

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)MAX}$	$I_C(100^{\circ}C)$
650V	2V@15V	75A

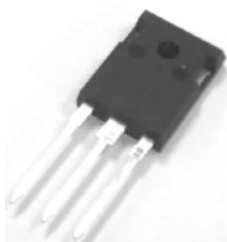
Feature

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175°C
- Positive temperature coefficient
- High ruggedness, temperature stable

Application

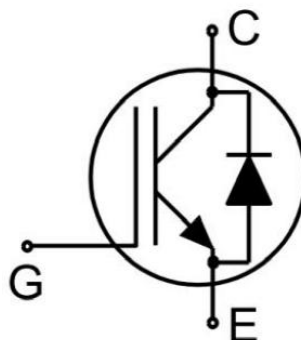
- Resonant converters
- Uninterruptible power supplies
- Mid to high range switching frequency converters

Package

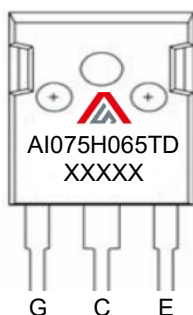


TO-247AB

Circuit diagram



Marking



Absolute maximum ratings ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	650	V
Continuous Gate- Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu\text{s}, D < 0.010$)	V_{GE}	± 30	V
Collector Current, limited by T_{jmax}	I_C	85	A
Collector Current, limited by T_{jmax} ($T_C=100^{\circ}\text{C}$)	$I_C(100^{\circ}\text{C})$	80	A
Pulsed Collector Current, $V_{GE}=15\text{V}$, t_p limited by T_{jmax}	I_{CM}	300	A
Diode Continuous Forward Current	I_F	85	A
Diode Continuous Forward Current ($T_C=100^{\circ}\text{C}$)	$I_F(100^{\circ}\text{C})$	80	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	300	A
Power Dissipation ($T_J=175^{\circ}\text{C}$)	P_D	330	W
Thermal Resistance, Junction to case for Diode	$R_{\theta JC}$	0.45	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to case for IGBT	$R_{\theta JC}$	0.45	$^{\circ}\text{C/W}$
Thermal Resistance, Junction - Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$
Operating junction temperature range	T_J	$-40 \sim +175$	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^{\circ}\text{C}$

Electrical characteristics of the IGBT ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

