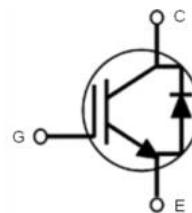
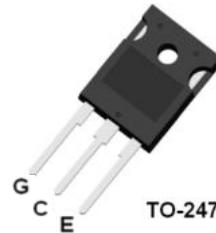


## 350V 50A IGBT

### Description

The device is designed by advanced technology process. This IGBT have excellent quality for applications such as AC/DC square wave welder and other switching .



### Features

- $V_{CE(sat)}=1.35V$  (typ.) @ $I_C=50A$
- $t_r=36ns$  (typ.)
- High Input Impedance

### Applications

- AC/DC square wave welder, Low speed switch

### Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
$V_{CES}$	Collector to Emitter Voltage		350	V
$V_{GES}$	Gate to Emitter Voltage		$\pm 20$	V
$I_C$	Collector Current	$T_C=25^\circ C$	80	A
		$T_C=100^\circ C$	50	A
$I_{CM}$	Pulsed Collector Current		150	A
$I_F$	Diode Continuous Forward Current	$T_C=100^\circ C$	30	A
$I_{FM}$	Diode Maximum Forward Current		180	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$	325	W
		$T_C=100^\circ C$	162	W
$T_J$	Operating Junction Temperature Range		-55~+150	°C
$T_{STG}$	Storage Temperature Range		-55~+150	°C

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$ (IGBT)	Thermal Resistance, Junction to case for IGBT	0.39	°C/W
$R_{th(J-C)}$ (Diode)	Thermal Resistance, Junction to case for Diode	1.0	°C/W
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	°C/W

**Electrical Characteristics of IGBT @ $T_C=25\text{ }^\circ\text{C}$  unless otherwise noted**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{CES}$	Collector to Emitter Breakdown Voltage	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	350	-	-	V
$V_{CE(\text{sat})}$	Collector to Emitter Saturation Voltage	$I_C=50\text{A}, V_{GE}=15\text{V}$	-	1.35	1.7	V
		$I_C=50\text{A}, V_{GE}=15\text{V}, T_C=125\text{ }^\circ\text{C}$	-	1.40	-	V
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{CE}=V_{GE}, I_C=250\mu\text{A}$	-	4.0	-	V
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}$	-	-	1	mA
$I_{GES}$	Gate to Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}$	-	-	$\pm 250$	nA

**Electrical Characteristics of Diode @ $T_C=25\text{ }^\circ\text{C}$  unless otherwise noted**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_F$	Diode Forward Voltage	$I_F=30\text{A}$	-	1.0	2.0	V
		$I_F=30\text{A}, T_C=125\text{ }^\circ\text{C}$	-	0.9	-	V
$t_{rr}$	Diode Reverse Recovery Time	$I_F=30\text{A},$ $dI/dt=-200\text{A/us}$	-	36	-	ns
$I_{rr}$	Diode Peak Reverse Recovery Current		-	5.0	-	A
$Q_{rr}$	Diode Reverse Recovery Charge		-	120	-	nC

**Switching Characteristics @ $T_C=25\text{ }^\circ\text{C}$  unless otherwise noted**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$I_C=50\text{A},$ $V_{CC}=175\text{V},$ $V_{GE}=15\text{V},$ $R_G=14\Omega$ Inductive Load, $T_C=25\text{ }^\circ\text{C}$	-	19	-	ns
$t_r$	Rising Time		-	63	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	810	-	ns
$t_f$	Falling Time		-	2000	-	ns
$E_{on}$	Turn-on Switching Loss		-	1.2	-	mJ
$E_{off}$	Turn-off Switching Loss		-	15.3	-	mJ
$E_{ts}$	Total Switching Loss		-	16.5	-	mJ
$t_{d(on)}$	Turn-on Delay Time		-	19	-	ns
$t_r$	Rising Time	$I_C=50\text{A},$ $V_{CC}=175\text{V},$ $V_{GE}=15\text{V},$ $R_G=14\Omega$ Inductive Load, $T_C=125\text{ }^\circ\text{C}$	-	63	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	980	-	ns
$t_f$	Falling Time		-	3650	-	ns
$E_{on}$	Turn-on Switching Loss		-	1.4	-	mJ
$E_{off}$	Turn-off Switching Loss		-	21.5	-	mJ
$E_{ts}$	Total Switching Loss		-	22.9	-	mJ
$C_{ies}$	Input Capacitance	$V_{GE}=0\text{V}, V_{CE}=30\text{V},$ $f=1.0\text{MHz}$	-	5100	-	pF
$C_{res}$	Reverse Transfer Capacitance		-	215	-	pF
$C_{oes}$	Output Capacitance		-	93	-	pF
$Q_g$	Total Gate Charge	$I_C=50\text{A},$ $V_{CC}=175\text{V}$ $V_{GE}=15\text{V}$	-	215	-	nC
$Q_{ge}$	Gate to Emitter Charge		-	28	-	nC
$Q_{gc}$	Gate to Collector Charge		-	157	-	nC
$tsc$	Short Circuit Withstand Time	$V_{CC}=175\text{V}, V_{GE}=15\text{V}$	5	-	-	us

## Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

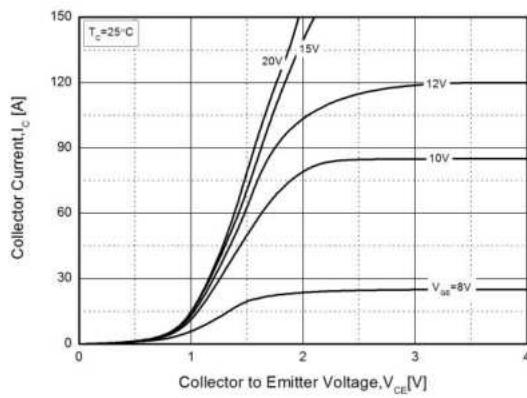


Fig. 3. Typical Saturation Voltage vs.  $T_c$

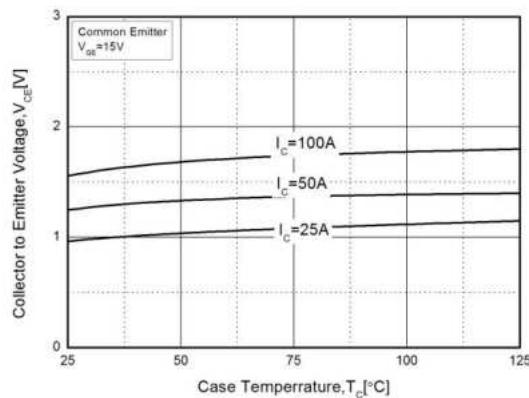


Fig. 5. Typical Capacitance Characteristics

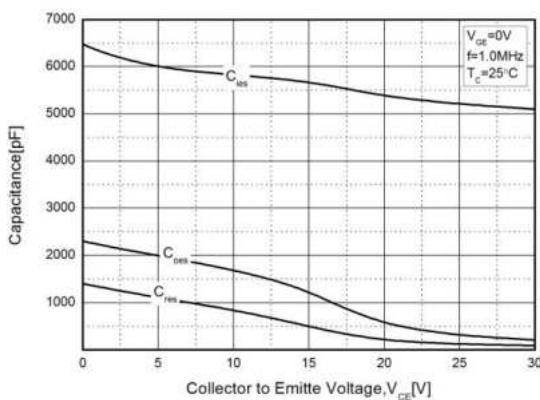


Fig. 2. Typical Saturation Voltage Characteristics

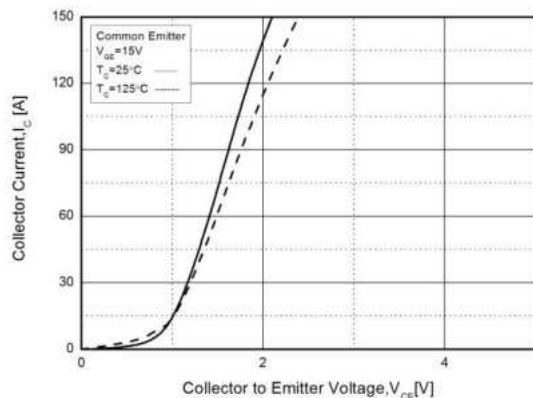


Fig. 4. Diode Forward Characteristics

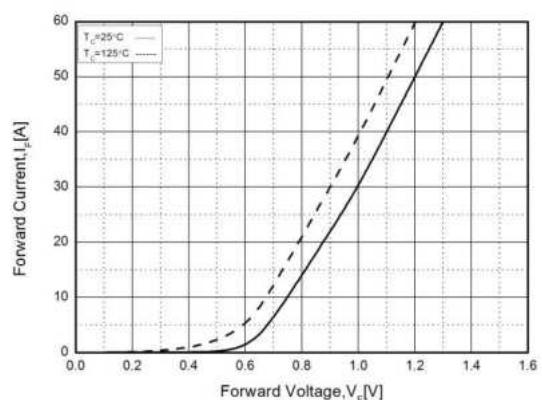
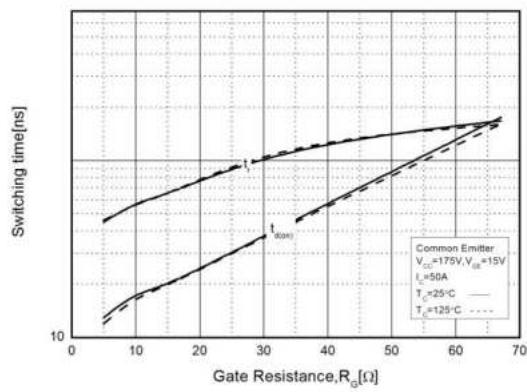


