

1700V 500mΩ SiC MOSFET

Features:

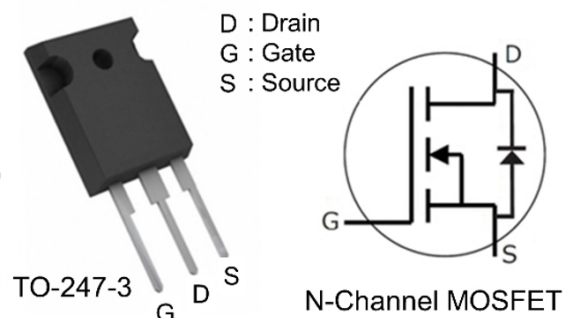
- High blocking voltage with low $R_{DS(on)}$
- High frequency operation with low capacitance
- Simple to drive and easy to parallel
- Robust body diode with low Q_{rr}
- 100% Avalanche tested

Benefits:

- Superior robustness and system reliability
- Higher system efficiency
- Easier paralleling without thermal runaway
- Capable of high temperature application
- Faster and more efficient switching

Applications:

- Auxiliary power supplies
- Energy storage and battery charging
- High voltage DC-DC converters
- Boost converter
- UPS and PFC



Key Performance and Package Parameters

Type	V_{DS}	$R_{DS(on)}$	$I_D@25^\circ C$	$I_D@100^\circ C$	Marking	Package
PC500S170ALC	1700V	500mΩ	7A	5A	PC500S170ALC	TO247-3

Absolute Maximum Ratings($T_C=25^\circ C$ unless otherwise specified)

Parameter	Symbols	Conditions	Value	Unit
Drain - source voltage	$V_{DS(max)}$	$V_{GS}=0V, I_D=100\mu A$	1700	V
Gate - source voltage(dynamic)	$V_{GS(max)}$	AC ($f>1Hz$)	-10 / +25	V
Gate – source voltage (static)	$V_{GS(op)}$	Recommended operation value	-5 / +18 to 20	V
Continuous drain current	I_D	$V_{GS}=20V, T_C=25^\circ C$ $V_{GS}=20V, T_C=100^\circ C$	7 5	A
Pulsed drain current	$I_{D(pulse)}$	$T_C=25^\circ C$	14	A
Total power dissipation	P_D	$T_C=25^\circ C, T_J=175^\circ C$	83	W
Operating junction temperature	T_J		-55 to 175	$^\circ C$
Storage temperature	T_{STG}		-55 to 175	$^\circ C$
Soldering temperature	T_L		260	$^\circ C$
Avalanche capability, single pulse*	I_{AV}	$V_{DD}=100V, V_{GS}=10V, L=2mH$	11	A
Avalanche capability, single pulse**	E_{AV}	$V_{DD}=100V, V_{GS}=10V, L=2mH$	121	mJ

*100% tested in 63% rating

**100% tested in 40% rating

Electrical Characteristics at Tc= 25°C (unless otherwise specified)

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=100\mu A$	1700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1mA$	2.0	2.8	4.0	V
		$V_{DS}=V_{GS}, I_D=1mA, T_J=150^\circ C$	-	2.0	-	
		$V_{DS}=V_{GS}, I_D=1mA, T_J=175^\circ C$	-	1.9	-	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=1700V, V_{GS}=0V$	0	0.5	60	uA
		$V_{DS}=1700V, V_{GS}=0V, T_J=175^\circ C$	-	10	-	
Gate-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	0	5	100	nA
Gate-source leakage current	I_{GSS}	$V_{GS}=-5V, V_{DS}=0V$	-100	-5	0	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=2A$	-	540	-	mΩ
		$V_{GS}=20V, I_D=2A$	-	500	700	
		$V_{GS}=18V, I_D=2A, T_J=175^\circ C$	-	1160	-	
		$V_{GS}=20V, I_D=2A, T_J=175^\circ C$	-	1120	-	
Transconductance	gfs	$V_{DS}=20V, I_D=2A$	-	1.26	-	S
		$V_{DS}=20V, I_D=2A, T_J=175^\circ C$	-	1.29	-	
Input capacitance	C_{iss}	$V_{DS}=1200V, V_{GS}=0V$ $f=1MHz, V_{AC}=25mV$	-	215	-	pF
Output capacitance	C_{oss}		-	12	-	
Reverse transfer capacitance	C_{rss}		-	1.7	-	
Coss stored energy	E_{oss}		-	9.6	-	
Turn-on switching energy	E_{on}	$V_{DS}=1200V, V_{GS}=-5/20V$ $I_D=2A, R_{G(ext)}=2\Omega, L=1000\mu H$	-	95	-	μJ
Turn-off switching energy	E_{off}		-	38	-	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=1200V, V_{GS}=-5V/20V$ $I_D=2A, R_{G(ext)}=2\Omega, L=1000\mu H$	-	4.5	-	ns
Rise time	t_r		-	13	-	
Turn-off delaytime	$t_{d(off)}$		-	22.5	-	
Fall time	t_f		-	62	-	
Total gate charge	Q_g	$V_{DS}=1200V, V_{GS}=-5V/20V$ $I_D=2A$	-	18	-	nC
Gate-source charge	Q_{gs}		-	2.8	-	
Gate-drain charge	Q_{gd}		-	9.9	-	
Internal gate input resistance	$R_{g(int)}$	$f=1MHz, I_D=0A, V_{AC}=25mV$	-	5.8	-	Ω

