

## IGBT Discrete

$V_{CE}$	<b>1200</b>	<b>V</b>
$I_C$	<b>25</b>	<b>A</b>
$V_{CE(SAT)} I_C=20A$	<b>2.75</b>	<b>V</b>

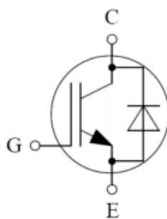
## Applications

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

## Features

- High breakdown voltage to 1200V 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

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	$V_{CE}$	1200	V
DC Collector Current, limited by $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_C$	50 25	A
Diode Forward Current, limited by $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_F$	50 25	A
Continuous Gate-Emitter Voltage	$V_{GE}$	$\pm 20$	V
Transient Gate-Emitter Voltage ( $t_p \leq 10\mu s, D < 0.010$ )	$V_{GE}$	$\pm 30$	V
Turn off Safe Operating Area $V_{CE} \leq 1200V$ , $T_j \leq 150^{\circ}C$		200	A
Pulsed Collector Current, $V_{GE}=15V$ , $t_p$ limited by $T_{jmax}$	$I_{CM}$	200	A
Diode Pulsed Current, $t_p$ limited by $T_{jmax}$	$I_{Fpuls}$	200	A
Short Circuit Withstand Time, $V_{GE}=15V, V_{CC}=900V, V_{CEM} \leq 1200V$	$T_{sc}$	10	$\mu s$
Power Dissipation, $T_j=175^{\circ}C, T_C=25^{\circ}C$	$P_{tot}$	250	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	$BV_{CES}$	$V_{GE}=0V, I_C=250\mu A$	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	3		6	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=20A$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		2.75 3.30 3.95	3.80	V
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$ $T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$			0.25 6.00	mA
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 20V$			$\pm 100$	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic</b>						
Input Capacitance	$C_{ies}$	$V_{CE}=30V, V_{GE}=0V,$ $f=1\text{MHz}$	-	3.80	-	nF
Reverse Transfer Capacitance	$C_{res}$		-	0.15	-	
Gate Charge	$Q_G$	$V_{CC}=600V, I_C=25A,$ $V_{GE}=15V$	-	0.21	-	uC
Short Circuit Collector Current	$I_{SC}$	$V_{GE}=15V, t_{sc}\leq 10\mu s,$ $V_{CC}=900V, T_j\leq 150^\circ\text{C}$	-	200	-	A

