited by T_{jmax}	I_{CM}	200	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	120	A
Power Dissipation, $T_C=25^\circ\text{C}$	P_{tot}	310	W
Power Dissipation, $T_C=100^\circ\text{C}$	P_{tot}	145	W

Operating Junction Temperature	T_j	-40...+175	°C
Storage Temperature	T_s	-55...+150	°C
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

Electrical Characteristics of the IGBT ($T_j=25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	$V_{GE}=0V, I_C=250\mu A$	600		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1mA$	4	5.8	7.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.98 3.20 3.60	3.30	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=600V, V_{GE}=0V$ $T_j=25^\circ\text{C}$, $T_j=150^\circ\text{C}$			0.25 4.00	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			± 200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}=30V, V_{GE}=0V,$ $f=1MHz$	-	1950	-	pF
Output Capacitance	C_{oes}		-	133	-	
Reverse Transfer Capacitance	C_{res}		-	16	-	
Gate Charge	Q_g	$V_{CC}=300V, I_C=40A,$ $V_{GE}=15V$	-	234	-	nC
Gate-Emitter Charge	Q_{ge}		-	41	-	
Gate-Collector Charge	Q_{gc}		-	139	-	

Switching Characteristic, Inductive Load ($T_j = 25^\circ\text{C}$ unless otherwise specified):

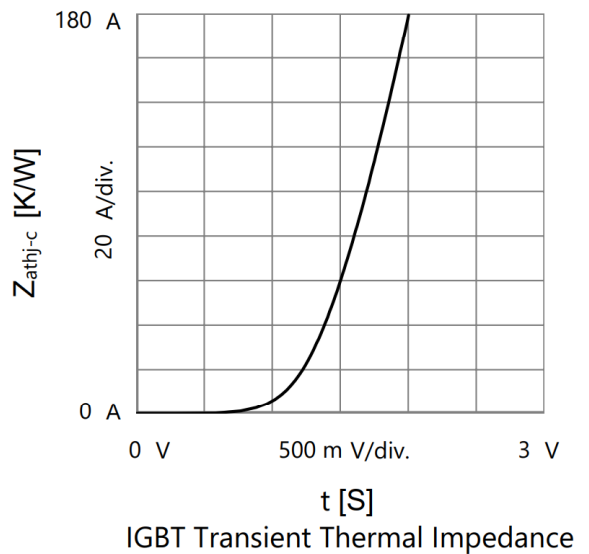
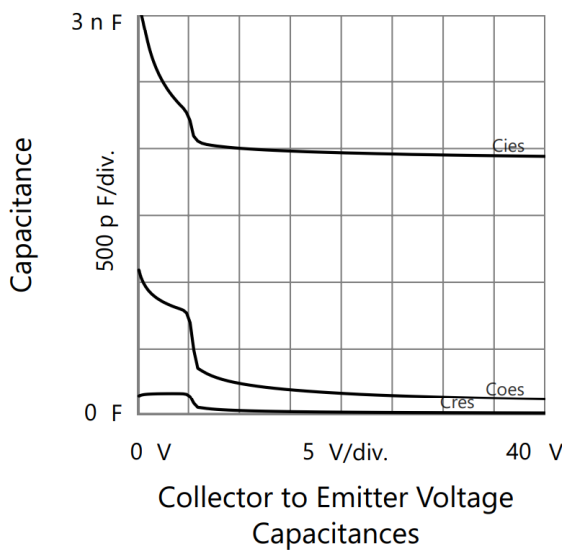
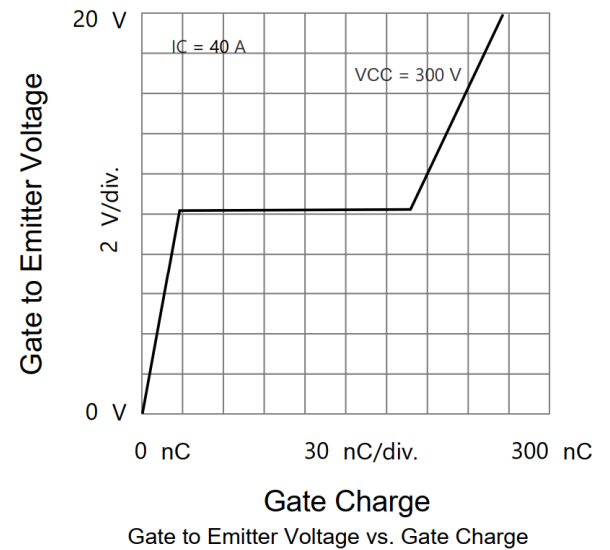
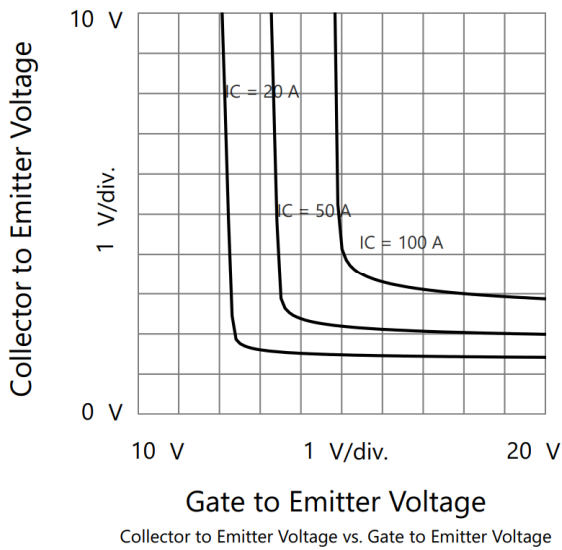
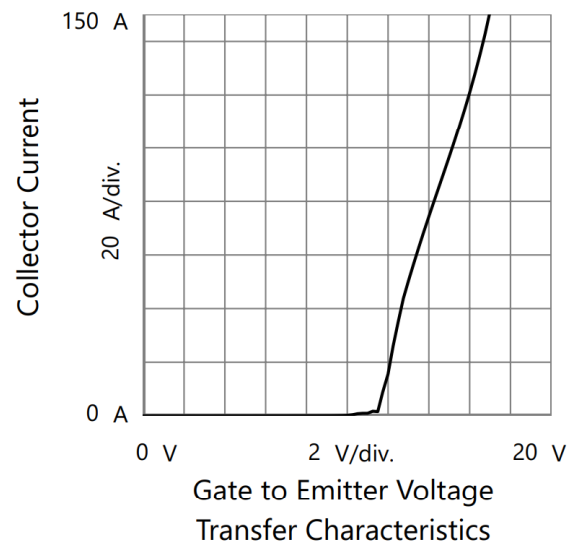
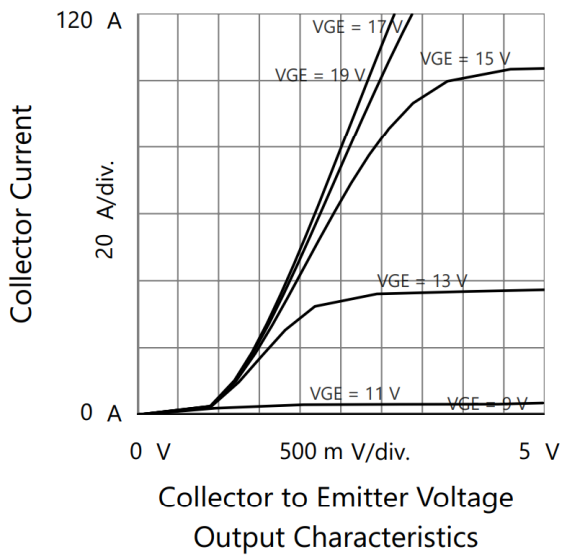
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 300\text{V}$, $I_C = 20\text{A}$, $V_{GE} = -15\text{V} \sim 15\text{V}$, $R_g = 12\Omega$	-	32	-	ns
Rise Time	t_r		-	61	-	ns
Turn-on Energy	E_{on}		-	1.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	127	-	ns
Fall Time	t_f		-	50	-	ns
Turn-off Energy	E_{off}		-	0.7	-	mJ

