

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
1200V	35mΩ@18V	50A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

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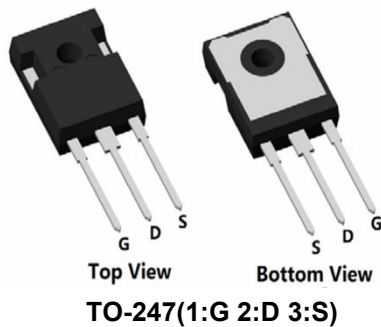
Feature

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

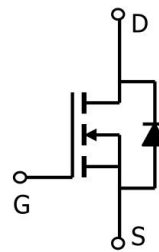
Applications

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

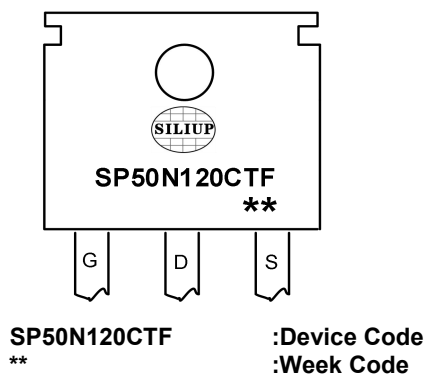
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP50N120CTF	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	$V_{GS\text{MAX}}$	-8/+22	V
Recommend Gate-Source Voltage	V_{GSop}	-4/+18	V
Continuous Drain Current(Tc=25°C)	I_D	74	A
Continuous Drain Current(Tc=100°C)	I_D	50	A
Pulsed Drain Current	I_{DM}	150	A
Single Pulse Avalanche Energy ¹	E_{AS}	1805	mJ
Power Dissipation(Tc=25°C)	P_D	312	W
Power Dissipation(Tc=100°C)	P_D	156	W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.51	°C/W
Storage Temperature Range	T_{STG}	-55 to 175	°C
Operating Junction Temperature Range	T_J	-55 to 175	°C

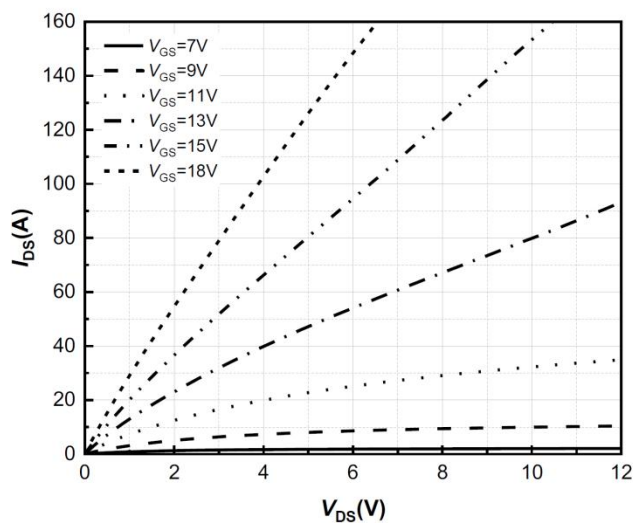
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	1200	-	-	V
Drain-Source Leakage Current	I _{DSS}	VDS=1200V, VGS=0V, TJ=25℃	-	1	100	uA
Gate-Source Leakage Current	I _{GSS}	VGS=18V , VDS=0V, TJ=25℃	-	1	100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID =5mA, TJ=25℃	2.0	2.5	4.0	V
		VGS=VDS , ID =5mA, TJ=175℃	-	1.8	-	
Static Drain-Source On-Resistance	R _{DS(ON)}	VGS=18V , ID=20A, TJ=25℃	-	35	45	mΩ
		VGS=18V , ID=20A, TJ=175℃	-	69	-	
Dynamic characteristics						
Input Capacitance	C _{iss}	VDS=1000V , VGS=0V , f=100KHz	-	2975	-	pF
Output Capacitance	C _{oss}		-	119	-	
Reverse Transfer Capacitance	C _{rss}		-	12	-	
Total Gate Charge	Q _g	VDS=800V , VGS= -4/+18V , ID=40A	-	117	-	nC
Gate-Source Charge	Q _{gs}		-	38	-	
Gate-Drain Charge	Q _{gd}		-	27	-	
Switching Characteristics						
Turn-On Delay Time	T _{d(on)}	VDS=800V , VGS= -4/+18V , ID=40A RG=4.5Ω	-	18	-	ns
Rise Time	T _r		-	21	-	
Turn-Off Delay Time	T _{d(off)}		-	31	-	
Fall Time	T _f		-	9	-	
Turn-On Energy	E _{on}		-	485	-	μJ
Turn-Off Energy	E _{off}		-	75	-	
Total Switching Loss	E _{tot}		-	253	-	
Reverse Diode Characteristics						
Diode Forward Voltage	V _{SD}	VGS=-4V , I _{SD} =20A , T _J =25℃	-	5	-	V
		VGS=-4V , I _{SD} =20A , T _J =175℃	-	4.4	-	
Continuous Diode Forward Current	I _S	VGS=-4V, T _C =25℃	-	45	-	A
		VGS=-4V, T _C =100℃	-	25	-	
Reverse Recovery Time	t _{rr}	VGS=-4V, I _{SD} =20A,	-	19	-	ns
Reverse Recovery Charge	Q _{rr}	V _R =800V,	-	500	-	nC
Peak Reverse Recovery Current	I _{rrm}	di/dt=3900A/μs	-	50	-	A

