

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
1200V	69mΩ@10V	23A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

技术 品质 服务

www.siliup.com

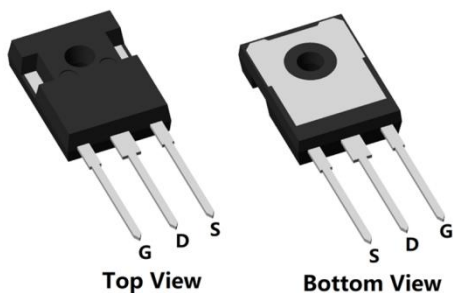
Feature

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel
- Simple to Drive
- RoHS Compliant

Applications

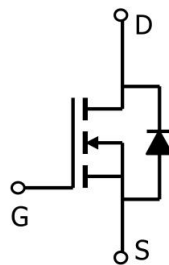
- Power Factor Correction Modules
- Switch Mode Power Supplies
- Photovoltaic Inverter
- UPS Power Supply
- Motor Drive
- High Voltage DC/DC Converter
- Switching Mode Power Supply

Package

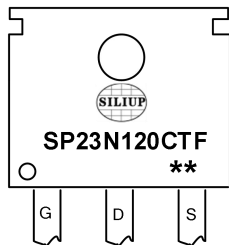


TO-247(1:G 2:D 3:S)

Circuit diagram



Marking



SP23N120CTF :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tube
SP23N120CTF	TO-247	30

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	1200	V
Gate-Source Voltage	V_{GSMAX}	-10/+25	V
Recommend Gate-Source Voltage	V_{GSop}	-5/+20	V
Continuous Drain Current(Tc=25°C)	I_D	32	A
Continuous Drain Current(Tc=100°C)	I_D	23	A
Pulsed Drain Current	I_{DM}	96	A
Single Pulse Avalanche Energy ¹	E_{AS}	420	mJ
Power Dissipation(Tc=25°C)	P_D	197	W
Power Dissipation(Tc=100°C)	P_D	104	W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.76	°C/W
Storage Temperature Range	T_{STG}	-55 to 175	°C
Operating Junction Temperature Range	T_J	-55 to 175	°C

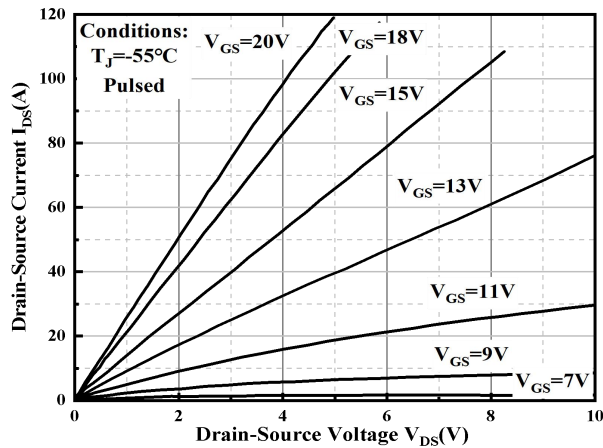
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =100uA	1200	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V, T _J =25℃	-	1	100	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =22V , V _{DS} =0V, T _J =25℃	-	1	100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =5mA, T _J =25℃	2.0	3.3	4.0	V
		V _{GS} =V _{DS} , I _D =5mA, T _J =175℃	-	2.2	-	
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =18V , I _D =20A, T _J =25℃	-	69	86	mΩ
		V _{GS} =18V , I _D =20A, T _J =175℃	-	105	-	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =1200V, V _{GS} =0V, f=100KHz	-	1176	-	pF
Output Capacitance	C _{oss}		-	64	-	
Reverse Transfer Capacitance	C _{rss}		-	7	-	
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} =800V , V _{GS} = -5/+18V , I _D =20A	-	69	-	nC
Gate-Source Charge	Q _{gs}		-	13	-	
Gate-Drain Charge	Q _{gd}		-	23	-	
Turn-On Delay Time	T _{d(on)}	V _{DS} =800V , V _{GS} = -5/+18V , I _D =20A R _G =2.5Ω, L=250uH	-	8	-	ns
Rise Time	T _r		-	23	-	
Turn-Off Delay Time	T _{d(off)}		-	27	-	
Fall Time	T _f		-	8	-	
Turn-On Energy	E _{on}		-	76	-	μJ
Turn-Off Energy	E _{off}		-	251	-	
Total Switching Loss	E _{tot}		-	337	-	
Reverse Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = -5V , I _{SD} =10A , T _J =25℃	-	4.6	-	V
		V _{GS} = -5V , I _{SD} =10A , T _J =175℃	-	4.1	-	
Reverse Recovery Time	t _{rr}	V _{GS} =-5V, I _{SD} =20A, V _R =800V, R _G =2.5Ω T _J =175℃	-	21	-	ns
Reverse Recovery Charge	Q _{rr}		-	299	-	nC
Peak Reverse Recovery Current	I _{rrm}		-	21	-	A
Maximum Body-Diode Continuous Current	I _S	V _{GS} = -4V , T _J =25℃	-	-	32	A