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

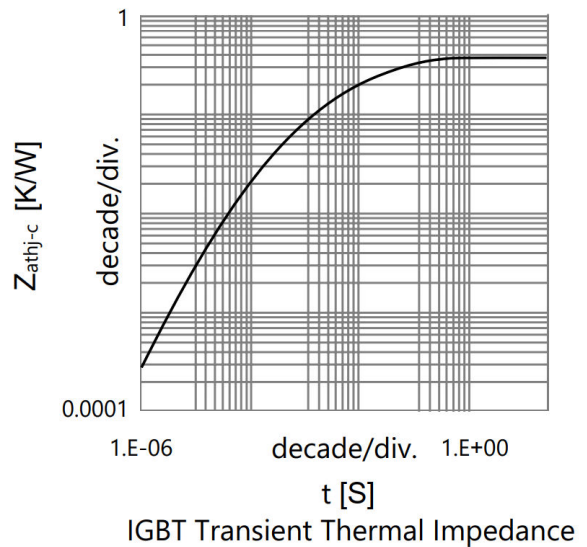
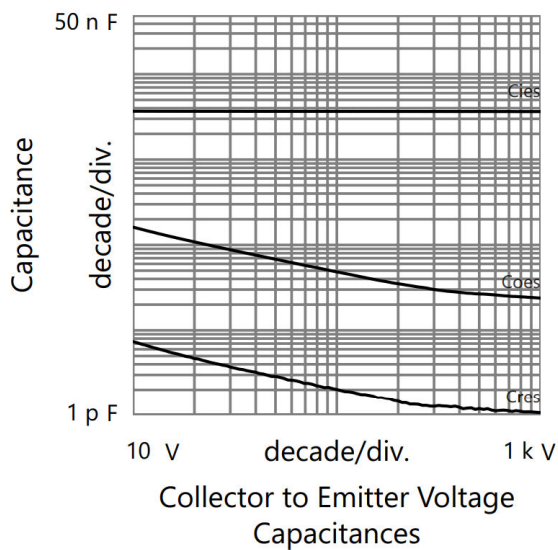
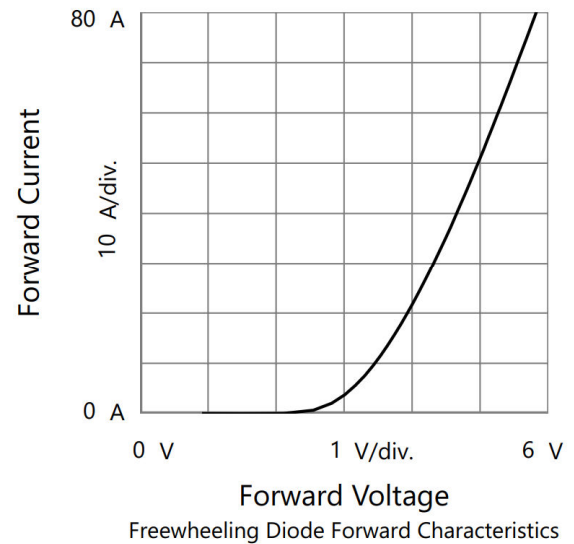
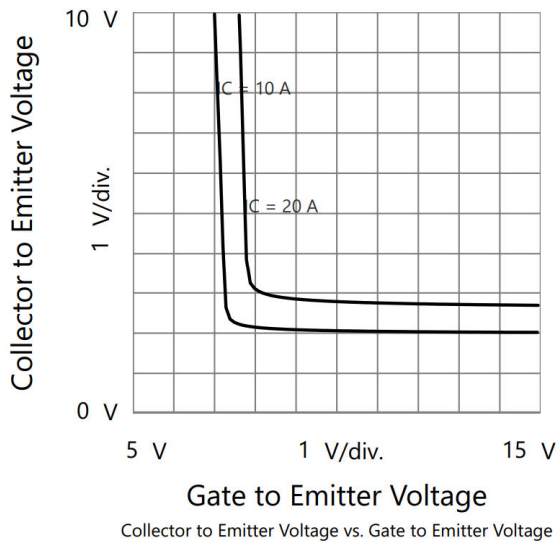
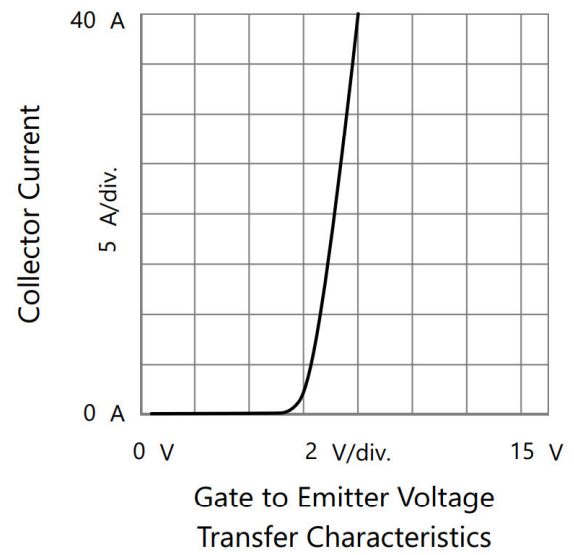
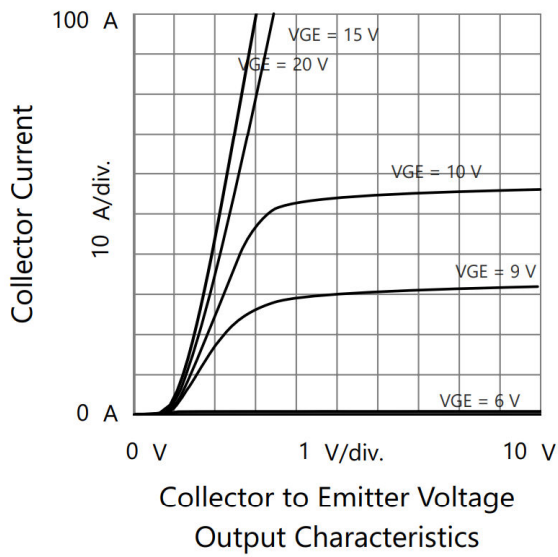
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}$ , $I_C = 25\text{A}$ , $V_{GE} = -15\text{V} \sim 15\text{V}$ , $R_g = 5\Omega$	-	48	-	ns
Rise Time	$t_r$		-	36	-	ns
Turn-on Energy	$E_{on}$		-	2.8	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	200	-	ns
Fall Time	$t_f$		-	40	-	ns
Turn-off Energy	$E_{off}$		-	1.7	-	mJ