Reverse Diode Characteristics at Tc= 25°C (unless otherwise specified)

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Diode forward voltage	V_{SD}	$V_{GS}=-5V, I_{SD}=1A, T_J=25^\circ C$	-	3.9	-	V
		$V_{GS}=-5V, I_{SD}=1A, T_J=175^\circ C$	-	3.4	-	
Continuous diode forward current	I_S	$V_{GS}=-5V, T_J=25^\circ C$	-	-	9	A
Reverse recovery time	t_{rr}	$V_{GS}=-5V, I_{SD}=2A$	-	4.9	-	ns
Reverse recovery charge	Q_{rr}	$V_R=1200V, T_J=25^\circ C$	-	28	-	nC
Peak reverse recovery current	I_{rrm}	$diff/dt=3250A/us$	-	10	-	A

Thermal Characteristics

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Thermal resistance	$R_{th(j-c)}$	Junction to case	-	1.4	1.8	°C/W

Typical Characteristics

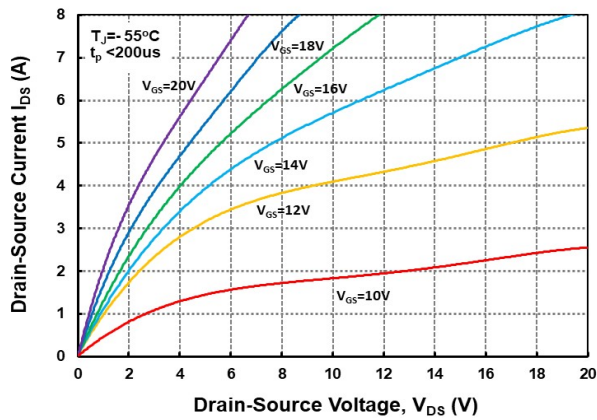


Figure 1: Output Characteristics, $T_J = -55^\circ\text{C}$

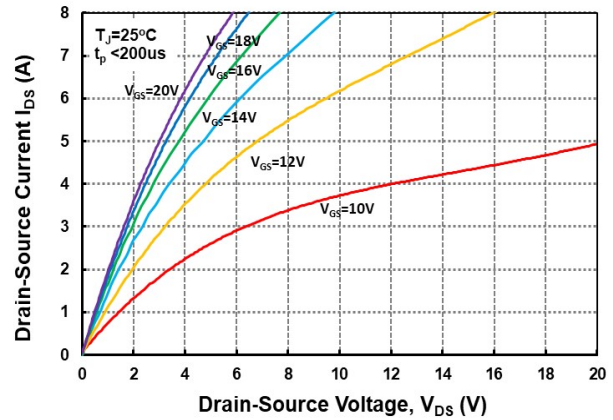


Figure 2: Output Characteristics, $T_J = 25^\circ\text{C}$

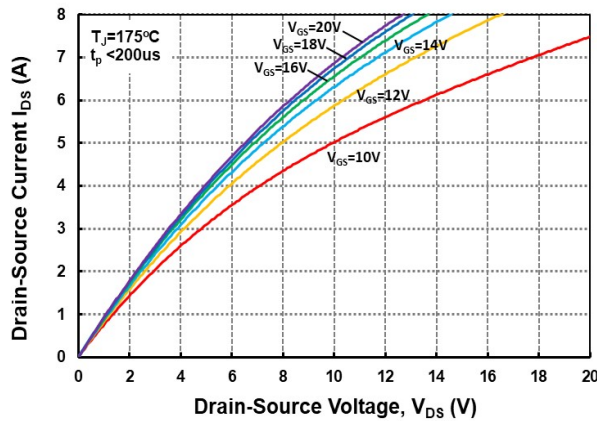


Figure 3: Output Characteristics, $T_J = 175^\circ\text{C}$

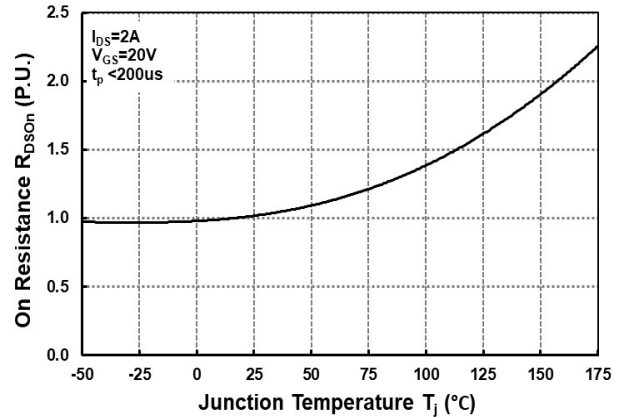


Figure 4: Normalized On-Resistance vs. Temperature

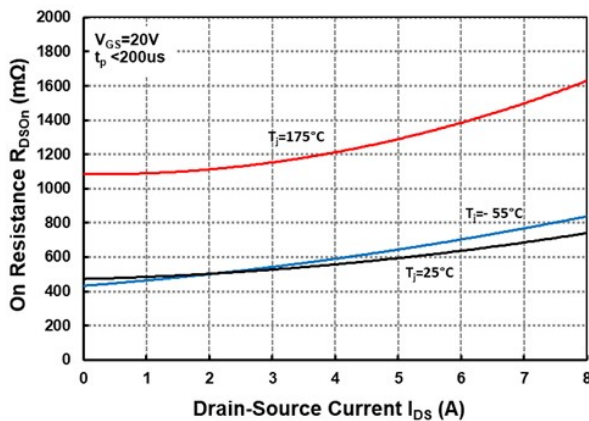


Figure 5: On-Resistance vs. Drain Current for Various Temperatures

