FCZ120N40M2

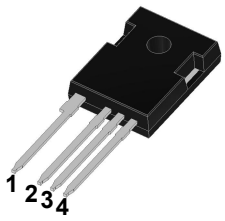
N沟道*e*SiC碳化硅功率MOSFET

1200 V, 57 A, 40 mΩ

Features

- 高开关频率，低栅极电荷
- 具有低反向恢复的快速体二极管
- 强大的雪崩能力
- 100% 雪崩测试
- 无铅、无卤且符合RoHS标准

$BV_{DSS,\ Tc=25℃}$	$I_{D,\ Tc=25℃}$	$R_{DS(on),typ}$	$Q_{g,typ}$
1200 V	57 A	40 mΩ	62 nC



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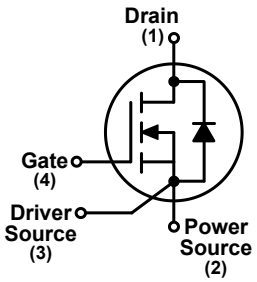


Benefits

- 提供效率提升
- 更高频率的适用性
- 增强功率密度
- 减少冷却工作量

Applications

- 光伏逆变器
- 新能源汽车充电桩
- UPS
- 工业电源

绝对最大额定值 (T_C = 25℃， 除非另有说明)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		1200	V
V_{GS}	Gate to Source Voltage (DC)		-10 / +22	V
V_{GSop}	Recommended Operation Value		-5...-3 / +18	V
I_D	Drain Current	Continuous (T_C = 25℃)	57	A
		Continuous (T_C = 100℃)	40	
I_{DM}	Drain Current	Pulsed (Note1)	142	A
P_D	Power Dissipation	(T_C = 25℃)	288	W
		Derate Above 25℃	1.9	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 175	℃
T_L	Maximum Lead Temperature for Soldering, 1/8” from Case for 10 Seconds		260	℃

热特性

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.52	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	40	

封装标识和订购信息

Part Number	Top Marking	Package	Packing Method	Quantity
PCZ120N40M2	PCZ120N40M2	TO-247-4L	Tube	30 units

电特性 (T_C = 25℃ 除非另有说明)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1200 V, V_{GS} = 0 V		1	100	μA
		V_{DS} = 1200 V, V_{GS} = 0 V, T_J = 175℃		10		
I_{GSS}	Gate-Source Leakage Current	V_{GS} = +22 V, V_{DS} = 0 V			+100	nA
		V_{GS} = -10 V, V_{DS} = 0 V			-100	
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 10 mA (tested after V_{GS} = 22 V, 1 ms pulse)	2.0	3.0	4.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 18 V, I_D = 28 A		40.0	56.0	mΩ
		V_{GS} = 18 V, I_D = 28 A, T_J = 175℃		64.0		
		V_{GS} = 15 V, I_D = 28 A		55.5		
g_{fs}	Transconductance	V_{DS} = 20 V, I_D = 28 A		16.9		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 800 V, V_{GS} = 0 V, f = 250 kHz		1668		pF
C_{oss}	Output Capacitance			105		
C_{rss}	Reverse Capacitance			4		
E_{oss}	Stored Energy in Output Capacitance	V_{DS} = 0 V to 800 V, V_{GS} = 0 V		42		μJ
$C_{o(er)}$	Energy Related Output Capacitance			132		pF
$C_{o(tr)}$	Time Related Output Capacitance			201		
$Q_{g(tot)}$	Total Gate Charge	V_{DS} = 800 V, I_D = 28 A, V_{GS} = -3 V / 18 V, Inductive load		62		nC
Q_{gs}	Gate to Source Charge			20		
Q_{gd}	Gate to Drain “Miller” Charge			14		
R_G	Internal Gate Resistance	f = 1 MHz, V_{AC} = 30 mV		3.0		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 800 V, I_D = 28 A, V_{GS} = -3 V / 18 V, R_G = 6.8 Ω, FWD : PCH120S20D1, Inductive load		19		ns
t_r	Turn-On Rise Time			15		
$t_{d(off)}$	Turn-Off Delay Time			35		
t_f	Turn-Off Fall Time			8		
E_{on}	Turn-on Switching Energy			158		μJ
E_{off}	Turn-off Switching Energy			100		
E_{tot}	Total Switching Energy			258		

