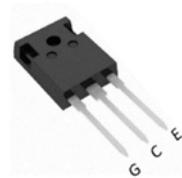




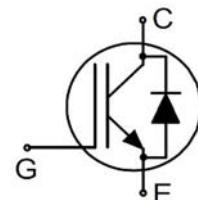
## Features

- Easy paralleling capability due to positive temperature coefficient in  $V_{CE(SAT)}$
- Low EMI
- Low Gate Charge
- Low Saturation Voltage  $V_{CE(SAT)}$
- Maximum junction temperature  $TVJmax=175^{\circ}C$



## Applications

- UPS
- EV-Charger
- Solar String Inverter
- Energy Storage Inverter



**Table 1 Key Performance and Package Parameters**

Type	$V_{CE}$	$I_C$	$V_{CE(SAT)}$ ( $T_{vj} = 25^{\circ}C$ , $V_{GE} = 15 V$ , $I_C=30A$ )	$V_F$ ( $T_{vj} = 25^{\circ}C$ , $IF=30A$ )	Package	Packing
IGBT	1350 V	30 A	1.65 V	1.85 V	TO-247	30PCS

**Table 2 Absolute Maximum Ratings**

( $TVJ = 25^{\circ}C$  unless otherwise noted)

Parameter	Symbol	Conditions	Value	Unit		
Collector emitter voltage	$V_{CE}$	$T_{vj} = 25^{\circ}C$	1350	V		
DC collector current	$I_C$	$T_c = 25^{\circ}C$	60	A		
		$T_c = 100^{\circ}C$	30	A		
Pulsed collector current	$I_{CM}$	$T_c = 25^{\circ}C$	90	A		
Maximum Diode forward current	$I_F$	$T_c = 25^{\circ}C$	60	A		
		$T_c = 100^{\circ}C$	30	A		
Diode pulsed current	$I_{FM}$	$T_c = 25^{\circ}C$	90	A		
Gate source voltage Transient Gate-Emitter Voltage ( $tp \leq 10\mu s$ , $D < 0.010$ )	$V_{GE}$	$T_{vj} = 25^{\circ}C$	$\pm 20$	V		
			$\pm 30$	V		
Power dissipation	$P_{tot}$	$T_c = 25^{\circ}C$	250	W		
		$T_c = 100^{\circ}C$	125			
Operating Junction Temperature Range	$T_{vj}$	-40 to +175			$^{\circ}C$	
Storage Temperature Range	$T_{stg}$	-55 to +150				



**Table 3 Thermal Resistance**

Parameter	Symbol	Conditions	Max	Unit
IGBT Thermal resistance junction - case	$R_{thJC}$	IGBT	0.6	°C / W
Thermal resistance junction - ambient	$R_{thJA}$		40	°C / W

**Table 4 Static Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector emitter voltage	$V_{(BR)CES}$	$T_{vj} = 25^\circ C$	1350	-	-	V
Collector emitter saturation voltage	$V_{CESat}$	$V_{GE} = 15 V, I_C = 30 A$ $T_{vj} = 25^\circ C$		1.65	1.95	V
		$V_{GE} = 15 V, I_C = 30 A$ $T_{vj} = 175^\circ C$	-	1.95	2.25	
Diode forward voltage	VF	$V_{GE} = 0 V, I_C = 30 A$ $T_{vj} = 25^\circ C$		1.85	2.0	V
		$V_{GE} = 0 V, I_C = 30 A$ $T_{vj} = 175^\circ C$		1.95		
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 0.5 mA$ $T_{vj} = 25^\circ C$	5.5	6.18	6.9	V
Zero gate voltage collector current	$I_{CES}$	$V_{CE} = 1350 V, V_{GE} = 0 V$ $T_{vj} = 25^\circ C$	-	-	100	μA
Gate-emitter leakage current	$I_{GES}$	$V_{GE} = \pm 20 V, V_{CE} = 0 V$	-	-	$\pm 200$	nA
Transconductance	$G_{FS}$	$V_{GE} = 15 V, I_C = 20 A$		30		S

**Table 5 Dynamic Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	$C_{ies}$	$V_{GE} = 0 V$ $V_{CE} = 25 V$ $f = 1 MHz$	-	3800	-	pF
Output capacitance	$C_{oes}$		-	51	-	
Reverse transfer capacitance	$C_{res}$		-	18	-	
Gate charge	$Q_g$	$V_{GE} = 0 V$ to $15 V$ $I_C = 20 A$ $V_{CE} = 600 V$	-	120	-	nC
Gate to emitter charge	$Q_{ge}$		-	35	-	
Gate to collector charge	$Q_{gc}$			51		



