AC3M0050330K

Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

Features

1) Low reverse recovery
2) Easy to parallel and simple to drive
3) Low on-resistance with high blocking voltage
4) Low capacitance with high-speed switching

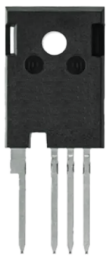
Parameter	Rating	Units
V_{DS}	**3300**	V
$I_{D\ @\ 25°C}$	**60**	A
$R_{DS(on)}$	**45**	mΩ

Benefits

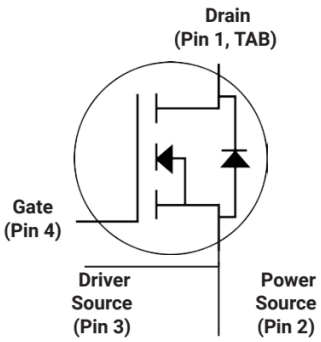
- Higher system efficiency
- Reduced switching loss
- Increased power density
- High-reliability

Applications

- Switch mode power supplies
- DC/DC converters
- Battery chargers
- Motor drivers
- Pulsed power applications



TO-247-4 Package



Part Number	Package	Marking
AC3M0050330K	TO-247-4	AC3M0050330

Maximum Ratings (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSS}	Drain-Source Voltage	3300	V	VGS = 0V, ID = 100μA
V_{GS} max	Gate-Source Voltage	-8/+22	V	AC (f > 1Hz)
V_{GS} op	Gate-Source Voltage	-4/+18	V	Recommended operational values
I_D	Continuous Drain Current	60	A	VGS = 18V, TC = 25°C
		44	A	VGS = 18V, TC = 100°C
$I_{D(pulse)}$	Pulsed Drain Current	236	A	tp limited by Tjmax
P_D	Power Dissipation	500	W	TC = 25°C, TJ = 175°C
T_J	Operating Junction Temperature	-55 ~ +175	°C	
T_{STG}	Storage Temperature	-55 ~ +175	°C	

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Thermal Characteristics

Symbol	Parameter	Value	Unit	Test Conditions
$R_{th(j-c)}$	Thermal Resistance, Junction to Case	0.3	°C/W	

Static Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{DSS}	Drain-Source Breakdown Voltage	3300			V	VGS = 0V, ID = 100μA
$V_{GS(th)}$	Gate Threshold Voltage		3.2	4.0	V	VDS = VGS, ID = 10mA
			2.4		V	VDS = VGS, ID = 10mA, TJ = 175°C
$R_{DS(on)}$	Drain-Source On-Resistance		45	55	mΩ	VGS = 18V, ID = 40A
			140		mΩ	VGS = 18V, ID = 40A, TJ = 175°C
g_{fs}	Transconductance		19.1		S	VDS = 10V, ID = 40A
			14.2		S	VDS = 10V, ID = 40A, TJ = 175°C
I_{DSS}	Drain-Source Leakage Current		1	10	μA	VGS = 0V, VDS = 3300V
I_{GSS}	Gate-Source Leakage Current		1	100	nA	VGS = 15V, VDS = 0V

Dynamic Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance		5028		pF	VGS = 0V, VDS = 1000V, f = 100kHz
C_{oss}	Output Capacitance		116		pF	
C_{rss}	Reverse Transfer Capacitance		5.0		pF	
E_{oss}	Output Capacitor Stored Energy		76		μJ	
Q_g	Total Gate Charge		212		nC	VGS = -5/+20V, VDS = 1000V, ID = 40A
Q_{gs}	Gate-Source Charge		73		nC	
Q_{gd}	Gate-Drain Charge		58		nC	
$R_{G(int)}$	Gate Resistance		1.2		Ω	VAC = 25mV, f = 1MHz

Switching Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-On Delay Time		37		ns	VGS = -5V/+20V, VDD = 1700V, ID = 50A, RG(ext) = 3Ω, L = 60μH
t_r	Rise Time		27		ns	
$t_{d(off)}$	Turn-Off Delay Time		51		ns	
t_f	Fall Time		9.6		ns	
E_{on}	Turn-On Switching Energy		737		μJ	
E_{off}	Turn-Off Switching Energy		288		μJ	