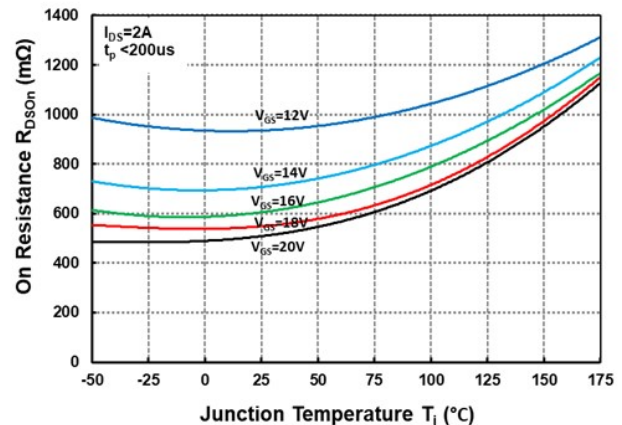


Figure 6: On-Resistance vs. Temperature for Various Gate Voltage

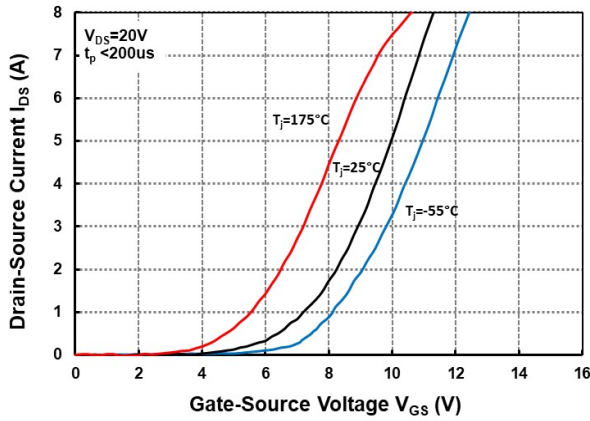


Figure 7: Transfer Characteristic for Various Junction Temperatures

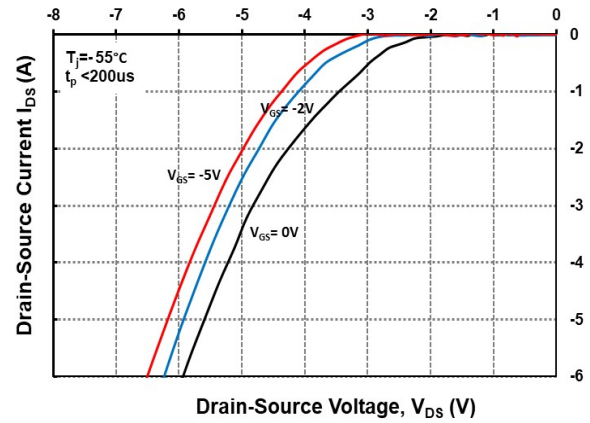


Figure 8: Body Diode Characteristics @ -55°C

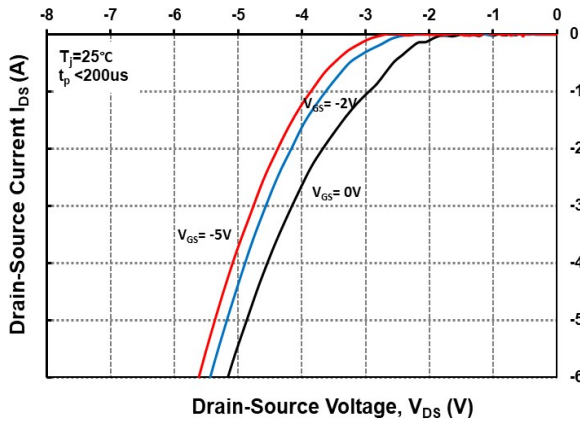


Figure 9: Body Diode Characteristics @ 25°C

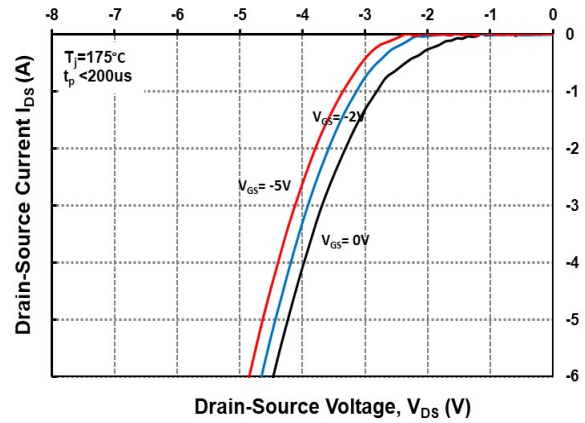


Figure 10: Body Diode Characteristics @ 175°C

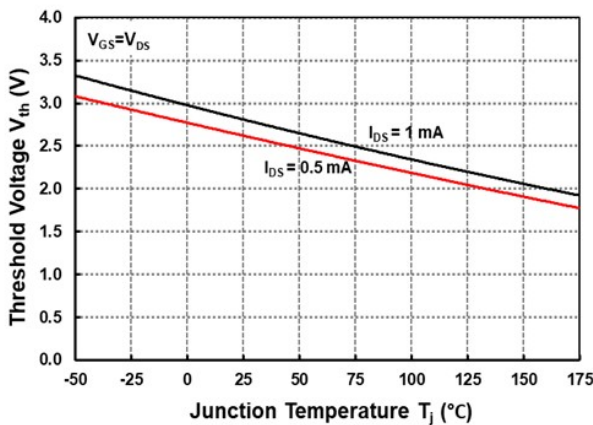


Figure 11: Threshold Voltage vs. Temperature

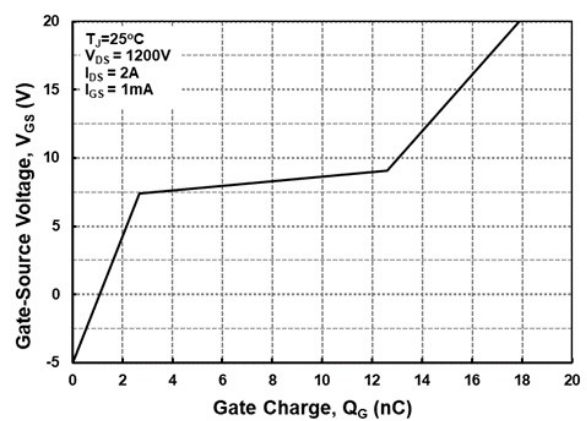