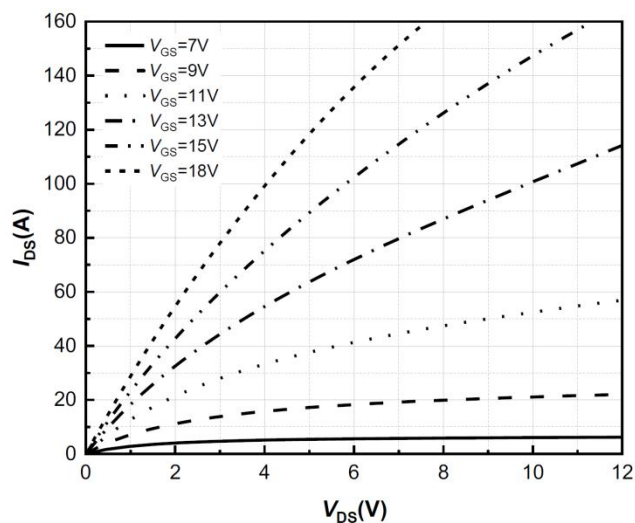
Note :

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

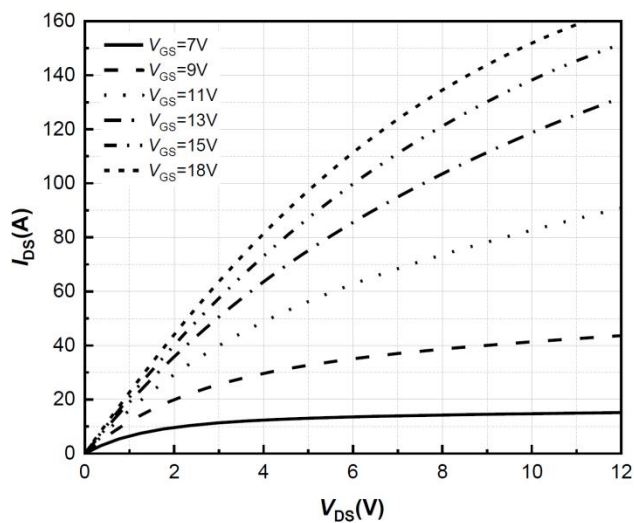
Typical Characteristics



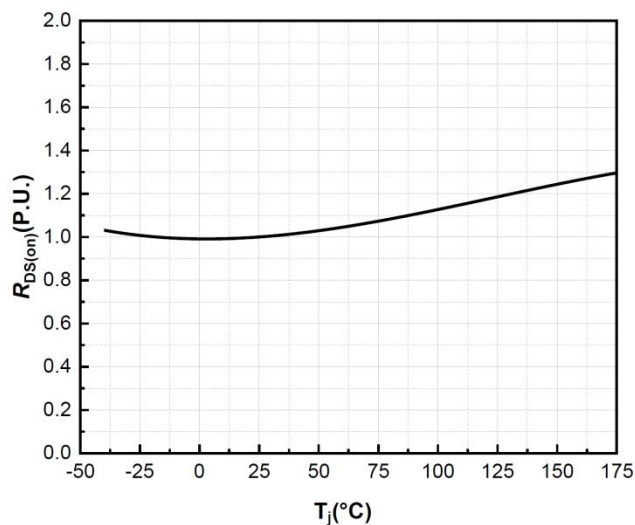
Output Characteristics $T_j = -40^\circ\text{C}$



