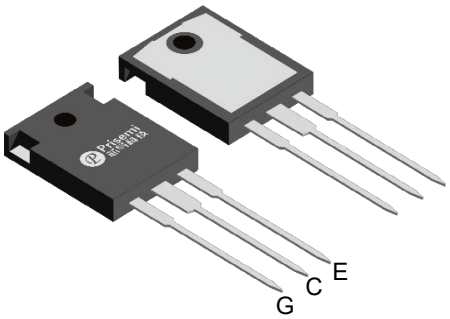
Prisemi®

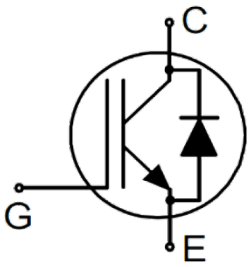
PI25F120T3H1A7

Insulate-Gate Bipolar Transistor

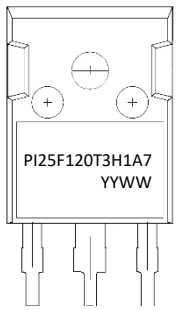
Description



TO-247-3L



Circuit Diagram



Marking (Top View)

Feature

- Low switching power loss
- Low switching surge and noise
- Advanced Field Stop technology
- Low EMI
- Qualified according to JEDEC for target applications
- Pb-free lead plating, halogen-free mold compound, RoHS compliant
- Internal insulation

Applications

- Industrial UPS
- Welding machine
- Solar converters
- Energy Storage
- EV Charger
- Inverter

Absolute maximum rating@25℃

Parameter		Symbol	Value	Units
Collector-Emitter Voltage		V_{CE}	1200	V
Gate-Emitter Voltage		V_{GE}	±20	V
Transient Gate-emitter Voltage (t_p≤10μs, D<0.010)			±30	
Collector Current	T_c= 25℃	I_C	50	A
	T_c= 100℃		25	
Pulsed Collector Current		I_{CM}	75	A
Diode Forward Current	T_c= 25℃	I_F	25	A
	T_c= 100℃		12.5	
Diode Maximum Forward Current		I_{FM}	50	A
Power Dissipation		P_D	278	W
Operating Junction Temperature		T_J	-55~+150	℃
Storage Temperature		T_{STG}	-55~+150	℃
Thermal Resistance, Junction to case for IGBT		$R_{\theta JC}$	0.45	℃/W
Thermal Resistance, Junction to case for FRD		$R_{\theta JC}$	1.4	℃/W
Thermal Resistance, Junction to Ambient for IGBT		$R_{\theta JA}$	50	℃/W

Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Collector-Emitter Breakdown Voltage	BV_{CE}	V_{GE}=0V, I_C=1mA		1200	-	-	V
C-E Leakage Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V		-	-	10	μA
G-E Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE}=0V		-	-	±120	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C=250μA, V_{CE}=V_{GE}		4.7	-	7.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=25A, V_{GE}=15V	T_c= 25℃	-	2.2	2.7	V
			T_c= 125℃	-	2.4	-	
Input Capacitance	C_{ies}	V_{CE}=30V,V_{GE}=0V, f=1MHz		-	2772	-	pF
Output Capacitance	C_{oes}			-	85	-	
Reverse Transfer Capacitance	C_{res}			-	19	-	
Turn-on Delay Time	$t_{d(on)}$	V_{CE}=600V, V_{GE}=15V, R_G=10Ω,	I_C=10A	-	24	-	ns
			I_C=25A	-	30	-	
Rise Time	t_r		I_C=10A	-	30	-	
			I_C=25A	-	77	-	
Turn-off Delay Time	$t_{d(off)}$		I_C=10A	-	64	-	
			I_C=25A	-	68	-	
Fall Time	t_f		I_C=10A	-	154	-	
			I_C=25A	-	108	-	
Turn-on Energy Loss	E_{on}	V_{CE}=600V, V_{GE}=15V, R_G=10Ω,	I_C=10A	-	0.86	-	mJ
			I_C=25A	-	2.3	-	
Turn-off Energy Loss	E_{off}		I_C=10A	-	0.19	-	
			I_C=25A	-	0.42	-	
Total Switching Loss	E_{st}		I_C=10A	-	1.05	-	
			I_C=25A	-	2.72	-	
Total Gate Charge	Q_g	V_{CE}=600V, V_{GE}=15V, I_C=25A		-	91	-	nC
Gate to Emitter Charge	Q_{ge}			-	30	-	
Gate to Collector Charge	Q_{gc}			-	31	-	
Diode Forward Voltage	V_{FM}	I_F=12.5A	T_c= 25℃	-	2.8	3.1	V
			T_c= 125℃	-	2.4	-	
Reverse Recovery Time	t_{rr}	I_{EC}=10A, di/dt=200A/μs		-	67	-	ns
Reverse Recovery Charge	Q_{rr}			-	331	-	nC