Electrical Characteristics (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Source-Drain Diode Characteristics						
I_S	Continuous Diode Forward Current	V_{GS} = -3 V			57	A
I_{SM}	Pulsed Diode Forward Current	V_{GS} = -3 V (Note1)			142	
V_{SD}	Diode Forward Voltage	V_{GS} = -3 V, I_{SD} = 28 A		4.3		V
t_{rr}	Reverse Recovery Time	V_{DD} = 800 V, I_{SD} = 28 A, dI_F/dt = 3000 A/μs, Includes Q_{oss}		15		ns
Q_{rr}	Reverse Recovery Charge			219		nC
I_{rrm}	Peak Reverse Recovery Current			24		A

※注1：受最高结温限制

典型性能特性

Figure 1. 输出曲线 T_J = -40℃

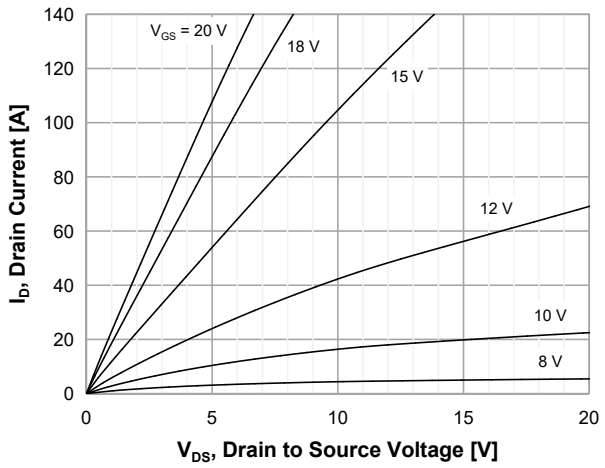


Figure 2.输出曲线 T_J = 25℃

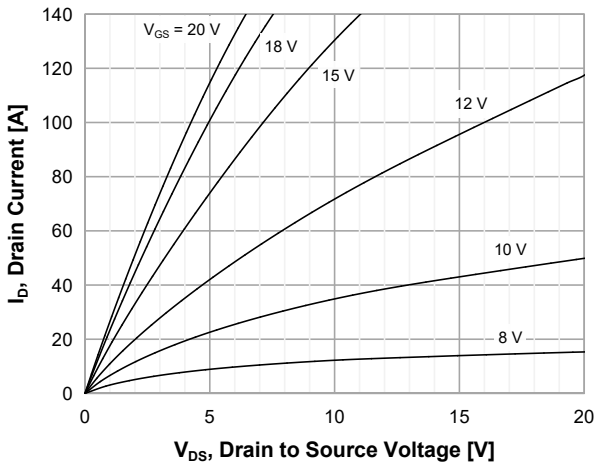


Figure 3.输出曲线 T_J = 175℃

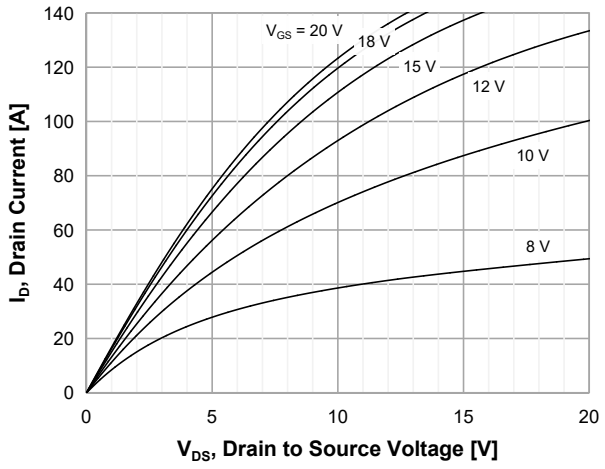


Figure 4.规范化导通电阻特性与温度的关系

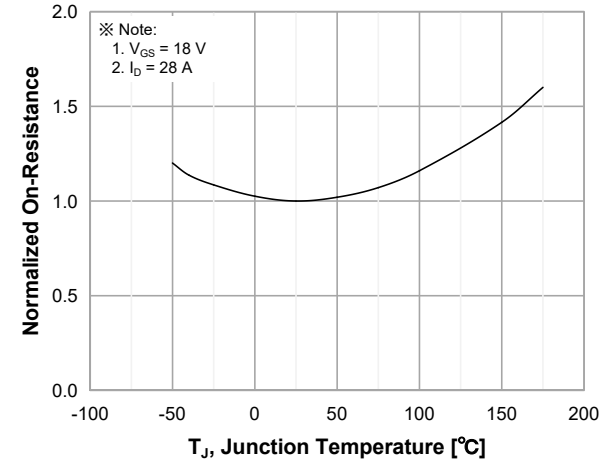


Figure 5.传输特性曲线

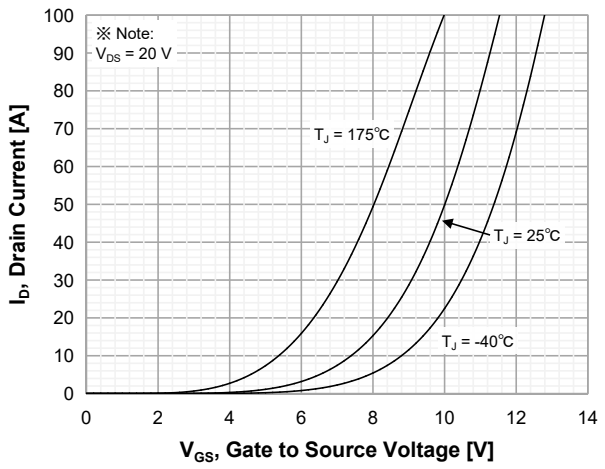
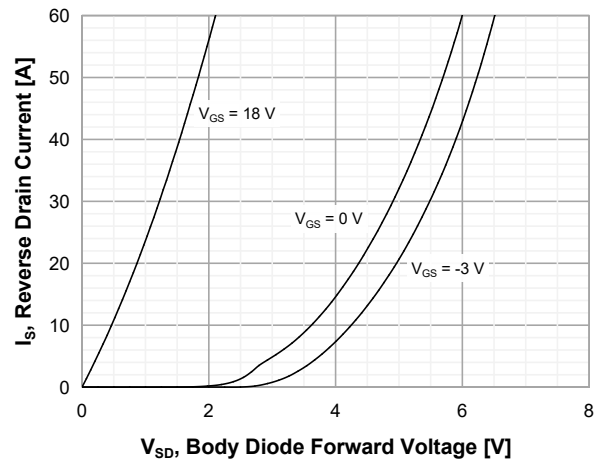


