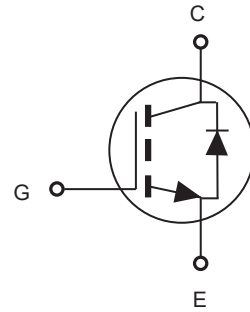
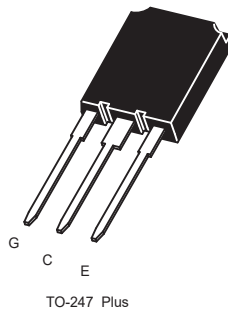


## 1200V 75A Insulated Gate Bipolar Transistors

### FEATURES

- $V_{CES} = 1200V$ ,  $I_C = 75A$  ( $T_C = 100^\circ C$ ) .
- Trench Gate and Field Stop Processes IGBT .
- Low switching power loss .
- Low switching surge and noise .
- Low EMI .



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Limit	Units
Collector-to-Emitter Breakdown Voltage	$V_{CES}$	1200	V
Gate-to-Emitter Voltage	$V_{GE}$	$\pm 20$	V
Continuous Collector Current @ $T_C = 25^\circ C$ @ $T_C = 100^\circ C$	$I_C$	150	A
		75	A
Pulsed Collector Current	$I_{CM}$	300	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ @ $T_C = 100^\circ C$	$P_D$	625	W
		349	W
Operating Junction Temperature	$T_J$	-40 to 175	$^\circ C$
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case for IGBT	$R_{\theta JC}$	0.24	$^\circ C/W$
Thermal Resistance, Junction-to-Case for Diode	$R_{\theta JC}$	0.43	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ C/W$

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units	
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$V_{GE} = 0V, I_C = 0.5mA$	1200			V	
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE} = 1200V, V_{GE} = 0V$			1	$\mu A$	
Gate Body Leakage Current, Forward	$I_{GESF}$	$V_{GE} = 20V, V_{CE} = 0V$			200	nA	
Gate Body Leakage Current, Reverse	$I_{GESR}$	$V_{GE} = -20V, V_{CE} = 0V$			-200	nA	
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 250\mu A$	5		6.6	V	
Collector-Emitter saturation Voltage	$V_{CE(sat)}$	$V_{GE} = 20V, I_C = 75A$		1.9	2.2	V	
Input Capacitance	$C_{ies}$	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		19520		pF	
Output Capacitance	$C_{oes}$			242		pF	
Reverse Transfer Capacitance	$C_{res}$			131		pF	
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 75A, V_{GE} = 15V, R_{GEN} = 0.6\Omega$ Inductive Load $T_a = 25^\circ\text{C}$		42		ns	
Turn-On Rise Time	$t_r$			145		ns	
Turn-Off Delay Time	$t_{d(off)}$			122		ns	
Turn-Off Fall Time	$t_f$			103		ns	
Turn-On Switching Loss	$E_{on}$			4.1		mJ	
Turn-Off Switching Loss	$E_{off}$			2.4		mJ	
Total Gate Charge	$Q_g$		$V_{CC} = 960V, I_C = 75A, V_{GE} = 15V$		589		nC
Gate-Emitter Charge	$Q_{ge}$				--		nC
Gate-Collector Charge	$Q_{gc}$				--		nC

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Diode Forward Voltage	$V_F$	$I_F = 75A$		2.2	3	V
Diode Reverse Recovery Time	$t_{rr}$	$I_F = 75A$ $di_F / dt = 100A / \mu s$		210		ns
Diode peak Reverse Recovery Current	$I_{rr}$			26		A
Diode Reverse Recovery Charge	$Q_{rr}$			2.9		$\mu C$

