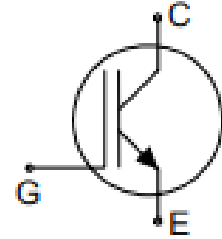


Features

- High breakdown voltage to 650V for improved reliability
- Trench-stop technology offering:
 - High speed switching
 - High ruggedness, temperature stable behavior
 - Short circuit withstand time: 5μs
 - Low $V_{CE(SAT)}$
 - Easy parallel switching capability due to positive temperature coefficient in $V_{CE(SAT)}$
- Enhanced avalanche capability
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

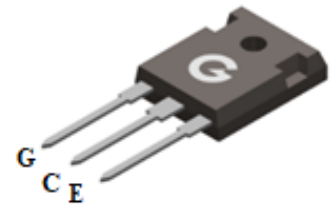


Applications

- Uninterruptible power supplies
- Solar inverter

Mechanical Data

- Case: TO-247
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-247

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TGGU75N65H5	TO-247	30 pcs / Tube	GU75N65H5

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Collector-to-Emitter Voltage	V_{CES}	650	V
Gate-Emitter Voltage	V_{GES}	± 20	V
DC Collector Current ($T_C = 25^\circ\text{C}$, limited by maximum T_J)	I_C	150	A
DC Collector Current ($T_C = 100^\circ\text{C}$, limited by maximum T_J)		75	A
Pulsed Collector Current (Pulse width limited by maximum T_J , $V_{GE} = 15\text{V}$)	I_{CM}	225	A
Short Circuit Withstand Time ($V_{GE} = 15\text{V}$, $V_{CE} \leq 400\text{V}$)	T_{SC}	5	μs
Soldering Temperature, Wave Soldering 1.6mm (0.063in.) from case for 10s	T_{sold}	260	$^\circ\text{C}$
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	375	W
Operating Junction Temperature Range	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