Figure 6.二极管正向电压与源级漏电流曲线 T_J = -40℃



典型性能特性

Figure 7.二极管正向电压与源级漏电流曲线 T_J = 25℃

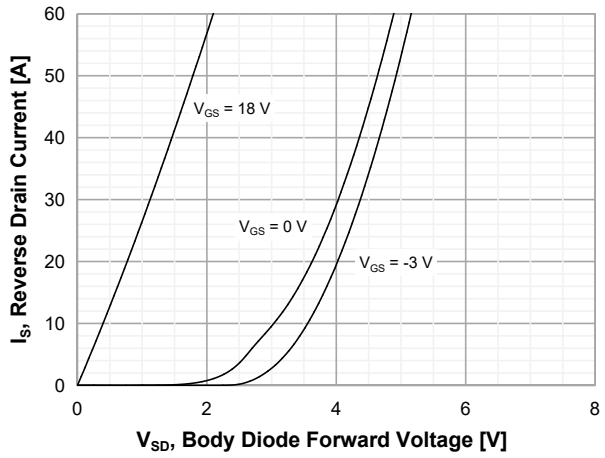


Figure 8.二极管正向电压与源级漏电流曲线 T_J = 175℃

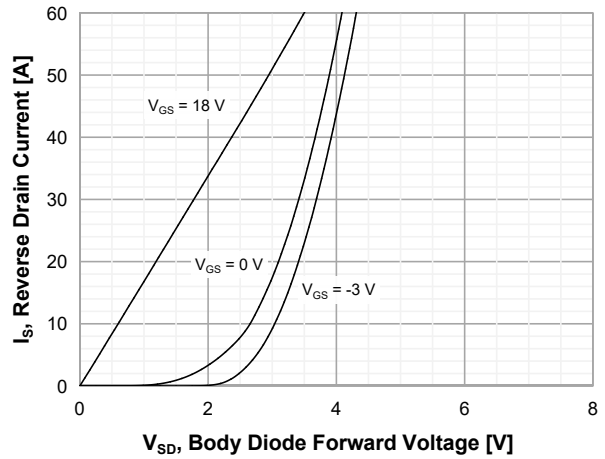


Figure 9.阈值电压与温度关系

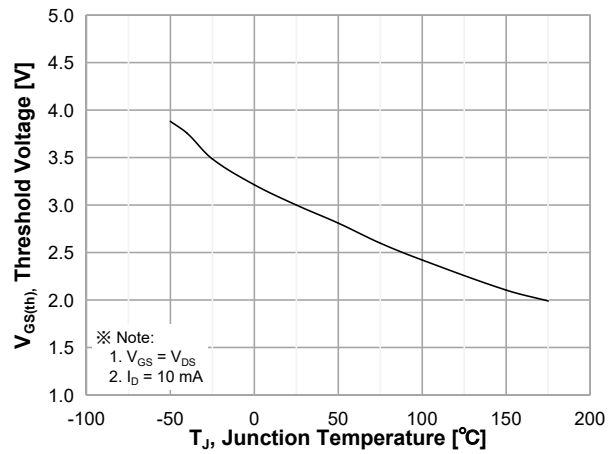


Figure 10.栅极电荷特性