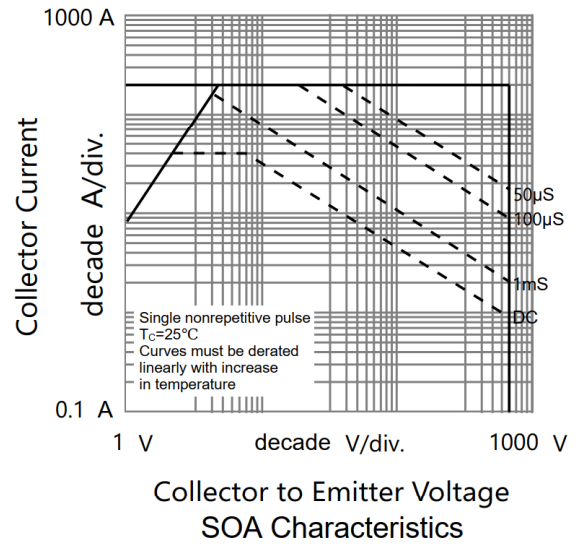
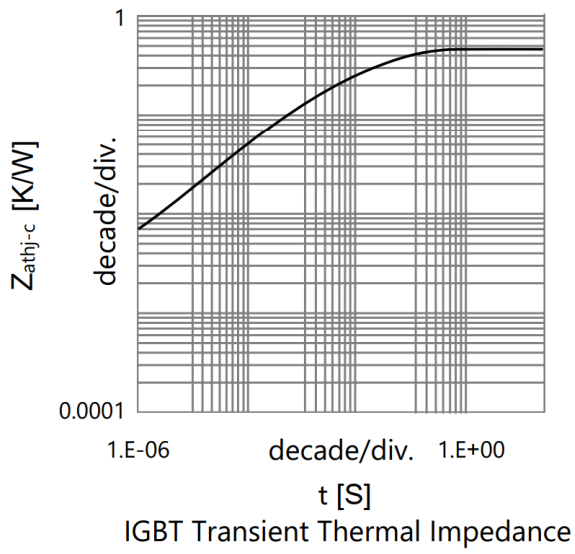
Electrical Characteristics of the DIODE ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F = 20\text{A}$	-	1.2	2.1	V
Reverse Recovery Current	I_{rr}	$I_F = 20\text{A}$, $V_R = 300\text{V}$, $di/dt = -200\text{A}/\mu\text{s}$,	-	6	-	A
Reverse Recovery Charge	Q_{rr}		-	250	-	nC
Reverse Recovery Energy	E_{rec}		-	0.15		mJ