Figure 12: Gate Charge Characteristics

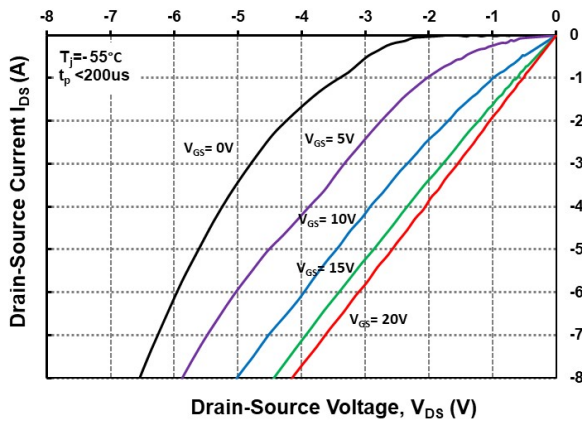


Figure 13: 3rd Quadrant Characteristics @ -55°C

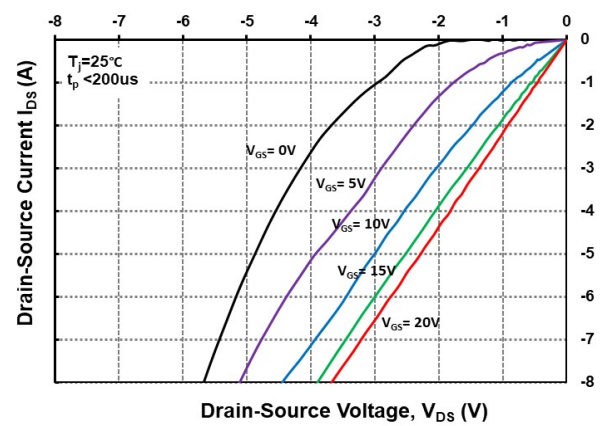


Figure 14: 3rd Quadrant Characteristics @ 25°C

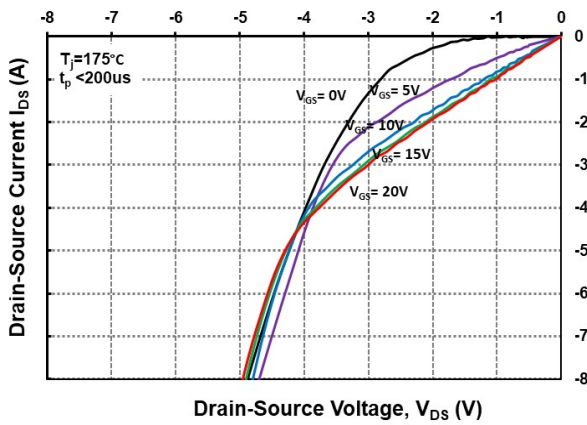


Figure 15: 3rd Quadrant Characteristics @ 175°C

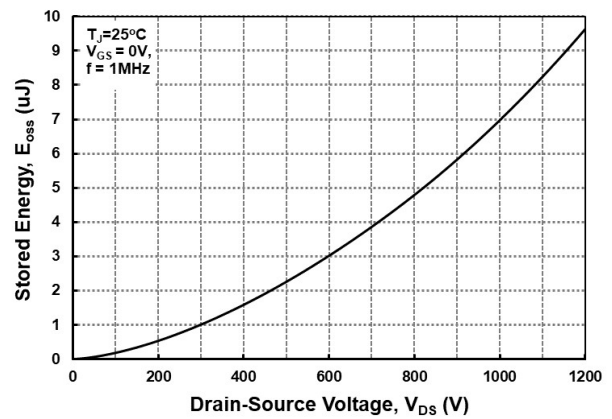


Figure 16: Output Capacitor Stored Energy

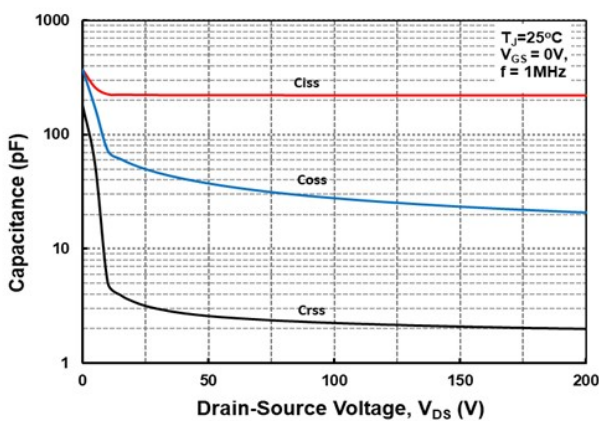


Figure 17: Capacitances vs. Drain-Source Voltage (0-200V)

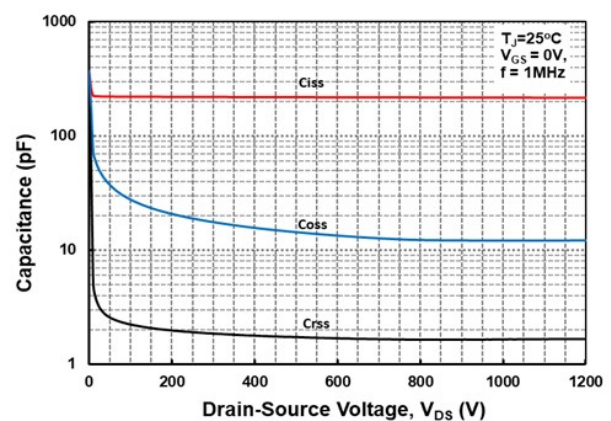


Figure 18: Capacitances vs. Drain-Source Voltage (0-1200V)