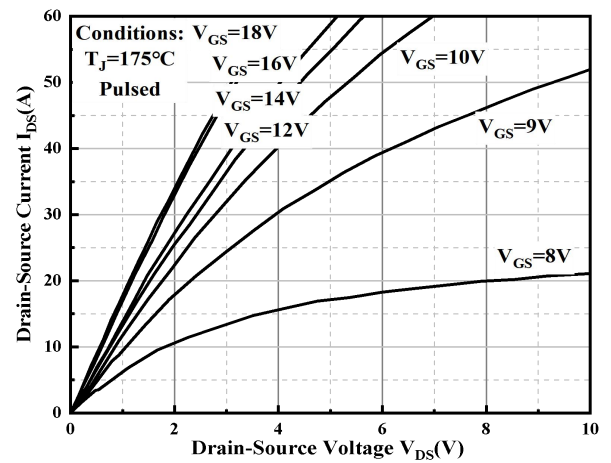
Note :

The test condition is $V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

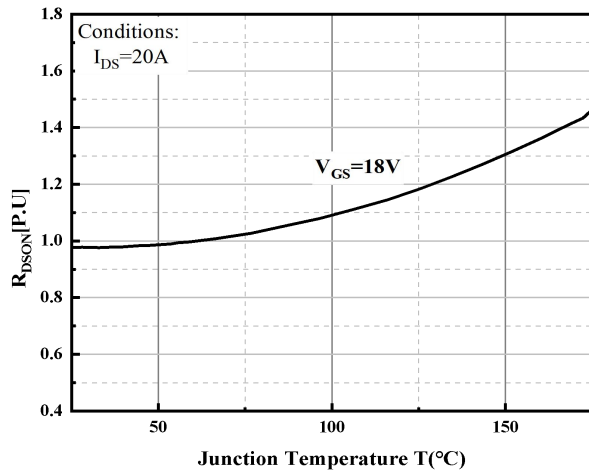
Typical Characteristics



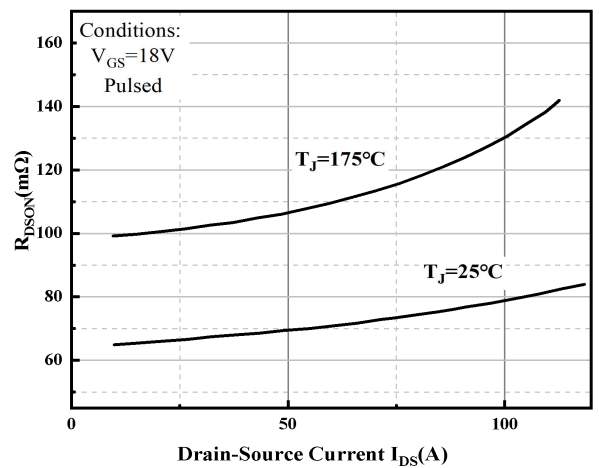
Typical output characteristic(25°C)