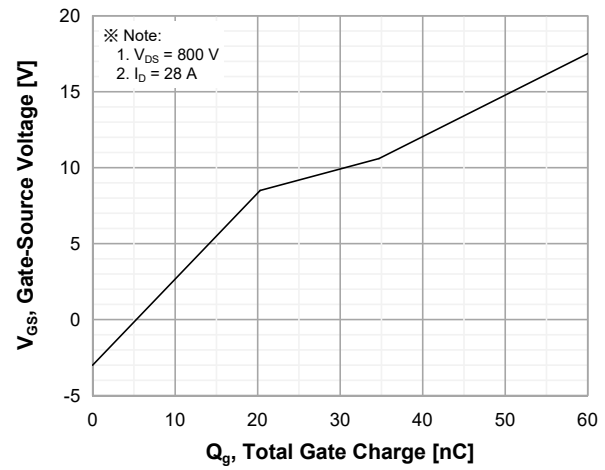


Figure 11.输出电容中的储存能量

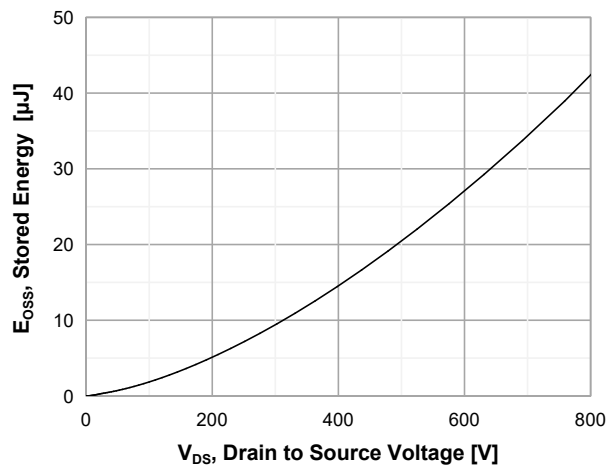


Figure 12.电容特性

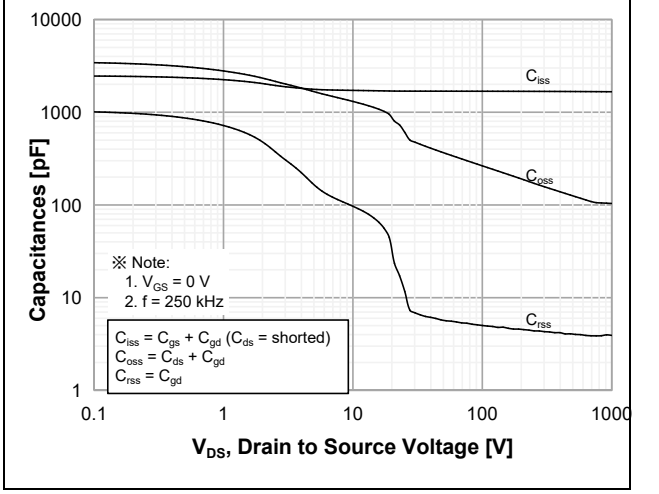


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Figure 13.连续漏极电流降额与外壳温度

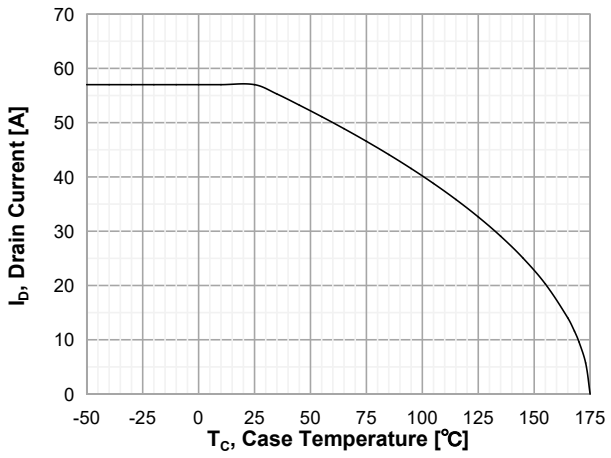


Figure 14.最大功耗降额与外壳温度