Typical Characteristics

图1. 典型输出特性

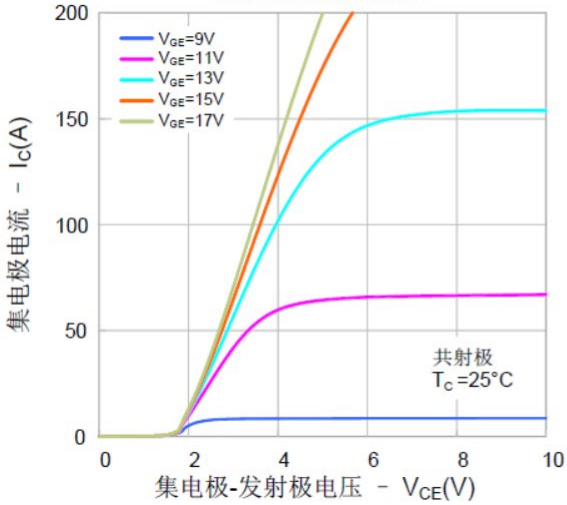


图2. 典型输出特性

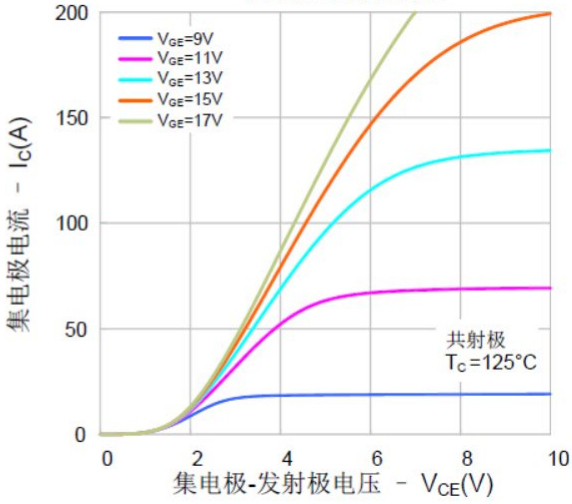


图 3. 典型饱和电压特性

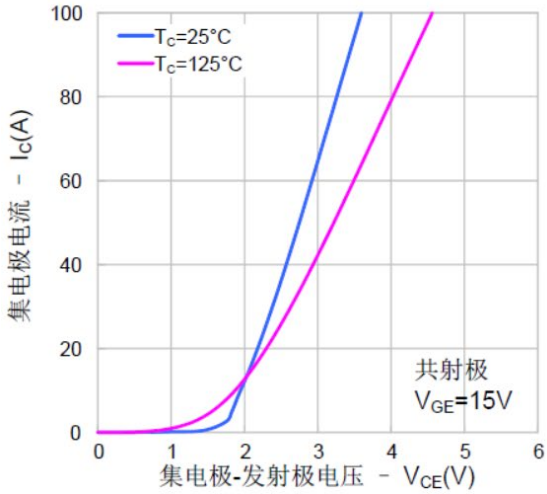


图 4. 传输特性

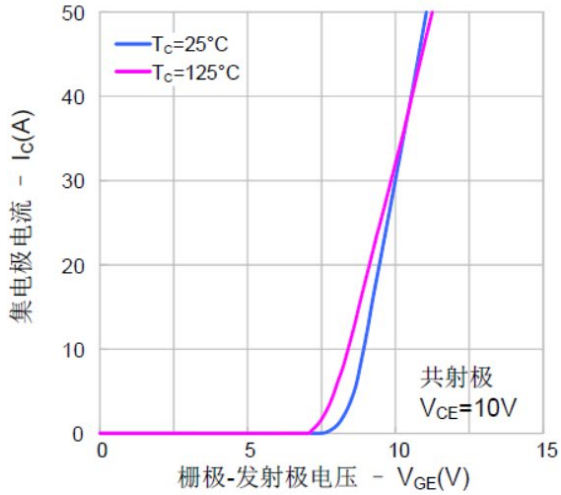


图 5. 饱和电压 vs. V_{GE}