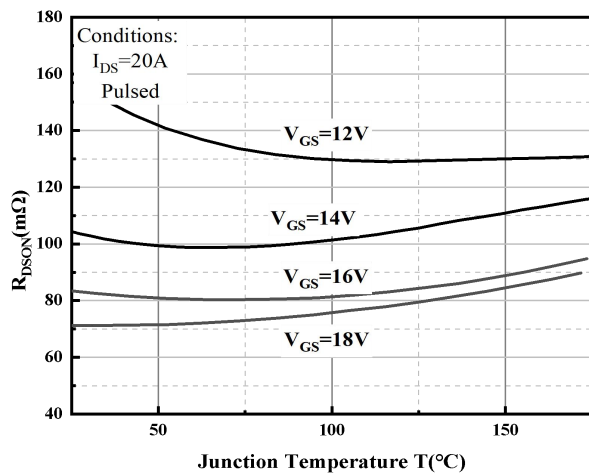
Typical output characteristic(175°C)



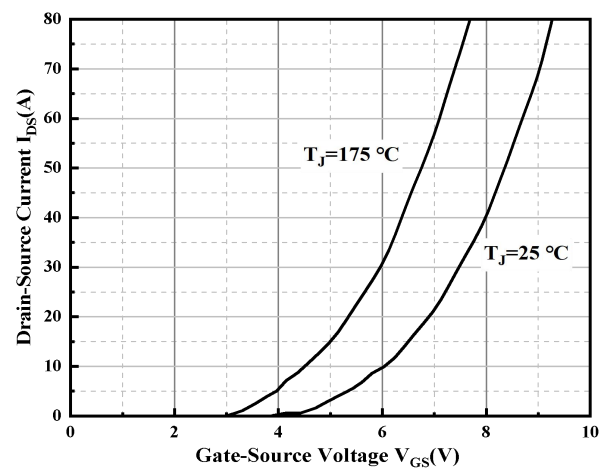
Normalized On-Resistance vs Temperature



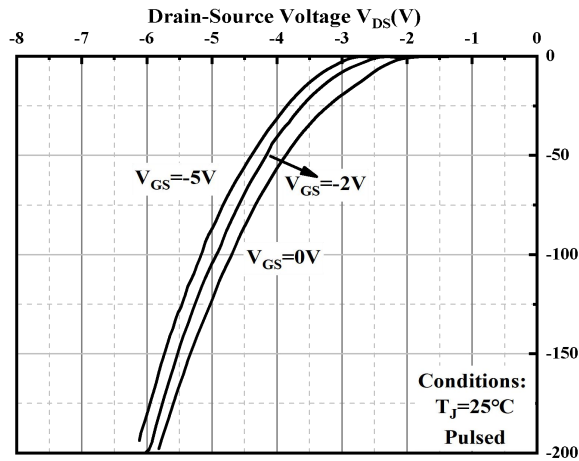
On-Resistance vs Drain Current For Various Temperatures Voltage



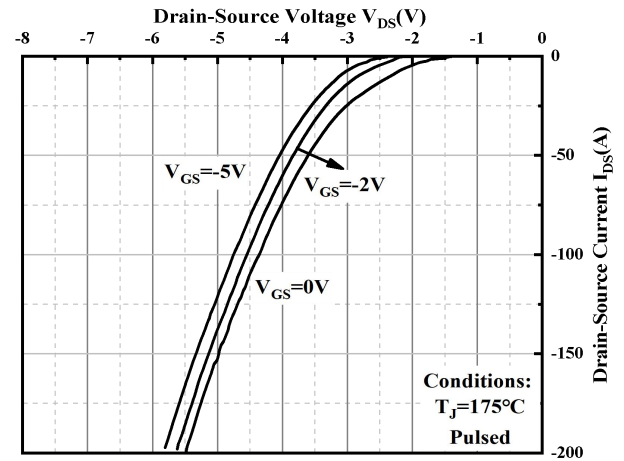
On-Resistance vs Temperature For Various Gate



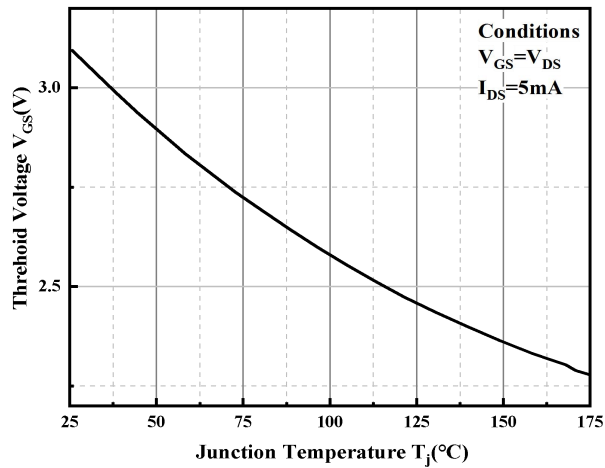
Transfer Characteristics for Various Temperatures



