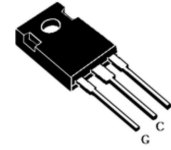


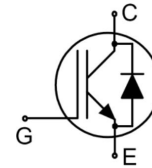
Features

- Fast Switching & Low $V_{CE(sat)}$
- High Input Impedance
- $V_{CE(sat)} = 1.88V @ I_C = 40A$
- High Input Impedance
- Short circuit withstand time 10 μs



Applications

- PFC
- UPS
- Inverter
- Welding Machine



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-emitter voltage		V_{CES}	650	V
Gate-emitter voltage		V_{GES}	± 20	
Collector current	$T_C = 25^\circ C$	I_C	80	A
	$T_C = 100^\circ C$		40	
Pulsed collector current, pulse time limited by T_{jmax}		I_{CM}	120	
Diode forward current @ $T_C = 100^\circ C$		I_F	20	
Diode pulsed current, Pulse time limited by T_{jmax}		I_{FM}	60	
Power dissipati	$T_C = 25^\circ C$	P_D	280	W
	$T_C = 100^\circ C$		120	
Operating Junction and storage temperature rang		T_J	-55 to 175	$^\circ C$
		T_{stg}	-55 to 175	

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance junction-to-ambien ^{1,2}	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	0.75	
Thermal resistance junction-to-case for Diod	$R_{\theta JC}$	1.8	

Not:

1. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heat sink, assuming maximum junction temperature of $T_{J(MAX)} = 175^\circ C$.
2. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

Electrical Characteristics (T_C =25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter breakdown voltag	BV _{CES}	I _C = 500 μ A, V _{GE} = 0V	650	-	-	V
Gate-emitter threshold voltage	V _{GE(th)}	V _{CE} = V _{GE} , I _C = 250 μ A	4.0	5.7	7	
Zero gate voltage collector current	I _{CES}	V _{CE} = 650V, V _{GE} = 0V	-		1000	μ A
Gate-emitter leakage current	I _{GES}	V _{GE} = 20V, V _{CE} = 0V	-	-	±250	nA
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 40A V _{GE} = 15V T _C = 25°C	-	1.88	2.36	V
		I _C = 40A, V _{GE} = 15V, T _C = 150°C	-	2.4	-	
Dynamic and Switching Characteristi						
Total gate charg	Q _g	V _{CE} = 400V, I _C = 40A, V _{GE} = 15V	-	165	-	nC
Input capacitanc	C _{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	-	3155	-	pF
Reverse transfer capacitanc	C _{res}		-	81.5	-	
Output capacitance	C _{oes}		-	175	-	
Turn-on delay time	t _{d(on)}	V _{GE} = 15V, V _{CC} = 400V, I _C = 40A, R _G = 10Ω , Inductive Load, T _C = 25°C	-	45	-	nS
Rise tim	t _r		-	50	-	
Turn-off delay time	t _{d(off)}		-	210	-	
Fall time	t _f		-	55	-	
Turn-on switching energy	E _{on}		-	1.6	-	mJ
Turn-off switching energy	E _{off}		-	0.7	-	
Total switching energ	E _{ts}		-	2.3	-	
Turn-on delay time	t _{d(on)}	V _{GE} = 15V, V _{CC} = 400V, I _C = 40A, R _G = 10Ω , Inductive Load, T _C = 125°C	-	75	-	nS
Rise tim	t _r		-	80	-	
Turn-off delay time	t _{d(off)}		-	305	-	
Fall time	t _f		-	108	-	
Turn-on switching energy	E _{on}		-	2.1	-	mJ
Turn-off switching energ	E _{off}		-	1.4	-	
Total switching energ	E _{ts}		-	1.5	-	
Short circuit safer operation area	SCSOA	T _J =125°C V _{CE} =300V I _C =40A R _g =22ohm V _{GE} =0-15V	10	-	-	μ S
Diode Characteristics (T _C =25°C unless otherwise specified)						
Forward voltag	V _F	I _F =20A,T _C =25°C	-	1.8	-	V
		I _F =20A,T _C =125°C	-	1.6	-	
Reverse recovery time	t _{rr}	I _F =20A,di/dt=200A/μS T _C =25°C	-	41	-	nS
Reverse recovery current	I _{rr}		-	13.3	-	A
Reverse recovery charge	Q _{rr}		-	310	-	nC