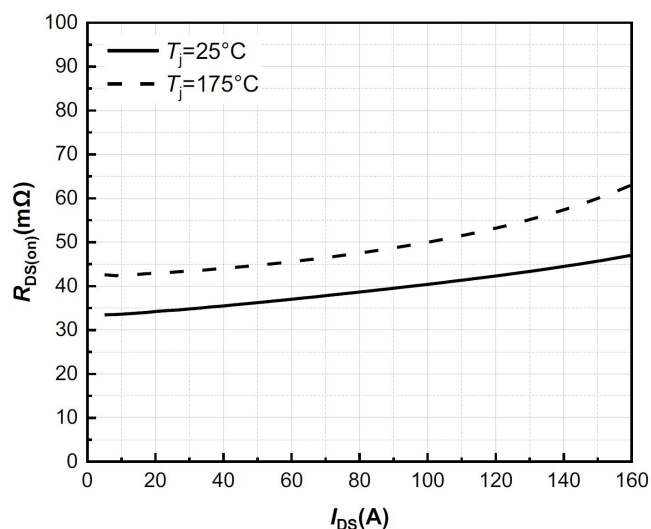
Output Characteristics $T_j = 25^\circ\text{C}$



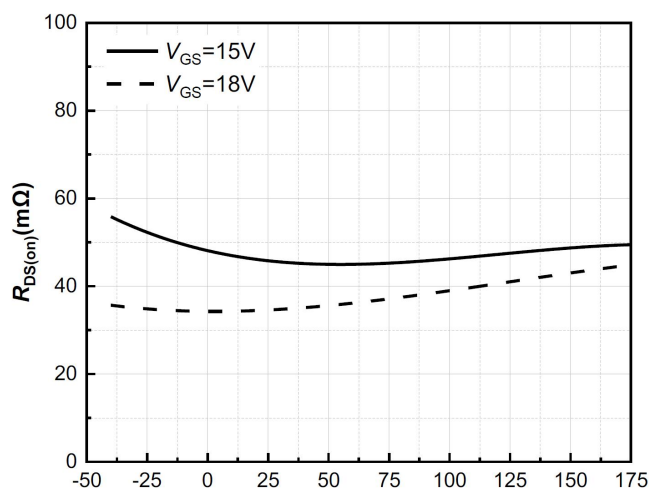
Output Characteristics $T_j = 175^\circ\text{C}$



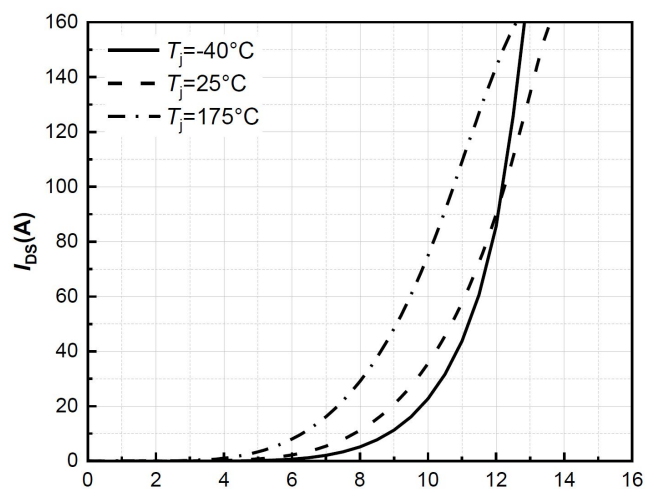
Normalized On-Resistance vs. Temperature



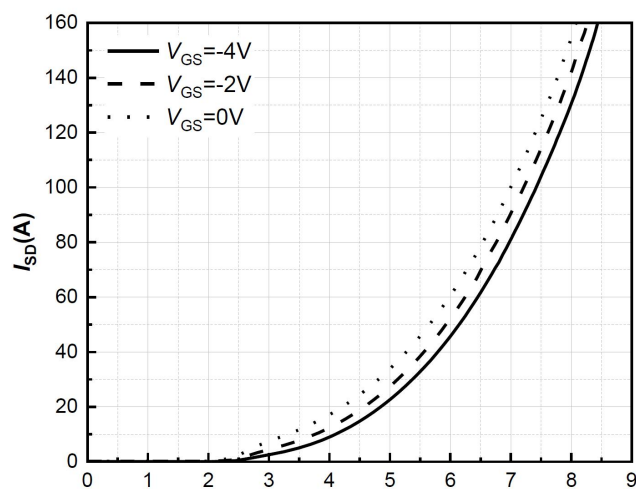
On-Resistance vs. Drain Current For Various Temperatures