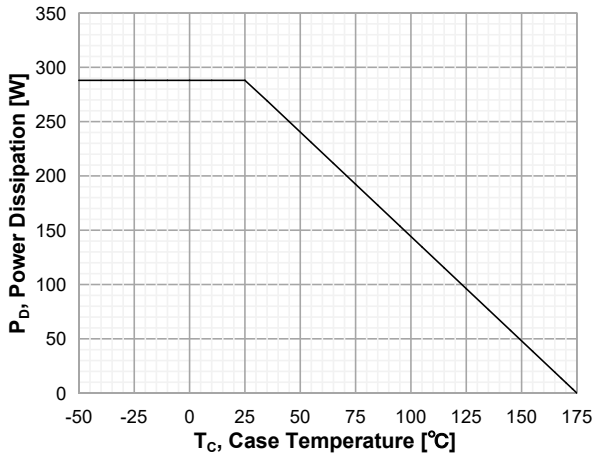


Figure 15. Typ.开关损耗与漏极电流

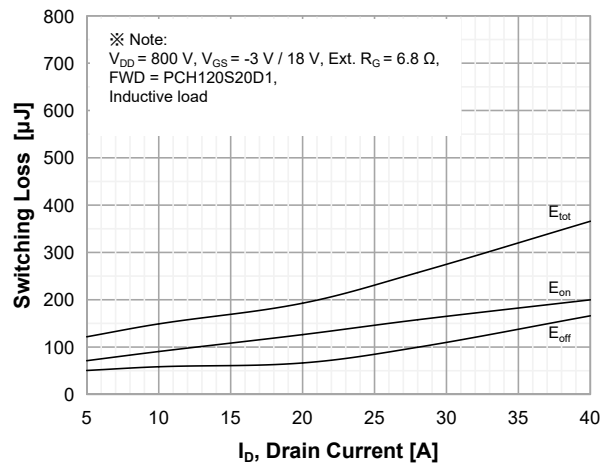


Figure 16. Typ.开关损耗与栅极电阻

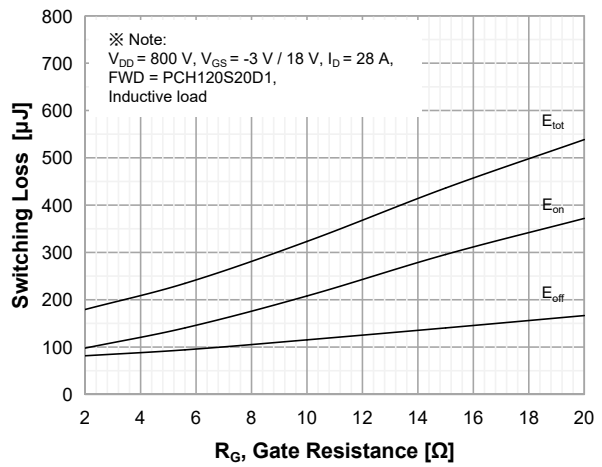


Figure 17. Typ.开关损耗与漏极电流

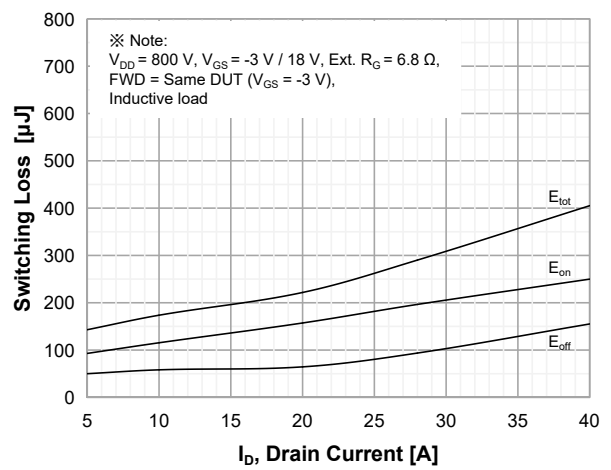
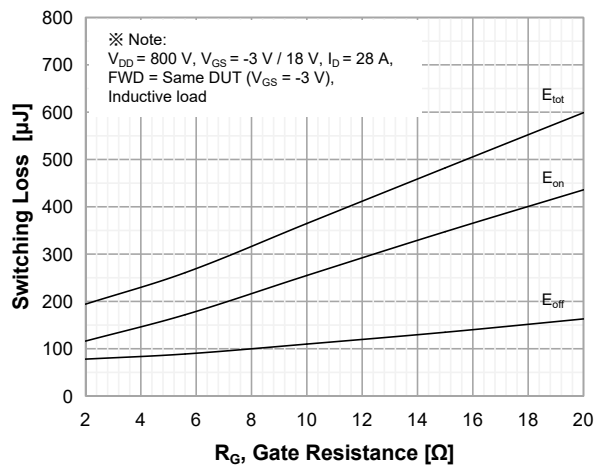