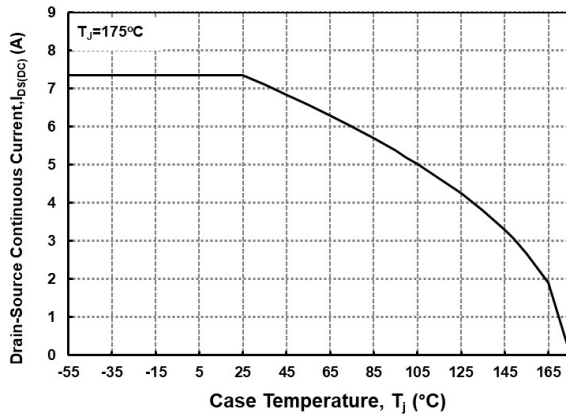


Figure 19: Continuous Drain Current Derating vs. Case Temperature

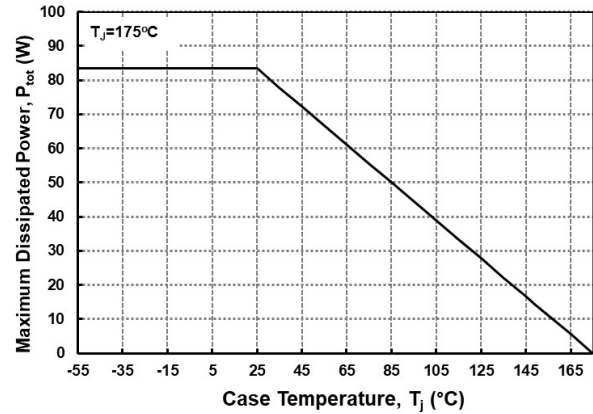


Figure 20: Maximum Power Dissipation Derating vs. Case Temperature

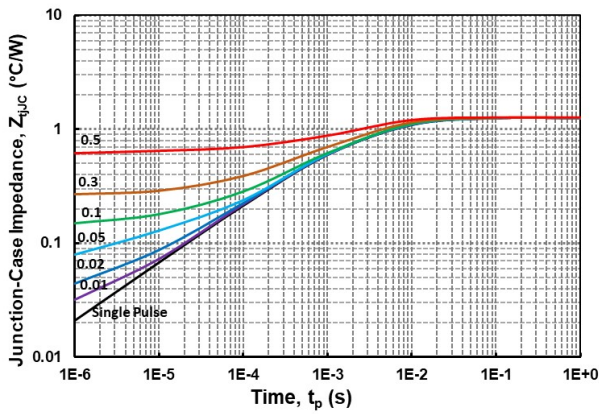


Figure 21: Transient Thermal Impedance (Junction – Case)

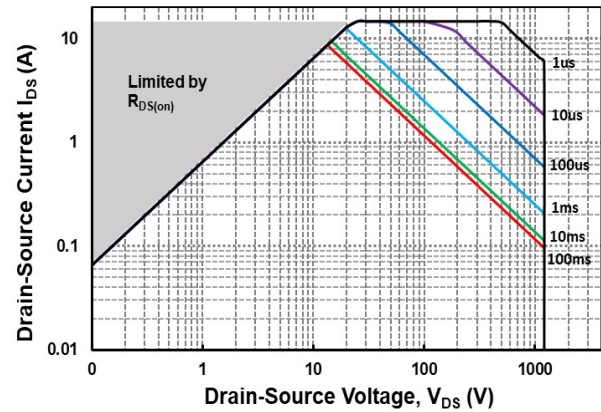


Figure 22: Safe Operating Area

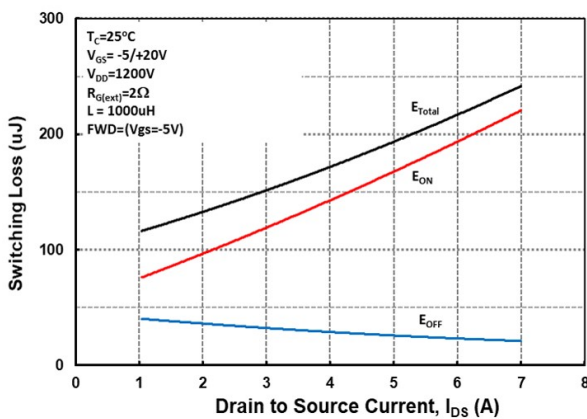


Figure 23: Clamped Inductive Switching Energy vs Drain Current (V_{DD}= 1200V)

