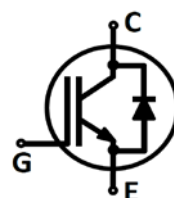
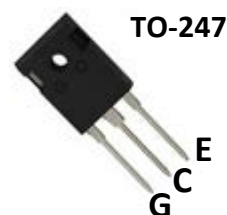


特征

饱和压降为正温度系数，易于并联使用
内置快恢复二极管
高可靠性及热稳定性，良好的参数一致性
极低的关断损耗

应用领域

逆变焊机



最大额定值¹

参数	符号	额定值	单位
集电极-发射极电压	V_{CE}	650	V
集电极电流 $T_C=25^{\circ}\text{C}$ $T_C=100^{\circ}\text{C}$	I_C	100 60	A
集电极脉冲电流	I_{Cpuls}	240^{*2}	
RBSOA 电流 $V_{CE}<650\text{V}, T_j<150^{\circ}\text{C}$	I_{Cpeak}	120^{*}	
二极管正向电流 $T_C=25^{\circ}\text{C}$ $T_C=100^{\circ}\text{C}$	I_F	60 30	
二极管脉冲电流	I_{Fpuls}	120^{*}	
栅极-发射极电压	V_{GE}	± 20	V
短路承受时间 ³ $V_{GE}=15\text{V}, V_{CE}=400\text{V}, T_j=150^{\circ}\text{C}$	t_{SC}	5	μs
耗散功率 $T_C=25^{\circ}\text{C}$ $T_C=100^{\circ}\text{C}$	P_{tot}	517 258	W
工作温度	T_j	$-55\sim 175$	$^{\circ}\text{C}$
储存温度	T_{stg}	$-55\sim 150$	

¹测试标准参考 JESD-022

²加* 表示估计值，下同

³允许短路次数:<1000;短路时间间隔:>1s

热学特性

参数	符号	封装形式	最小值	典型值	最大值	单位
IGBT结壳热阻	R_{thJC}	TO-247	-	-	0.29	K/W
二极管结壳热阻	R_{thJD}	TO-247	-	-	1.2	
结-环境热阻	R_{thJA}	TO-247	-	-	30	

电学特性 (未特殊说明时, $T_j=25^\circ\text{C}$)

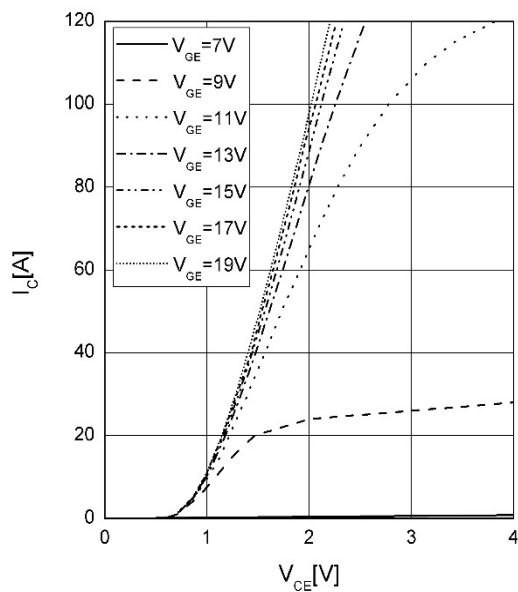
参数	符号	测试条件	最小值	典型值	最大值	单位
静态特性						
击穿电压	$V_{(BR)CES}$	$V_{GE}=0V, I_C=2mA$	650	-	-	V
IGBT导通压降	$V_{CE(sat)}$	$V_{GE}=15V, I_C=60A$	-	-	-	
		$T_j=25^\circ\text{C}$	-	1.7	2.3	
		$T_j=150^\circ\text{C}$	-	2.2	-	
二极管正向压降	V_F	$V_{GE}=0V, I_F=30A$	-	-	-	V
		$T_j=25^\circ\text{C}$	-	1.6	1.9	
		$T_j=150^\circ\text{C}$	-	1.4	1.7	
阈值电压	$V_{GE(th)}$	$I_C=0.8mA, V_{CE}=V_{GE}$	5.0	5.7	6.5	
集电极-发射极漏电流	I_{CES}	$V_{CE}=650V, V_{GE}=0V$	-	-	1.0	mA
		$T_j=150^\circ\text{C}$	-	-	2.0	
栅极-发射极漏电流	I_{GES}	$V_{CE}=0V, V_{GE}=20V$	-	-	200	nA
动态特性						
输入电容	C_{iss}	$V_{CE}=25V$	-	8450	-	pF
输出电容	C_{oss}	$V_{GE}=0V$	-	160	-	
反馈电容	C_{rss}	$f=1MHz$	-	120	-	
栅电荷	Q_G	$V_{CE}=480V, I_C=60A, V_{GE}=15V$	-	-	-	nC

