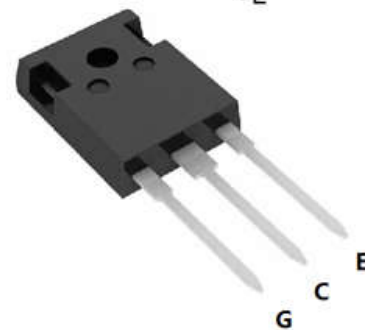
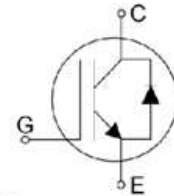


FEATURES

- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
 - High speed switching
 - High ruggedness, temperature stable
 - Short circuit withstand time – 8μs
 - Low V_{CEsat}
 - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Enhanced avalanche capability

V_{CE}	1200	V
I_C	50	A
$V_{CE(SAT)} I_C=50A$	1.65	V



APPLICATION

- Uninterruptible Power Supplies
- Solar inverter
- Welding
- PFC applications

Product	Package	Packaging
YGW50N120FP	TO247	Tube

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC collector current, limited by T_{jmax} $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_C	100 50	A
Diode Forward current, limited by T_{jmax} $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_F	100 50	A
Continuous Gate-emitter voltage	V_{GE}	± 20	V
Transient Gate-emitter voltage	V_{GE}	± 30	V
Turn off safe operating area $V_{CE} \leq 1200\text{V}$, $T_j \leq 150^\circ\text{C}$	-	150	A
Pulsed Collector Current, $V_{GE} = 15\text{V}$, t_p limited by T_{jmax}	I_{CM}	150	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	150	A
Short Circuit Withstand Time, $V_{GE} = 15\text{V}$, $V_{CE} \leq 600\text{V}$	T_{sc}	8	μs
Power dissipation, $T_j = 25^\circ\text{C}$	P_{tot}	350	W
Operating junction temperature	T_j	-40...+150	$^\circ\text{C}$
Storage temperature	T_s	-55...+150	$^\circ\text{C}$
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	$R_{\theta(j-c)}$	0.36	K/W
Diode thermal resistance, junction - case	$R_{\theta(j-c)}$	0.7	K/W
Thermal resistance, junction - ambient	$R_{\theta(j-a)}$	40	K/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter breakdown voltage	BV_{CES}	$V_{GE}=0V, I_C=250\mu A$	1200	-	-	V
Gate threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	4.8	5.5	6.2	V
Collector-Emitter Saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=50A$ $T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	- -	1.65 2.00	2.05 -	V
Zero gate voltage collector current	I_{CES}	$V_{CE} = 1200V, V_{GE} = 0V$ $T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	- -	- -	250 2500	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	200	nA
Transconductance	g_{fs}	$V_{CE}=20V, I_C=50A$	-	40	-	S

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input capacitance	C_{ies}	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1\text{MHz}$	-	4600	-	pF
Output capacitance	C_{oes}		-	210	-	
Reverse transfer capacitance	C_{res}		-	25	-	
Gate charge	Q_G	$V_{CC} = 960V, I_C = 50A,$ $V_{GE} = 15V$	-	125	-	nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V, t_{sc}\leq 8\mu s$ $V_{CC}=600V,$ $T_{j, start}=25^\circ\text{C}$	-	490	-	A

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j = 25° C						
Turn-on delay time	t _{d(on)}	V _{CC} = 600V, I _C = 50A, V _{GE} = 0/15V, R _g =20Ω	-	85	-	ns
Rise time	t _r		-	75	-	ns
Turn-on energy	E _{on}		-	2.7	-	mJ
Turn-off delay time	t _{d(off)}		-	270	-	ns
Fall time	t _f		-	75	-	ns
Turn-off energy	E _{off}		-	1.8	-	mJ
Dynamic , at T_j =150° C						
Turn-on delay time	t _{d(on)}	V _{CC} = 600V, I _C = 50A, V _{GE} = 0/15V, R _g =20Ω	-	70	-	ns
Rise time	t _r		-	85	-	ns
Turn-on energy	E _{on}		-	3.0	-	mJ
Turn-off delay time	t _{d(off)}		-	300	-	ns
Fall time	t _f		-	135	-	ns
Turn-off energy	E _{off}		-	2.7	-	mJ