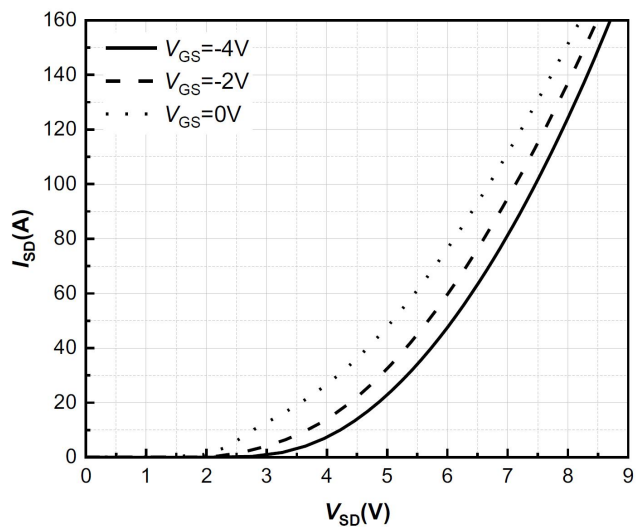
On-Resistance vs. Temperature For Various Gate Voltage



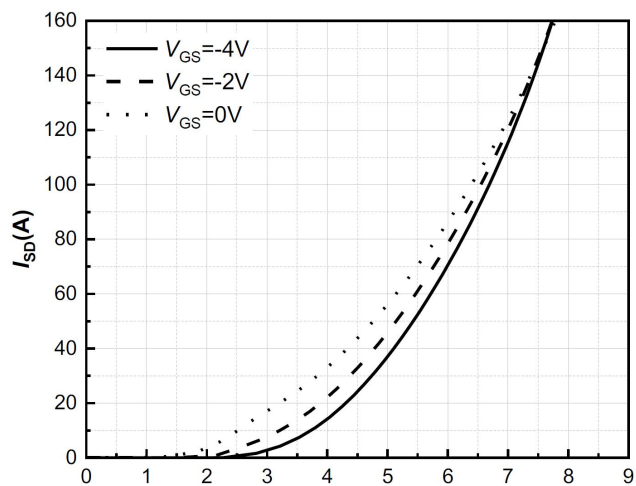
Transfer Characteristic for Various Junction Temperatures $V_{DS}=20\text{V}$



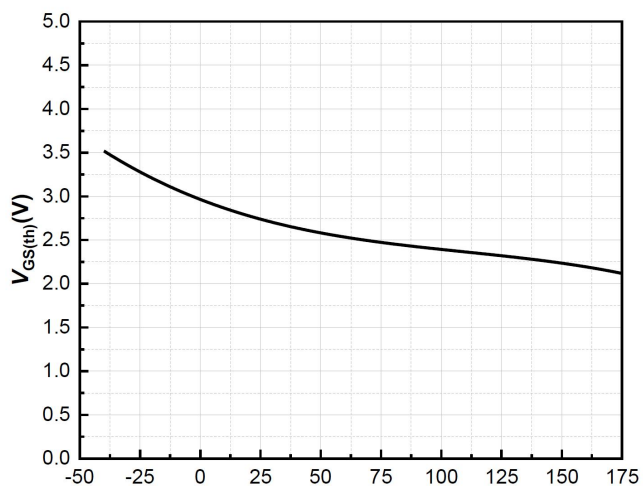
Body Diode Characteristic $T_j = -40^\circ\text{C}$



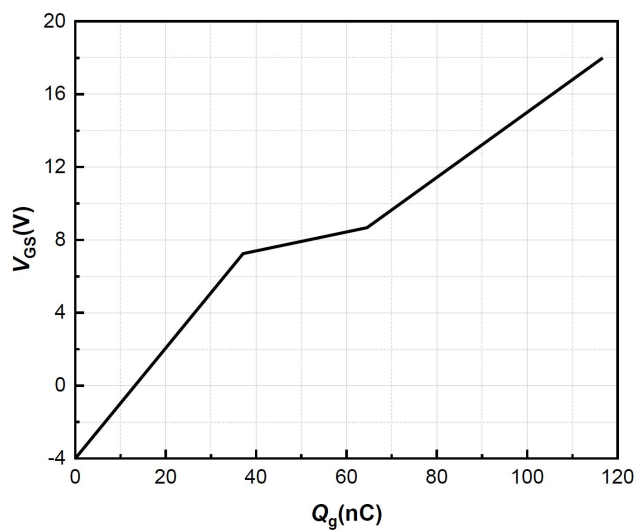
Body Diode Characteristic $T_j = 25^\circ\text{C}$