**Table 6 Switching Characteristic ( TVJ = 25°C )**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600 \text{ V}, I_C = 30 \text{ A}$ $V_{GE} = 15 \text{ V}$ $R_{G(on)} = 10\Omega, R_{G(off)} = 10\Omega$	-	51	-	ns
Rise time	$t_r$		-	52	-	
Turn-off delay time	$t_{d(off)}$		-	190	-	
Fall time	$t_f$		-	152	-	
Turn-on energy	$E_{on}$		-	2.6	-	
Turn-off energy	$E_{off}$		-	1.3	-	
Total switching energy	$E_{ts}$		-	3.9	-	

**Table 7 Diode Recovery Characteristics**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse recovery time	$T_{rr}$	$V_R = 600 \text{ V}, I_F = 30 \text{ A}, di/dt = 600 \text{ A}/\mu\text{s}$	-	330	-	ns
Reverse recovery charge	$Q_{rr}$		-	2.0	-	$\mu\text{C}$
Peak reverse recovery current	$I_{rrm}$		-	12	-	A



## Typical Characteristics

Fig.1 Typical Output characteristics (25°C)

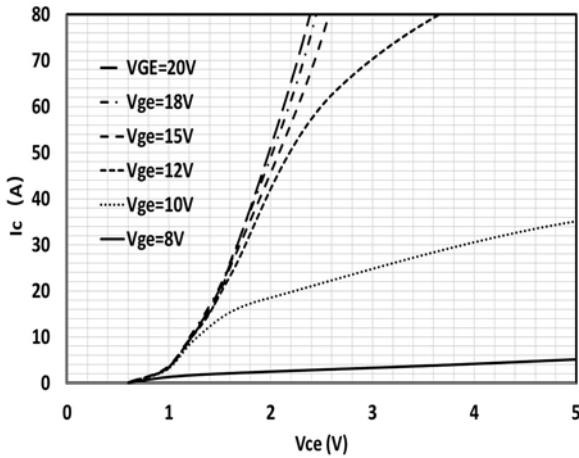


Fig.2 Typical Output characteristics (175°C)

