

1350V 25A Trench and Field Stop IGBT

DESCRIPTION :

- High ruggedness performance
- Fast switching and short tail current
- Positive $V_{CE(SAT)}$ temperature coefficient
- High speed switching
- RoHS compliant.

TYPICAL APPLICATIONS :

- Induction cooking
- Resonant converters



TO-247

IGBT

MAXIMUM RATINGS (Tvj=25°C unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	1350	V
Continuous collector current	Tc=25°C Tc=100°C	$I_{C\ nom}$	50 25	A
Pulsed collector current	t _p limited by Tvjmax	I_{CM}	100	A
Gate emitter voltage		V_{GE}	±20	V
Power dissipation	Tc=25°C Tc=100°C	P_{tot}	416 208	W
Temperature under switching conditions		Tvj op	-40~+175	°C
Storage temperature		T _{STG}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Max.	Unit
IGBT thermal resistance, junction - case		$R_{th(j-C)}$	0.36	K/W
Diode thermal resistance, junction - case		$R_{th(j-C)}$	1.40	K/W
Thermal resistance, junction - ambient		$R_{th(j-A)}$	40	K/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector-emitter cut-off current VCE=1350V, VGE=0V Tvj=25°C	I_{CES}			100	μA
Gate-emitter leakage current VCE=0V, VGE=20V Tvj=25°C	I_{GES}			100	nA
Gate-Emitter threshold voltage IC=1.0mA, VGE= VCE Tvj=25°C	$V_{GE(th)}$	5.0	5.4	6.0	V
Collector-Emitter saturation voltage VGE=15V, IC=25A Tvj=25°C VGE=15V, IC=25A Tvj=175°C	$V_{CE(SAT)}$		2.0 2.5		V
Input capacitance f=1MHz, VCE=30 V, VGE=0 V Tvj=25°C	C_{ies}		4530		pF
Output capacitance f=1MHz, VCE=30 V, VGE=0 V Tvj=25°C	C_{oes}		54		pF
Reverse transfer capacitance f=1MHz, VCE=30 V, VGE=0 V Tvj=25°C	C_{res}		25		pF
Gate charge IC = 25A, VGE = 15 V, VCC = 1080V Tvj=25°C	Q_G		147		nC
Turn-off delay time IC=25A, VCC=600 V Tvj=25°C VGE=0/15 V, RG=10Ω Tvj=175°C (inductive load)	$t_{d(OFF)}$		181 209		ns
Fall time IC=25A, VCC=600 V Tvj=25°C VGE=0/15 V, RG=10Ω Tvj=175°C (inductive load)	t_f		126 215		ns
Turn-off energy IC=25A, VCC=600 V Tvj=25°C VGE=0/15 V, RG=10Ω Tvj=175°C (inductive load)	$E_{(OFF)}$		1.1 1.5		mJ

Diode

MAXIMUM RATINGS (Tvj=25°C unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Repetitive peak reverse voltage	Tvj=25°C	V _{RRM}	650	V
Continuous forward current	Tc=100°C	I _F	40	A
Diode maximum current	t _p limited by Tvj max	I _{FM}	160	A

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Forward voltage IF=25A, VGE=0 V Tvj=25°C IF=25A, VGE=0 V Tvj=175°C	V _F		2.6 2.4		V

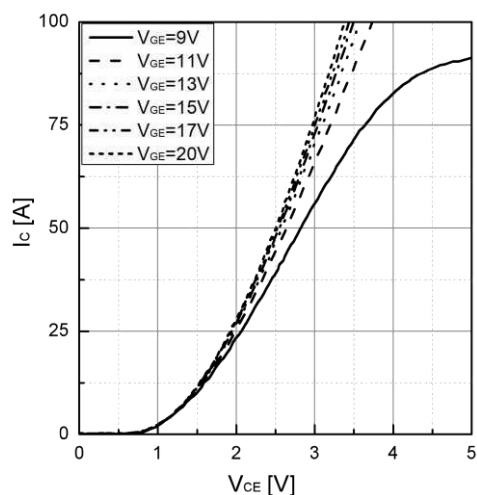


Figure 1. Typical output characteristics ($T_{vj}=25^{\circ}\text{C}$)