Electrical Characteristics of the DIODE (T_j= 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Diode Forward Voltage	V _{FM}	I _F = 50A	-	2.8	-	V
Reverse Recovery Time	T _{rr}	I _F = 50A, V _R = 600V, di/dt= 750A/μs,	-	250	-	ns
Reverse Recovery Current	I _{rr}		-	20	-	A
Reverse Recovery Charge	Q _{rr}		-	600	-	nC

Fig. 1 Output characteristics

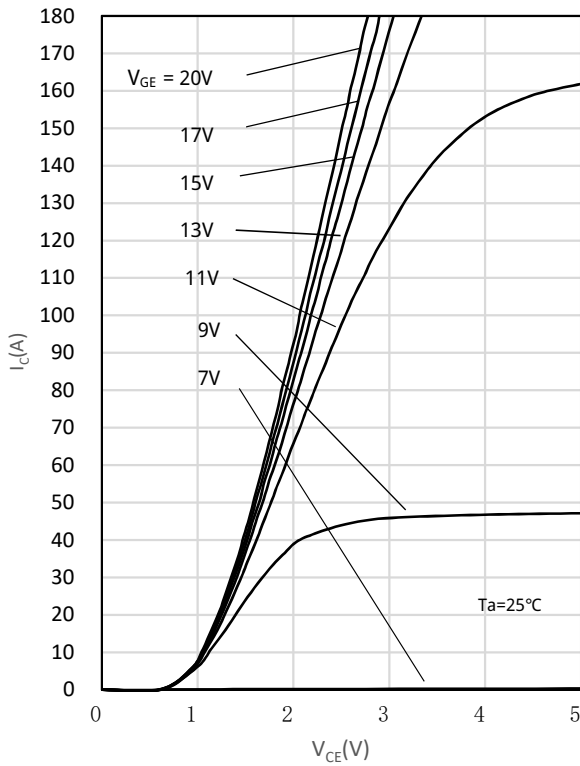


