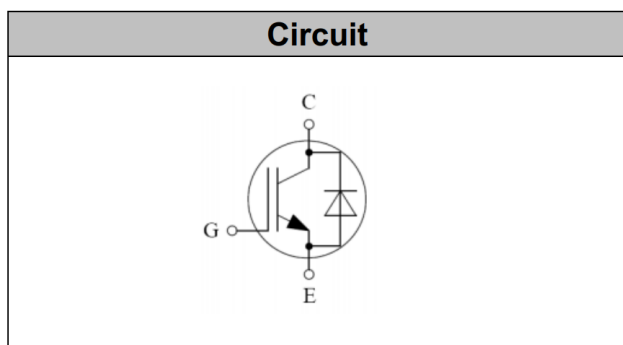


TO-3P Pin Configuration



IGBT Discrete

V_{CE}	650	V
I_C	40	A
$V_{CE(SAT)} I_C=40A$	1.6	V

Applications

- High-frequency converters
- AC and DC servo drive amplifier
- Induction heating

Features

- High breakdown voltage to 650V for improved reliability
- Maximum junction temperature 175°C
- Positive temperature coefficient
- Resonant converters
- Induction heating

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	80 40	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	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}	246	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	$R_{th(j-c)}$	0.61	K/W
Diode Thermal Resistance, Junction - Case	$R_{th(j-c)}$	0.68	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	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	4.5	5.5	6.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C},$ $T_j=150^\circ\text{C}$	- -	1.6 2.1	2.05 -	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$ $T_j=25^\circ\text{C},$ $T_j=150^\circ\text{C}$	- -	- -	15 300	μA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	100	nA
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1\text{MHz}$	-	1920	-	pF
Output Capacitance	C_{oes}		-	100	-	
Reverse Transfer Capacitance	C_{res}		-	32	-	
Gate Charge	Q_G	$V_{CC}=40V, I_C=40A,$ $V_{GE}=15V$	-	127	-	nC
Gate-Emitter Charge	Q_{GE}		-	15	-	
Gate-Collector Charge	Q_{GC}		-	37	-	