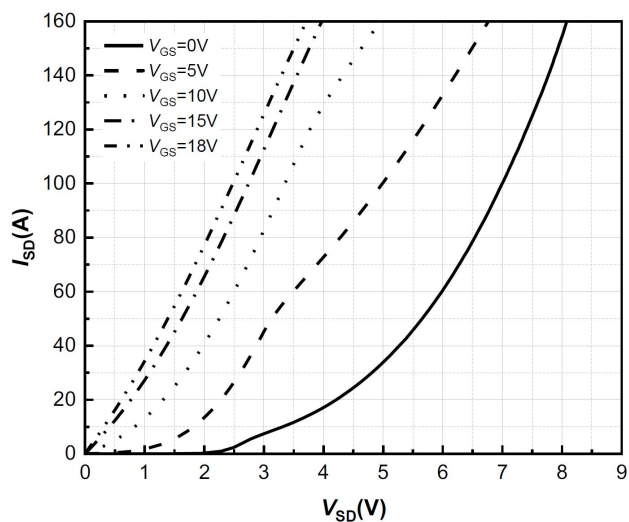
Body Diode Characteristic $T_j = 175^\circ\text{C}$



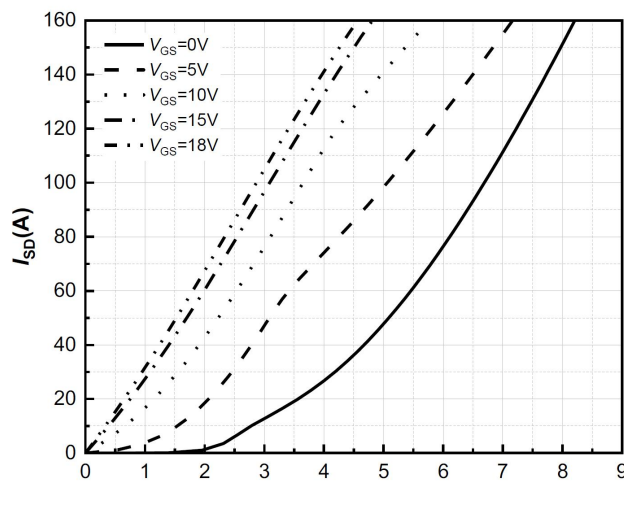
Threshold Voltage vs. Temperature



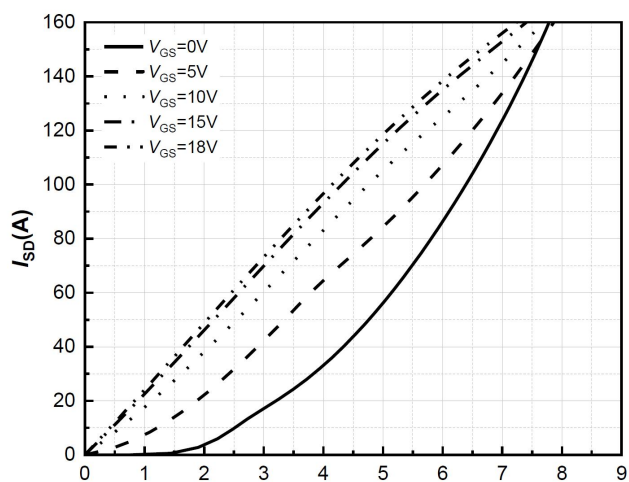
Gate Charge Characteristics



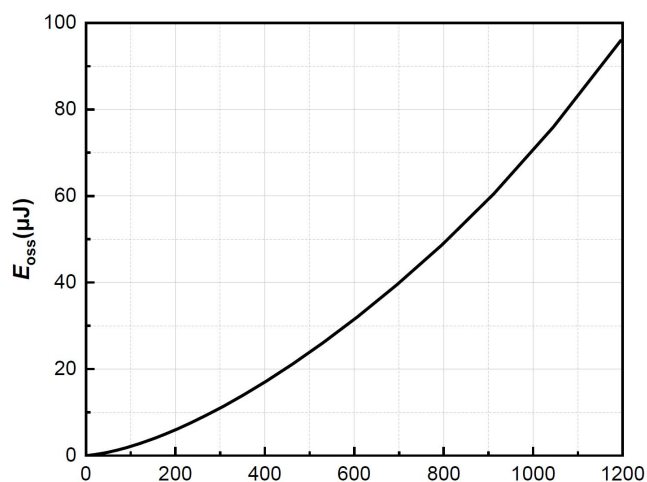
3rd Quadrant Characteristic $T_j = -40^\circ\text{C}$