Typical Performance Characteristics

Fig.1 Power dissipation vs Case temperature

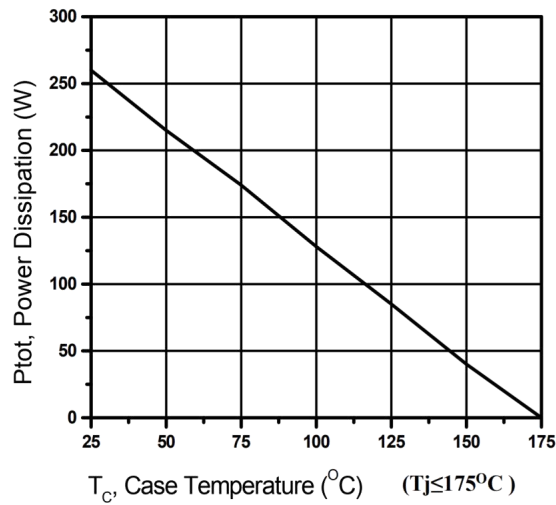


Fig.2 Collector Current vs Case temperature

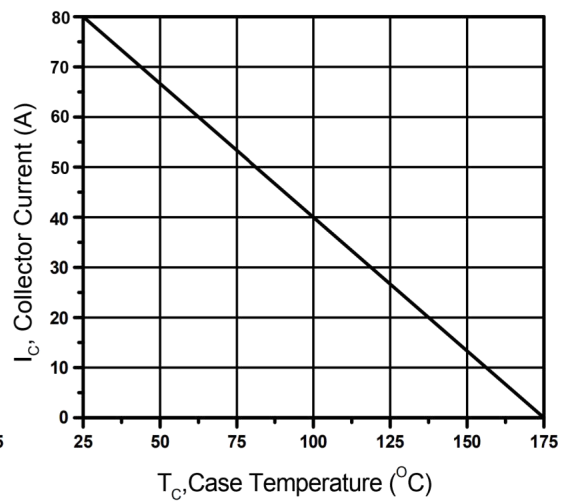


Fig.3 Typical Output Characteristics

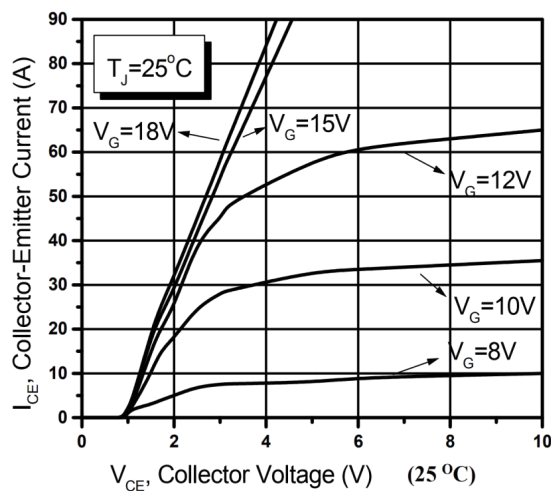


Fig.4 Typical Output Characteristics

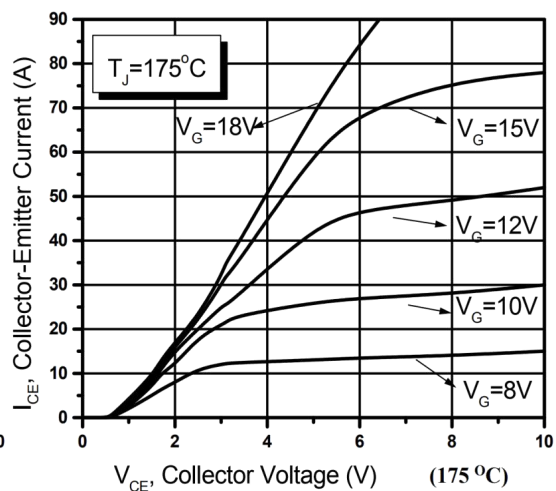


Fig.5 Transfer Characteristics