参数	符号	测试条件	最小值	典型值	最大值	单位
IGBT开关特性（感性负载）						
开通延迟时间	$t_{d(on)}$	$T_j=25^{\circ}\text{C}$ $V_{CE}=400\text{V}, I_C=60\text{A}$ $V_{GE}=15/0\text{V}$	-	51	-	ns
上升时间	t_r		-	121	-	
关断延迟时间	$t_{d(off)}$		-	160	-	
下降时间	t_f		-	66	-	
开通损耗	E_{on}	$R_G=10\Omega$ $L_{load}=500\mu\text{H}$	-	2.7	-	mJ
关断损耗	E_{off}		-	1.5	-	
开关损耗	E_{ts}		-	4.2	-	
开通延迟时间	$t_{d(on)}$	$T_j=150^{\circ}\text{C}$ $V_{CE}=400\text{V}, I_C=60\text{A}$ $V_{GE}=15/0\text{V}$	-	47	-	ns
上升时间	t_r		-	107	-	
关断延迟时间	$t_{d(off)}$		-	173	-	
下降时间	t_f		-	68	-	
开通损耗	E_{on}	$R_G=10\Omega$ $L_{load}=500\mu\text{H}$	-	2.6	-	mJ
关断损耗	E_{off}		-	1.6	-	
开关损耗	E_{ts}		-	4.2	-	
二极管开关特性						
反向恢复时间	t_{rr}	$T_j=25^{\circ}\text{C}$ $V_R=400\text{V}, I_F=30\text{A}$ $di_F/dt=600\text{A}/\mu\text{s}$	-	94	-	ns
反向恢复电荷	Q_{rr}		-	1.3	-	μC
反向恢复峰值电流	I_{rrm}		-	25.9	-	A
反向恢复时间	t_{rr}	$T_j=150^{\circ}\text{C}$ $V_R=400\text{V}, I_F=30\text{A}$ $di_F/dt=600\text{A}/\mu\text{s}$	-	137	-	ns
反向恢复电荷	Q_{rr}		-	3.0	-	μC
反向恢复峰值电流	I_{rrm}		-	37.2	-	A

输出特性 IGBT

output characteristic IGBT

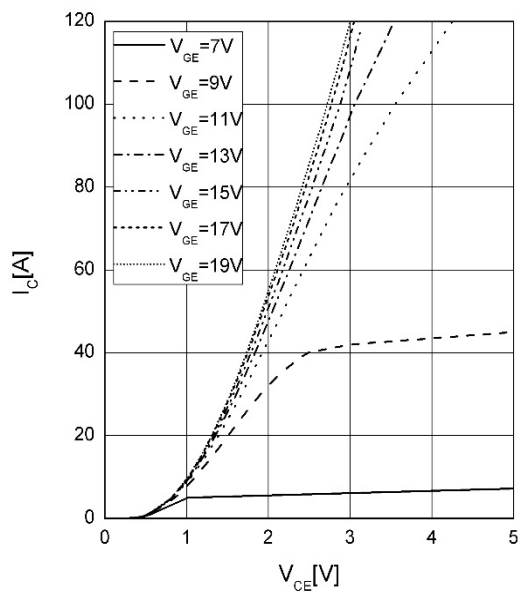
$I_C = f(V_{CE})$, $T_J = 25^\circ\text{C}$



输出特性 IGBT

output characteristic IGBT

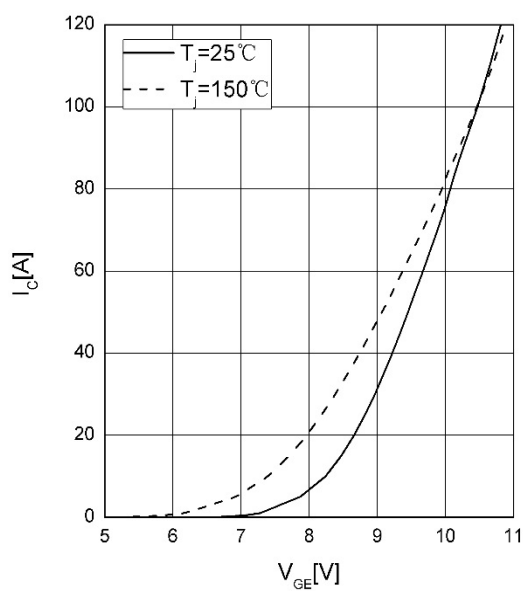
$I_C = f(V_{CE})$, $T_J = 150^\circ\text{C}$