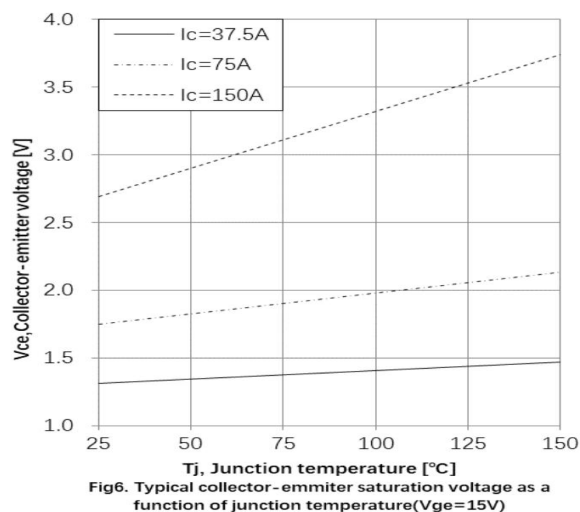
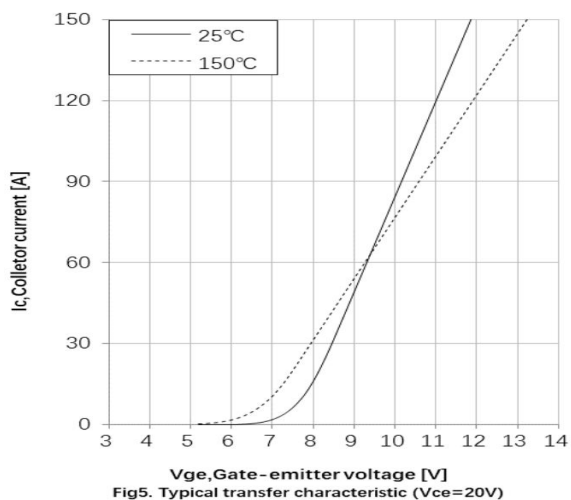
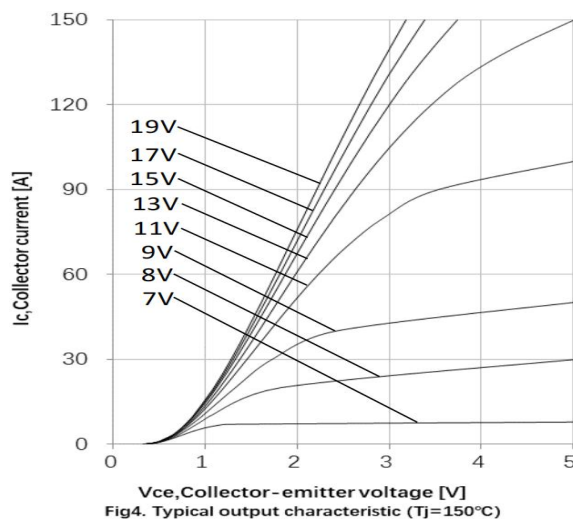
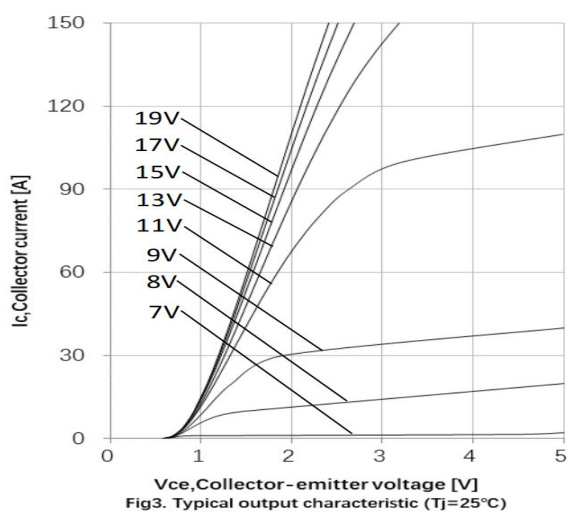
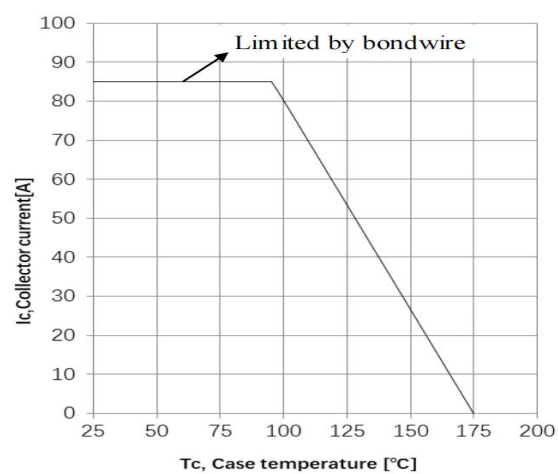
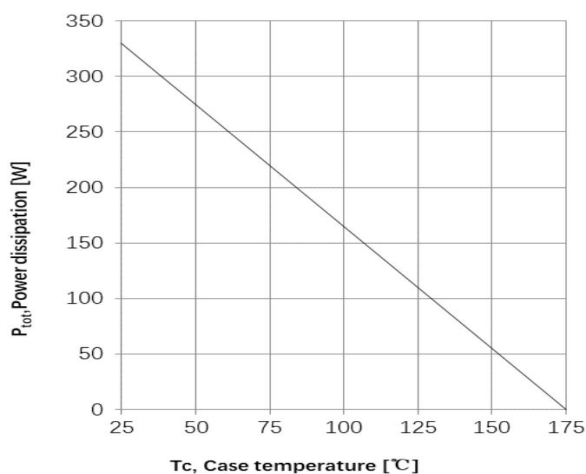
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=250\mu A$	650			V
Collector-Emitter Leakage Current	I_{CES}	$V_{GE}=0V, V_{CE}=650V$			0.25	mA
		$V_{GE}=0V, V_{CE}=650V, T_J=150^{\circ}C$			3	
Gate to Emitter Leakage Current	I_{GES}	$V_{GE}=20V, V_{CE}=0V$			100	nA
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=0.75mA$	4.8	5.5	6.2	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=75A$	1.40	1.70	2.00	V
		$V_{GE}=15V, I_C=75A, T_J=125^{\circ}C$		2.05		
		$V_{GE}=15V, I_C=75A, T_J=150^{\circ}C$		2.10		
Dynamic characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		4.05		nF
Reverse Transfer Capacitance	C_{res}			0.04		
Total Gate Charge	Q_g	$V_{CC}=520V, V_{GE}=15V, I_C=75A$		0.18		μC
Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, V_{GE}=-5V\sim 15V, I_C=75A, R_G=10\Omega, \text{Inductive Load}$		35		nS
Turn-on rise time	t_r			90		
Turn-off delay time	$t_{d(off)}$			67		
Turn-off fall time	t_f			94		
Turn-On Switching Loss	E_{on}			3.70		mJ
Turn-Off Switching Loss	E_{off}			1.63		
Total Switching Loss	E_{ts}			5.33		
Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, V_{GE}=-5V\sim 15V, I_C=75A, R_G=10\Omega, \text{Inductive Load}, T_J=125^{\circ}C$		35		nS
Turn-on rise time	t_r			91		
Turn-off delay time	$t_{d(off)}$			76		
Turn-off fall time	t_f			124		
Turn-On Switching Loss	E_{on}			3.90		mJ
Turn-Off Switching Loss	E_{off}			2.01		
Total Switching Loss	E_{ts}			7.09		

