

IGBT Discrete

V_{CE}	600	V
I_C	30	A
$V_{CE(SAT)} I_C=30A$	1.5	V

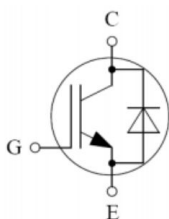
Applications

- 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)

Circuit



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	60 30	A
Diode Forward Current, limited by T_{jmax} $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_F	60 30	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}	90	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	90	A
Power Dissipation, $T_C = 25^\circ\text{C}$	P_{tot}	195	W
Power Dissipation, $T_C = 100^\circ\text{C}$	P_{tot}	81	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	697	-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1mA$	4	6.33	7.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=30A$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.6 1.8 2.0	2.0	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=600V, V_{GE}=0V$ $T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$			8.06 10.9	nA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			± 250	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	1450	-	pF
Onput Capacitance	C_{oes}		-	75	-	
Reverse Transfer Capacitance	C_{res}		-	27	-	
Gate Charge	Q_g	$V_{CC}=300V, I_C=30A,$ $V_{GE}=15V$	-	134	-	nC
Gate-Emitter Charge	Q_{ge}		-	31	-	
Gate-Collector Charge	Q_{gc}		-	69	-	

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

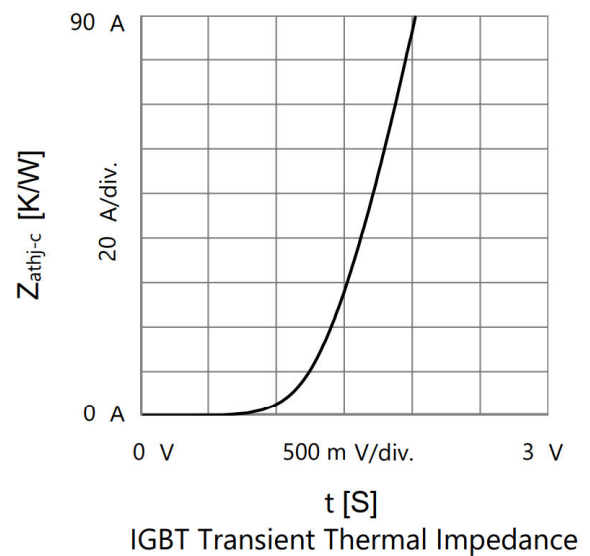
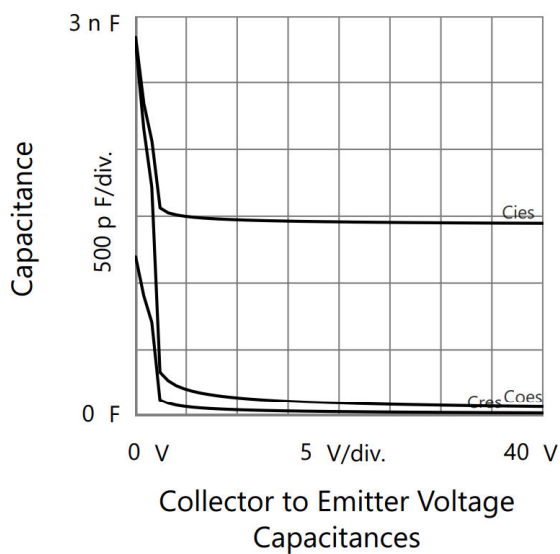
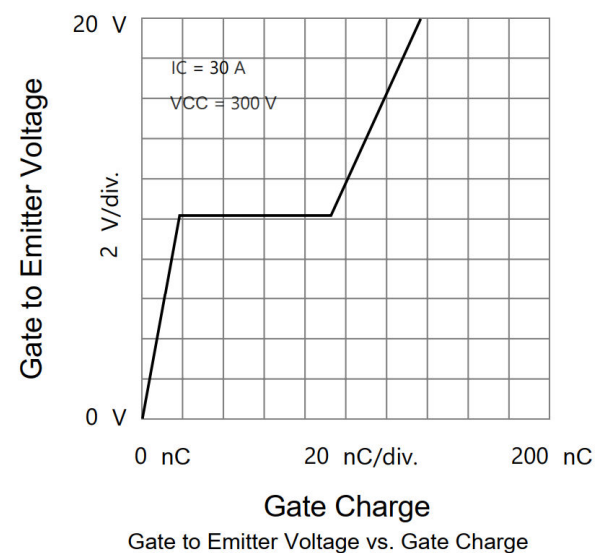
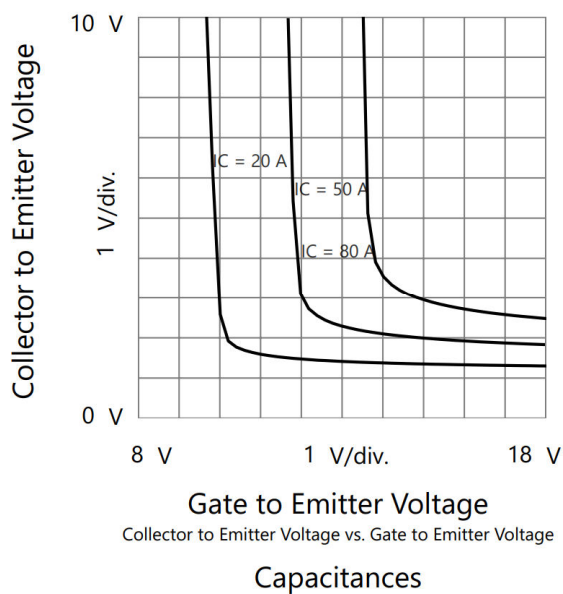
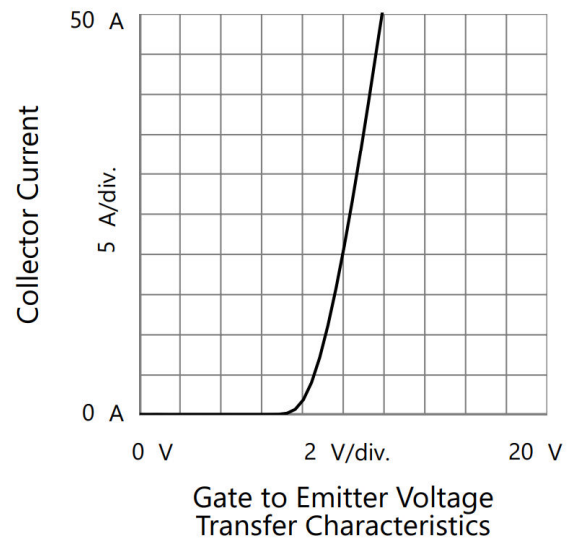
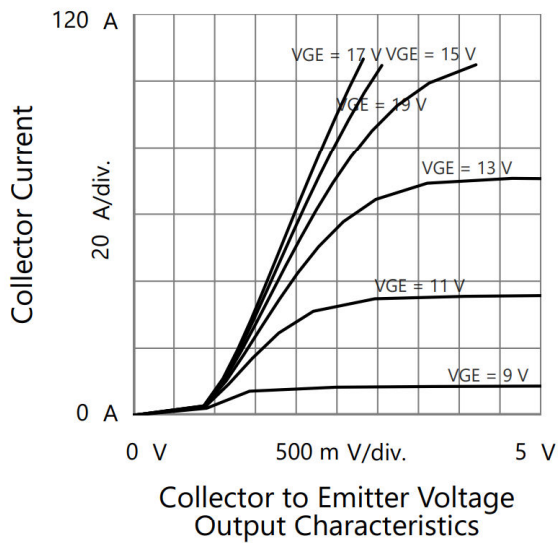
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 300\text{V}$, $I_C = 20\text{A}$, $V_{GE} = -15\text{V} \sim 15\text{V}$, $R_g = 10\Omega$	-	22	-	ns
Rise Time	t_r		-	31	-	ns
Turn-on Energy	E_{on}		-	0.8	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	152	-	ns
Fall Time	t_f		-	20	-	ns
Turn-off Energy	E_{off}		-	0.4	-	mJ

