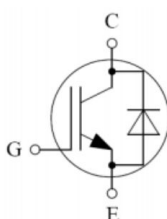

**TO-3PH Pin Configuration**
**Circuit**


## IGBT Discrete

$V_{CE}$	<b>650</b>	<b>V</b>
$I_C$	<b>40</b>	<b>A</b>
$V_{CE(SAT)} I_C=40A$	<b>1.7</b>	<b>V</b>

## Applications

- Power factor corrector
- Energy Storage

## Features

- Low gate charge
- Maximum junction temperature 175°C
- Trench FS Technology
- Fast switching speed
- Low switching losses

## Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	$V_{CE}$	650	V
DC Collector Current, limited by $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_C$	80 40	A
Diode Forward Current, limited by $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_F$	40 20	A
Continuous Gate-Emitter Voltage	$V_{GE}$	$\pm 30$	V
Pulsed Collector Current, $V_{GE}=15V$ , $t_p$ limited by $T_{jmax}$	$I_{CM}$	160	A
Power Dissipation, $T_j=175^{\circ}C, T_C=25^{\circ}C$	$P_{tot}$	83	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

## Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	$R_{th(j-c)}$	1.8	K/W
Diode Thermal Resistance, Junction - Case	$R_{th(j-c)}$	2.8	K/W
Thermal Resistance, Junction - Ambient	$R_{th(j-a)}$	40	K/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$V_{GE}=0V, I_C=250\mu A$	650	-	-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	3.5	4.5	6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$ , $T_j=150^\circ\text{C}$	- -	1.7 2.1	2.1 -	V
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V$ $T_j=25^\circ\text{C}$ ,	-	-	50	$\mu A$
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	200	nA
Input Capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V$ , $f=1\text{MHz}$	-	1390	-	pF
Output Capacitance	$C_{oes}$		-	148	-	
Reverse Transfer Capacitance	$C_{res}$		-	41	-	
Gate Charge	$Q_G$	$V_{CC}=100V, I_C=40A$ , $V_{GE}=15V$	-	79	-	nC
Gate-Emitter Charge	$Q_{GE}$		-	10	-	
Gate-Collector Charge	$Q_{GC}$		-	54	-	