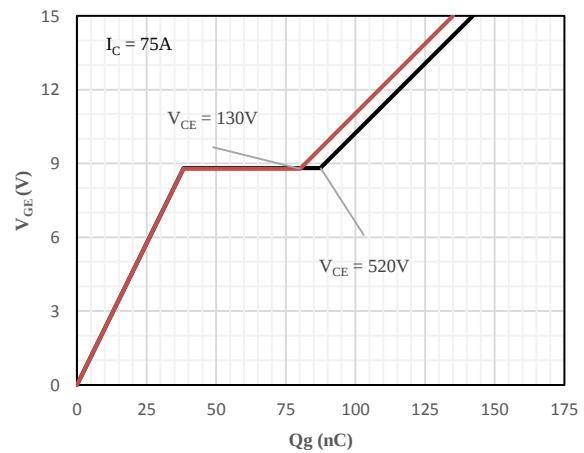
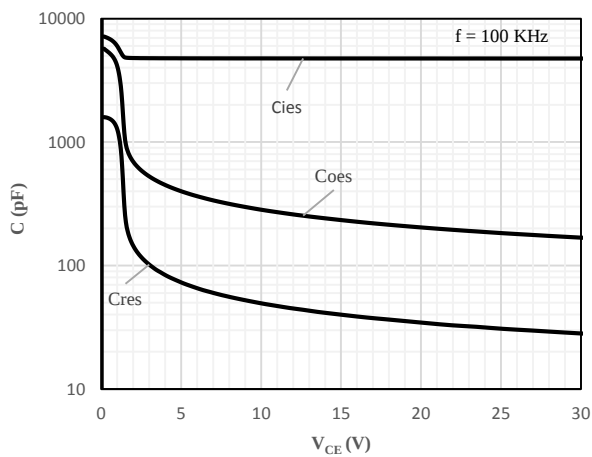
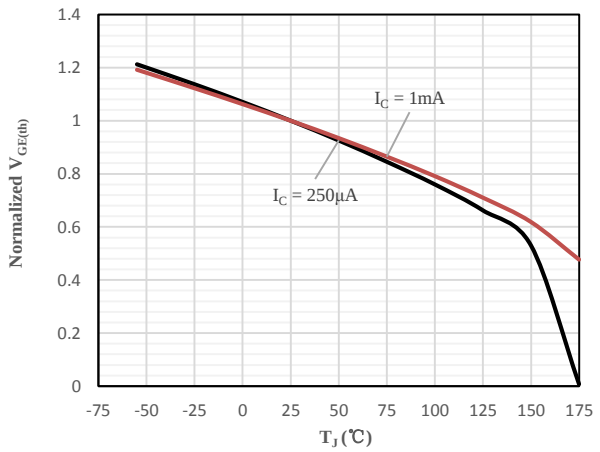
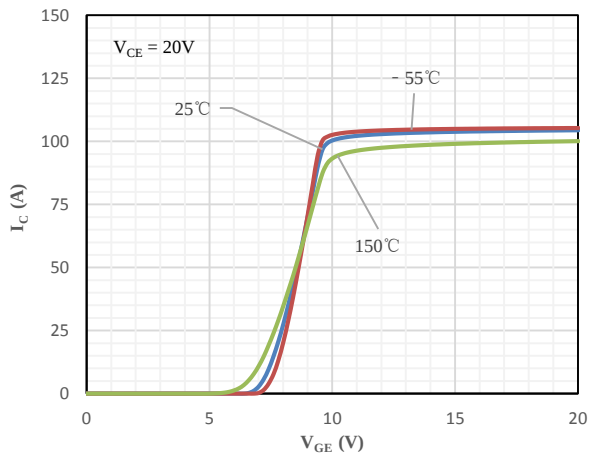
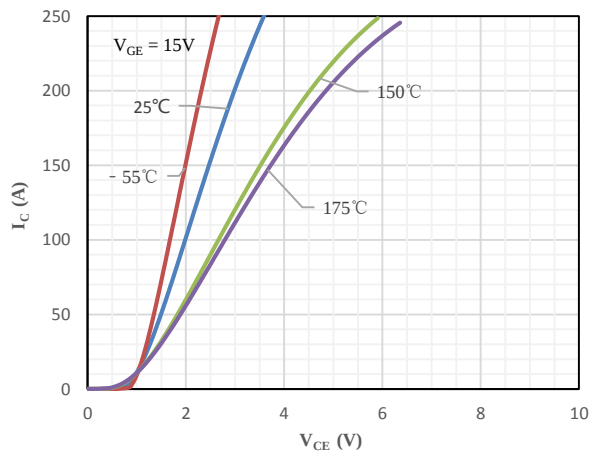
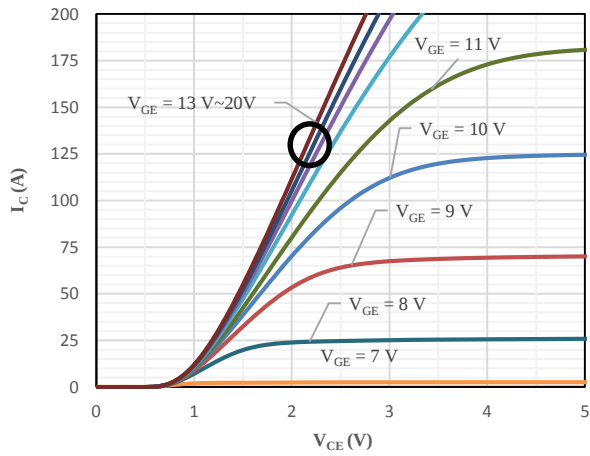
Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	0.27	0.4	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air	$R_{\theta JA}$	-	-	40	$^{\circ}\text{C/W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	650	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE} = 650V, V_{GE} = 0V, T_J = 25^{\circ}\text{C}$	-	-	100	μA
		$V_{CE} = 650V, V_{GE} = 0V, T_J = 175^{\circ}\text{C}$	-	-	5	mA
I_{GES}	Gate to Emitter Leakage Current	$V_{GE} = \pm 20V, V_{CE} = 0V$	-	-	± 200	nA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15V, I_C = 75A, T_J = 25^{\circ}\text{C}$	-	1.7	2.1	V
		$V_{GE} = 15V, I_C = 75A, T_J = 175^{\circ}\text{C}$	-	2.3	-	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{CE} = V_{GE}, I_C = 250\mu A$	4.2	5.4	6.2	V
g_{fs}	Transconductance	$V_{CE} = 20V, I_C = 75A$	-	40	-	S
R_G	Gate Resistance	$V_{GE} = 0V, f = 1\text{MHz}$	-	1.97	-	Ω
Dynamic Characteristics						
Q_G	Total Gate-Charge	$V_{CC} = 520V, V_{GE} = 15V, I_C = 75A$	-	142	-	nC
C_{ies}	Input Capacitance	$V_{CE} = 25V$	-	4753	-	pF
C_{oes}	Output Capacitance	$V_{GE} = 0V$	-	184	-	
C_{res}	Reverse Transfer Capacitance	$f = 100\text{kHz}$	-	31	-	
$I_{C(SC)}$	Short Circuit Collector Current	$V_{GE} = 15V, t_{SC} \leq 5\mu s$ $V_{CC} = 400V, T_J = 25^{\circ}\text{C}$	-	500	-	A
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CE} = 400V$ $V_{GE} = 15V$ $I_C = 75A$ $R_G = 20\Omega$ $T_J = 25^{\circ}\text{C}$	-	89	-	ns
t_r	Turn-on Rise Time		-	144	-	
$t_{d(off)}$	Turn-Off Delay Time		-	244	-	
t_f	Turn-Off Fall Time		-	99	-	
E_{on}	Turn-On Switching Loss		-	3.81	-	mJ
E_{off}	Turn-Off Switching Loss		-	2.02	-	