Fig. 2 Saturation voltage characteristics

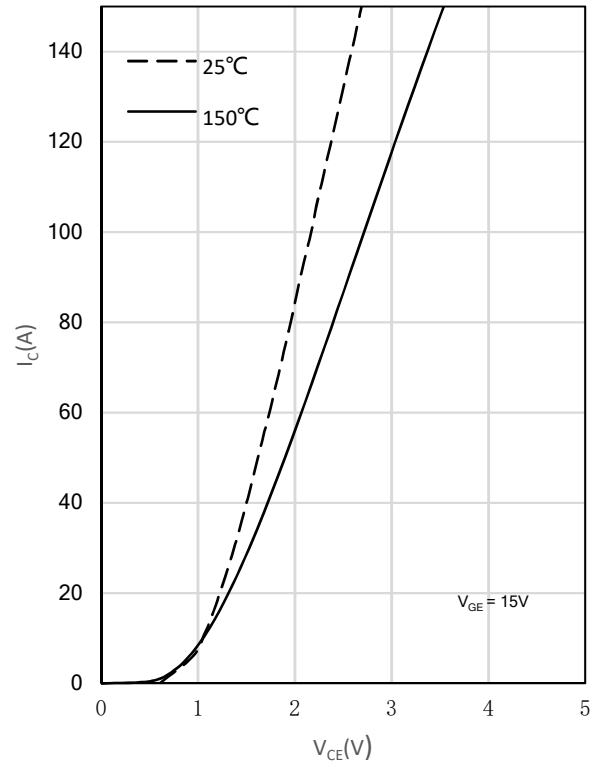


Fig. 3 Switching times vs. gate resistor

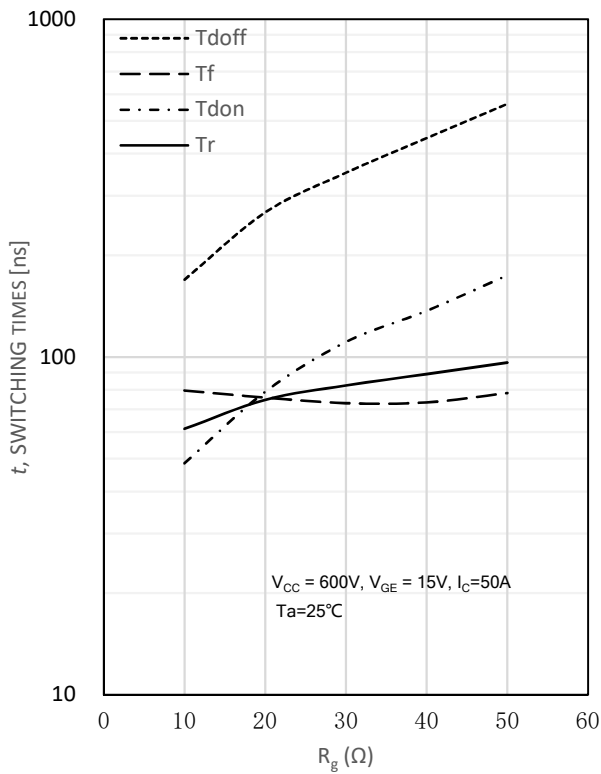


Fig. 4 Switching times vs. collector current

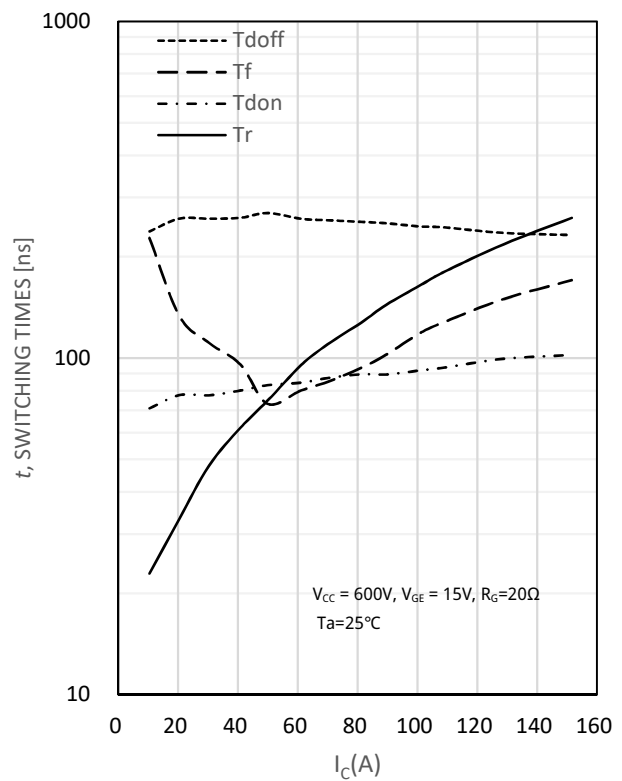


Fig. 5 Switching loss vs. gate resistor

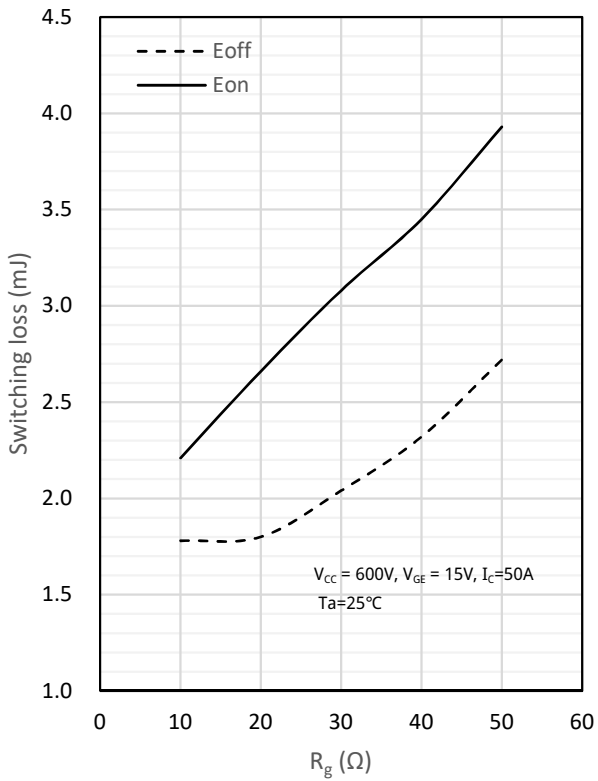


Fig. 6 Switching loss vs. collector current

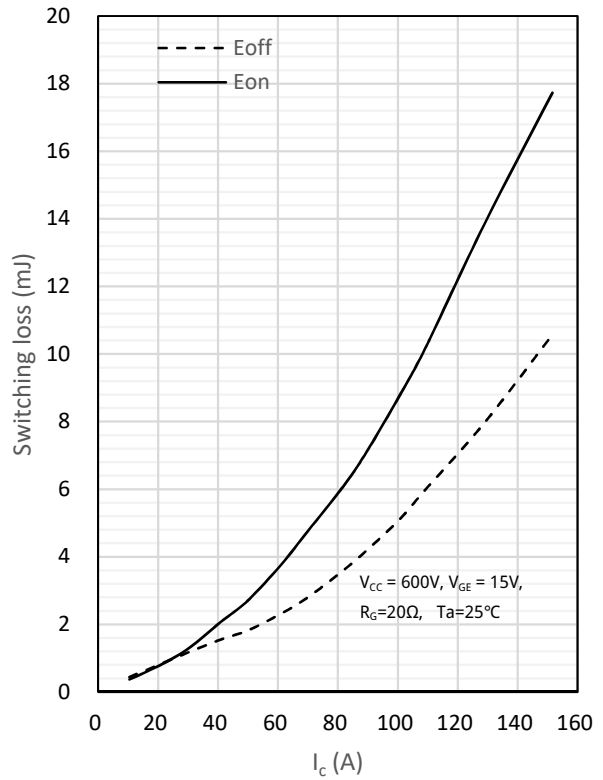