Notes :Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

## TYPICAL PERFORMANCE CHARACTERISTICS

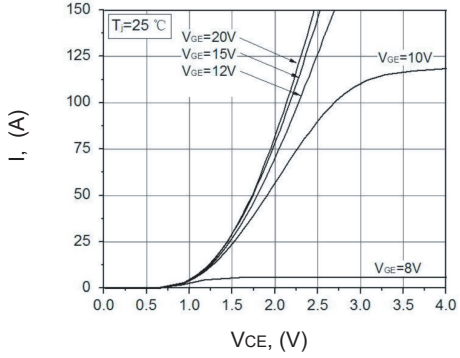


Figure 1. Output Characteristics

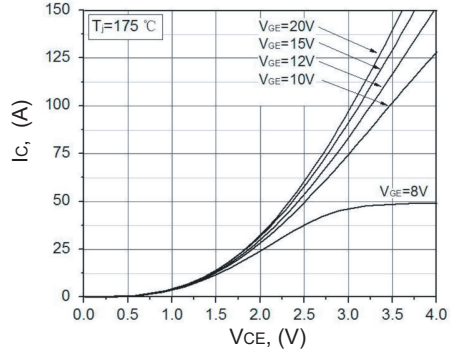


Figure 2. Output Characteristics

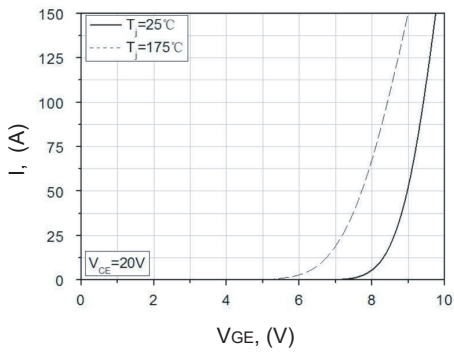


Figure 3. Typical Transfer Characteristics

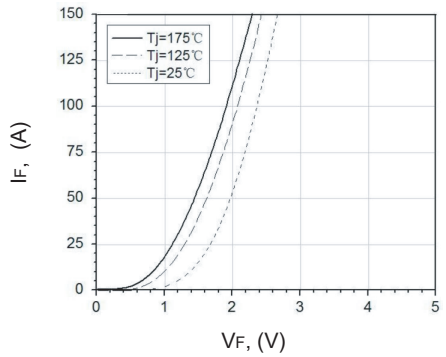


Figure 4. Typical Vf vs If Characteristics

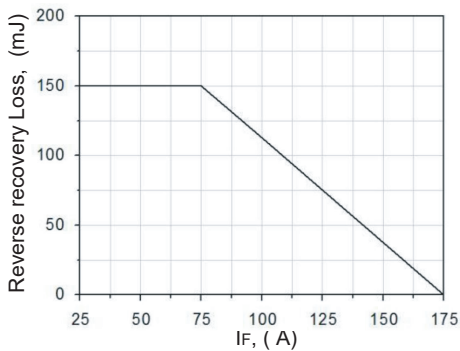


Figure 5. Reverse recovery Loss vs If Characteristics

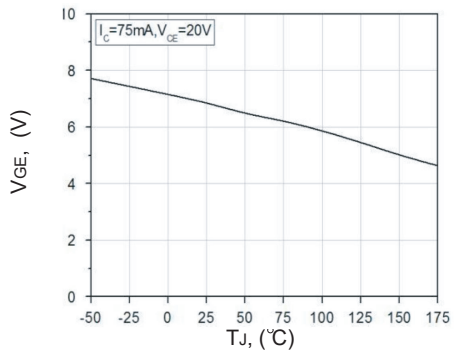