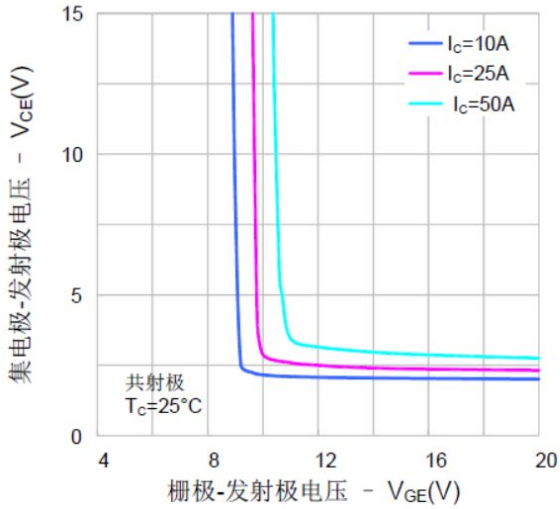


图 6. 饱和电压 vs. V_{GE}

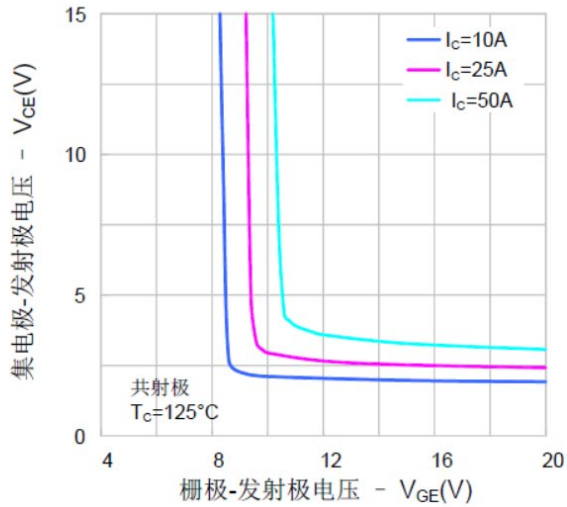


图 7. 饱和压降和温度

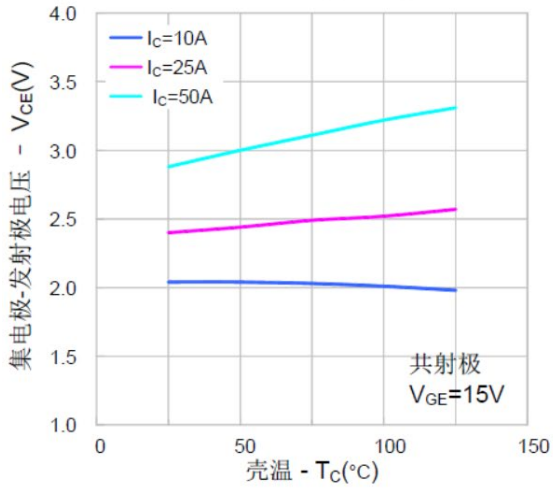


图 8. 电容特性

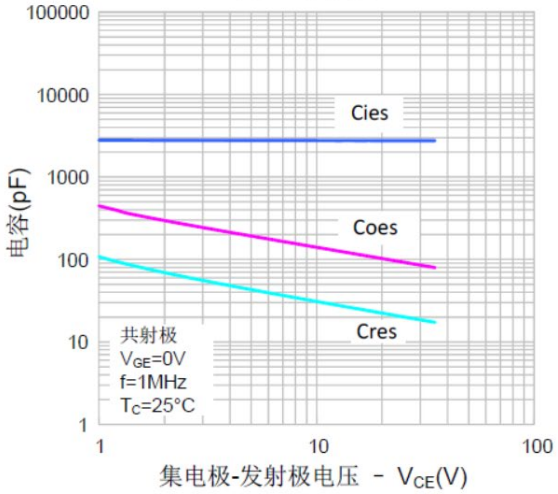


图9. 栅极电荷特性

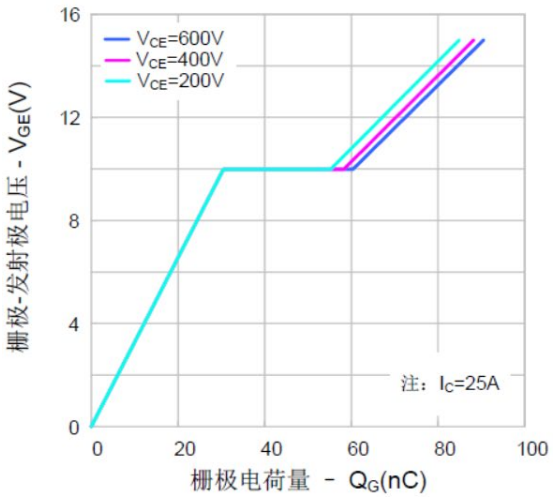


图10. 导通特性 vs. 栅极电阻