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Dynamic characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, V_{GE}=-5V\sim 15V,$ $I_C = 75A, R_G=10\Omega,$ Inductive Load, $T_J=150^\circ C$		35		nS
Turn-on rise time	t_r			92		
Turn-off delay time	$t_{d(off)}$			80		
Turn-off fall time	t_f			138		
Turn-On Switching Loss	E_{on}			3.98		mJ
Turn-Off Switching Loss	E_{off}			2.14		
Total Switching Loss	E_{ts}			6.12		

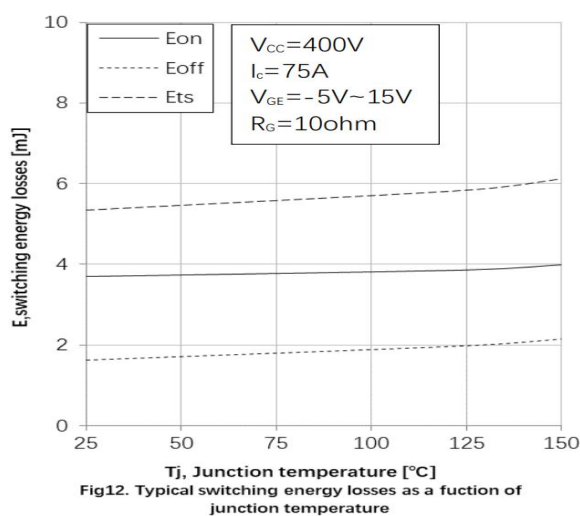
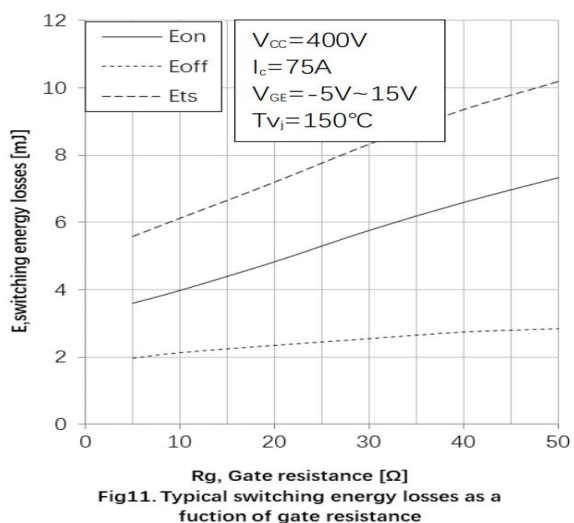
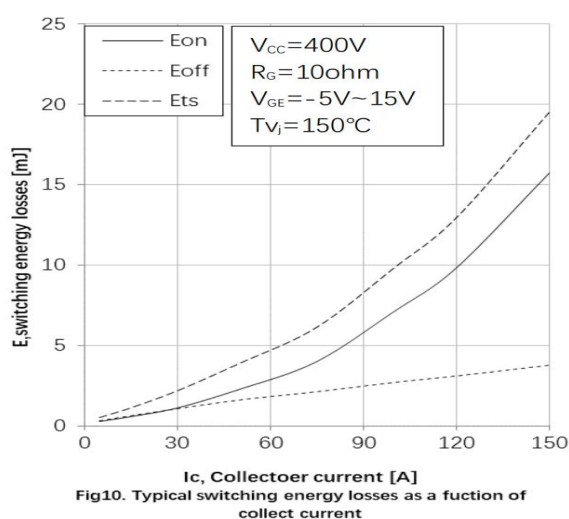
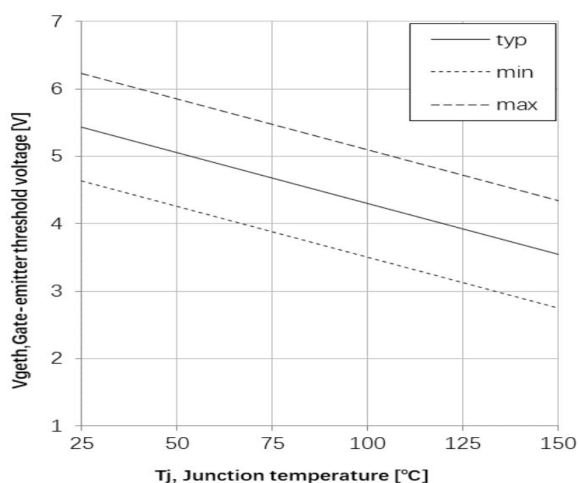
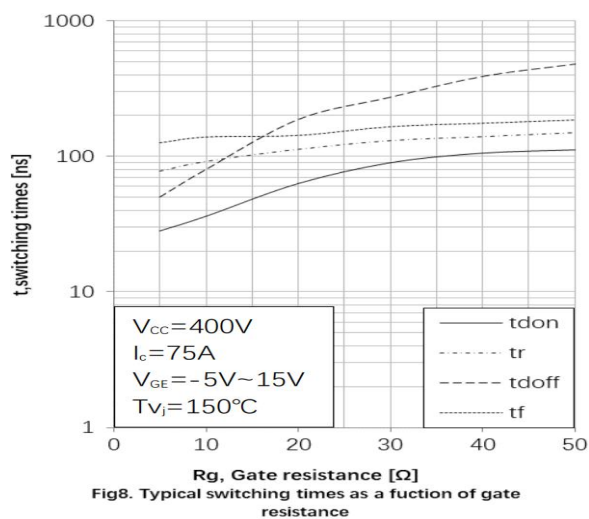
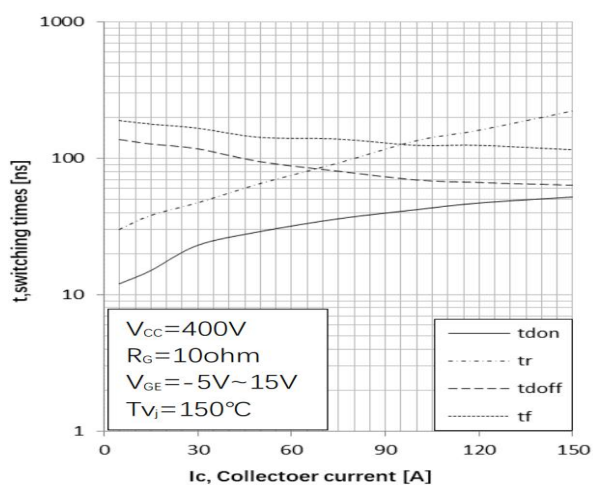
Electrical characteristics of the Diode ($T_J=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F=75A$		1.75	2.20	V
		$I_F=75A, T_J=125^\circ C$		1.65		
		$I_F=75A, T_J=150^\circ C$		1.60		
Reverse Recovery Current	I_{rr}	$V_R=400V, I_F = 75A,$ $-di/dt=440A/\mu s$		10		A
Reverse Recovery Charge	Q_{rr}			0.98		uC
Reverse Recovery Time	t_{rr}			160		nS
Reverse recovery energy	E_{rec}			0.14		mJ
Reverse Recovery Current	I_{rr}	$V_R=400V, I_F = 75A,$ $-di/dt=440A/\mu s,$ $T_J=125^\circ C$		17		A
Reverse Recovery Charge	Q_{rr}			2.97		uC
Reverse Recovery Time	t_{rr}			188		nS
Reverse recovery energy	E_{rec}			0.47		mJ
Reverse Recovery Current	I_{rr}	$V_R=400V, I_F = 75A,$ $-di/dt=440A/\mu s,$ $T_J=150^\circ C$		20		A
Reverse Recovery Charge	Q_{rr}			3.26		uC
Reverse Recovery Time	t_{rr}			212		nS
Reverse recovery energy	E_{rec}			0.54		mJ