Fig. 7 Gate charge characteristics

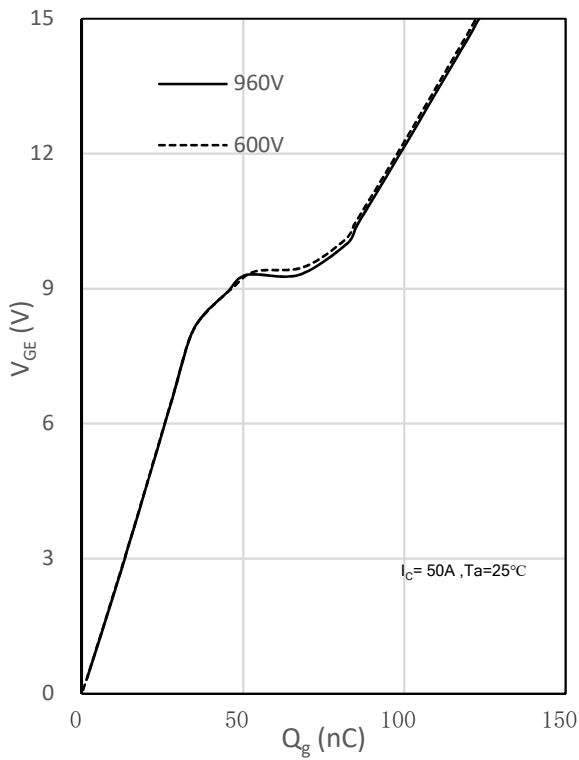


Fig. 8 Capacitance characteristics

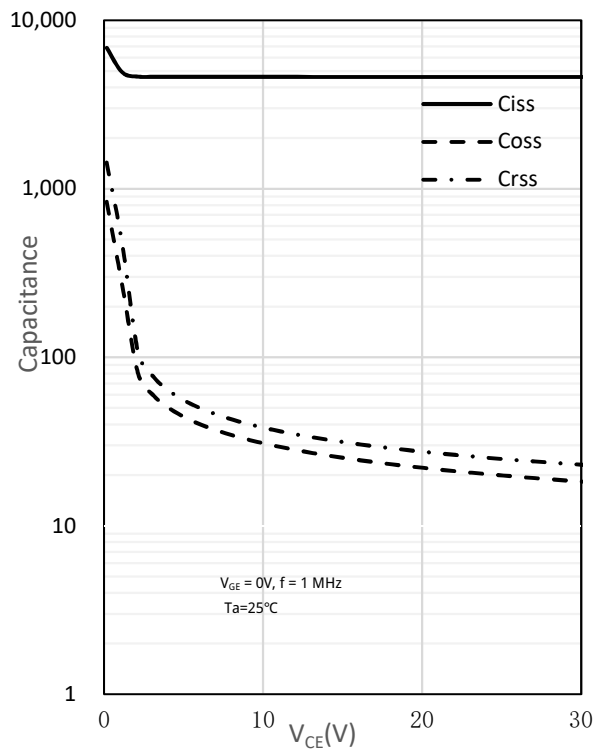


Fig. 9 IGBT Transient Thermal Impedance

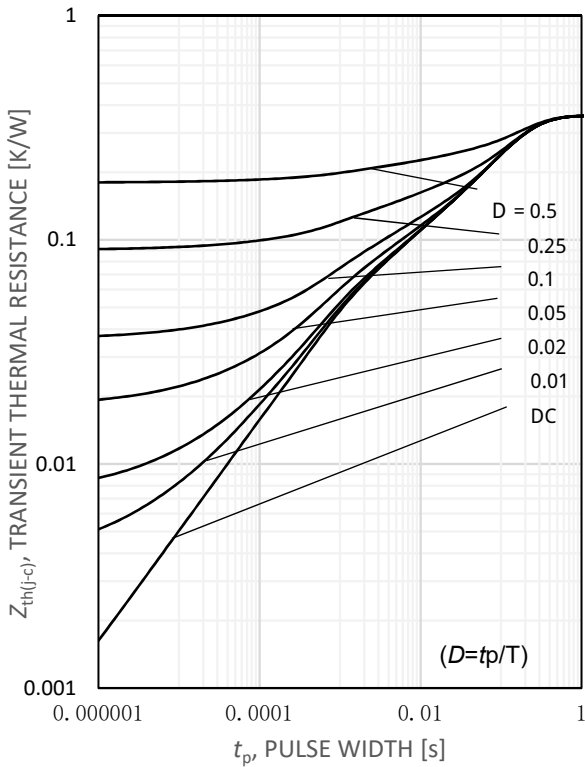


Fig. 10 FRD Transient Thermal Impedance

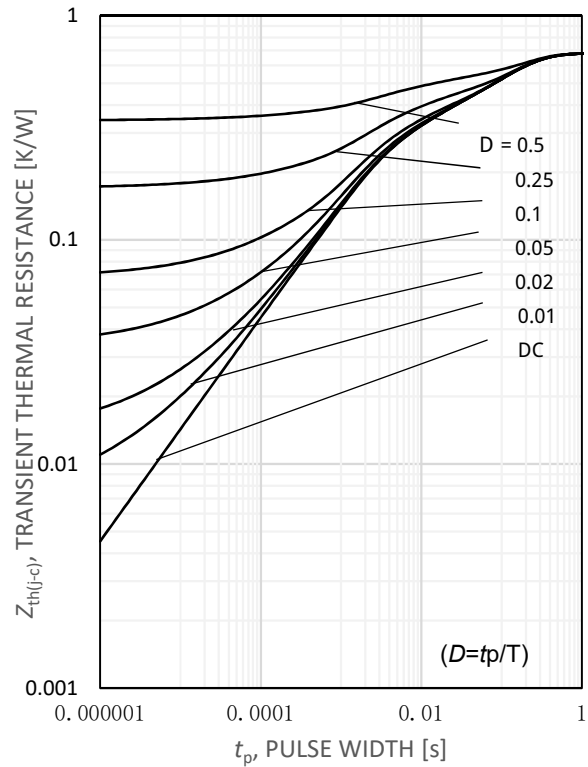


Fig. 11 FBSOA characteristics

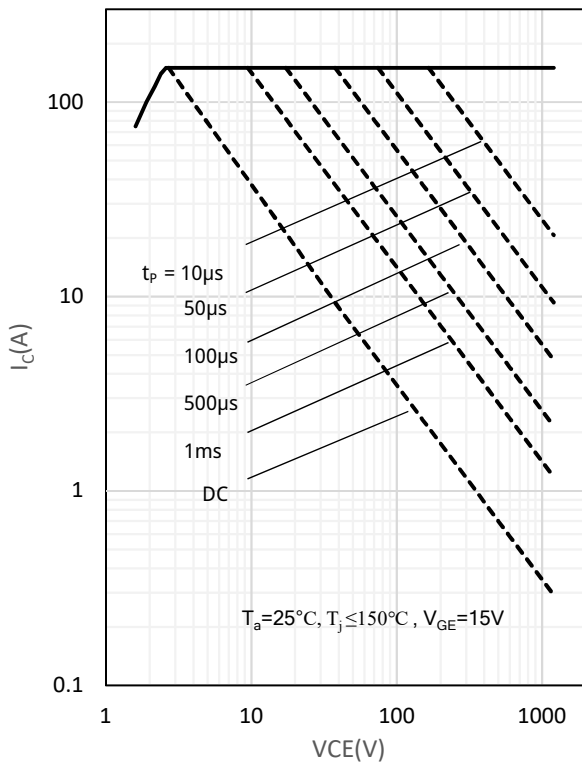