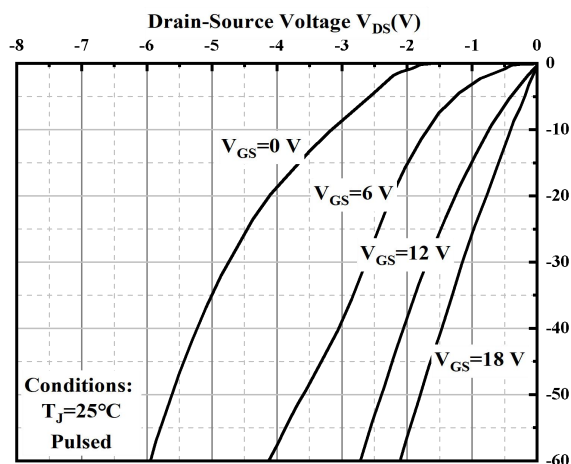
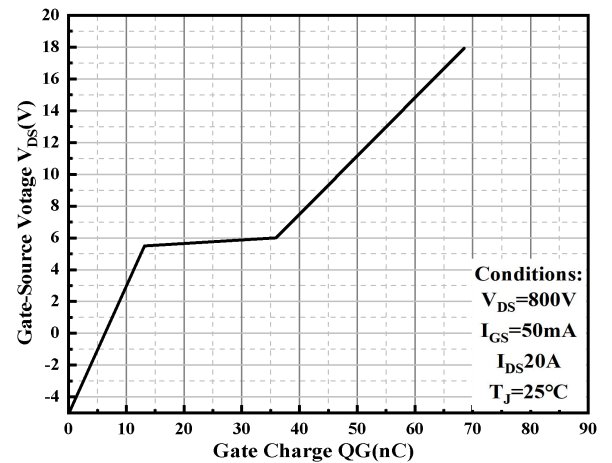
Body Diode Characteristics ($25^\circ C$)



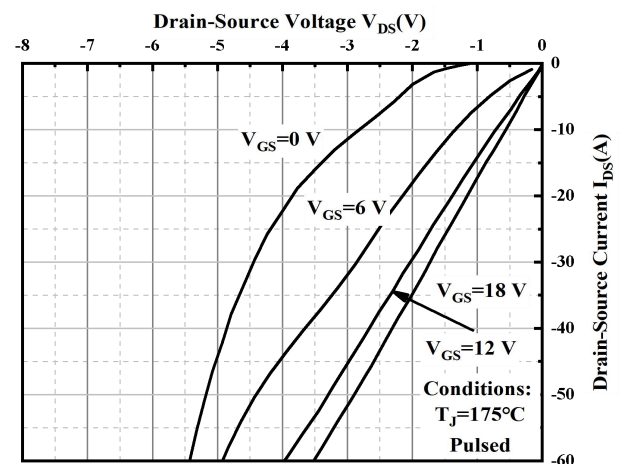
Body Diode Characteristics ($175^\circ C$)