传输特性 IGBT

transfer characteristic IGBT

$I_C = f(V_{GE})$, $V_{CE} = 20\text{ V}$

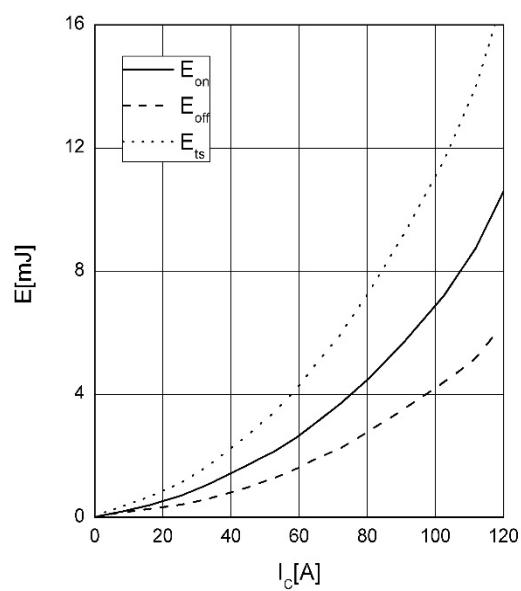


开关损耗 IGBT

switching losses IGBT

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{ts} = f(I_C)$

$V_{GE} = 15/0\text{ V}$, $R_G = 10\Omega$, $V_{CE} = 400\text{ V}$, $T_J = 150^\circ\text{C}$

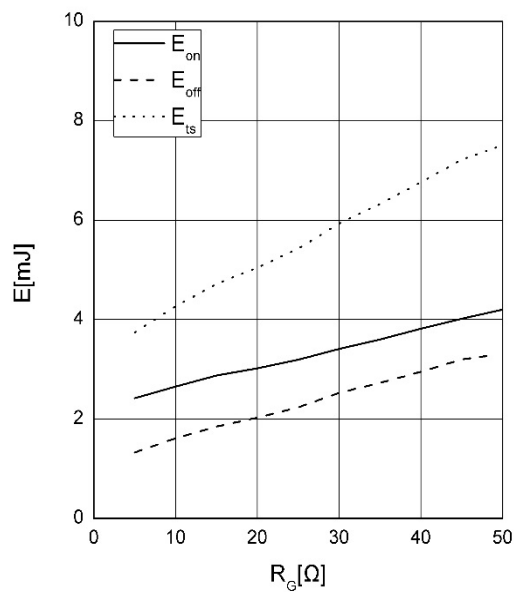


开关损耗 IGBT

switching losses IGBT

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{ts} = f(R_G)$

$V_{GE} = 15/0\text{ V}$, $I_C = 60\text{ A}$, $V_{CE} = 400\text{ V}$, $T_J = 150^\circ\text{C}$