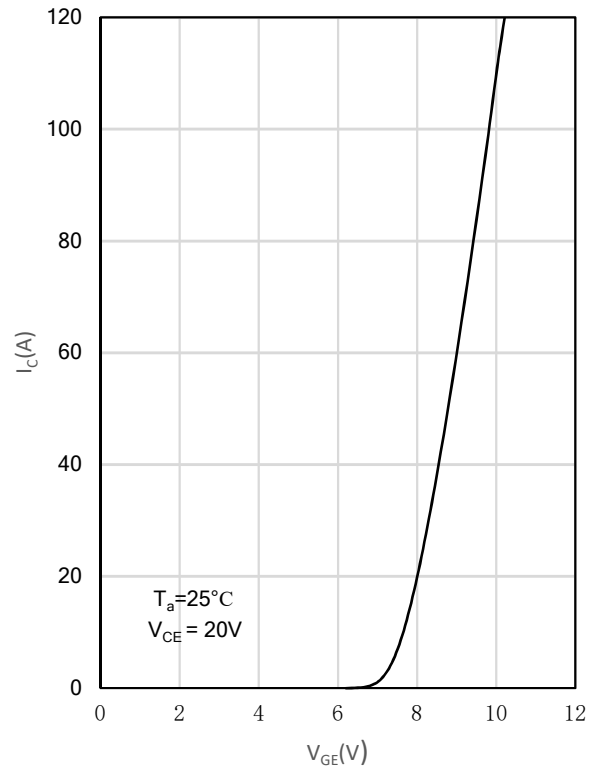
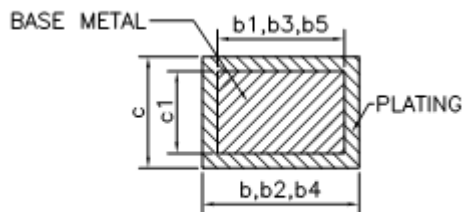
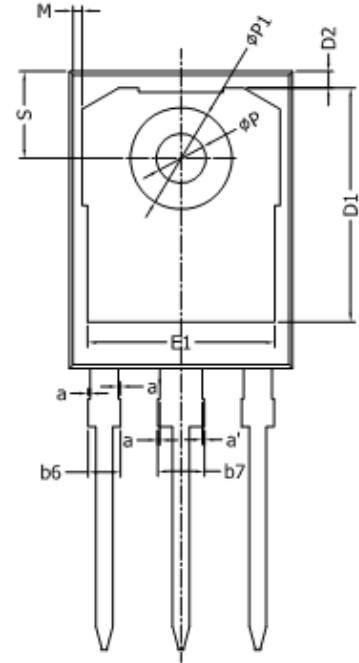
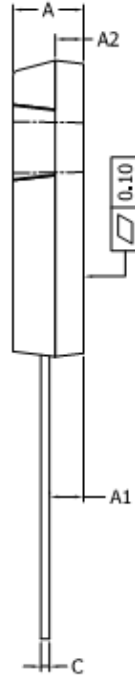
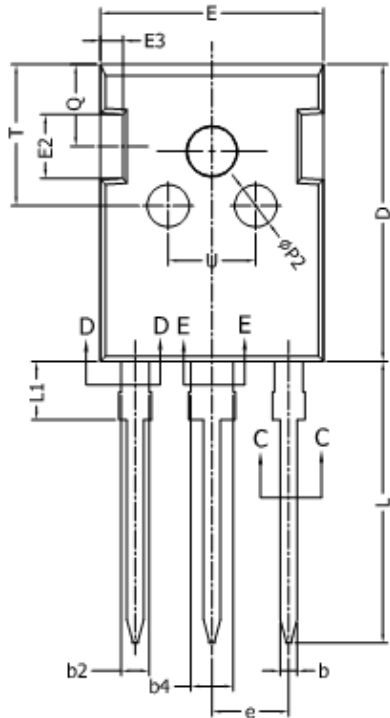


Fig. 12 Typical transfer characteristic



TO247 package information



SECTION C-C, D-D & E-E

**COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)**

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	--	0.15
a'	0	--	0.15
b	1.16	--	1.26
b1	1.15	1.2	1.22
b2	1.96	--	2.06
b3	1.95	2.00	2.02
b4	2.96	--	3.06
b5	2.96	3.00	3.02
b6	2.00	--	2.25
b7	3.00	--	3.25
c	0.59	--	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.40	4.50	4.60
E3	1.50	1.60	1.70
e	5.336	5.436	5.53
L	19.80	19.92	20.10
L1	4.10	--	4.30
M	0.35	--	0.95
P	3.40	3.50	3.60
P1	7.00	--	7.40
P2	2.40	2.50	2.60
Q	5.60	--	6.00
S	6.05	6.15	6.25
T	9.80	--	10.20
U	6.00	--	6.40