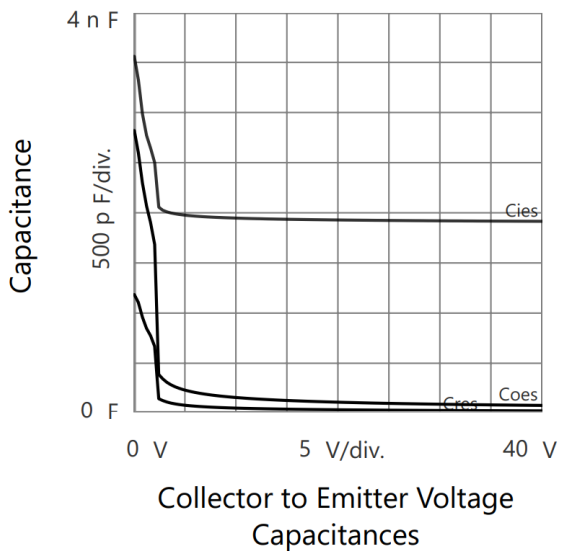
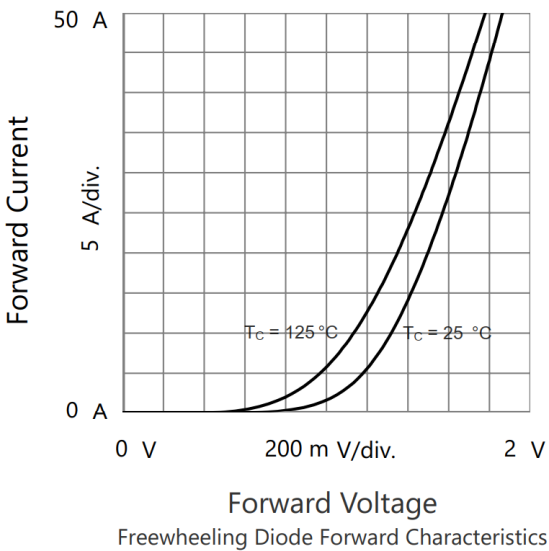
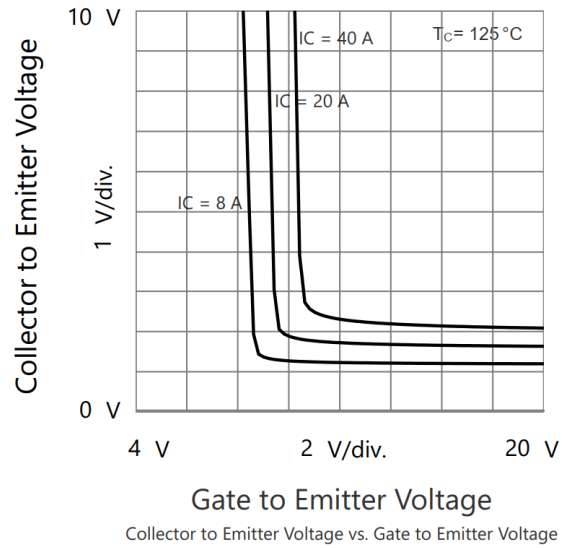
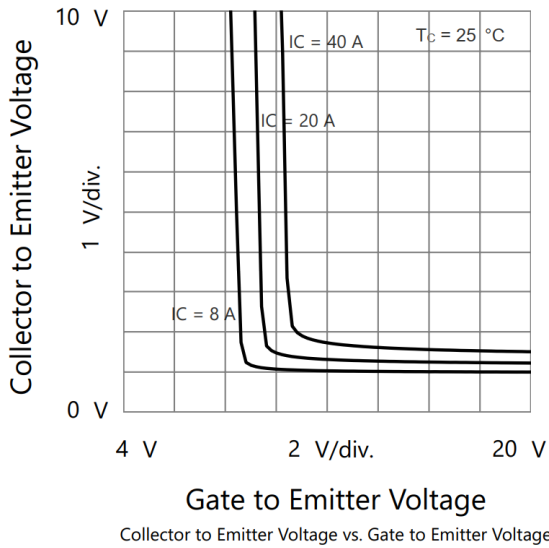
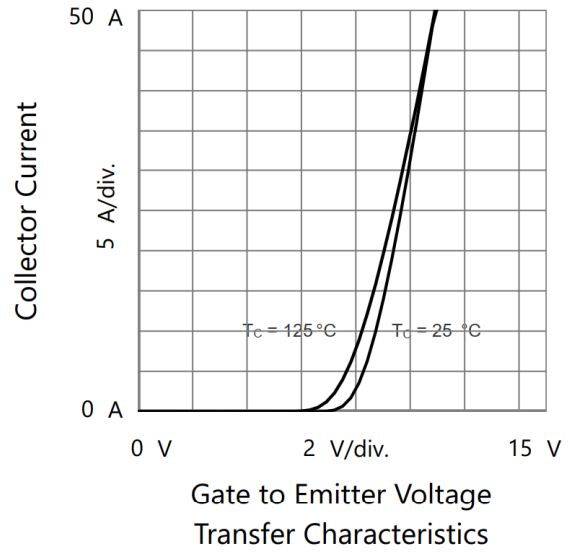
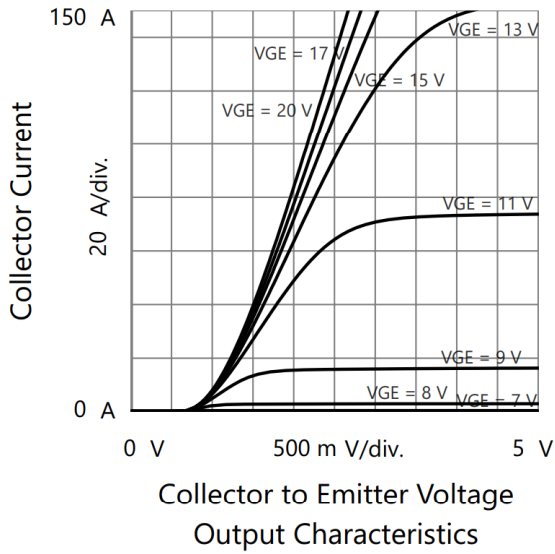
Switching Characteristic, Inductive Load ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 400\text{V}$, $I_C = 40\text{A}$, $V_{GE} = 15\text{V}$ $R_g = 10\Omega$	-	26	-	ns
Rise Time	t_r		-	35	-	ns
Turn-on Energy	E_{on}		-	1.05	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	110	-	ns
Fall Time	t_f		-	14	-	ns
Turn-off Energy	E_{off}		-	0.32	-	mJ