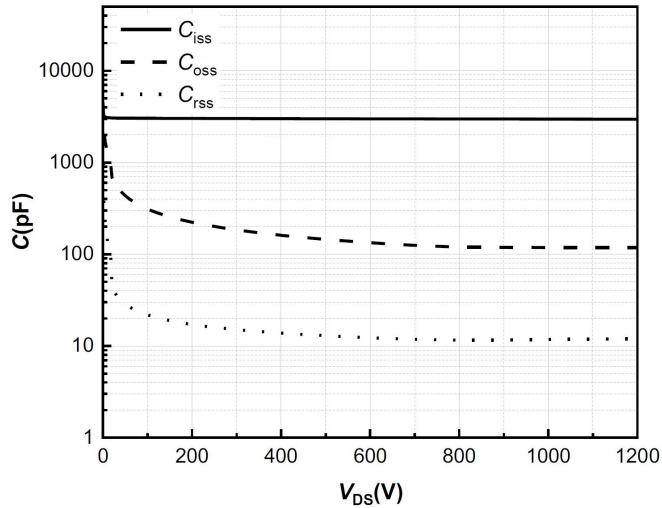
3rd Quadrant Characteristic $T_j = 25^\circ\text{C}$



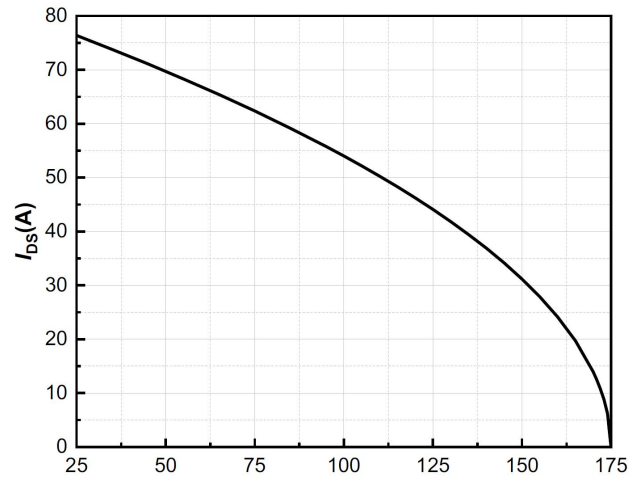
3rd Quadrant Characteristic $T_j = 175^\circ\text{C}$