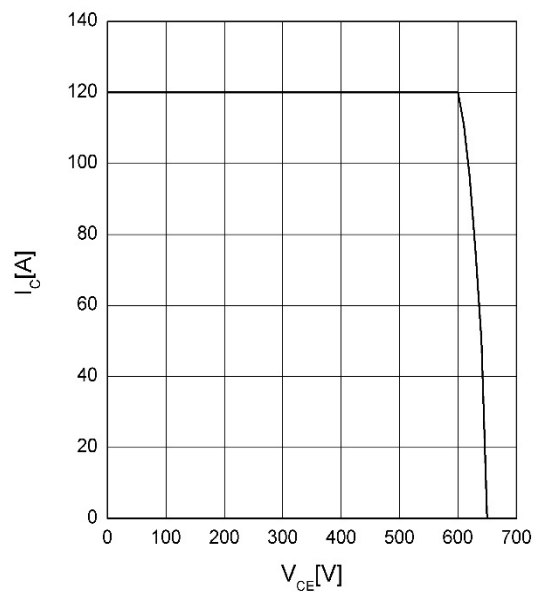


反偏安全工作区 IGBT

reverse bias safe operating area IGBT

$I_C = f(V_{CE})$

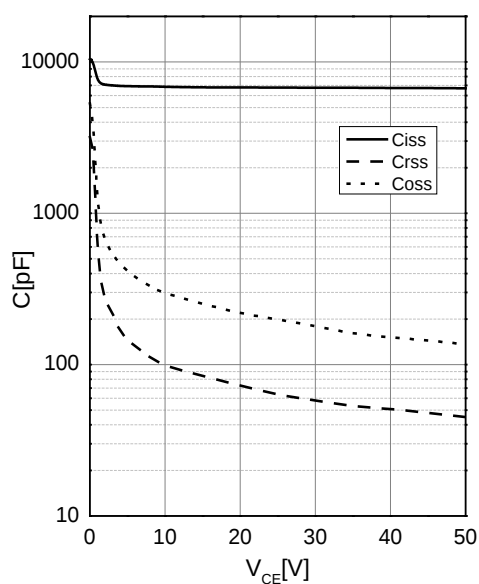
$V_{GE} = 15/0\text{ V}$, $R_{Goff} = 10\text{ Ω}$, $T_J = 150^\circ\text{C}$



电容特性 IGBT

capacitance characteristic of IGBT

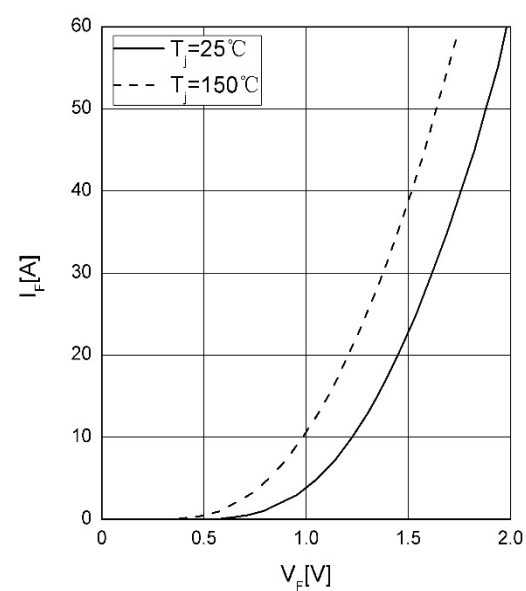
$C = f(V_{CE})$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$



正向偏压特性 二极管

forward characteristic of Diode

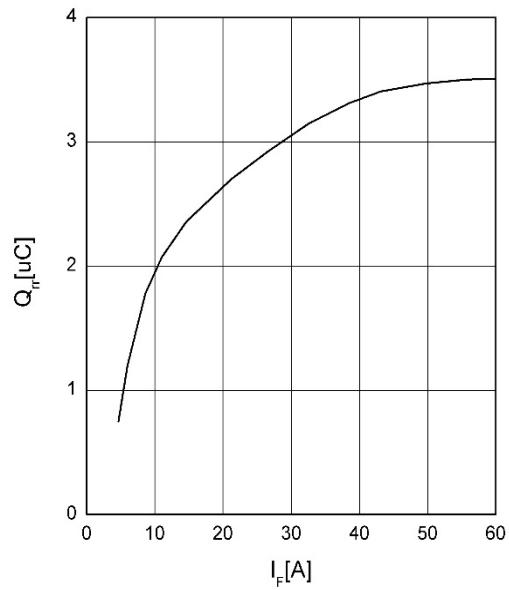
$I_F = f(V_F)$



恢复电荷 二极管

recovered charge of Diode

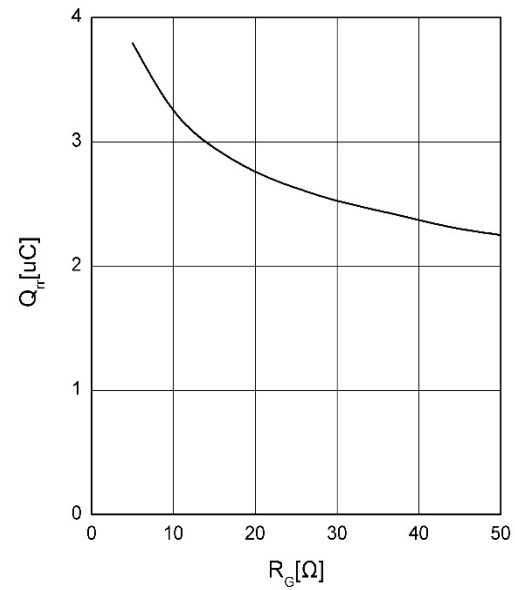
$Q_{rr} = f(I_F)$, $R_G = 10 \Omega$, $V_{CE} = 400 \text{ V}$