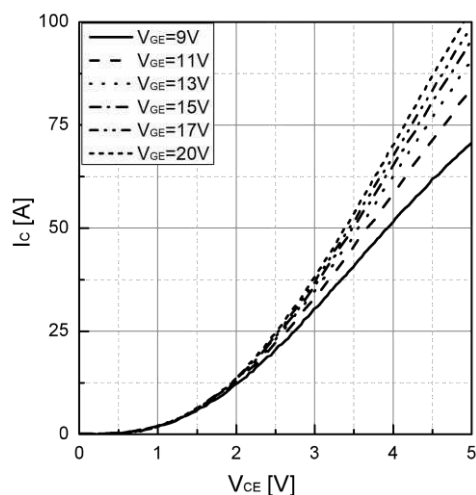


Figure 2. Typical output characteristics ($T_{vj}=175^{\circ}\text{C}$)

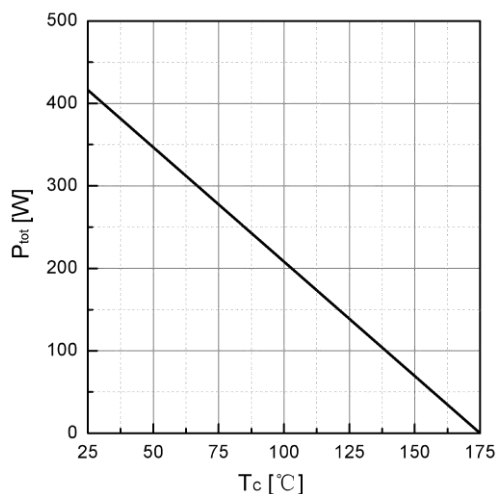


Figure 3. Power dissipation as a function of T_c

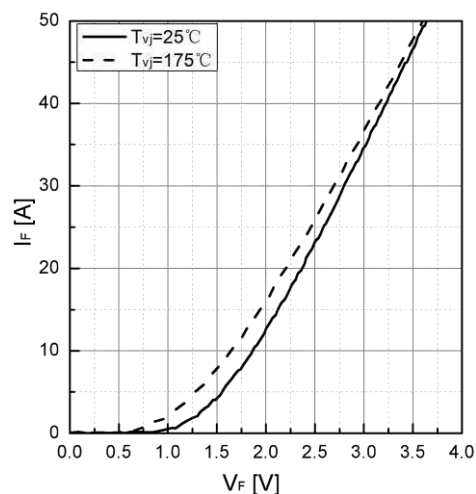


Figure 4. Typical I_F as a function of V_F

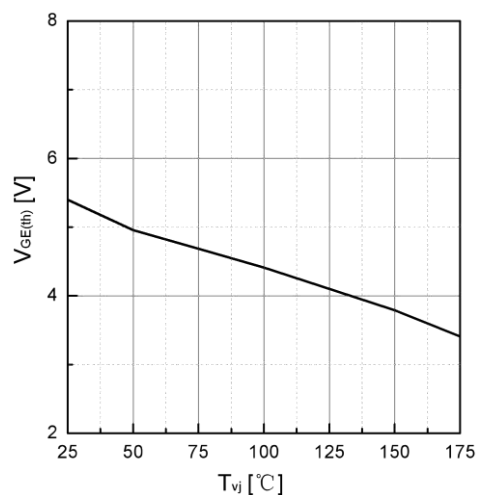


Figure 5. Typical $V_{GE(th)}$ as a function of T_{vj} ($I_c=1\text{mA}$)