Figure 18. Typ.开关损耗与栅极电阻



典型性能特性

Figure 19.最大安全操作区域

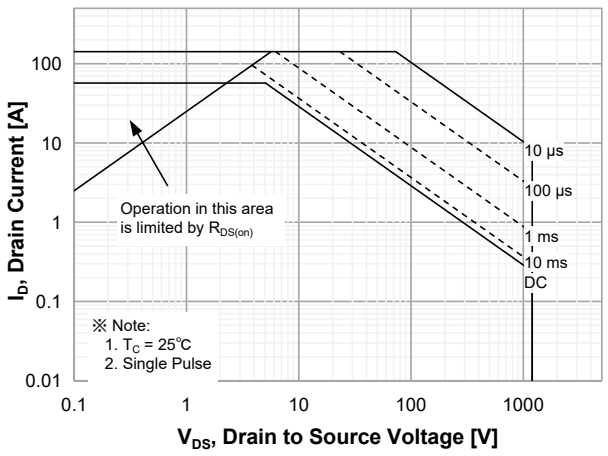


Figure 20.瞬态热响应曲线

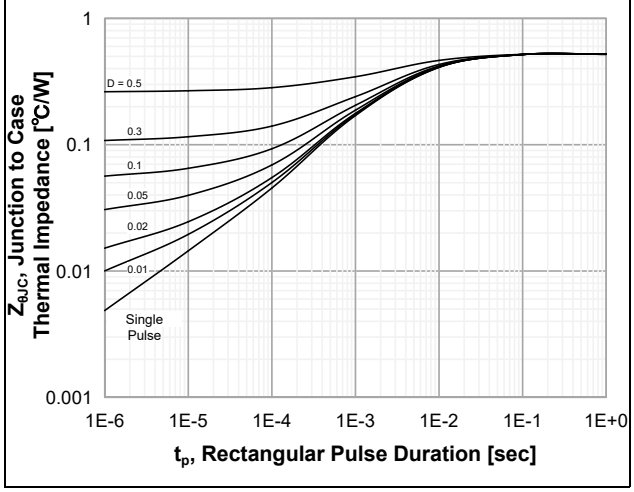


Figure 21.电感负载切换测试电路和波形

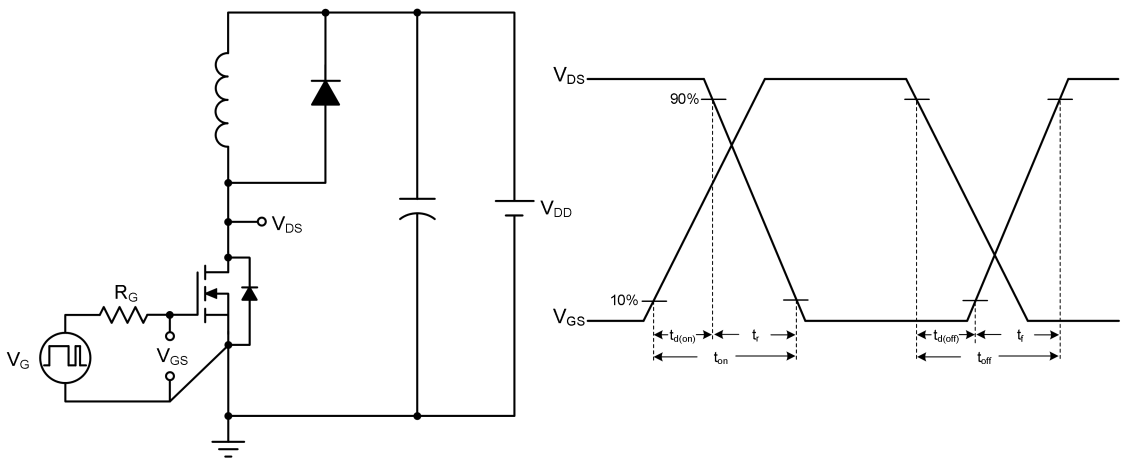
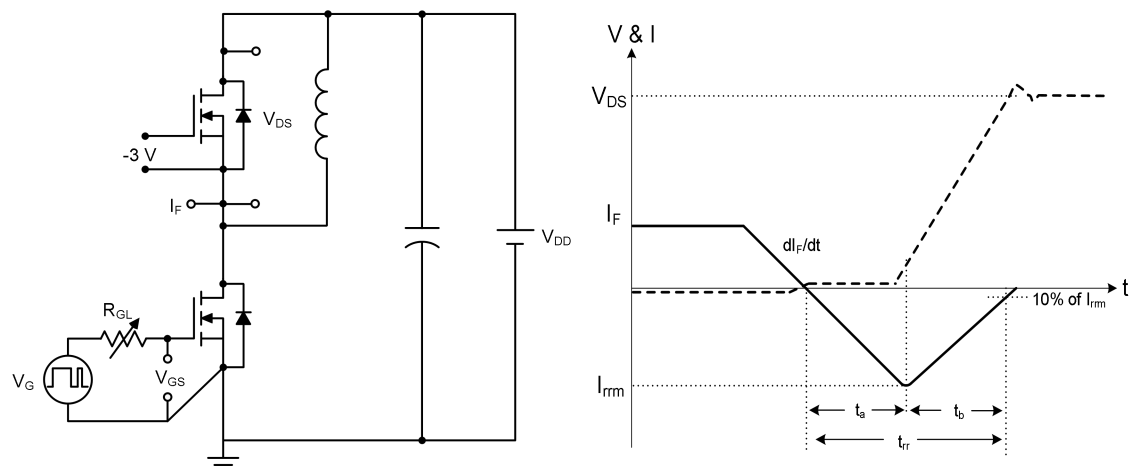