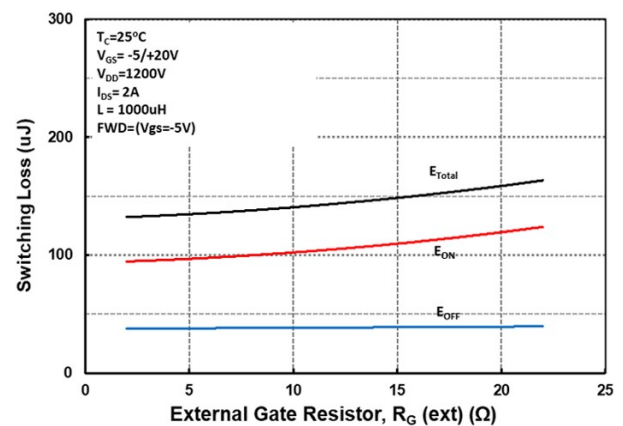


Figure 24: Clamped Inductive Switching Energy vs External Gate Resistor R_{G(ext)}

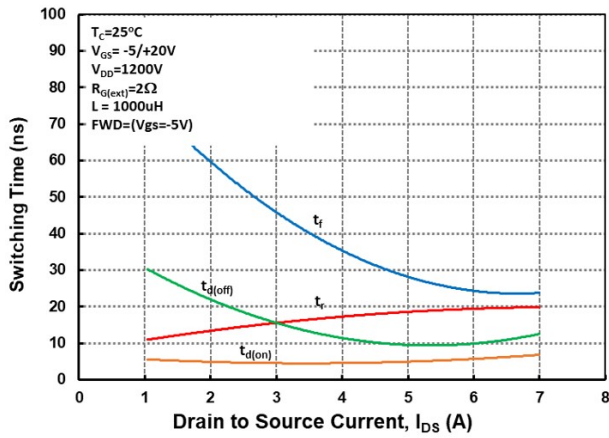


Figure 25: Switching Times vs Drain Current($V_{DD}=1200\text{V}$)

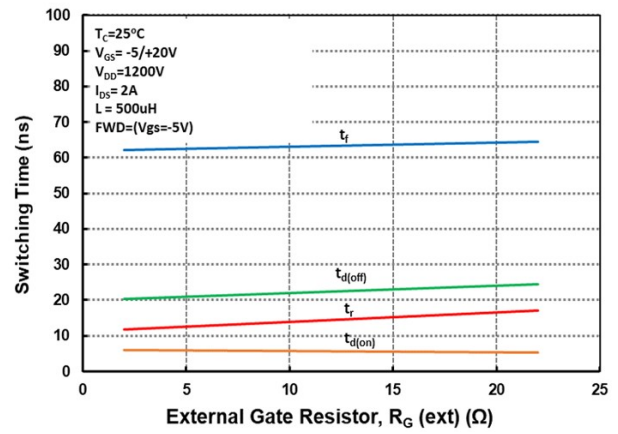
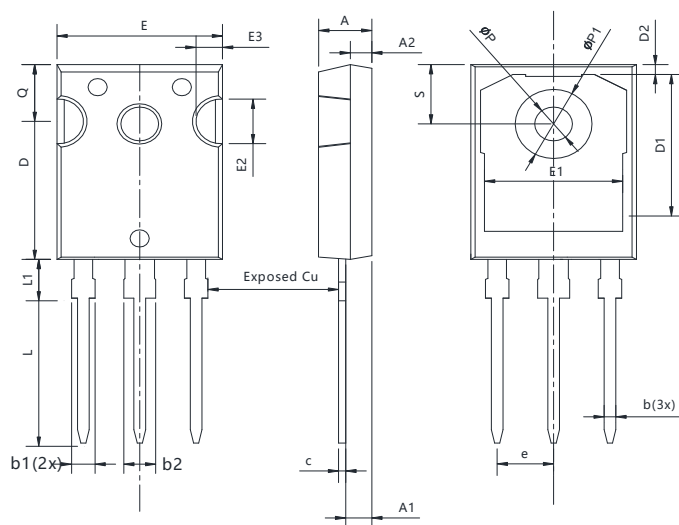


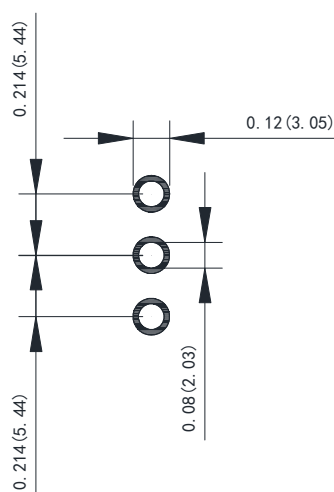
Figure 26: Switching Times vs External Gate Resistor $R_{G(ext)}$