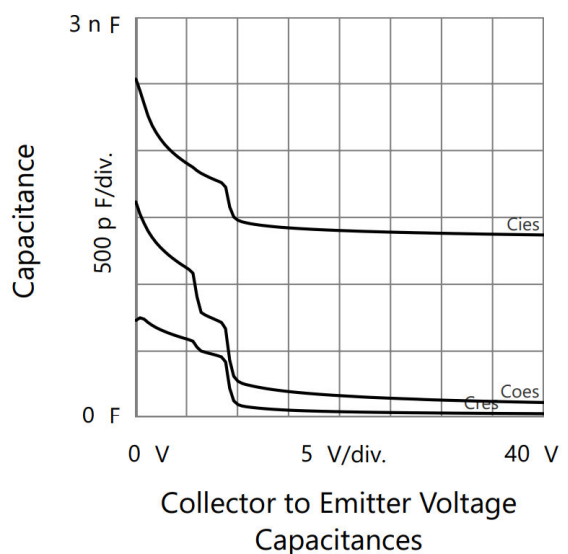
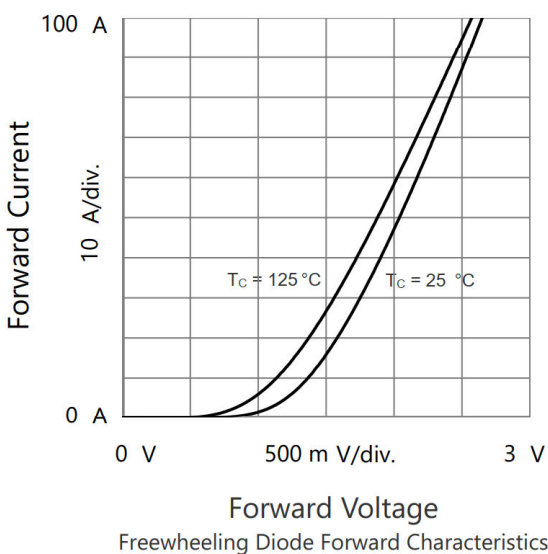
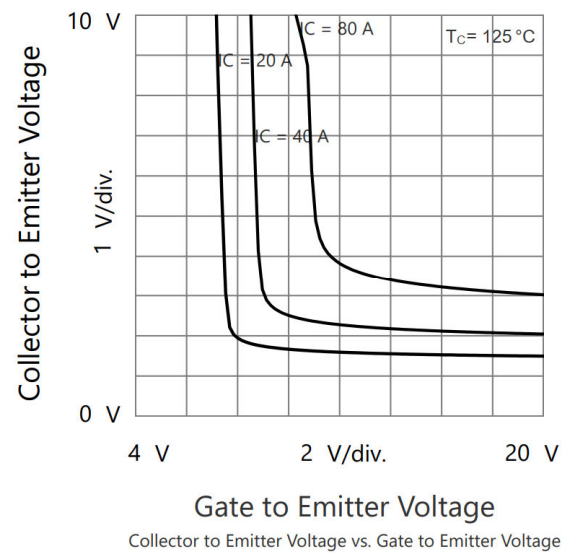
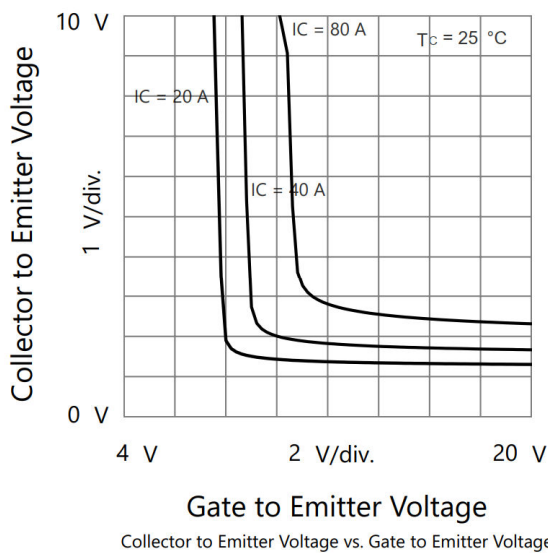
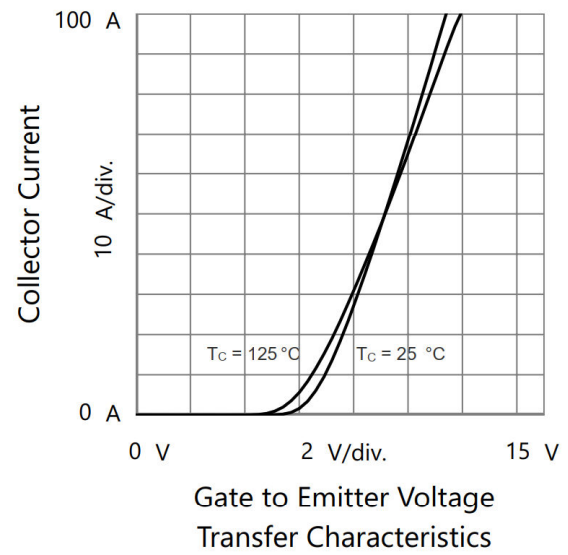
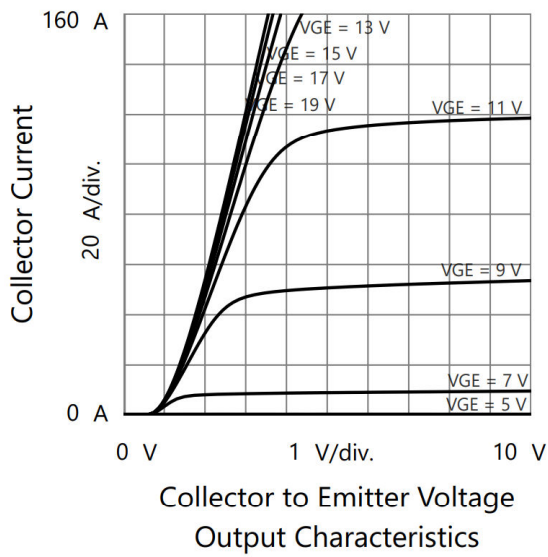
**Switching Characteristic, Inductive Load** ( $T_j = 25^\circ\text{C}$  unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 400\text{V}$ , $I_C = 40\text{A}$ , $V_{GE} = 15\text{V}$ $R_g = 5\Omega$	-	10	-	ns
Rise Time	$t_r$		-	51	-	ns
Turn-on Energy	$E_{on}$		-	0.71	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	86	-	ns
Fall Time	$t_f$		-	50	-	ns
Turn-off Energy	$E_{off}$		-	0.61	-	mJ