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage		3.9		V	VGS = -5V, ISD = 20A
			3.3		V	VGS = -5V, ISD = 20A, TJ = 175°C
I_S	Continuous Diode Forward Current			43	A	VGS = -5V
I_{SM}	Diode Pulse Current			300	A	VGS = -5V, tp limited by Tjmax
t_{rr}	Reverse Recovery Time		17.8		ns	VGS = -5V, ISD = 50A, VR = 3300V
Q_{rr}	Reverse Recovery Charge		290		nC	
I_{rrm}	Peak Reverse Recovery Current		28		A	

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Typical Characteristics

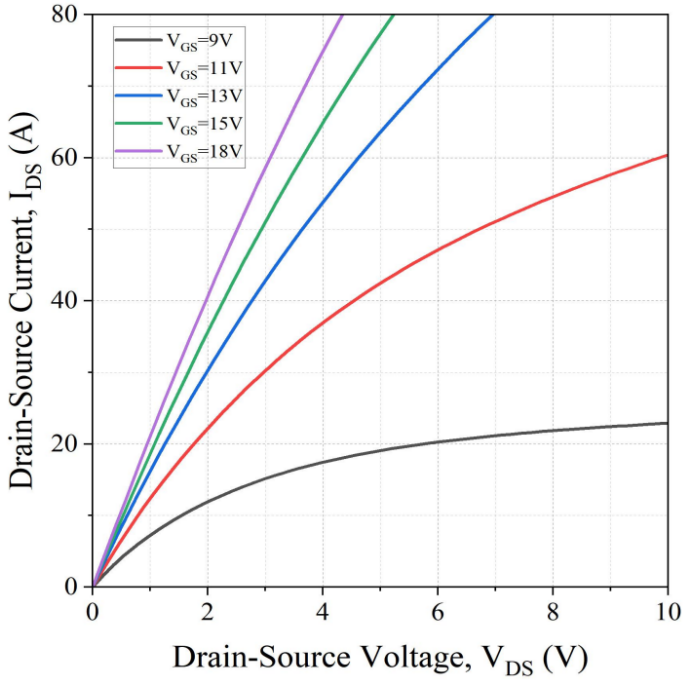


Fig 1. Output Characteristics at Tj= 25°C

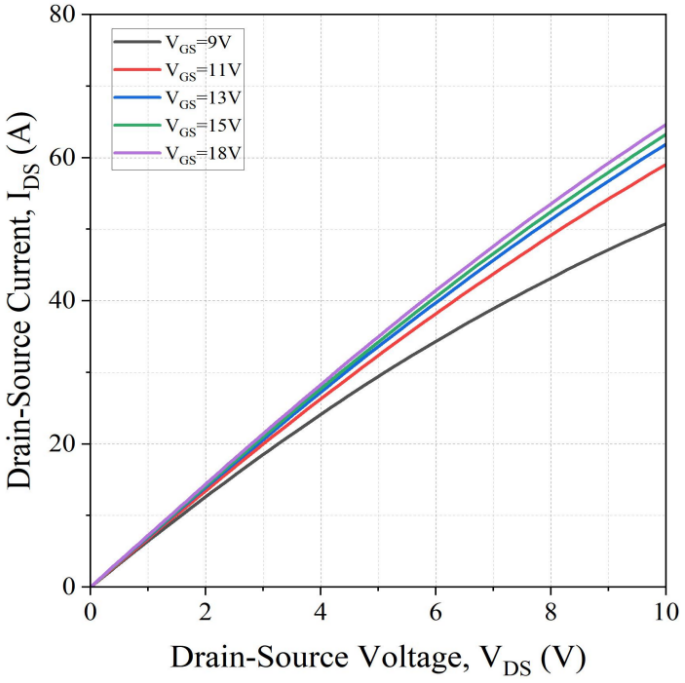


Fig 2. Output Characteristics at Tj= 175°C

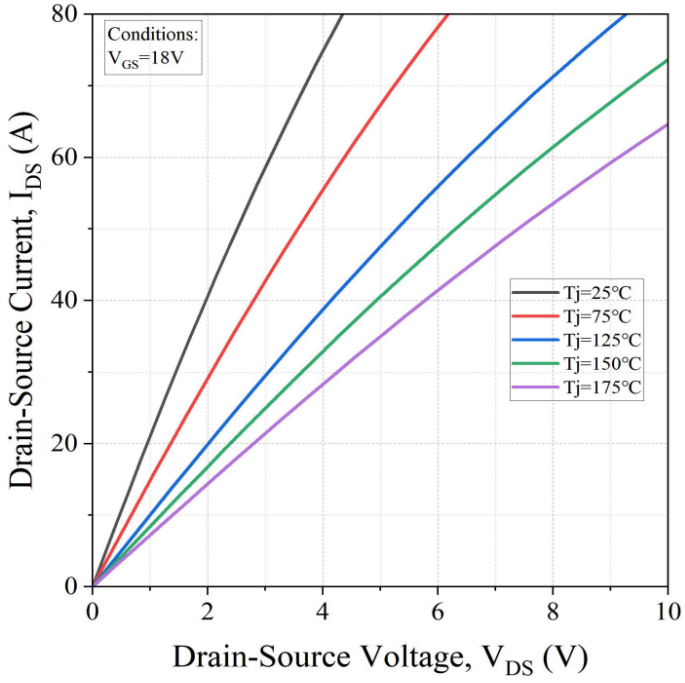


Fig 3. Output Characteristics vs. Temperature

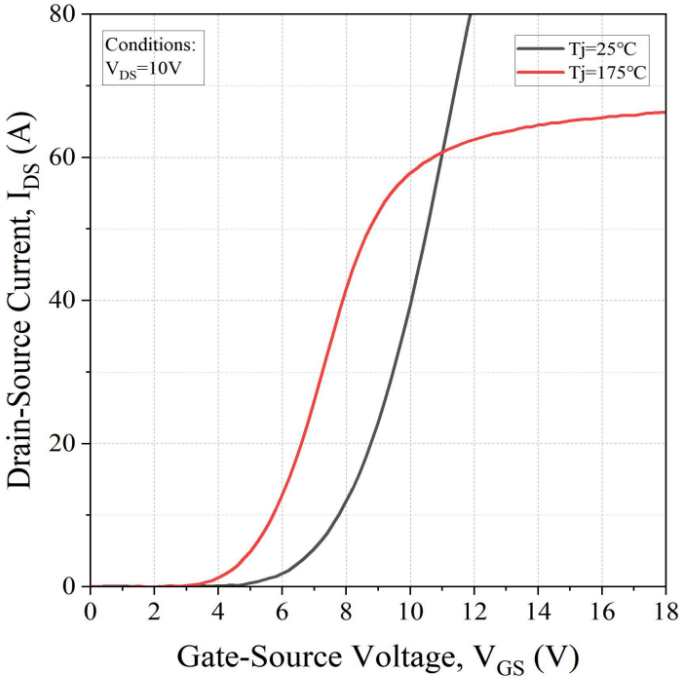


Fig 4. Transfer Characteristics vs. Temperature

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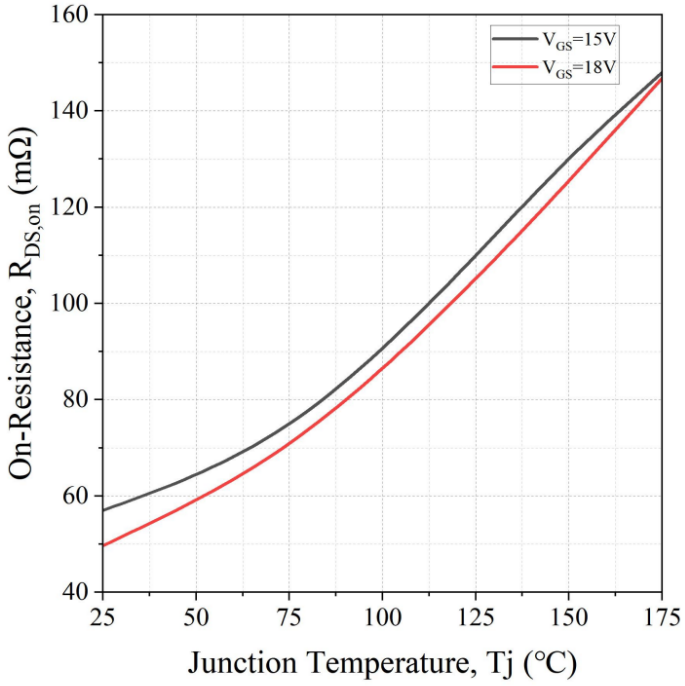