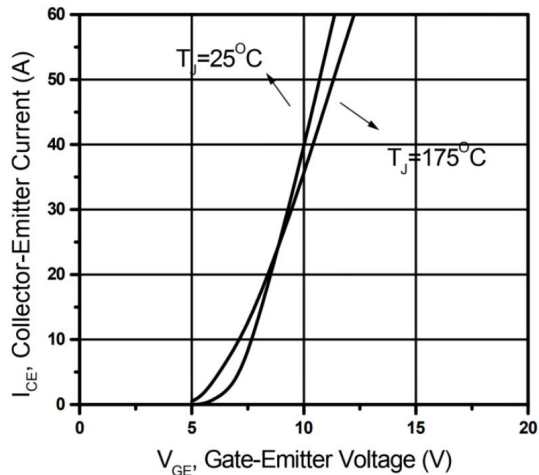


Fig.6 $V_{GE(th)}$ vs T_J

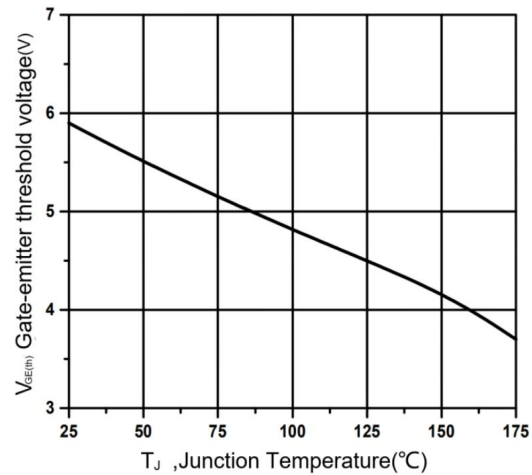


Fig.7 Forward Characteristics

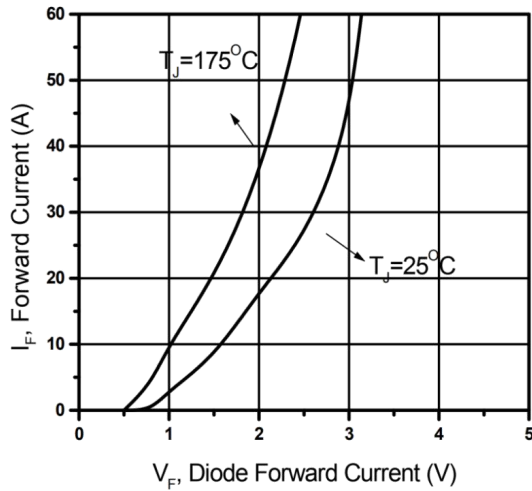


Fig.8 Saturation Voltage vs Junction temperature

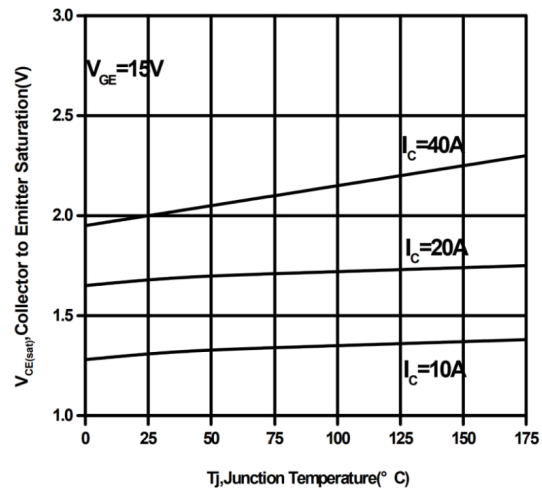


Fig.9 Switching Time vs. R_G

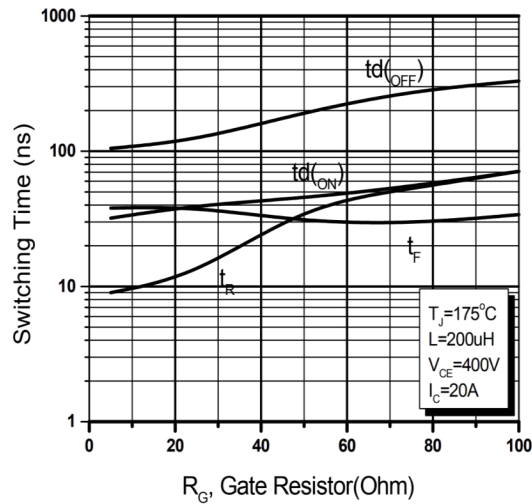


Fig.10 Switching Loss vs. R_G

