

## IGBT Discrete

$V_{CE}$	<b>600</b>	<b>V</b>
$I_C$	<b>40</b>	<b>A</b>
$V_{CE(SAT)} I_C=40A$	<b>1.9</b>	<b>V</b>

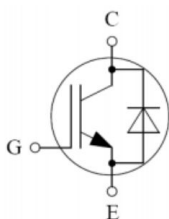
### Applications

- 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 $T_{jmax}$ $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_C$	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	$V_{GE}$	$\pm 20$	V
Transient Gate-Emitter Voltage ( $t_p \leq 10\mu\text{s}, D < 0.010$ )	$V_{GE}$	$\pm 30$	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
<b>Static</b>						
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	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 20V$			$\pm 200$	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic</b>						
Input Capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V,$ $f=1MHz$	-	1950	-	pF
Onput 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):

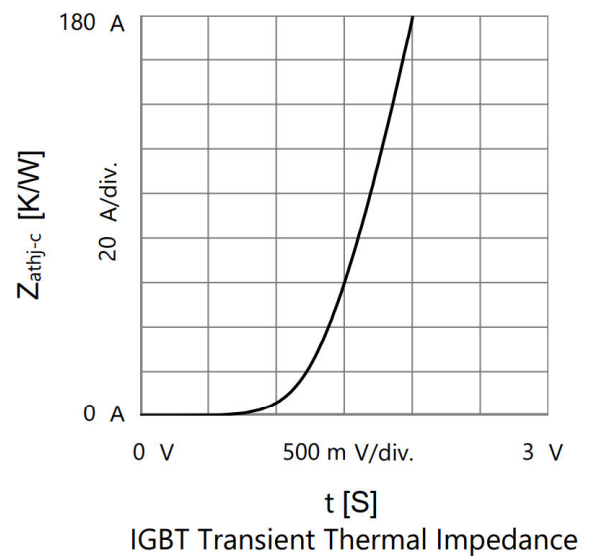
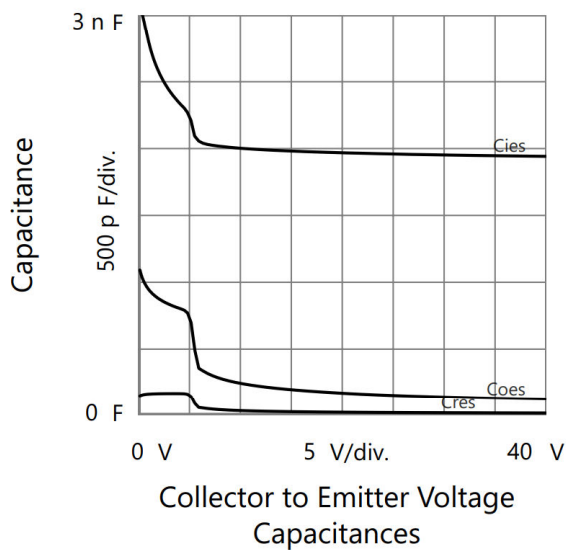
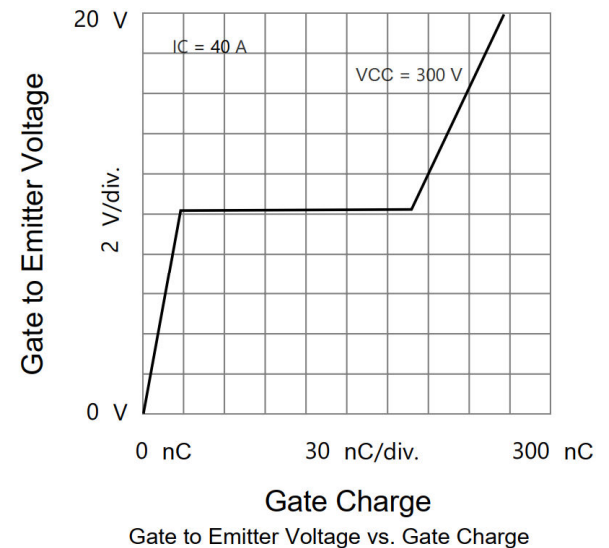
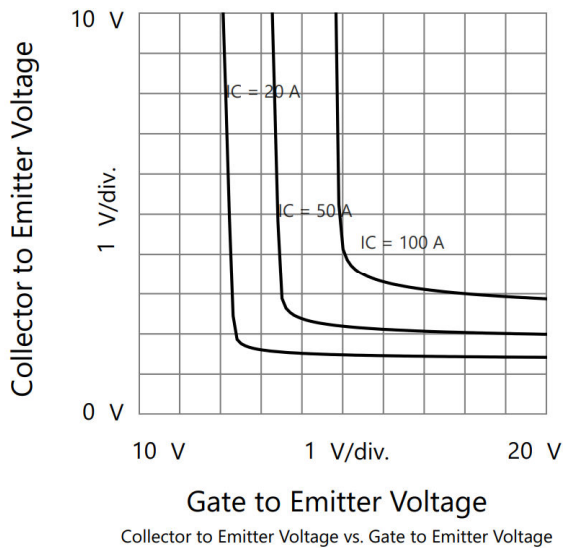
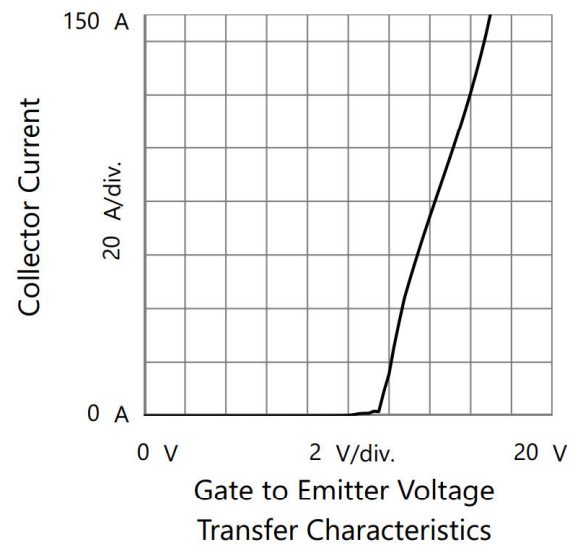
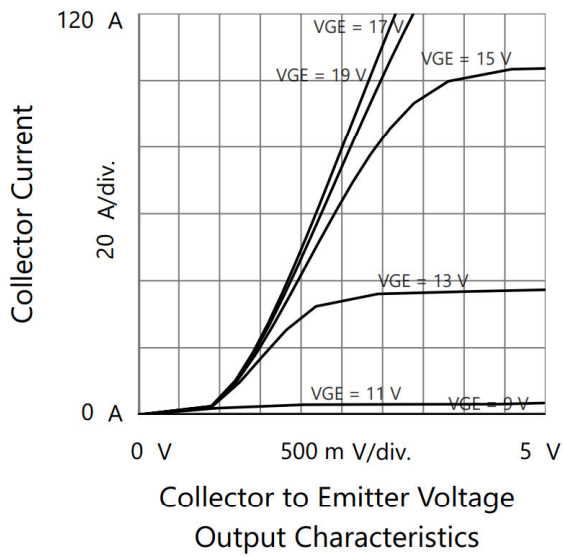
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 300\text{V}$ , $I_C = 20\text{A}$ , $V_{GE} = -15\text{V} \sim 15\text{V}$ , $R_g = 12\Omega$	-	32	-	ns
Rise Time	$t_r$		-	61	-	ns
Turn-on Energy	$E_{on}$		-	1.5	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	127	-	ns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