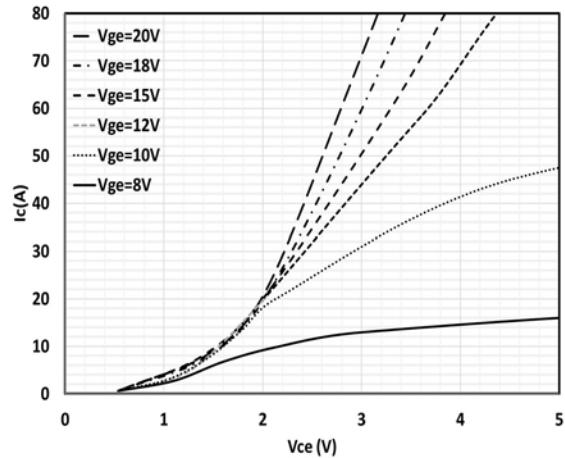


Fig.3 Forward Bias Safe Operating Area

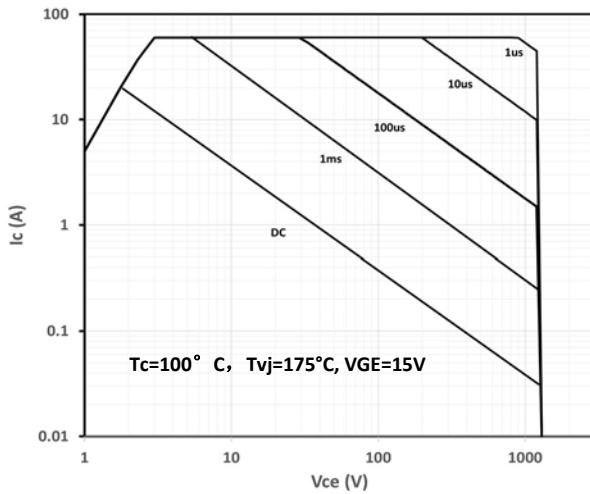


Fig.4 Transfer characteristics

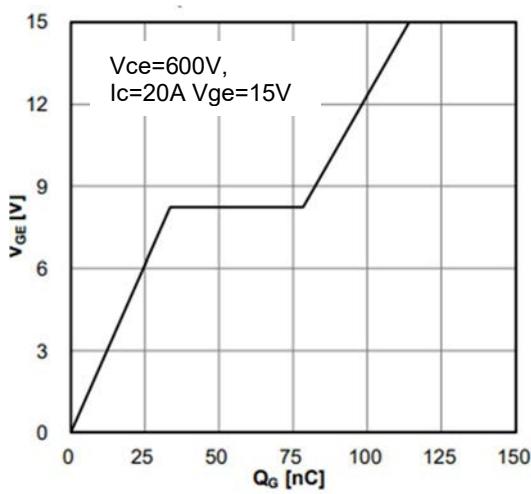
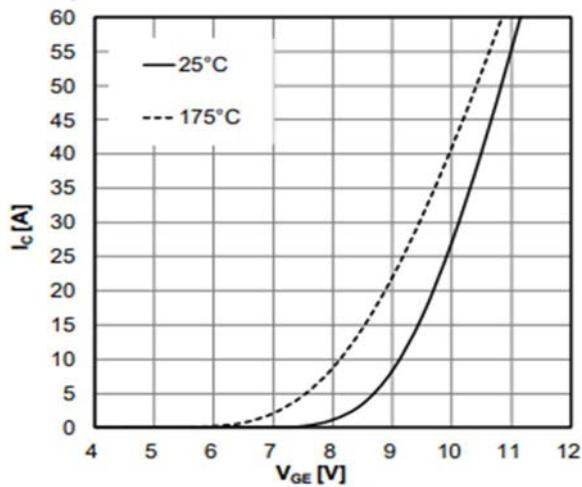