Figure 6. Gate Threshold Voltage

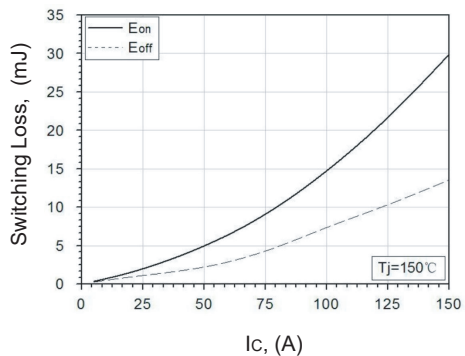


Figure 7. Switching Loss vs Collector Current

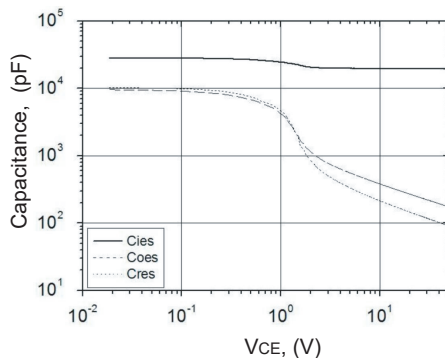


Figure 8. Capacitance Characteristics

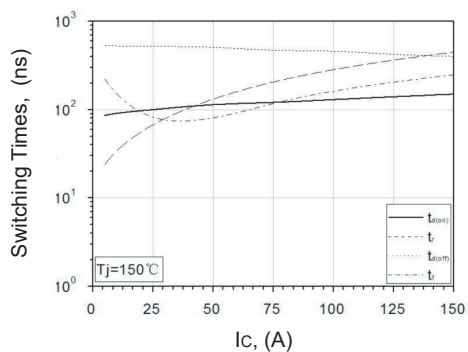


Figure 9. Switching Times vs Collector Current

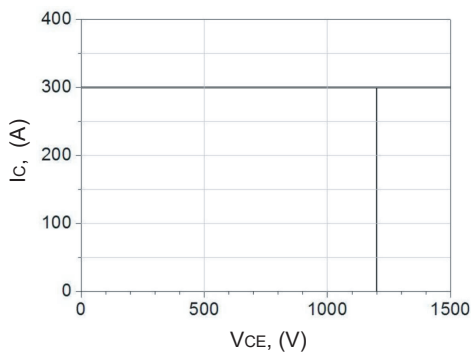


Figure 10. Forward Bias Safe Operating Area

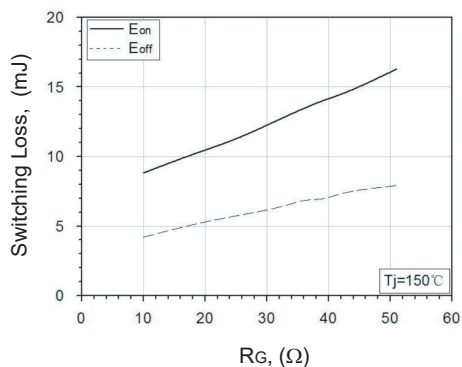


Figure 11. Switching Loss vs Gate Resistances

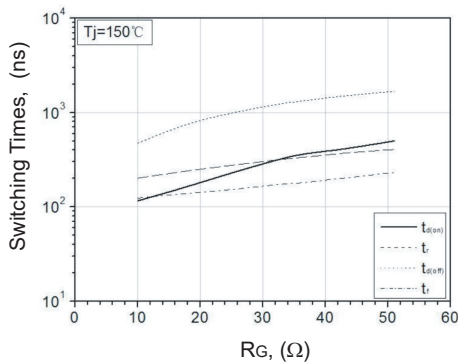
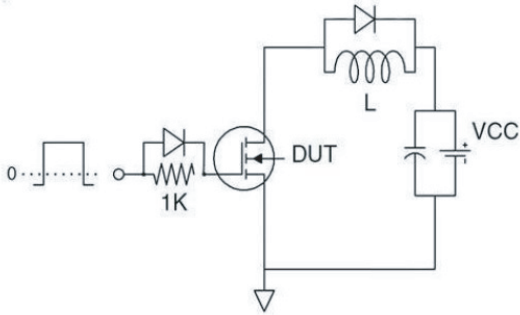
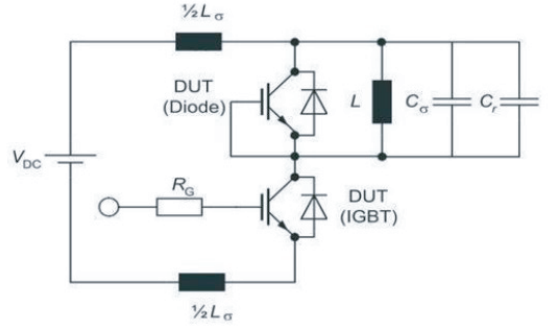