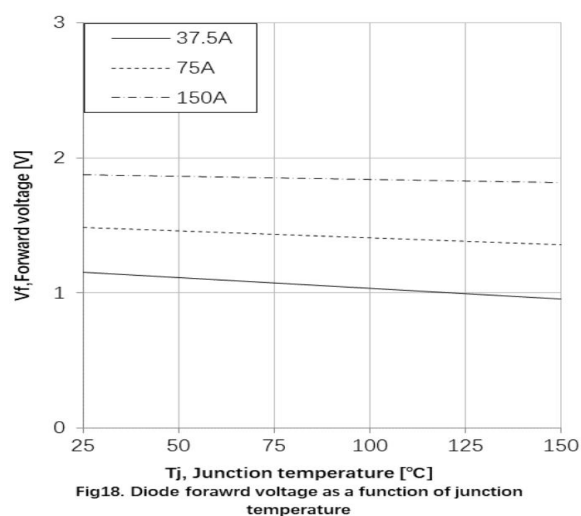
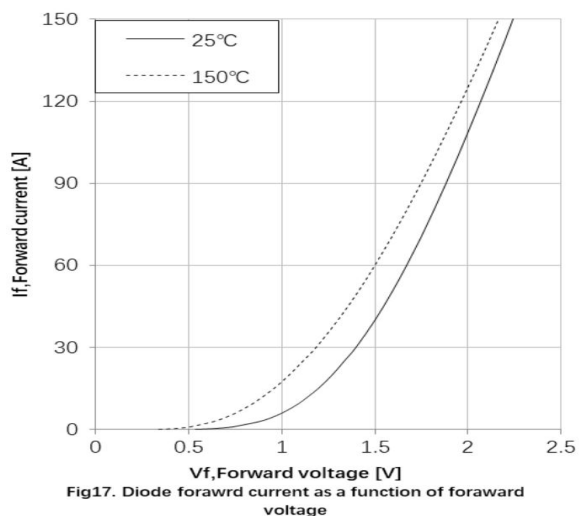
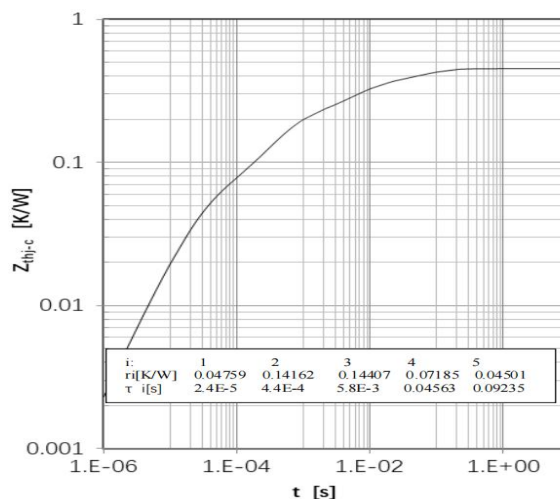
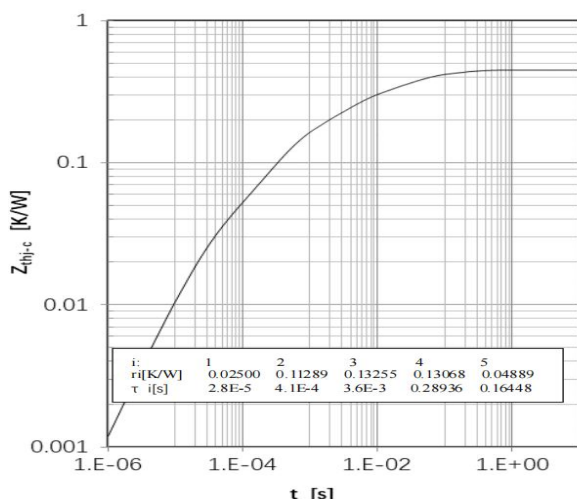
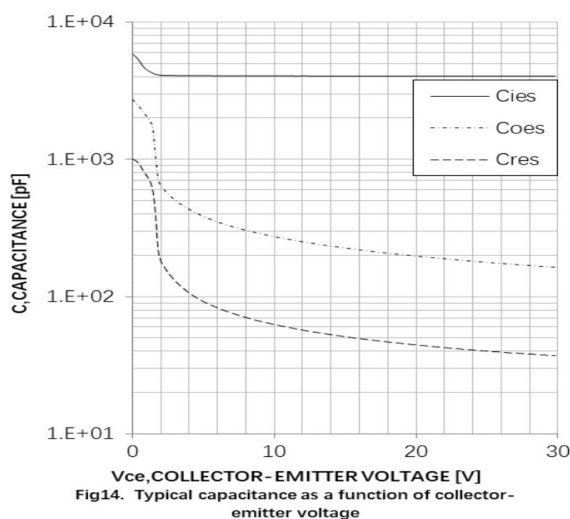
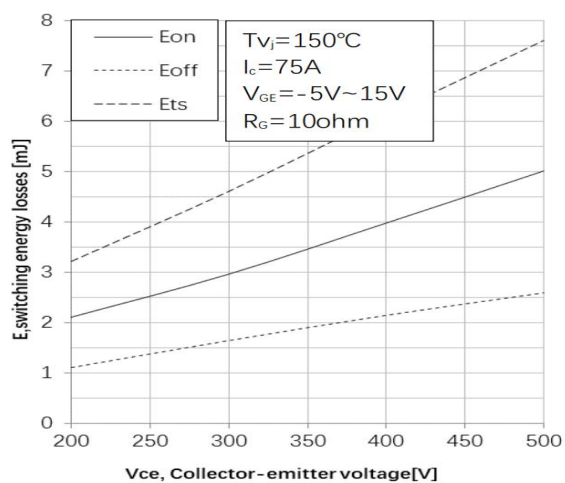
Typical Characteristics