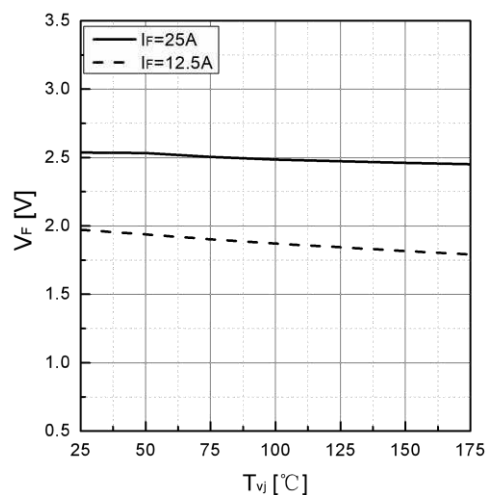


Figure 6. Typical V_F as a function of T_{vj}

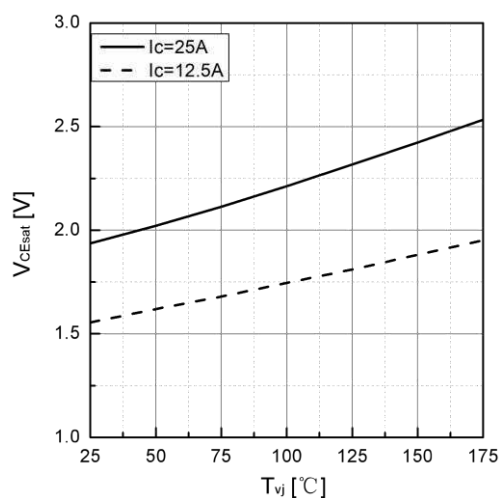


Figure 7. Typical VCEsat as a function of Tvj

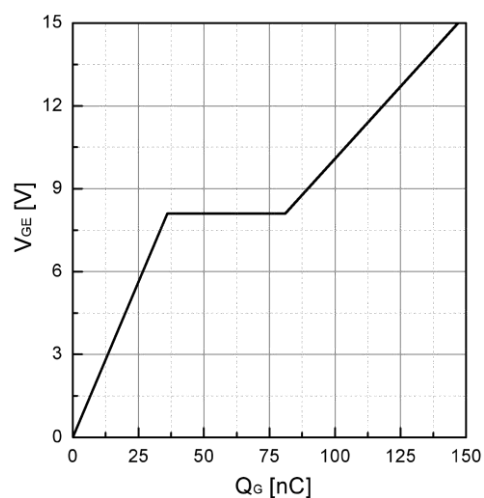


Figure 8. Typical Gate charge

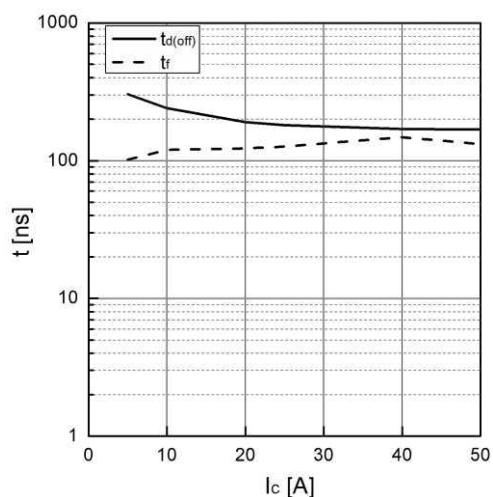


Figure 9. Typical switching times as a function of IC

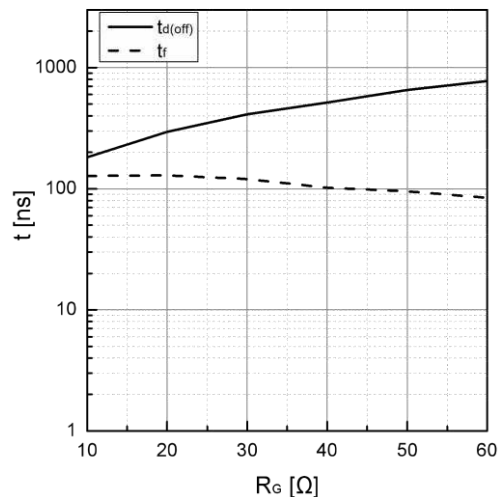


Figure 10. Typical switching times as a function of RG

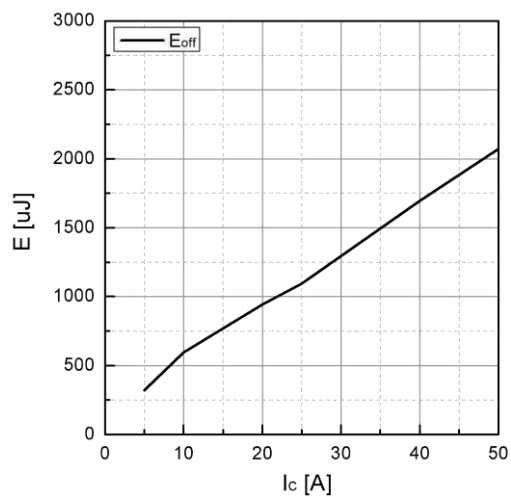


Figure 11. Typical switching energy losses as a function of IC

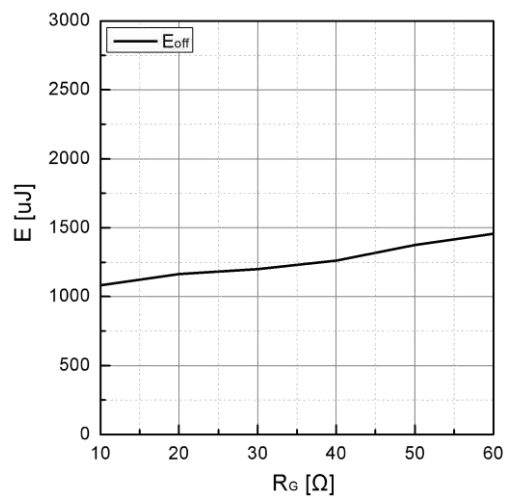


Figure 12. Typical switching energy losses as a function of RG