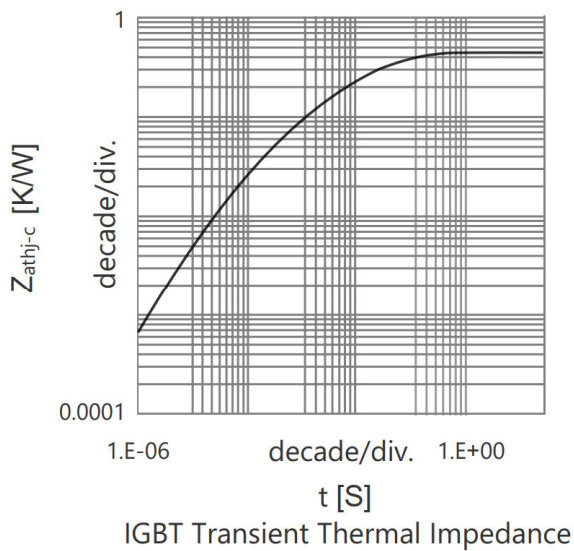
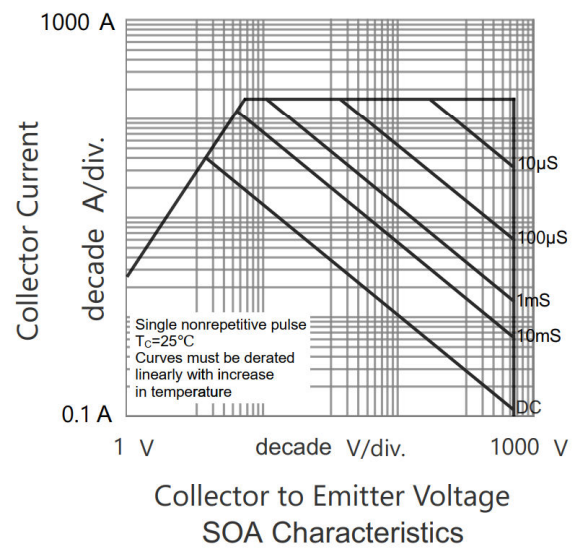
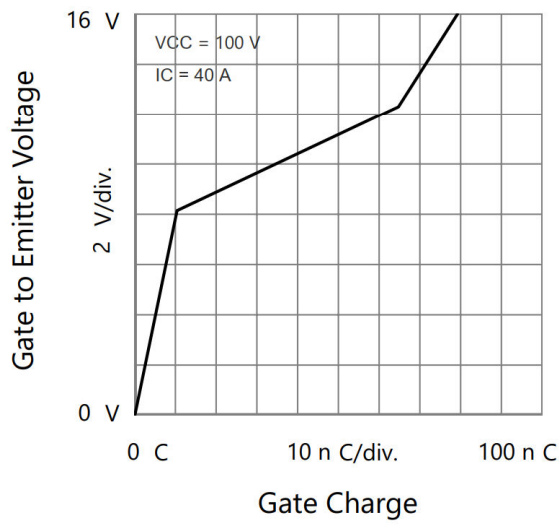
**Electrical Characteristics of the DIODE** ( $T_j = 25^\circ\text{C}$  unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	$V_F$	$I_F = 20\text{A}$	-	1.55	-	V
Reverse Recovery Time	$T_{rr}$	$V_R = 400\text{V}$ , $I_F = 20\text{A}$ $dI_F/dt = 200\text{A}/\mu\text{s}$ $T_{vj} = 25^\circ\text{C}$	-	149	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	420	-	nC
Reverse Recovery Time	$T_{rr}$	$V_R = 400\text{V}$ , $I_F = 20\text{A}$ $dI_F/dt = 200\text{A}/\mu\text{s}$ $T_{vj} = 150^\circ\text{C}$	-	235	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	1464	-	nC

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)





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