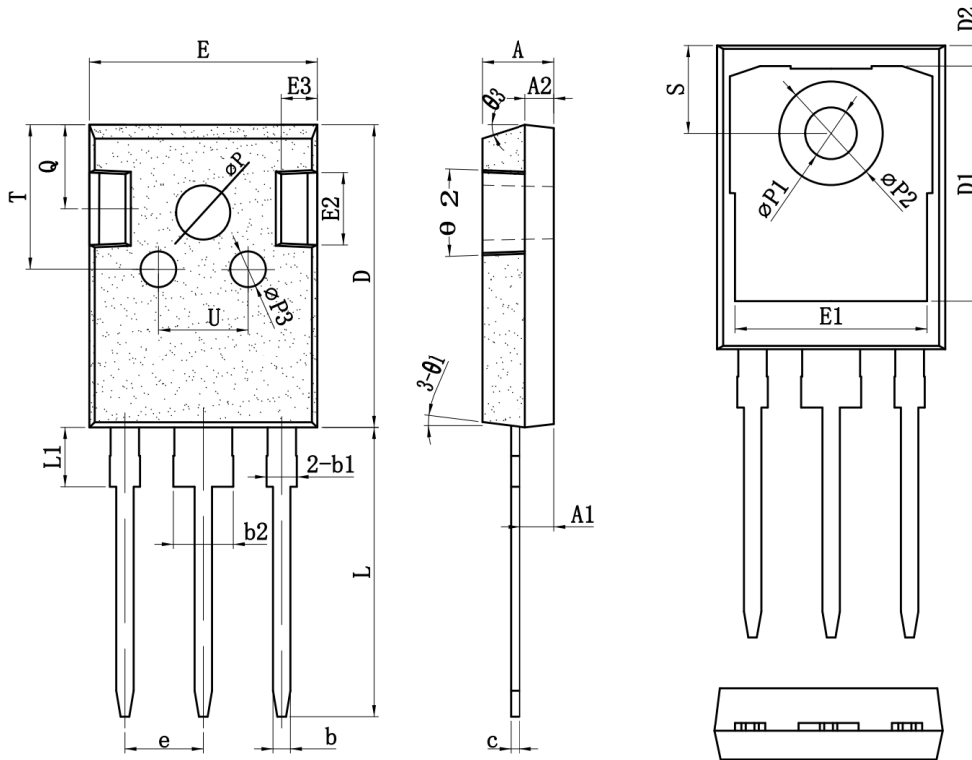
Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	$R_{th(j-c)}$	0.45	K/W
Diode Thermal Resistance, Junction - Case	$R_{th(j-c)}$	1.09	K/W
Thermal Resistance, Junction - Ambient	$R_{th(j-a)}$	40	K/W





TO-247_3L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.60	5.00	5.40	e	2.10	5.44	5.70
A1	2.10	2.41	2.70	L	19.00	19.98	21.00
A2	1.70	2.00	2.30	L1	-	-	4.50
b	1.00	1.20	1.40	ΦP	3.30	3.70	4.00
b1	1.80	2.10	2.40	$\Phi P1$	3.25	3.55	3.85
b2	2.80	3.10	3.40	$\Phi P2$	6.80	7.18	7.60
C	0.45	0.60	0.75	$\Phi P3$	2.30	2.50	3.30
D	19.00	21.00	23.00	Q	5.50	5.80	6.30
D1	16.00	16.55	17.00	S	5.60	6.15	6.30
D2	0.95	1.20	1.45	T	9.50	10.00	10.50
E	15.70	15.80	16.50	U	6.00	-	8.00
E1	12.80	13.25	13.70	$\theta 1$	5°	7°	9°
E2	4.20	5.00	5.30	$\theta 2$	1°	3°	5°
E3	2.20	2.50	2.80	$\theta 3$	13°	15°	17°

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