Fig.6 Typical capacitance

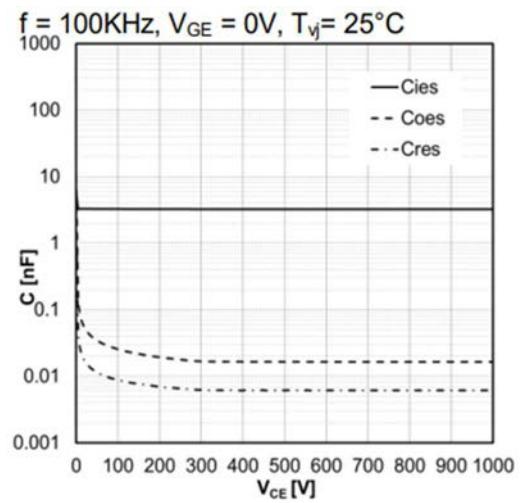




Fig.7 Vcesat vs. Junction Temperature

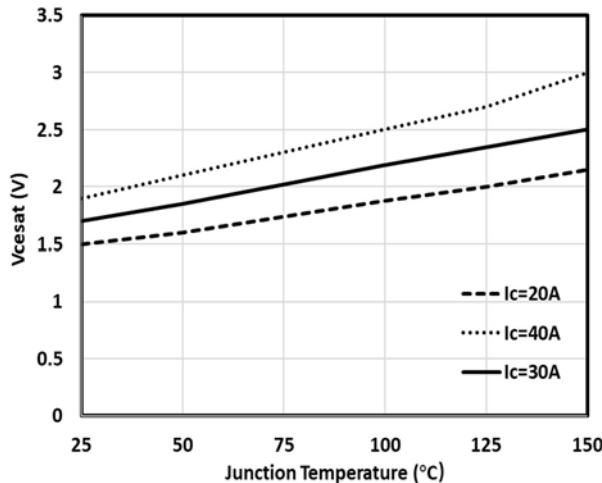


Fig.8 Typical diode VF vs. IF Characteristic

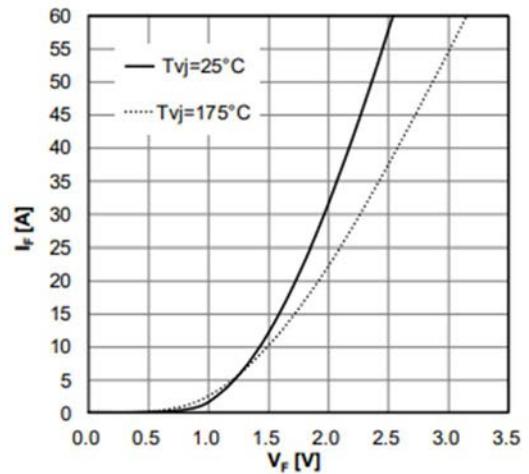


Fig.9 Threshold voltage vs. Junction temperature

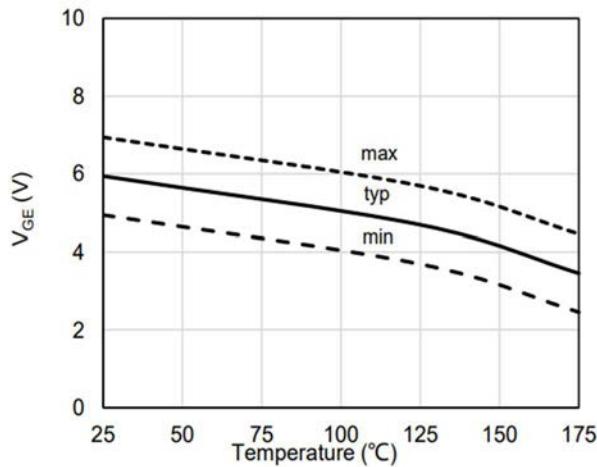


Fig.10 Switching Energy Loss vs. collector current

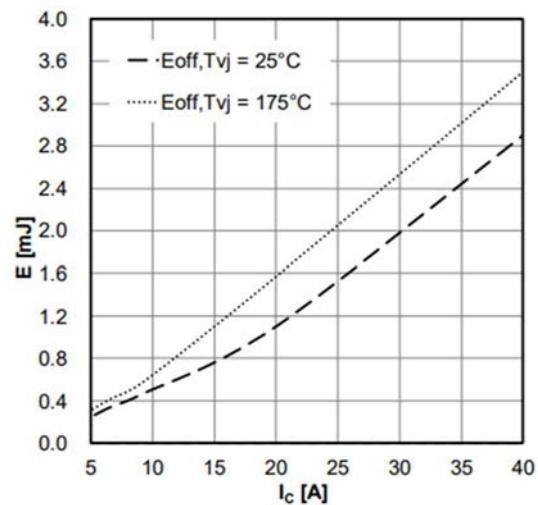


Fig.11 Switching Energy Loss vs. Rg

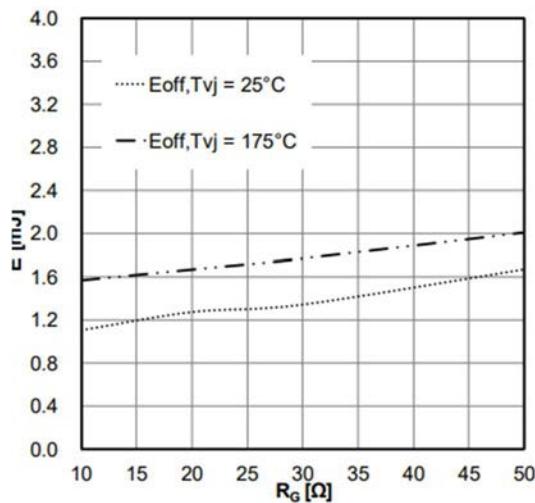
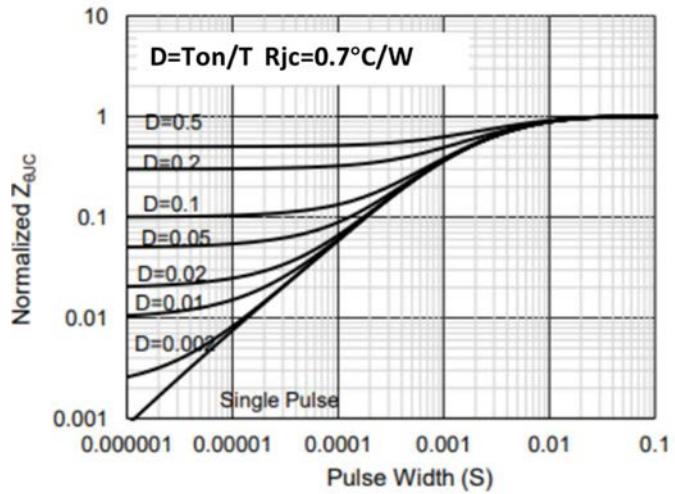
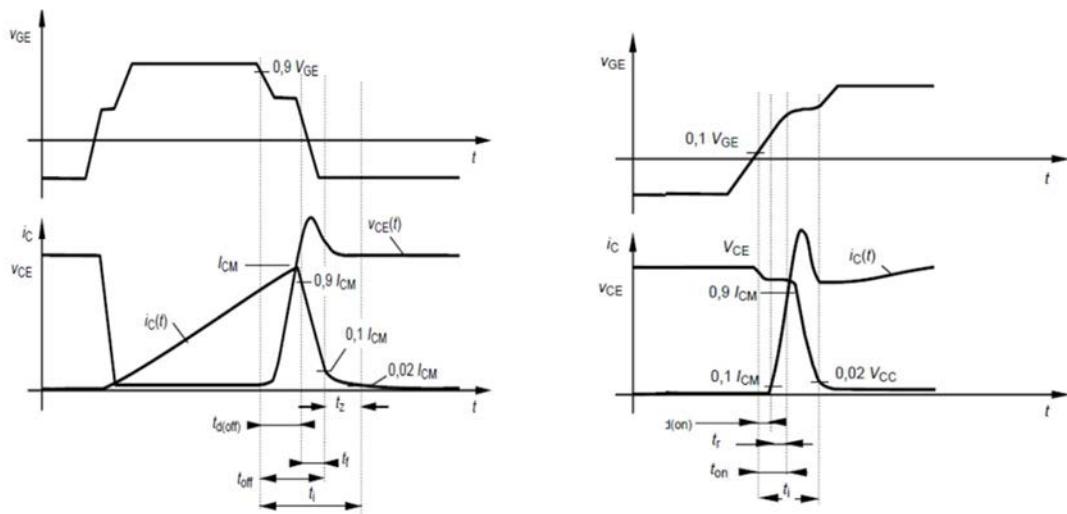