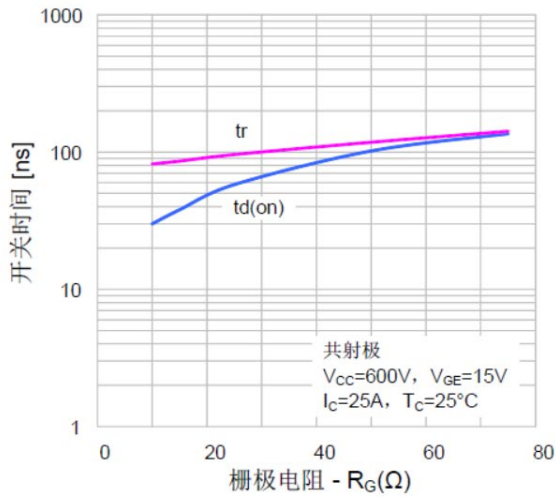


图11. 关断特性 vs. 栅极电阻

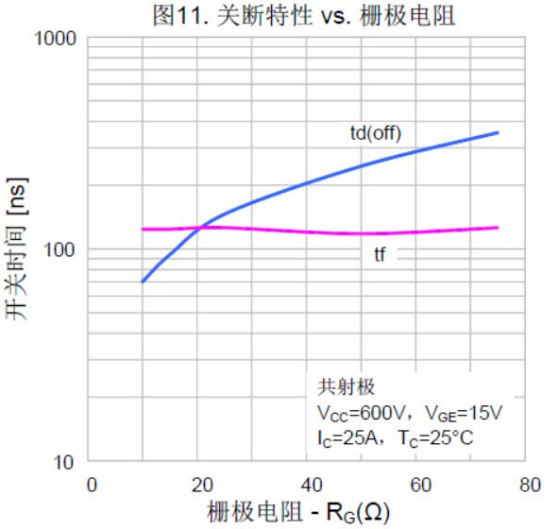


图12. 开关损耗 vs. 栅极电阻

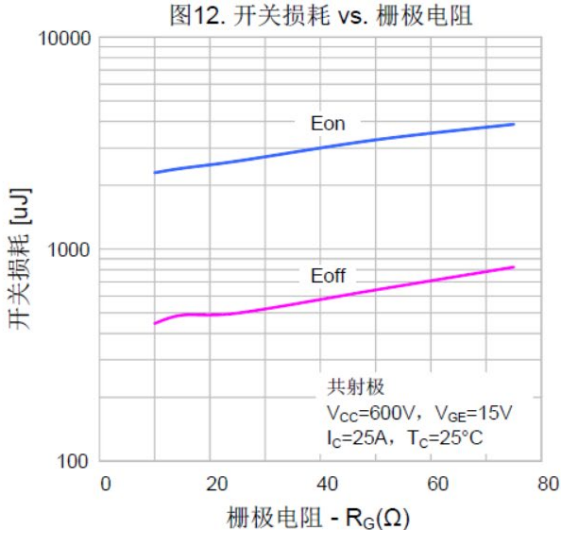


图13. 导通特性 vs. 集电极电流

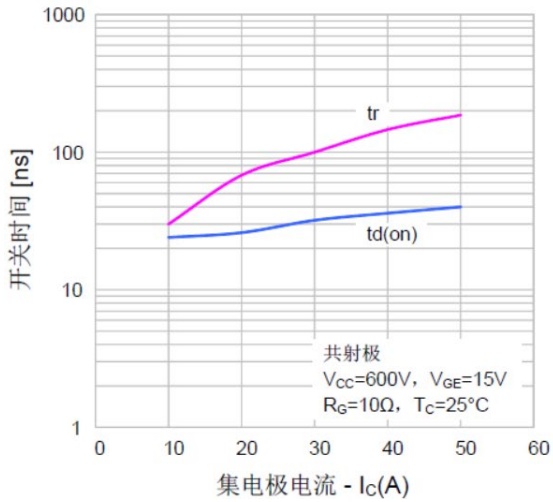


图14. 关断特性 vs. 集电极电流

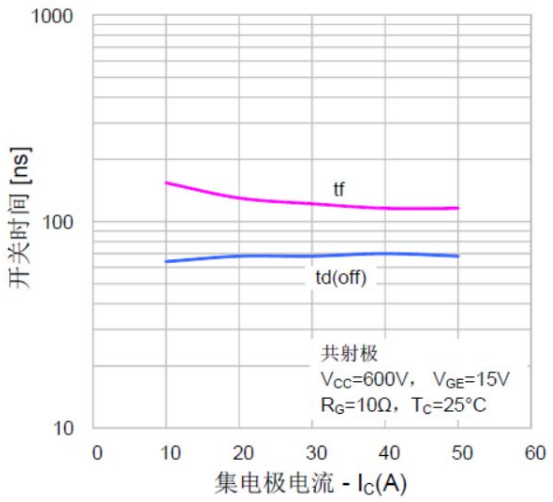