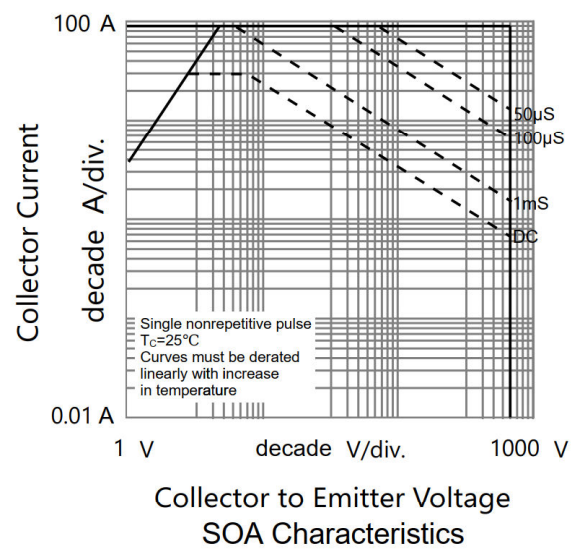
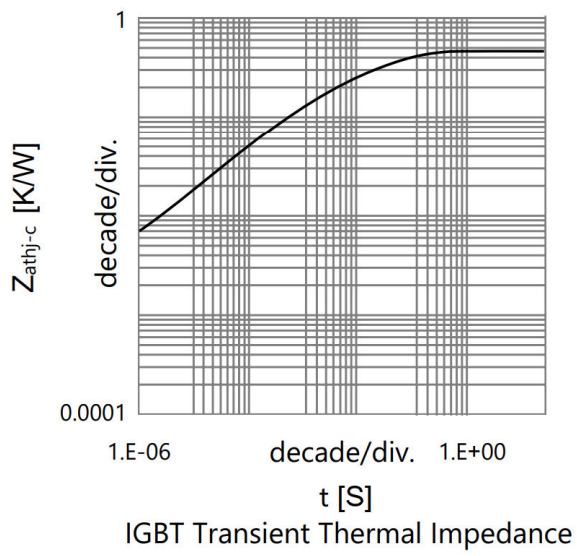
Electrical Characteristics of the DIODE ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F = 20\text{A}$	-	1.5	1.9	V
Reverse Recovery Current	I_{rr}	$I_F = 20\text{A}$, $V_R = 300\text{V}$, $di/dt = -200\text{A}/\mu\text{s}$,	-	4	-	A
Reverse Recovery Charge	Q_{rr}		-	405	-	nC
Reverse Recovery Energy	E_{rec}		-	0.15		mJ

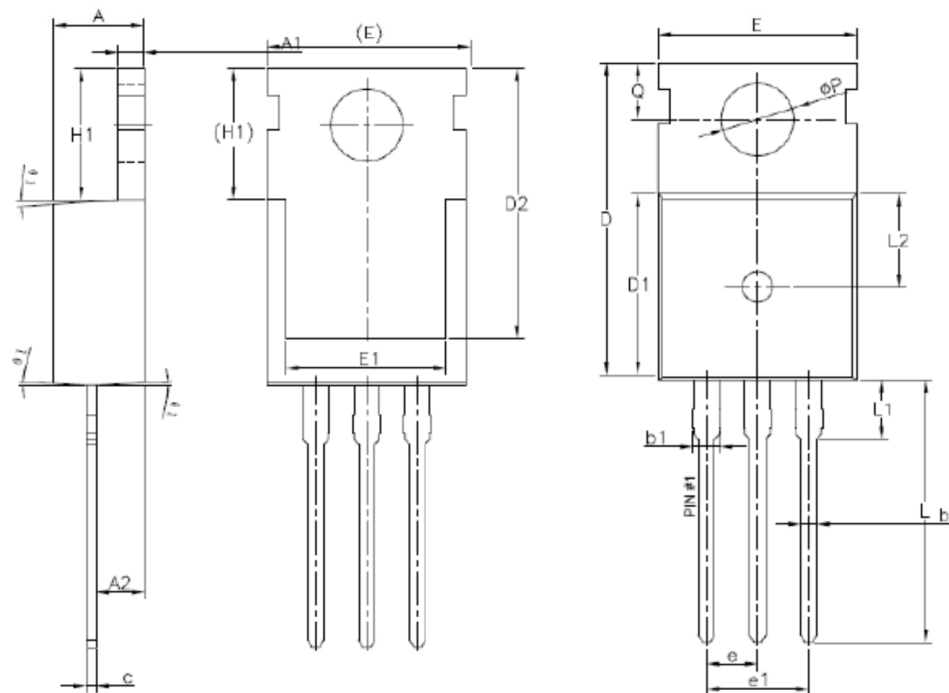
Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	$R_{th(j-c)}$	0.65	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

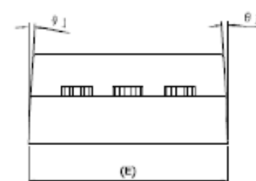




TO-220 Package Outline Information



SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	—	0.90
b1	1.27	—	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	—	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.49	2.54	2.59
e1	5.03	5.08	5.12
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	3.30	—	3.50
L2	4.50	4.60	4.70
φP	3.55	3.60	3.65
Q	2.73	—	2.87
θ1	1°	3°	5°



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