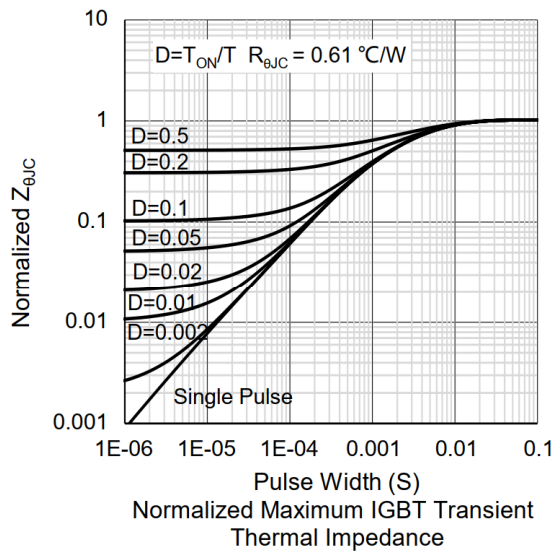
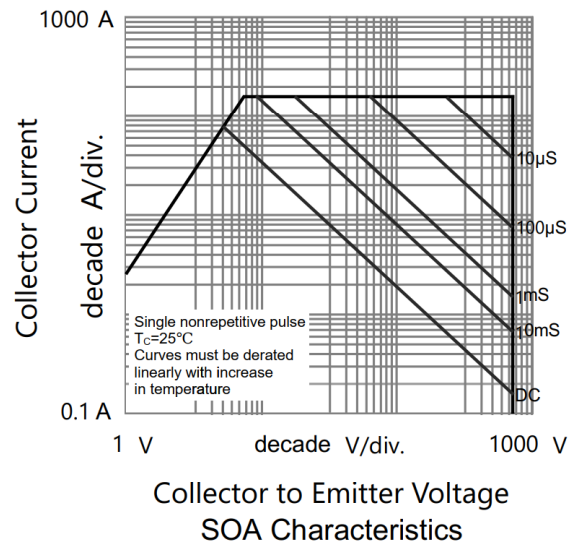
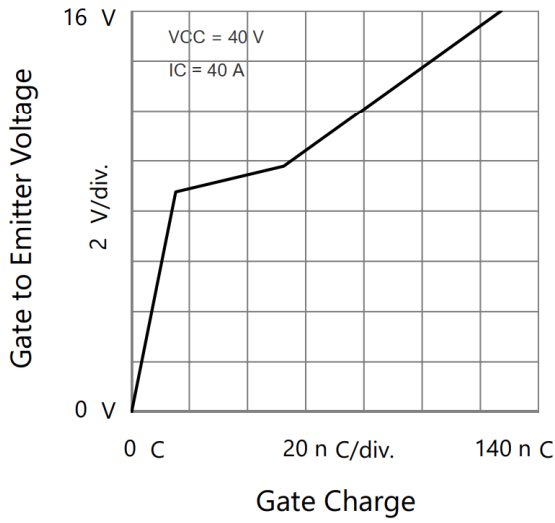
Electrical Characteristics of the DIODE ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F = 40\text{A}$	-	1.75	-	V
Reverse Recovery Time	T_{rr}	$I_F = 40\text{A}$, $V_R = 400\text{V}$, $di/dt = -100\text{A}/\mu\text{s}$,	-	80	-	ns
Reverse Recovery Charge	Q_{rr}		-	839	-	nC

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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