恢复电荷 二极管

recovered charge of Diode

$Q_{rr} = f(R_G)$, $I_F = 30 \text{ A}$, $V_{CE} = 400 \text{ V}$



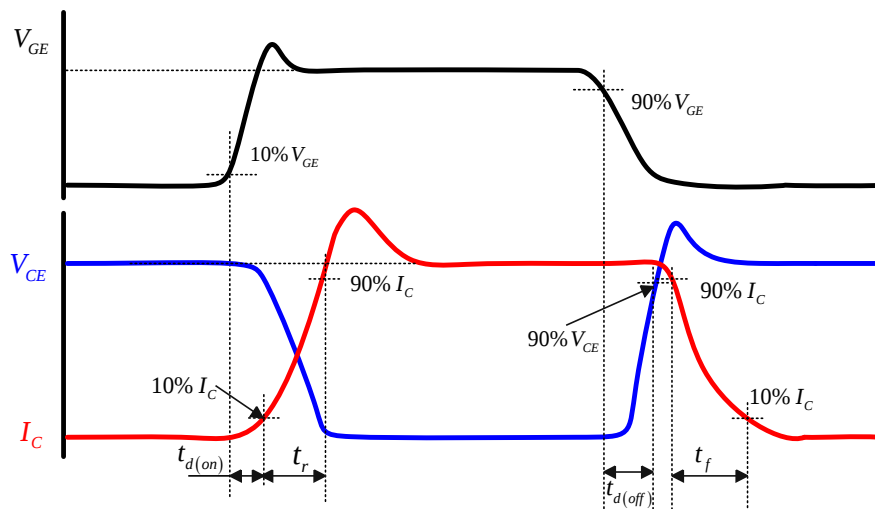


Figure A. Definition of switching times

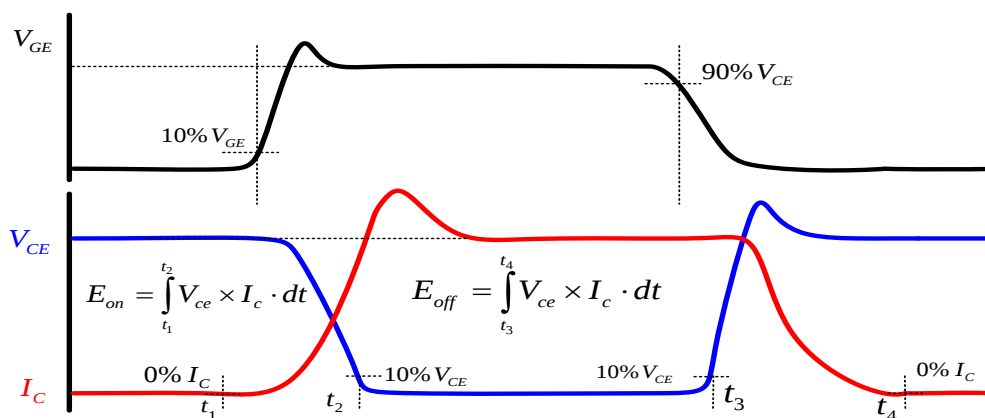


Figure B. Definition of switching losses

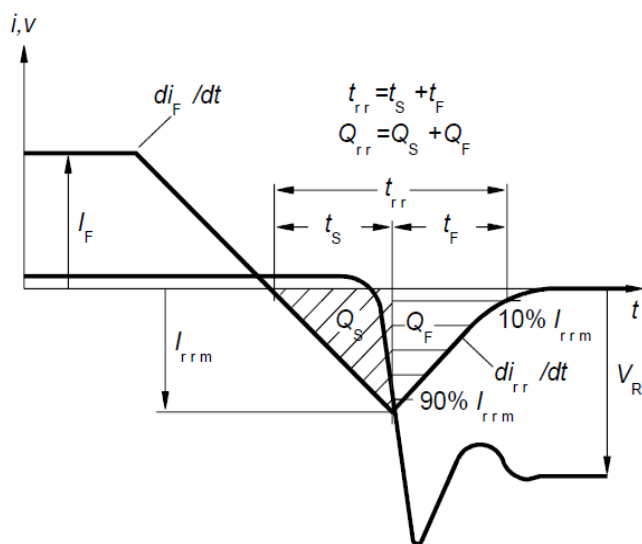


Figure C. Definition of diodes switching characteristics

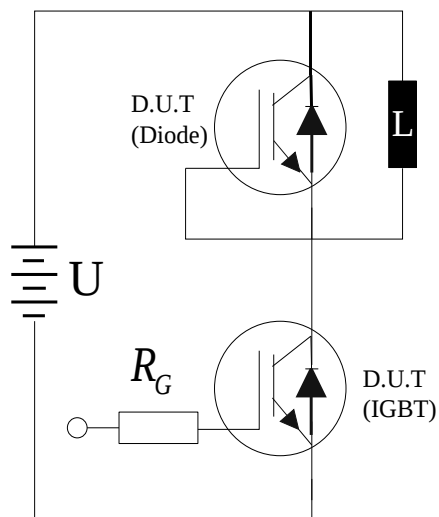
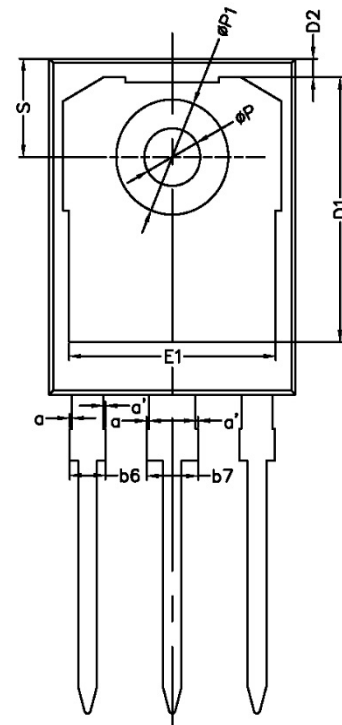
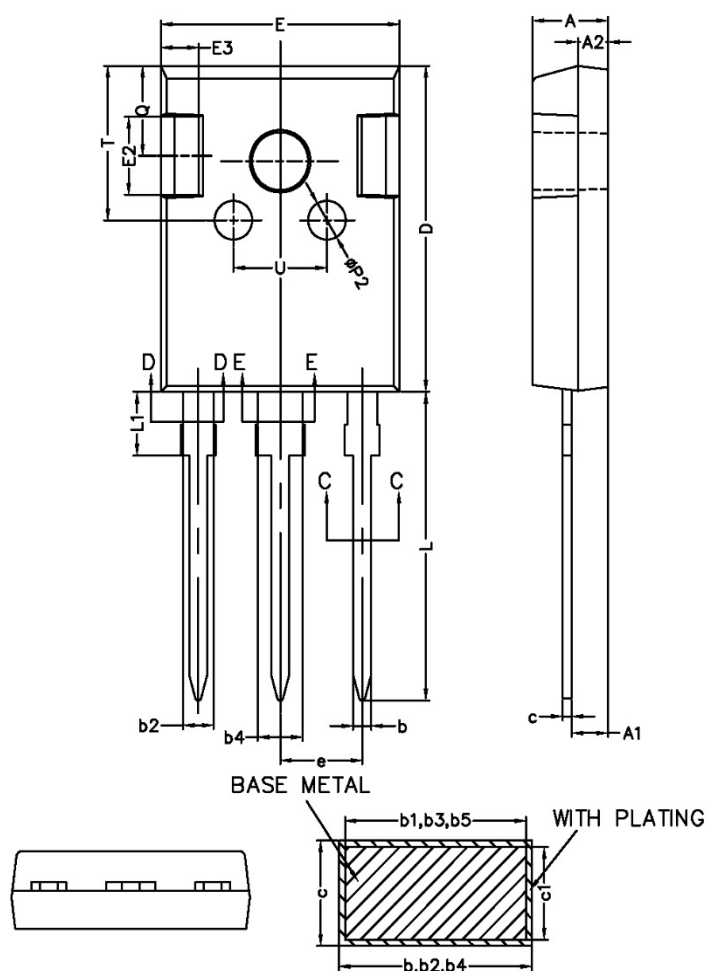


Figure D. Dynamic test circuit

TO-247



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	2.95	3.00	3.02
b6	—	—	2.25
b7	—	—	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	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.34	5.44	5.54
L	19.80	19.92	20.10
L1	—	—	4.30
P	3.50	3.60	3.70
P1	—	—	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

NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD
TO-247 AD DO NOT INCLUDE MOLD FLASH
OR PROTRUSIONS.
2. EJECTION MARK DEPTH 0.10 ± 0.15