Fig 5. On-Resistance vs. Temperature

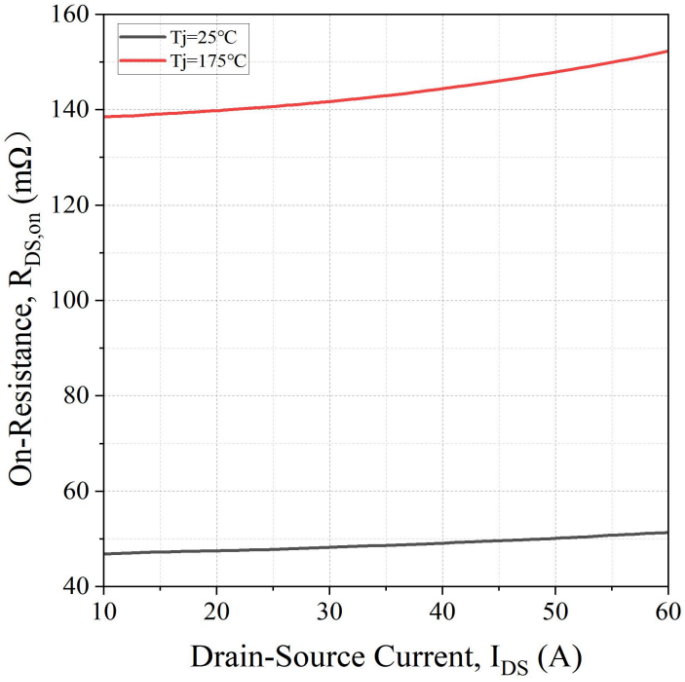


Fig 6. On-Resistance vs. Drain current

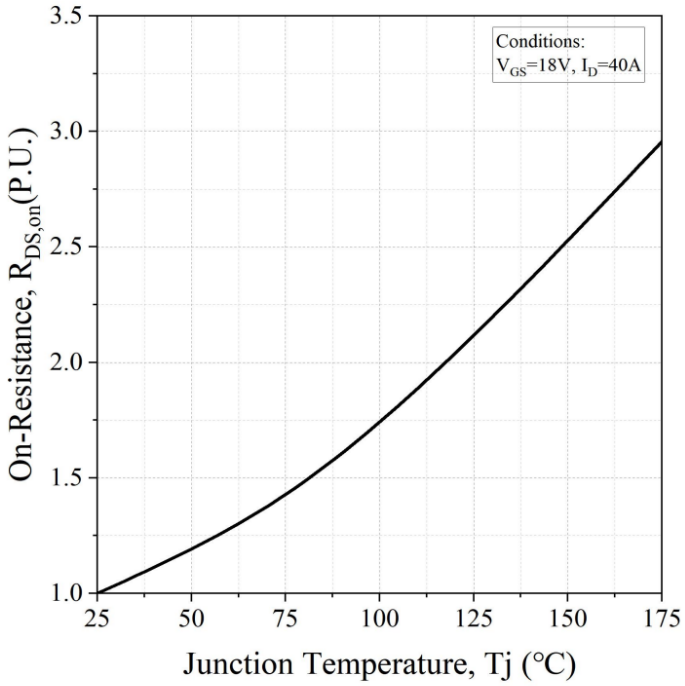


Fig 7. Normalized On-Resistance vs. Temperature

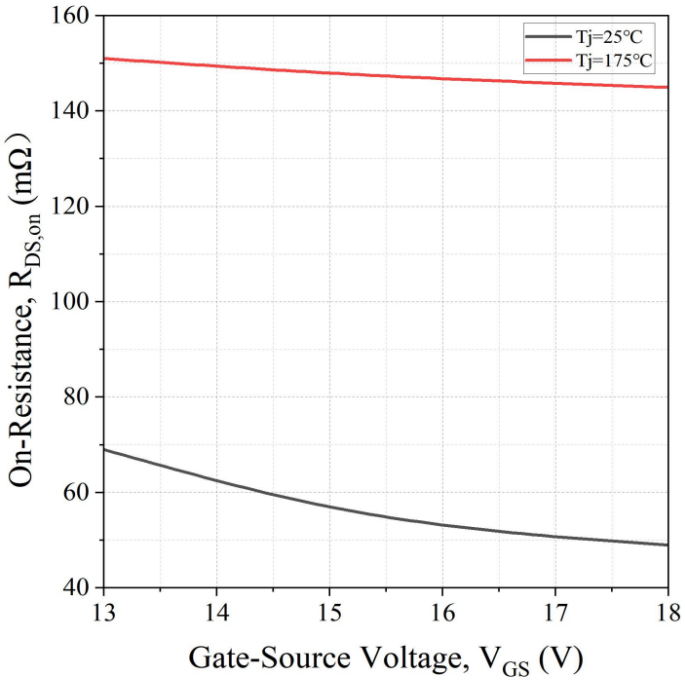


Fig 8. On-Resistance vs. Gate Voltage

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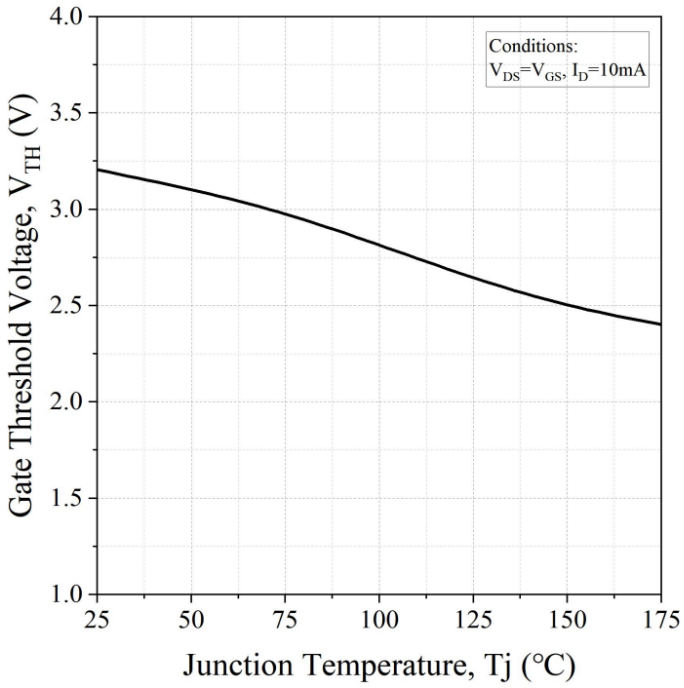