Fig. 6. Turn-on Characteristics vs.  $R_G$



## Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs.  $R_G$

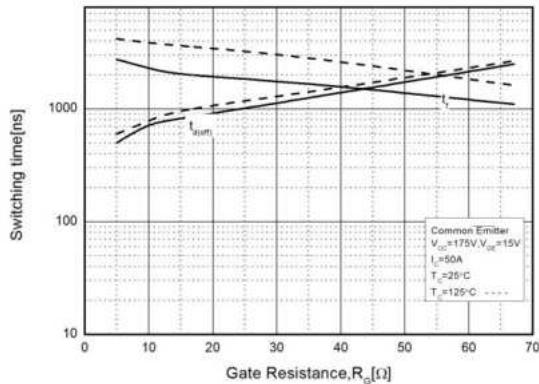


Fig. 8. Switching Loss vs.  $R_G$

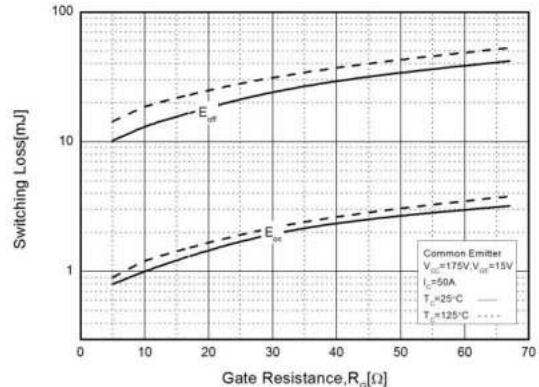


Fig. 9. Turn-on Characteristics vs.  $I_C$

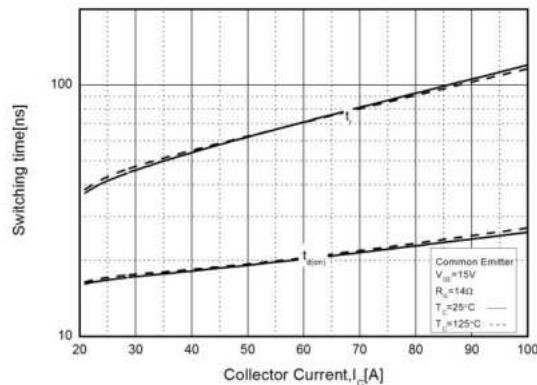


Fig. 10. Turn-off Characteristics vs.  $I_C$

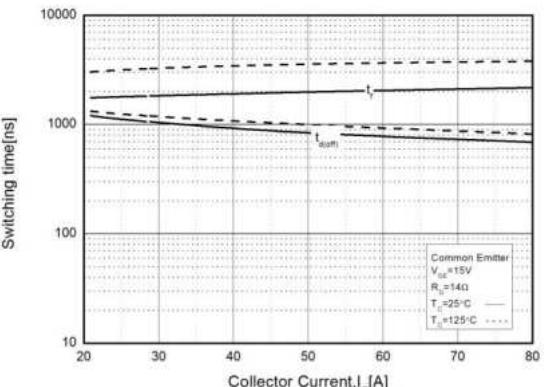
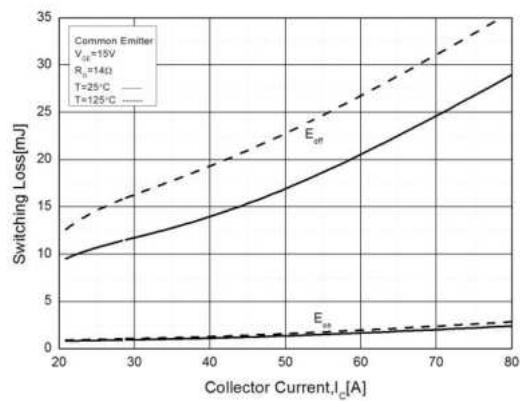


Fig. 11. Switching Loss vs.  $I_C$



**Package Dimensions****TO-247**

(Dimensions in Millimeters)