Fig.12 Transient Thermal Impedance IGBT

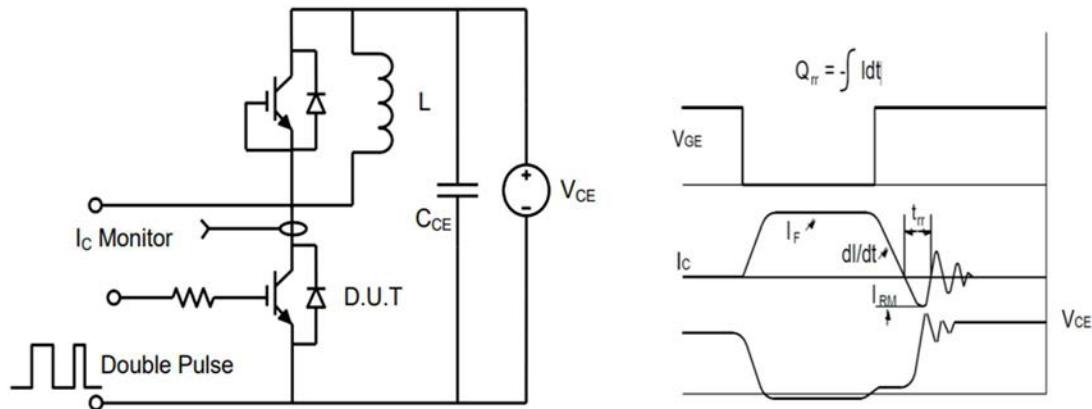




Switching Test Circuit & Waveforms

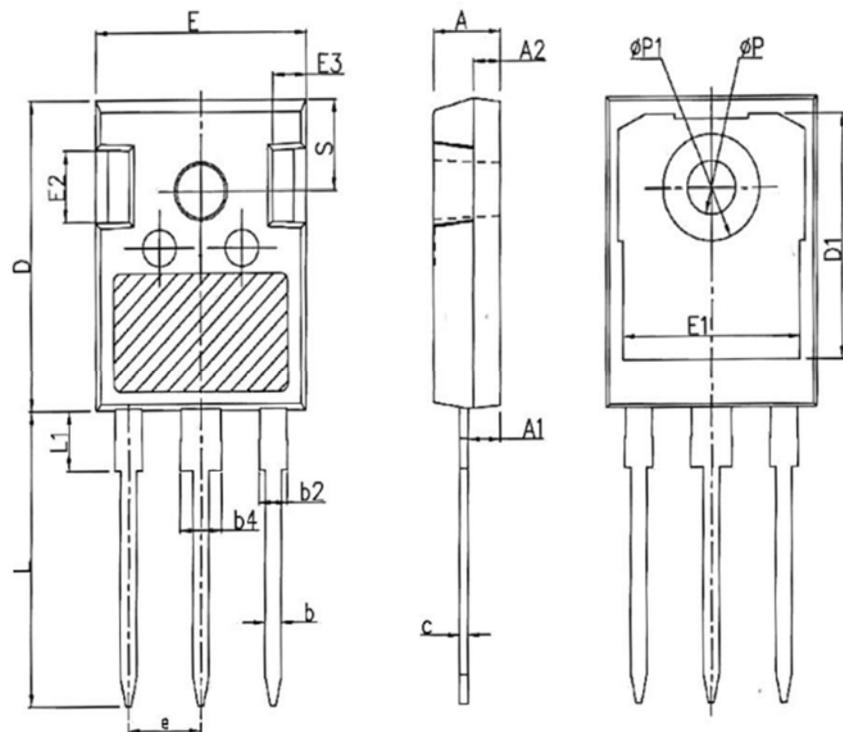


Diode Recovery Test Circuit & Waveforms





### Package Outline



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		



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