Fig 9. Threshold Voltage vs. Temperature

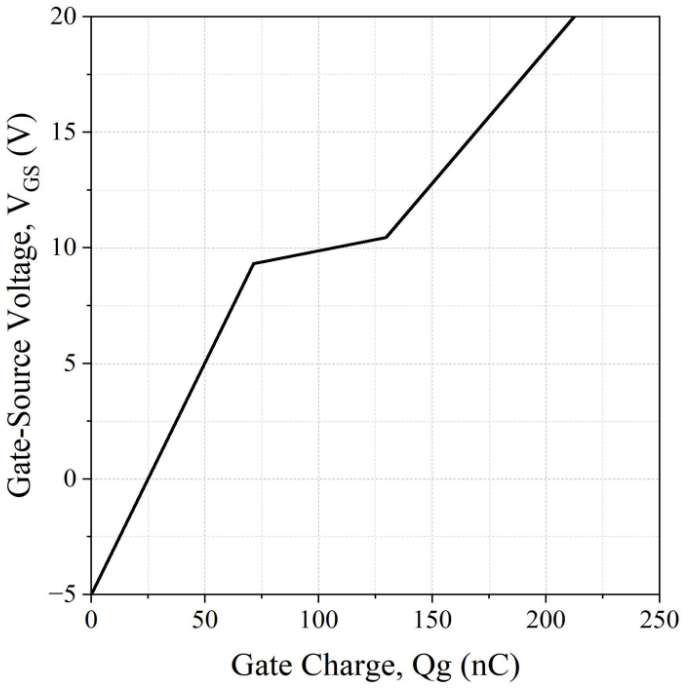


Fig 10. Gate Charge Characteristics

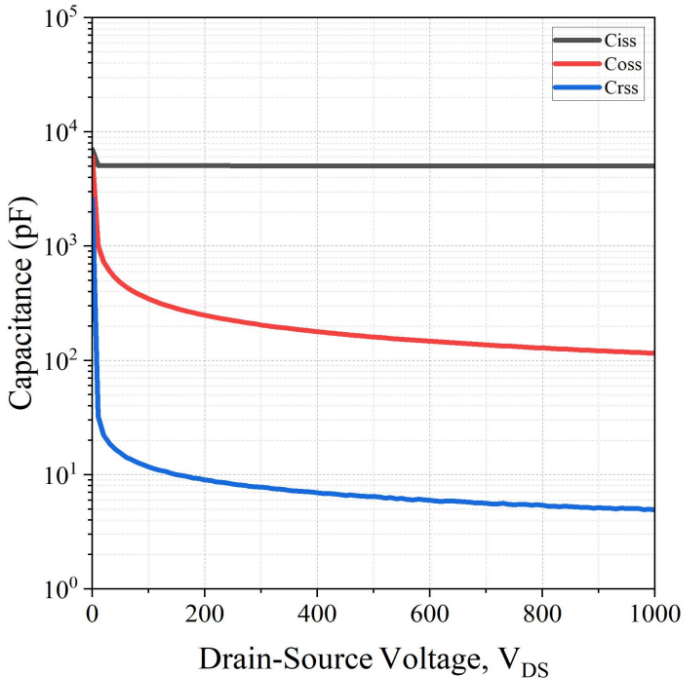


Fig 11. Capacitances vs. Drain-Source