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)



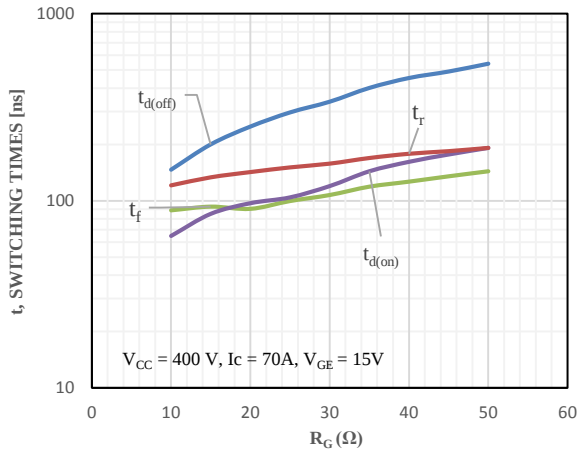


Fig 7 Switching Times vs. Gate Resistor

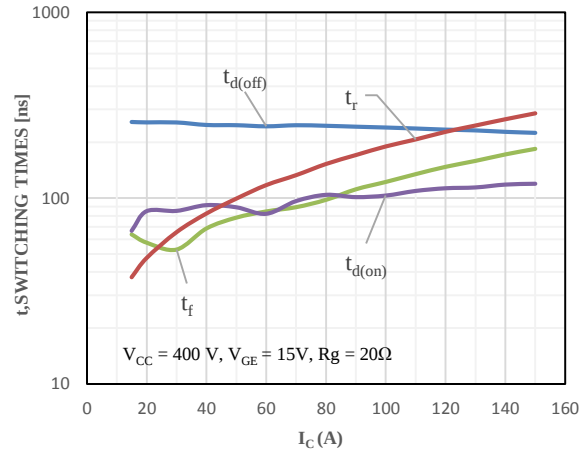


Fig 8 Switching Times vs. Collector Current

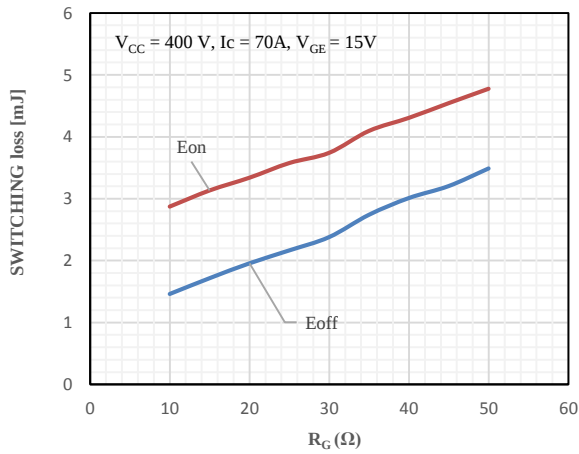


Fig 9 Switching Loss vs. Gate Resistor

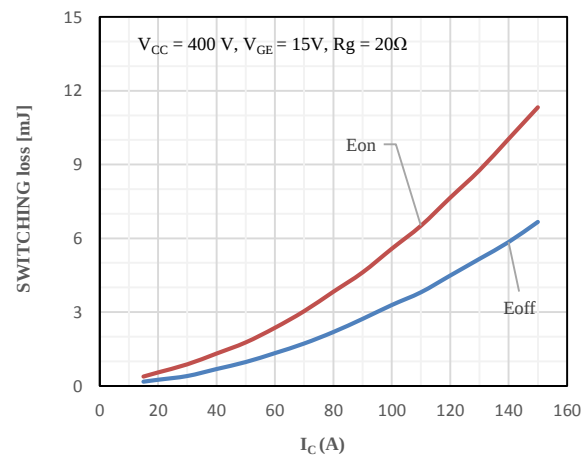


Fig 10 Switching Loss vs. Collector Current

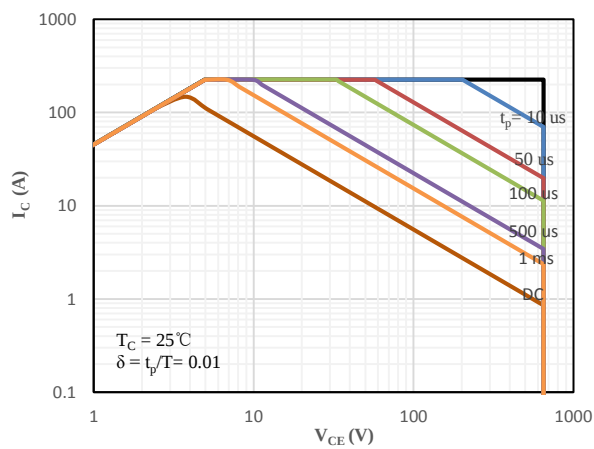


Fig 11 SOA characteristics

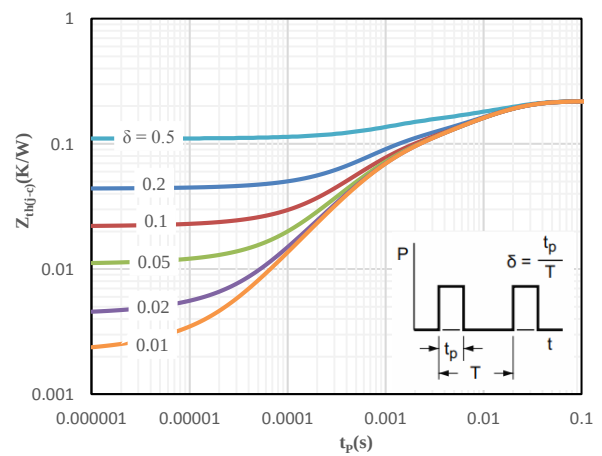