图15. 关断损耗 vs. 集电极电流

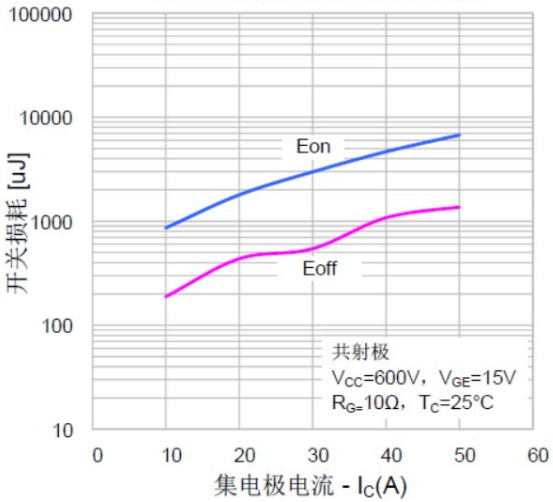


图 16. 正向特性

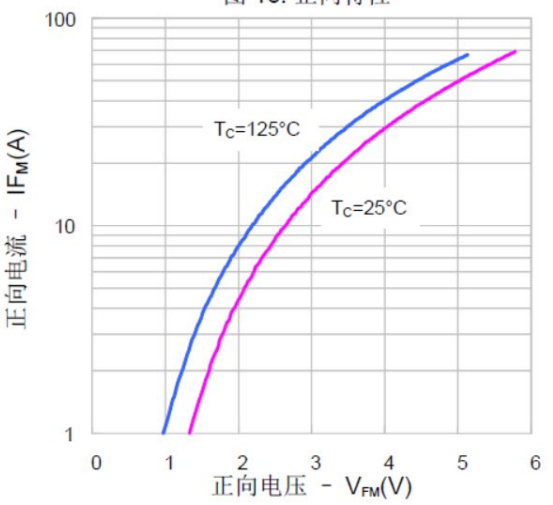


图17.反向恢复时间 vs. 正向电流

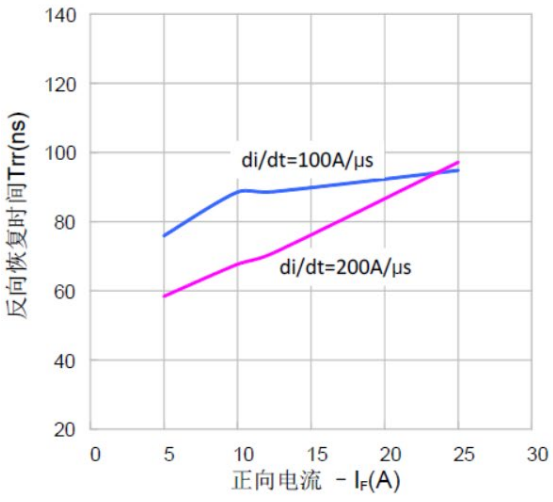


图 18. 反向恢复电荷 vs. 正向电流

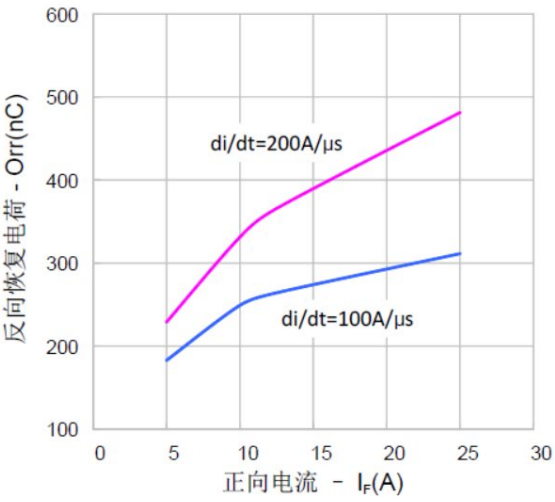