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

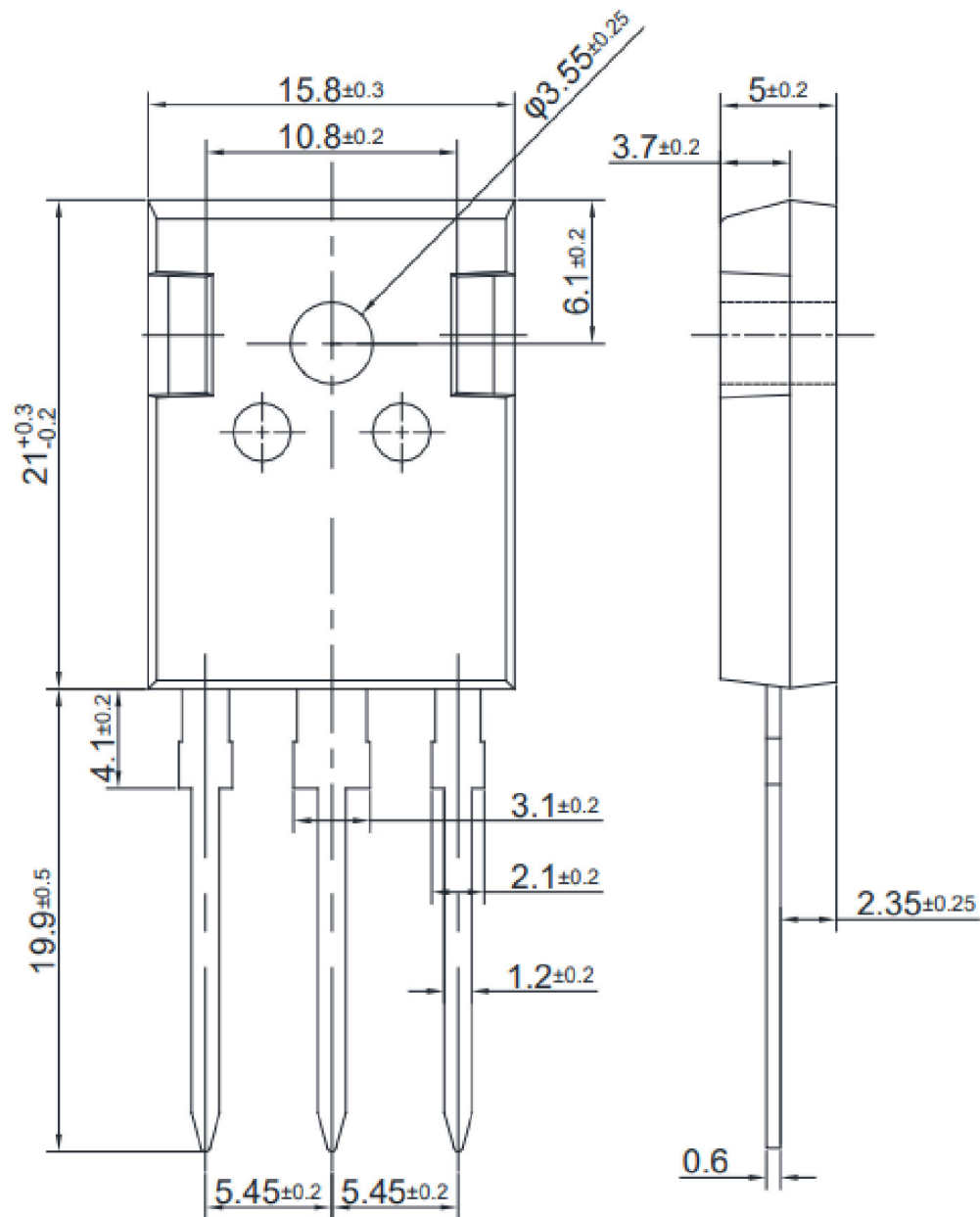
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	$V_{FM}$	$I_F = 20\text{A}$	-	2.5	-	V
Reverse Recovery Current	$I_{rr}$	$I_F = 20\text{A}$ , $V_R = 200\text{V}$ , $di/dt = -200\text{A}/\mu\text{s}$ ,	-	7	-	A
Reverse Recovery Charge	$Q_{rr}$		-	2.40	-	$\mu\text{C}$
Reverse Recovery Energy	$E_{rec}$		-	1.00	-	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	$R_{th(j-c)}$	0.80	K/W
Thermal Resistance, Junction - Ambient	$R_{th(j-a)}$	40	K/W



**TO-247 Package Outline Information**





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