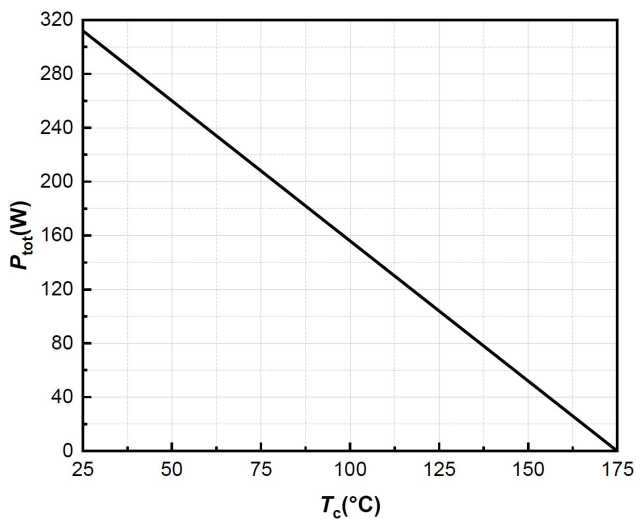
Output Capacitor Stored Energy



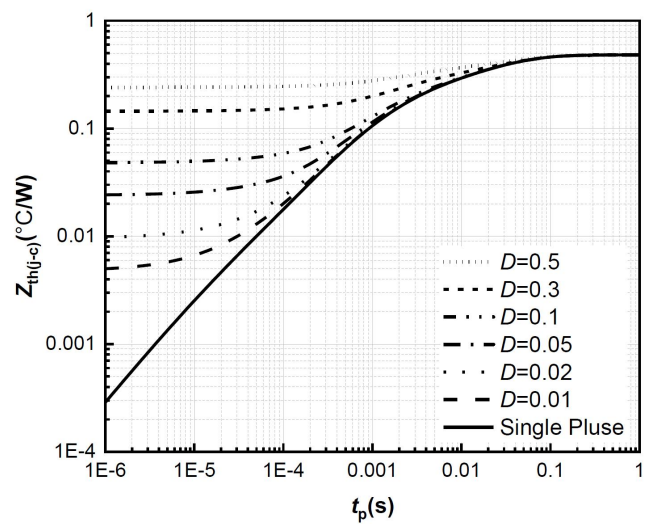
Capacitances vs. Drain-Source



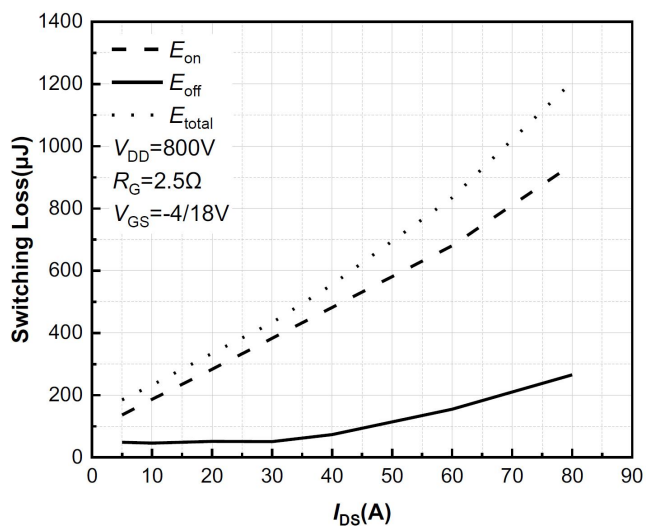
Continuous Drain Current Derating vs. Case Temperature



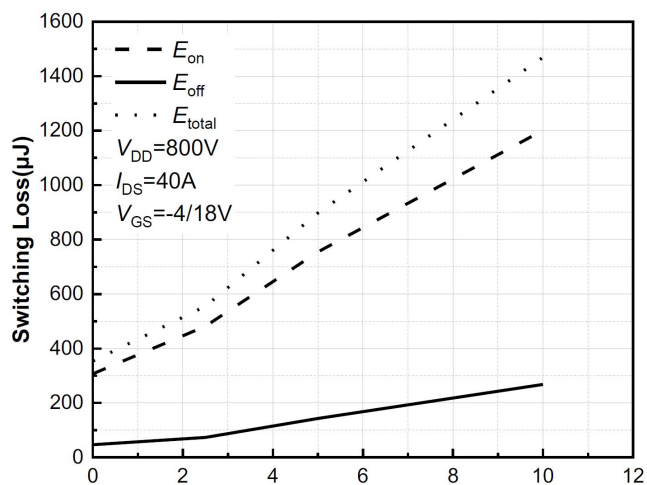
Maximum Power Dissipation Derating vs. Case Temperature