图 19. 峰值反向恢复电流 vs. 正向电流

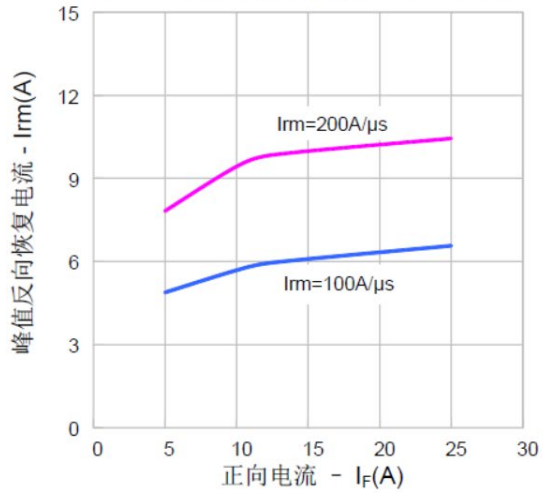


图 20. Tb斜率 vs. 正向电流

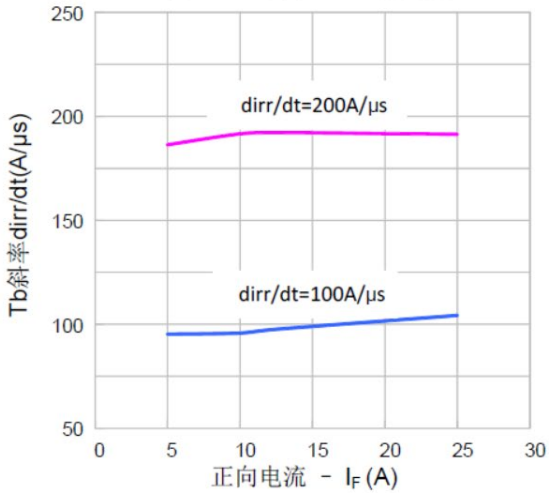


图 21. 最大安全工作区域

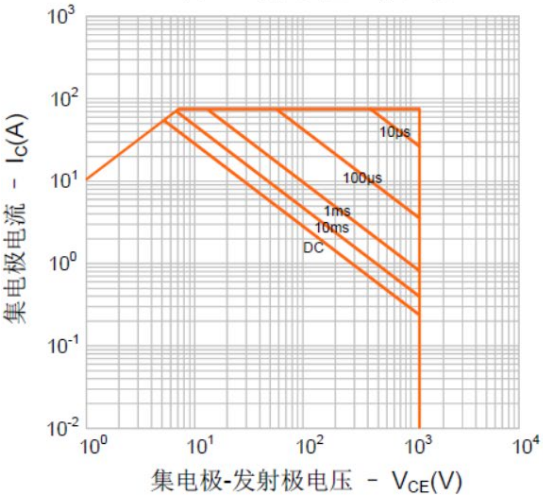


图22.IGBT 瞬态热阻抗 vs. 脉冲宽度

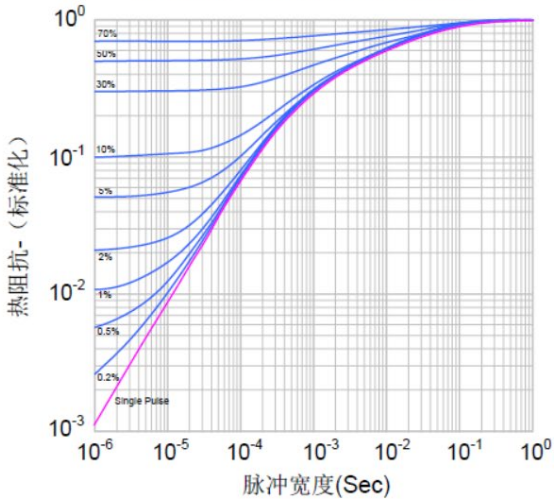
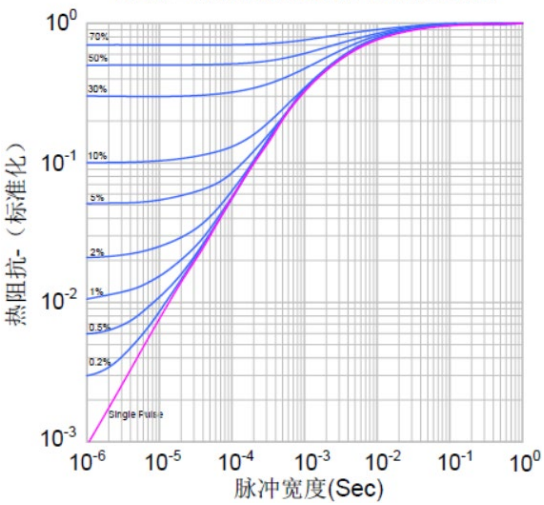