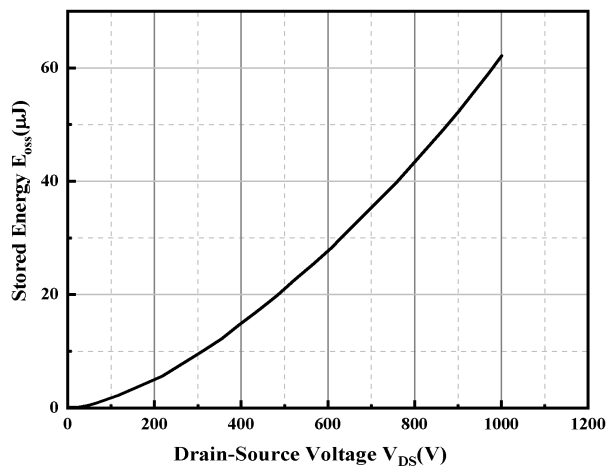
Threshold Voltage vs Temperature



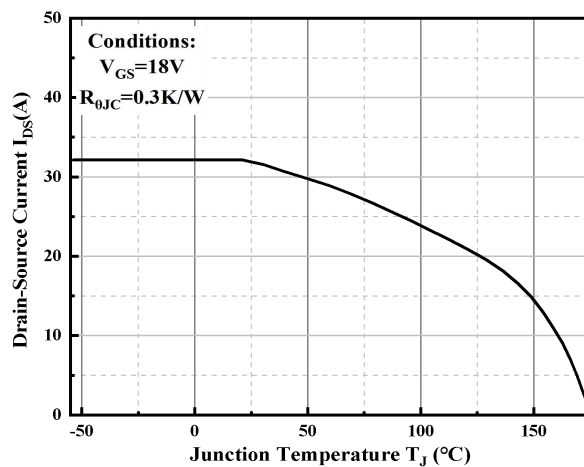
3rd Quadrant Characteristics ($25^\circ C$)



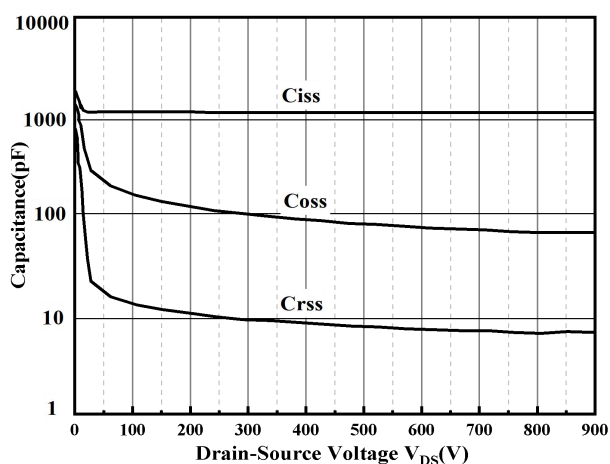
3rd Quadrant Characteristics ($175^\circ C$)



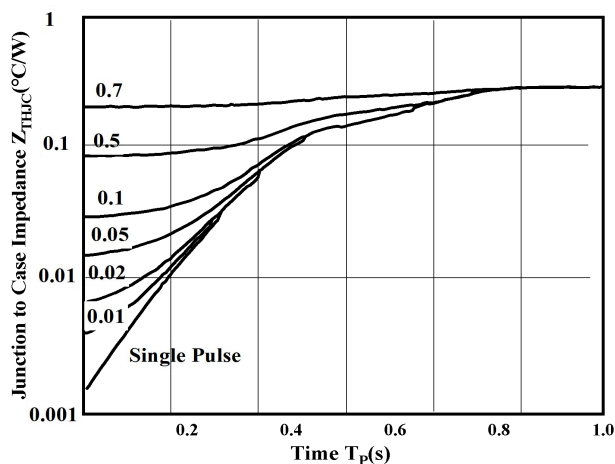
Output Capacitor Stored Energy



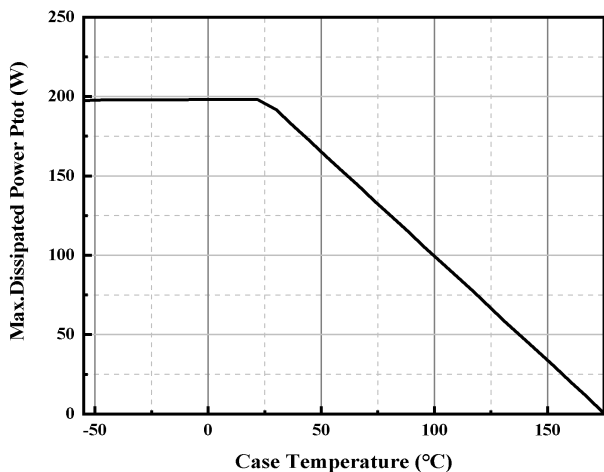
Continuous Drain Current Derating vs Case Temperature