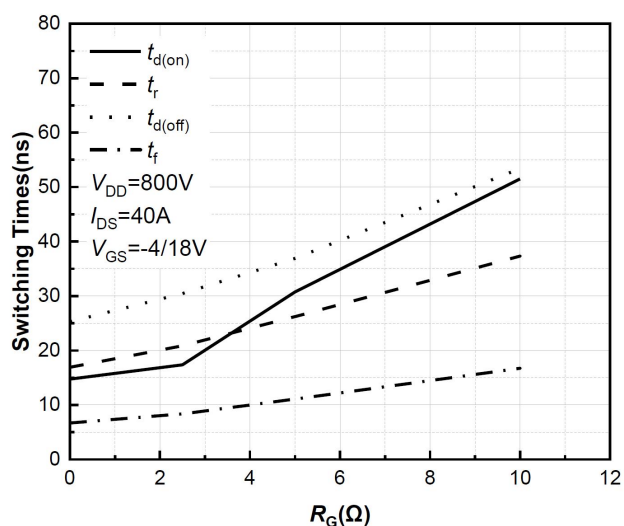
Transient Thermal Impedance



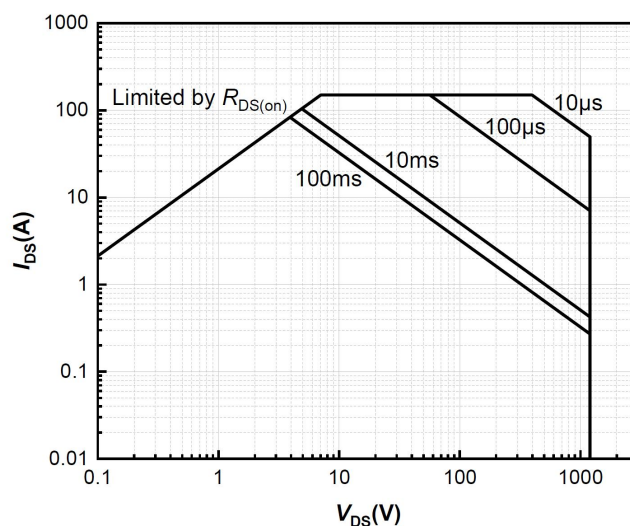
Clamped Inductive Switching Energy
vs. Drain Current



Clamped Inductive Switching Energy
vs. R_G

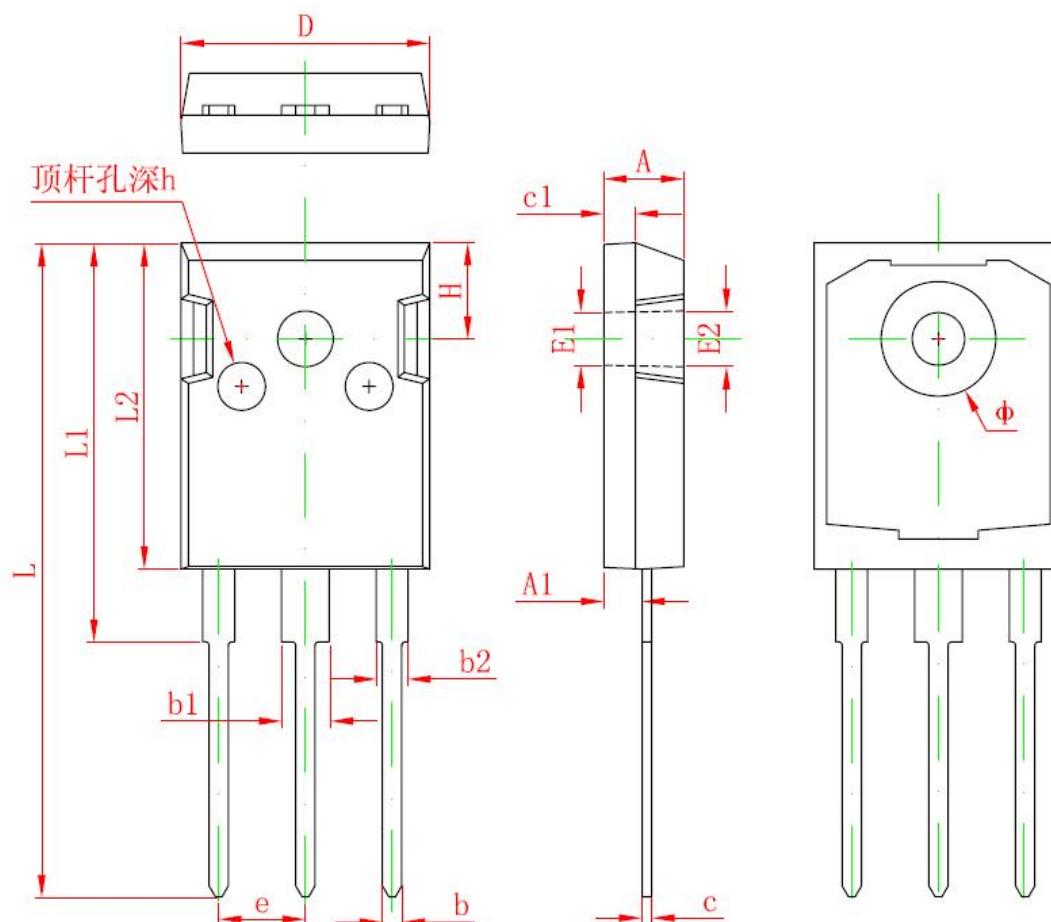


Switching Times vs. R_G



Safe Operating Area

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
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
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.	
H	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012