Figure 22.峰值二极管恢复dv/dt测试电路和波形



Package Outlines

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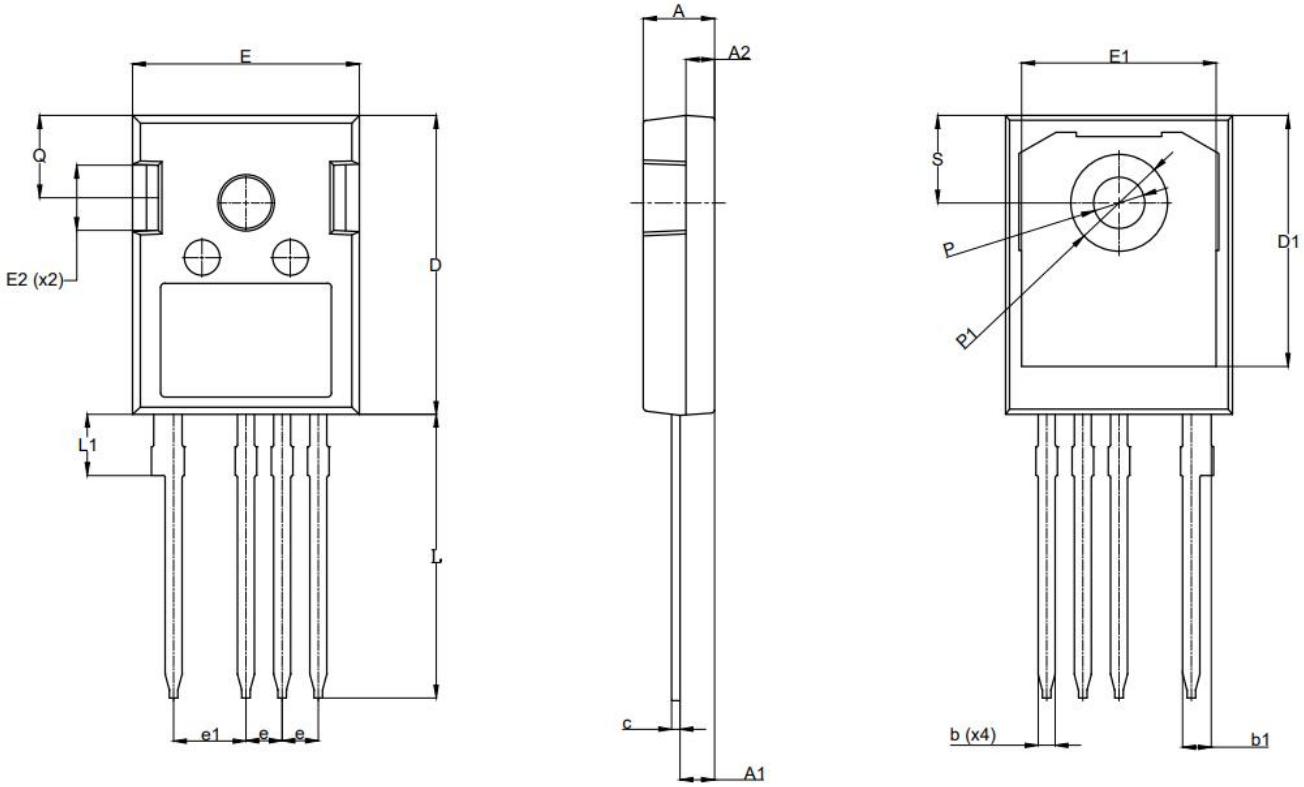

SYMBOL	Common		
	DIMENSIONS MILLIMETER		
	MIN.	NOM.	MAX.
A	4.80	5.00	5.20
A1	2.29	2.42	2.54
A2	1.90	2.00	2.10
b	1.10	1.20	1.30
b1	1.86	2.01	2.15
c	0.50	0.60	0.70
D	20.90	21.00	21.10
D1	17.43	17.63	17.83
E	15.75	15.94	16.13
E1	13.46	13.66	13.86
E2	4.32	4.58	4.83
e	2.54 BSC.		
e1	5.08 BSC.		
L	19.80	19.95	20.10
L1	-	-	4.30
P	3.56	3.61	3.66
P1	6.75	6.80	6.85
Q	5.38	5.79	6.20
S	6.15 BSC.		

* Dimensions in millimeters