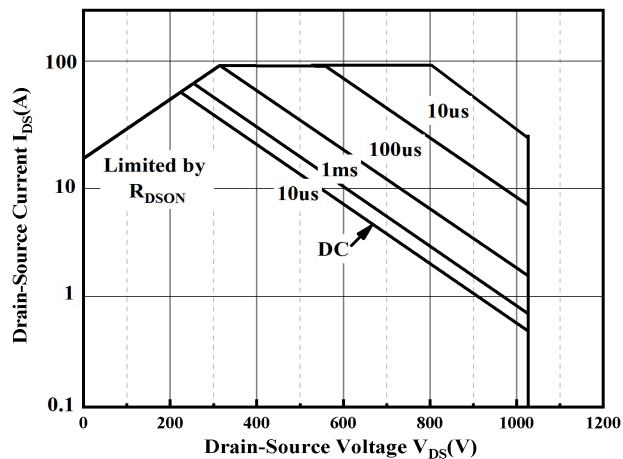
Capacitance vs. Drain-to-Source Voltage



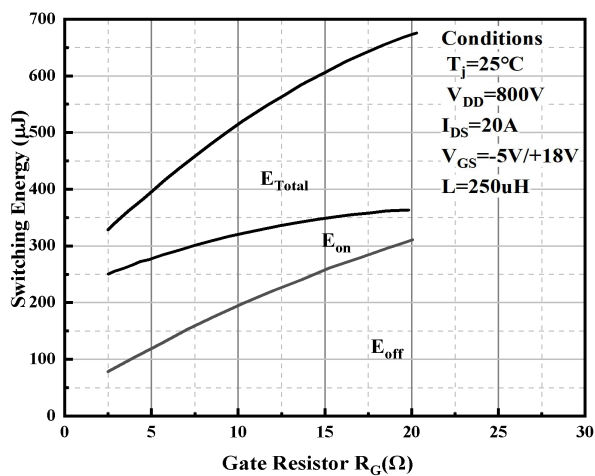
Transient Thermal Impedance (Junction-Case)