Figure 12. Switching Times vs Gate Resistances

## TEST CIRCUIT

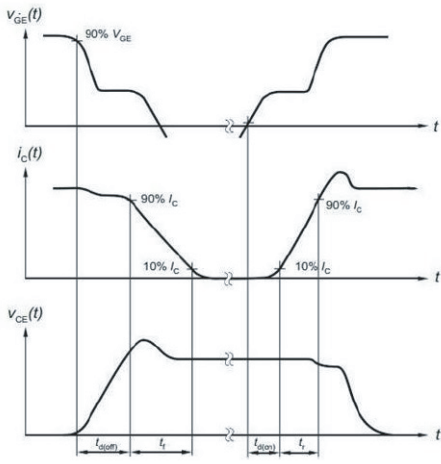


Gate Charge Test Circuit

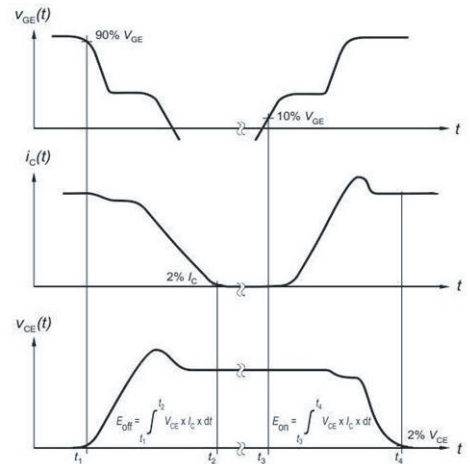


Switch Time Test Circuit

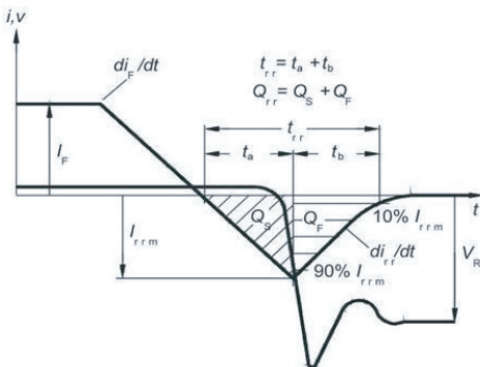
## SWITCHING CHARACTERISTICS



Definition of switching times

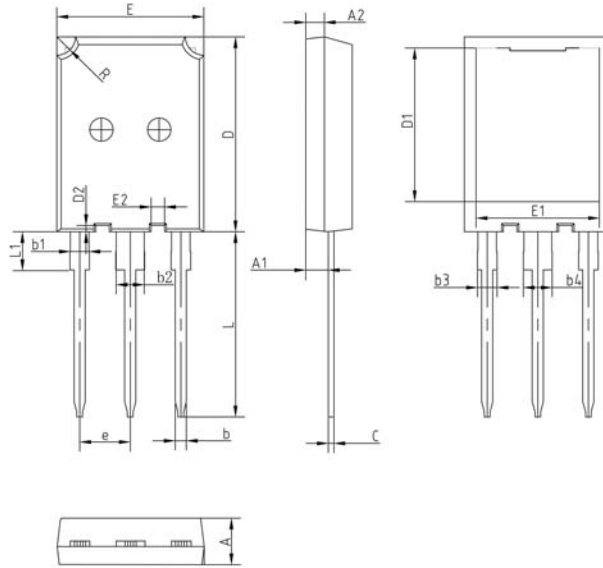


Definition of switching losses



Definition of diode switching characteristics

TO-247 PLUS 產品外觀尺寸圖 (Product Outline Dimension)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.800	5.200	0.189	0.205
A1	2.250	2.510	0.089	0.099
A2	1.900	2.100	0.075	0.083
b	1.000	1.400	0.039	0.055
b1	1.900	2.300	0.075	0.091
b2	2.900	3.300	0.114	0.130
b3	~	2.300	~	0.091
b4	~	3.300	~	0.130
c	0.450	0.750	0.018	0.030
D	20.500	21.500	0.807	0.846
D1	16.250	16.850	0.640	0.663
D2	0.300	0.800	0.012	0.031
E	15.600	16.000	0.614	0.630
E1	13.000	13.500	0.512	0.531
E2	1.300	2.000	0.051	0.079
e	5.440		0.214	
L	19.500	20.500	0.768	0.807
L1	3.500	4.500	0.138	0.177
R	1.800	2.200	0.071	0.087