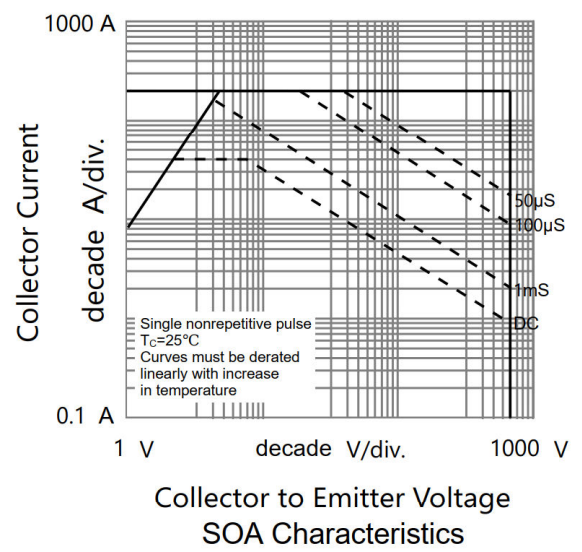
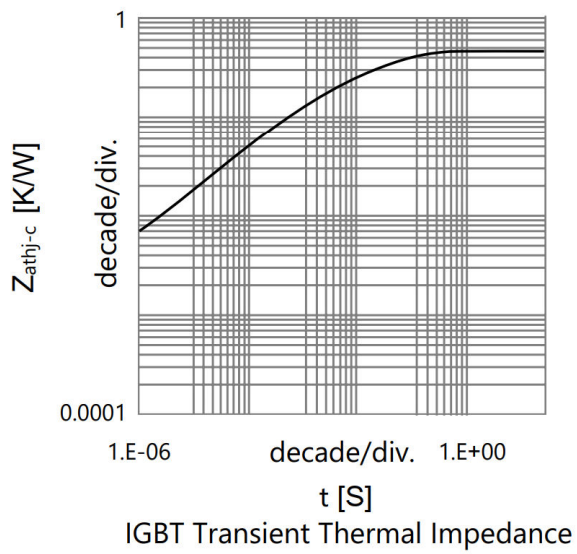
**Electrical Characteristics of the DIODE** ( $T_j = 25^\circ\text{C}$  unless otherwise specified):