Fig 12 Maximum transient thermal impedance

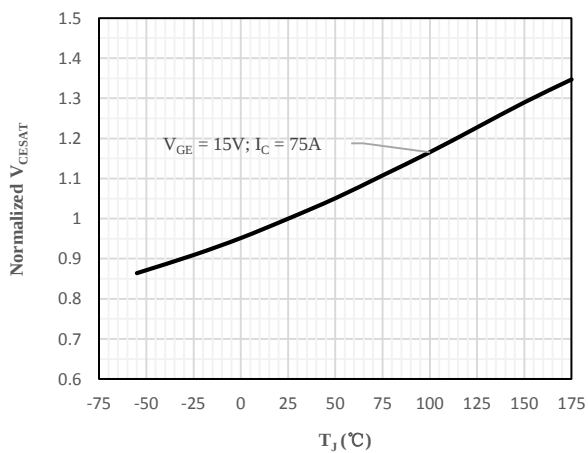
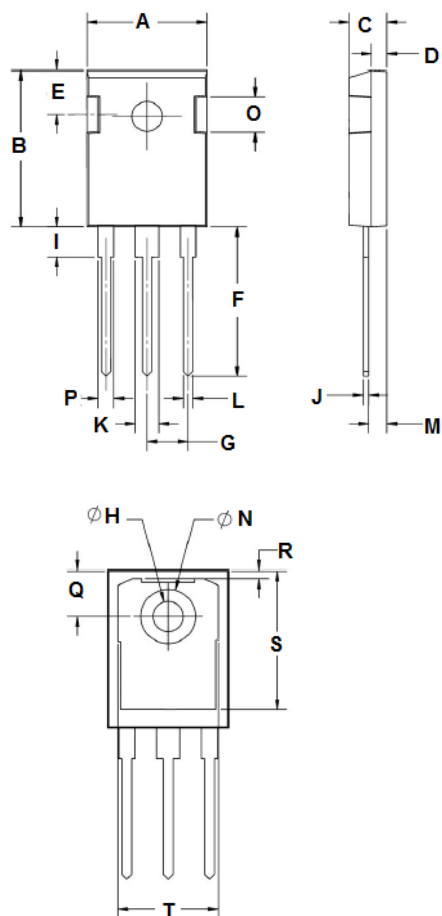


Fig 13 Normalized Collector-Emitter Saturation Voltage vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



TO-247		
Dimension	Min.	Max.
A	15.50	16.10
B	20.70	21.30
C	4.70	5.30
D	1.80	2.20
E	5.20	5.80
F	19.70	20.30
G	5.20	5.60
H	3.30	3.70
I	3.90	4.30
J	0.50	0.70
K	2.80	3.20
L	1.00	1.40
M	2.20	2.60
N	7.00	7.20
O	4.90	5.30
P	1.80	2.20
Q	5.70	5.90
R	0.80	1.20
S	17.00	17.80
T	13.60	14.20