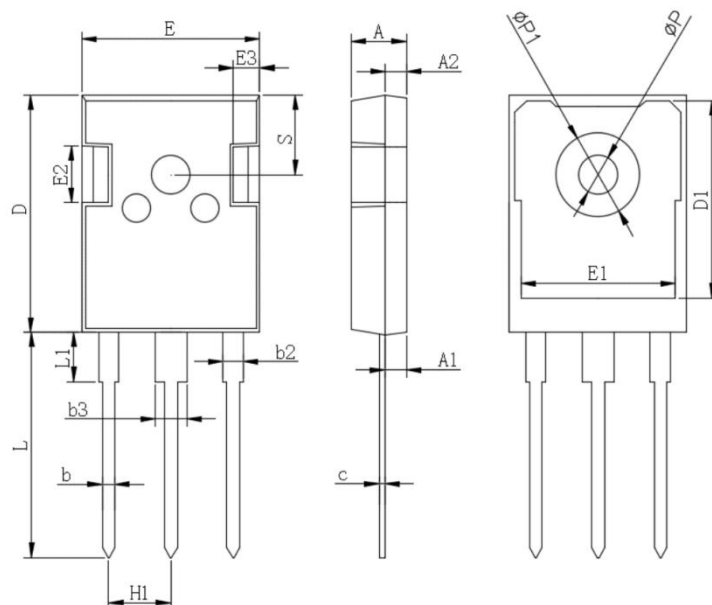
Typical Characteristics



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TO-247AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.200	0.189	0.205
A1	2.210	2.610	0.087	0.103
A2	1.850	2.150	0.073	0.085
b	1.000	1.400	0.039	0.055
b2	1.910	2.210	0.075	0.087
b3	2.800	3.200	0.110	0.126
C	0.500	0.700	0.020	0.028
D	20.700	21.300	0.815	0.839
D1	16.250	16.850	0.640	0.663
E	15.500	16.100	0.610	0.634
E1	13.000	13.600	0.512	0.535
E2	4.800	5.200	0.189	0.205
E3	2.300	2.700	0.091	0.106
L	19.620	20.220	0.772	0.796
L1	-	4.300	-	0.169
Φ P	3.400	3.800	0.134	0.150
Φ P1	-	7.300	-	0.287
S	6.150 TYP		0.242 TYP	
H1	5.440 TYP		0.214 TYP	