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

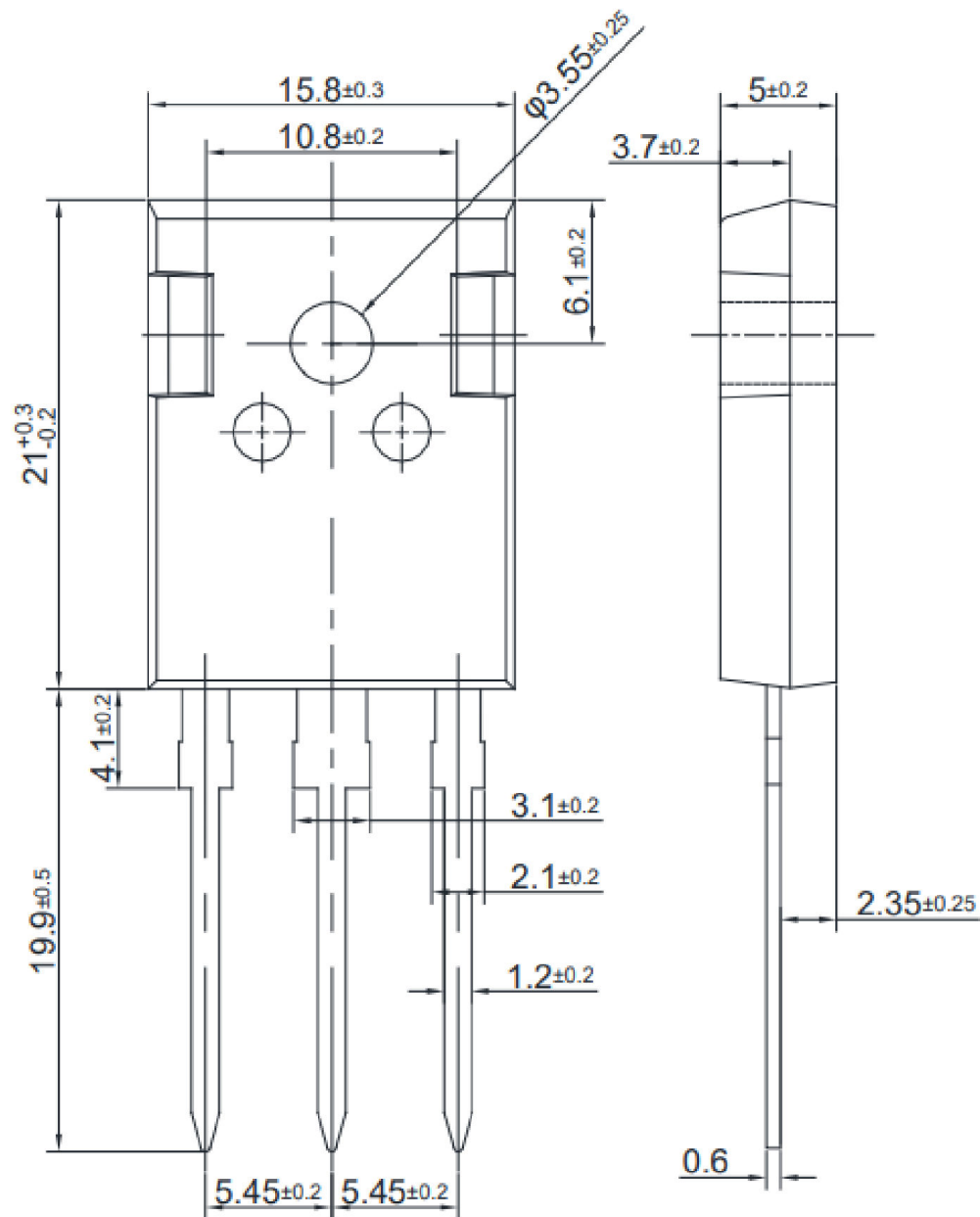
**Thermal Resistance**

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 Package Outline Information**





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