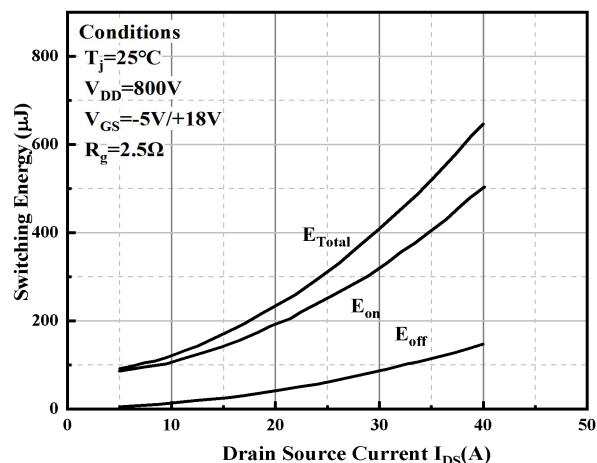
Power dissipation vs. Case temperature



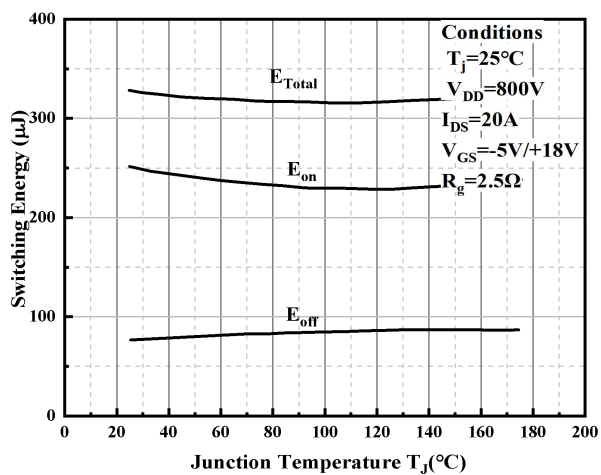
Safe Operation Area



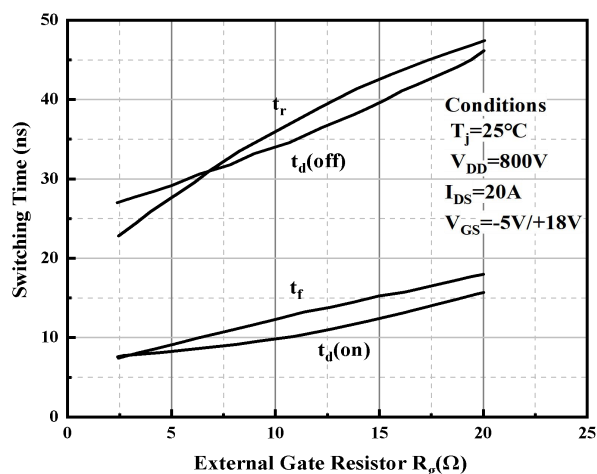
Clamped Inductive Switching Energy vs R_G



Clamped Inductive Switching Energy vs Drain Current

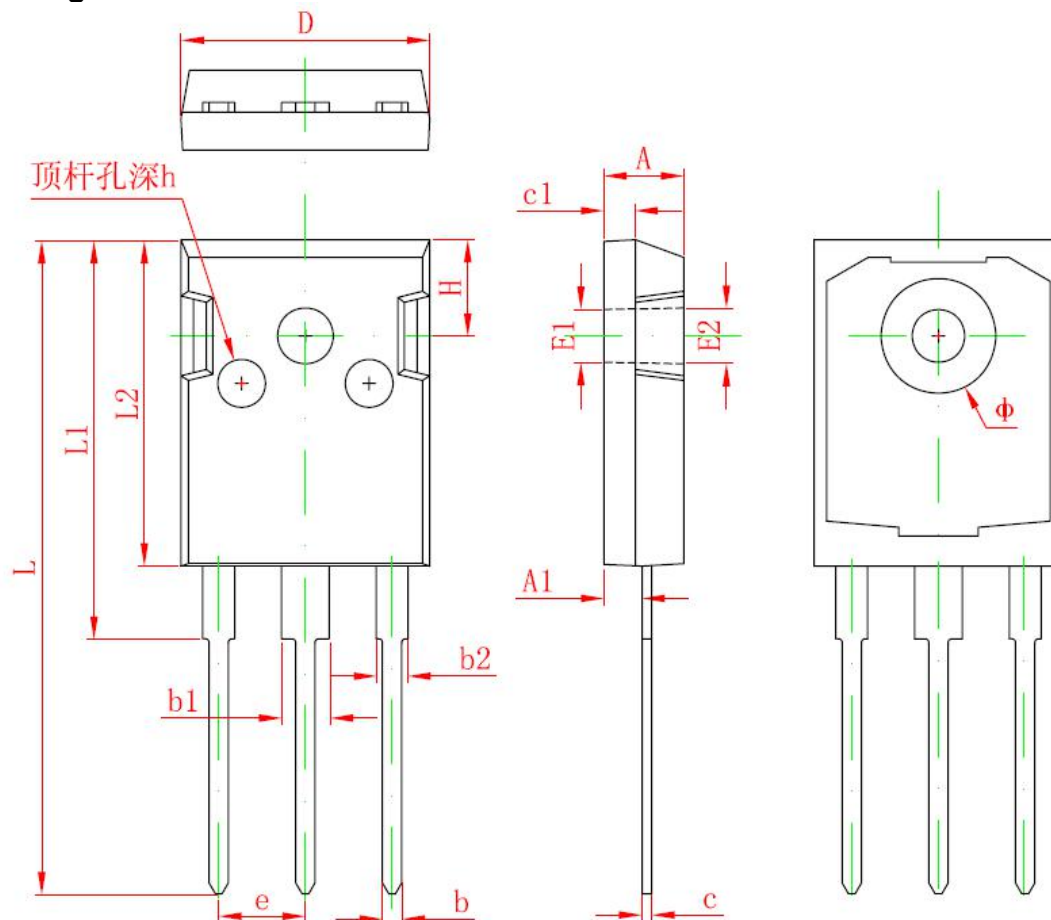


Clamped Inductive Switching Energy vs Temperature



Switching Times vs R_G

TO-247 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b2	1.800	2.200	0.071	0.087
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF.		0.138 REF.	
E2	3.600 REF.		0.142 REF.	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP.		0.215 TYP.	
H1	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012