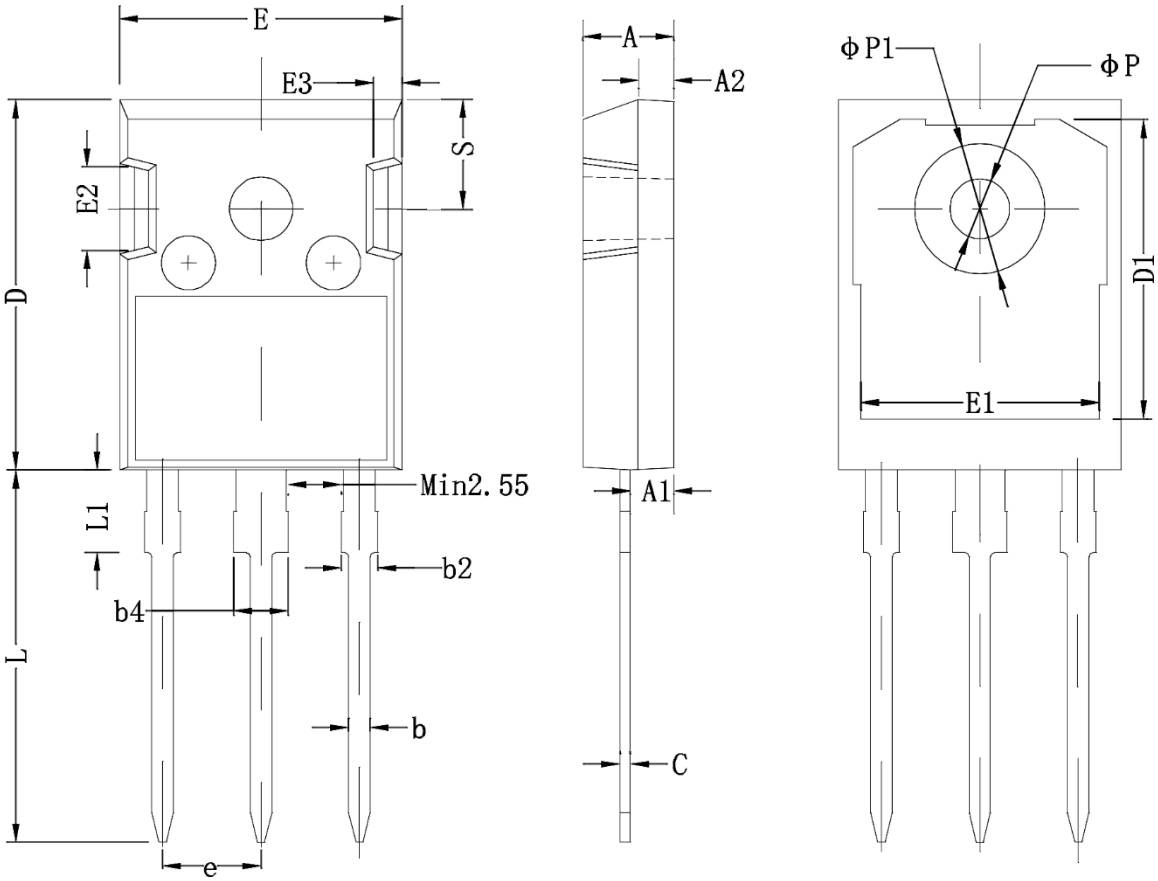


图23.二极管瞬态热阻抗 vs. 脉冲宽度



Product Dimension (TO-247-3L)



Dim	Millimeters			Dim	Millimeters		
	Min	Non	Max		Min	Non	Max
A	4.80	5.00	5.20	E1	13.00	13.30	13.60
A1	2.21	2.41	2.59	E2	4.80	5.00	5.20
A2	1.85	2.00	2.15	E3	2.30	2.50	2.70
b	1.11	1.21	1.36	e	5.44 BSC.		
b2	1.91	2.01	2.21	L	19.82	19.92	20.22
b4	2.91	3.01	3.21	L1	-	-	4.30
c	0.51	0.61	0.75	φP	3.40	3.60	3.80
D	20.80	21.00	21.30	φP1	-	-	7.30
D1	16.25	16.55	16.85	S	6.15 BSC.		
E	15.50	15.80	16.10				

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