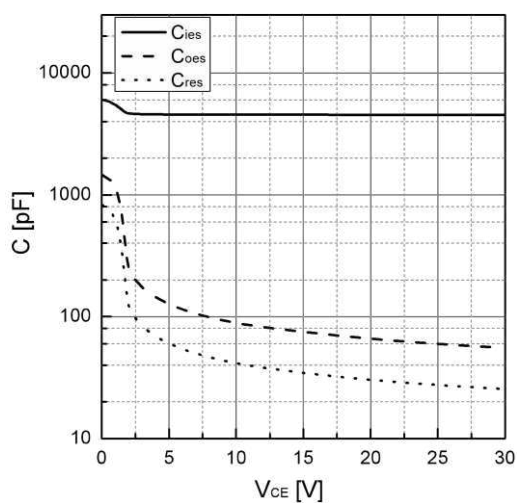


Figure 13. Typical capacitance as a function of VCE
(f=1Mhz, VGE=0V)

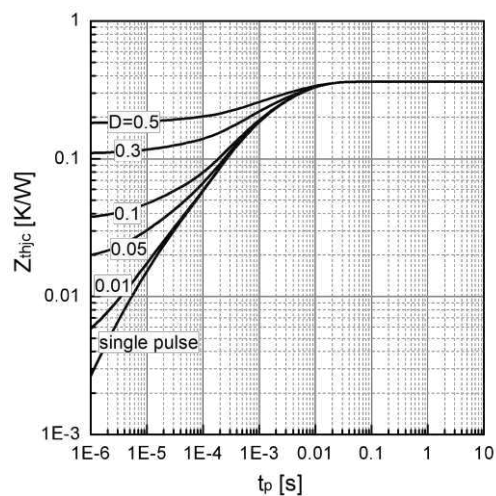
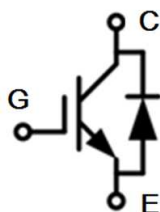
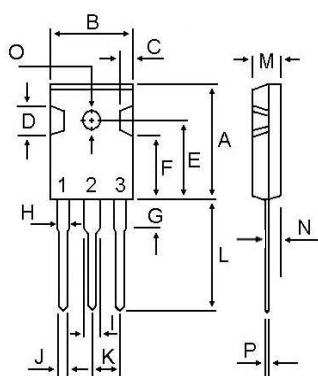


Figure 14. Transient thermal impedance, IGBT

• Circuit diagram



• Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	20.80	21.80
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.50	15.50
F	11.20	13.20
G	3.75	4.35
H	1.90	2.30
I	2.90	3.30
J	1.00	1.40
K	5.26	5.66
L	19.50	20.50
M	4.68	5.36
N	2.30	2.60
O	3.45	3.85
P	0.48	0.72

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