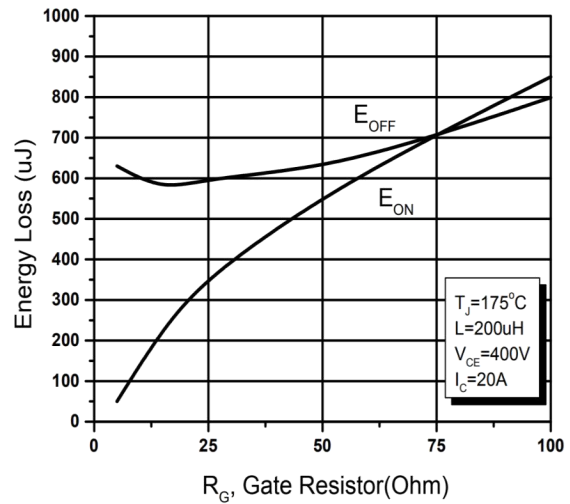


Fig.11 Switching Loss vs. I_C

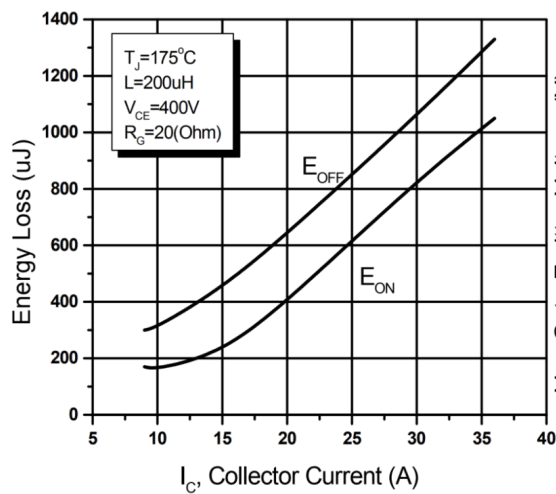


Fig.12 Gate Charge Characteristics

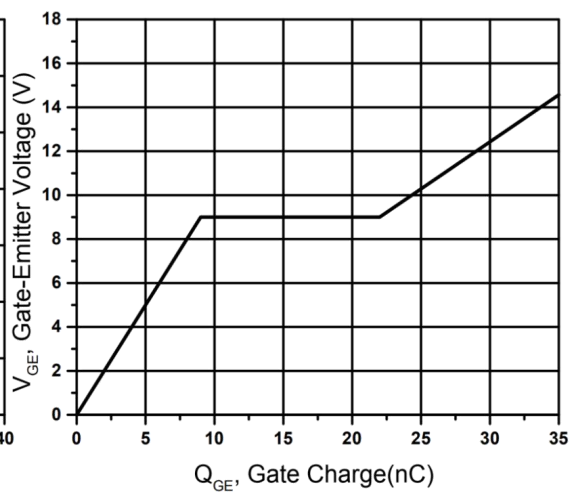


Fig.13 Transient Thermal Impedance for IGBT

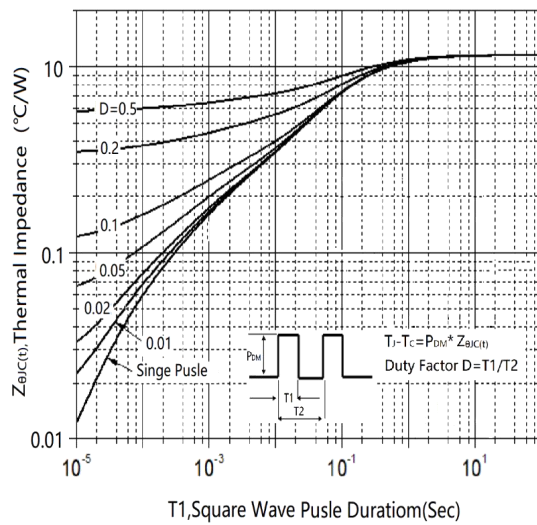
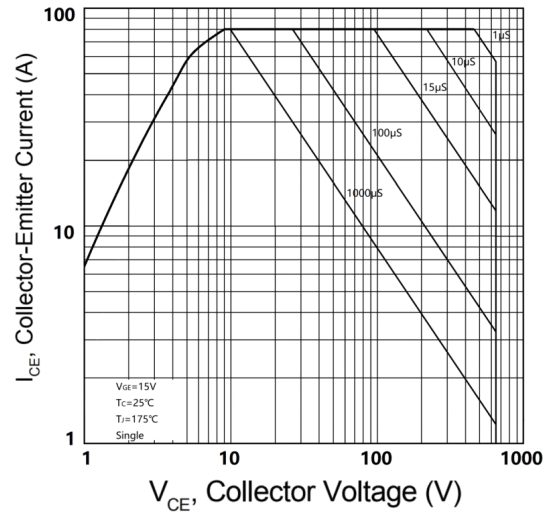


Fig.14 Forward Bias Safe Operating Area



Package outline dimension