Package Dimensions

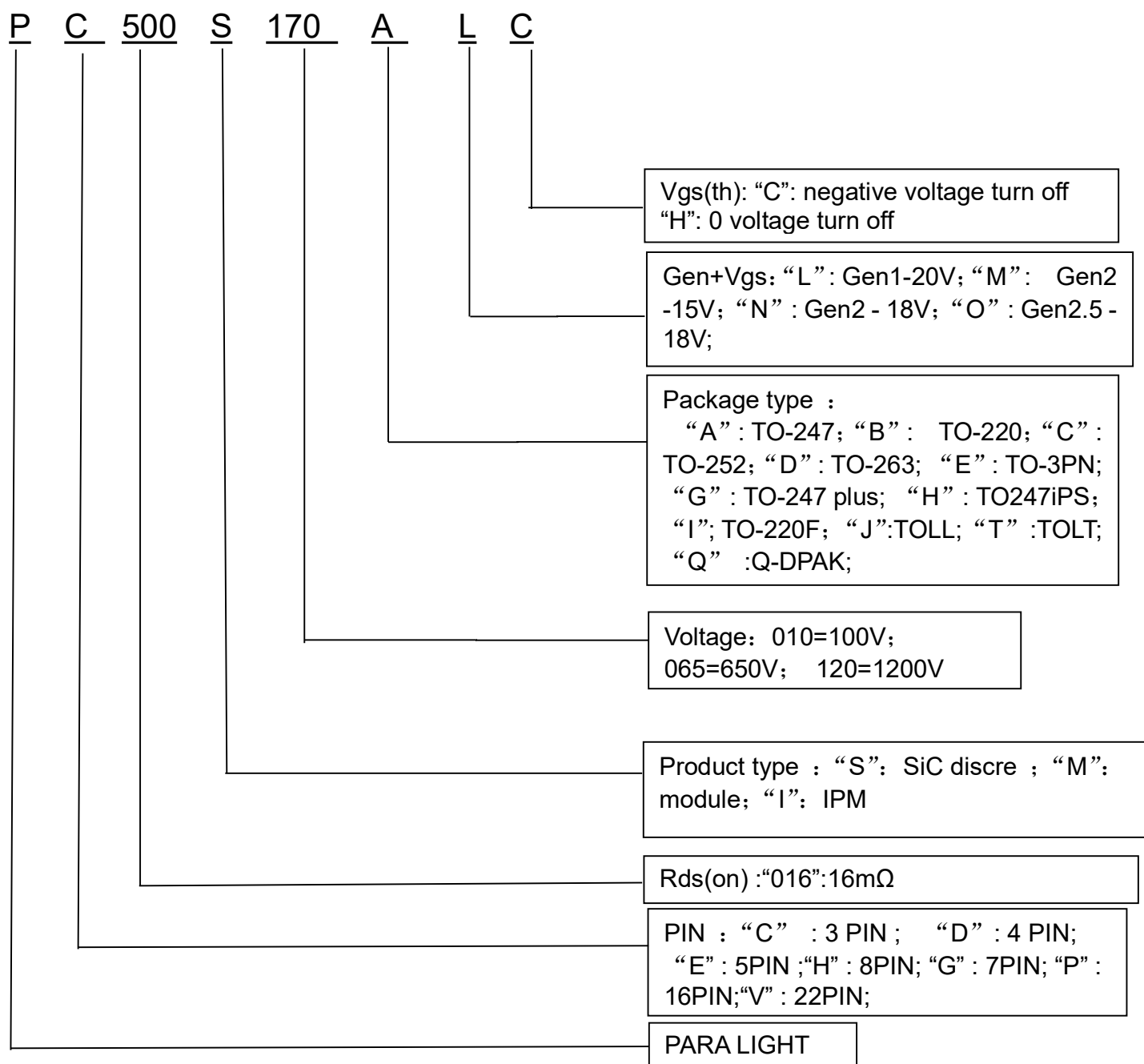


Common dimensions(mm)							
Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	4.82	5.02	5.22	E1	13.01	13.26	13.51
A1	2.21	2.41	2.61	E2	4.71	4.91	5.11
A2	1.8	2.0	2.2	E3	2.26	2.46	2.66
b	0.95	1.2	1.45	e	5.44BSC		
b1	1.95	2.2	2.45	L	19.82	20.07	20.32
b2	2.95	3.2	3.45	L1	3.94	4.19	4.44
c	0.35	0.6	0.85	P	3.41	3.61	3.81
D	20.75	20.95	21.15	P1	6.94	7.19	7.44
D1	16.3	16.55	16.8	Q	5.59	5.79	5.99
D2	0.99	1.19	1.39	S	5.97	6.17	6.37
E	15.74	15.94	16.14				

Recommended Solder Pad Layout



PART NO. SYSTEM :



Revision history

Document revision history

Date	Version	Changes
2026.01.05	A / 0	First release.