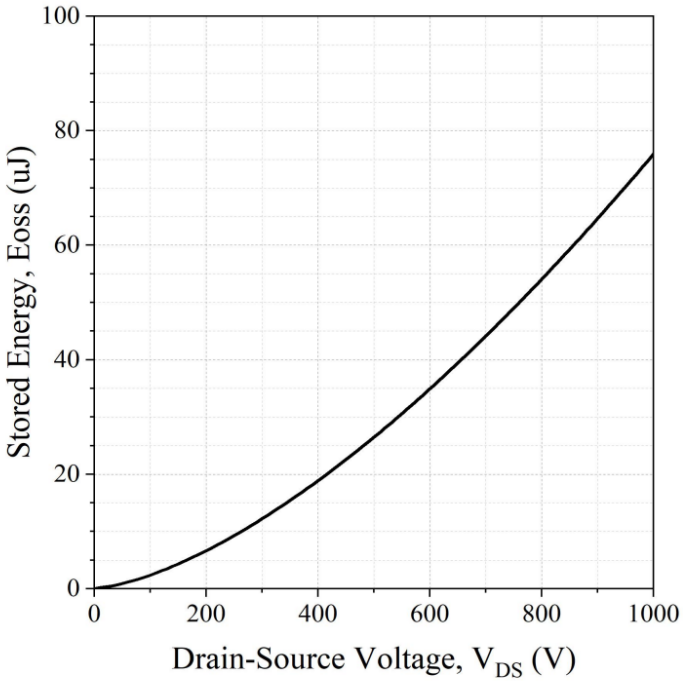


Fig 12. Output Capacitor Stored Energy

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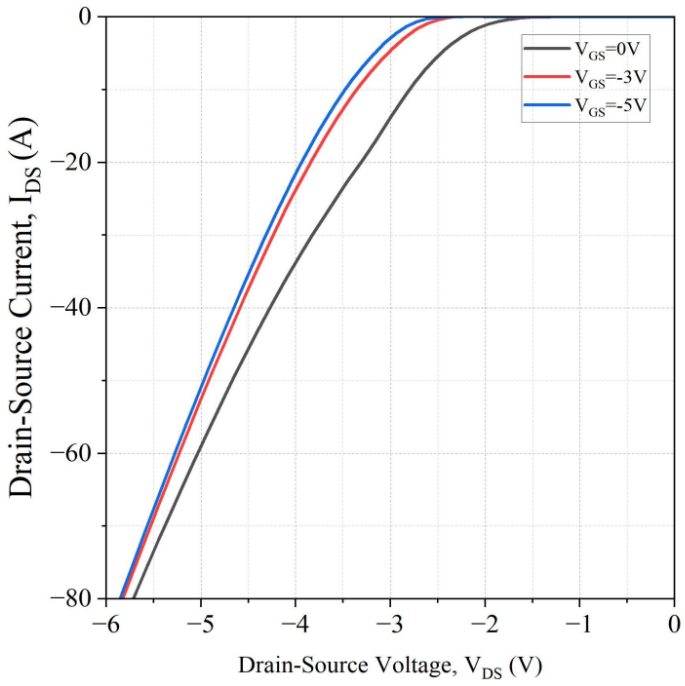


Fig 13. Body Diode Characteristics at Tj= 25°C

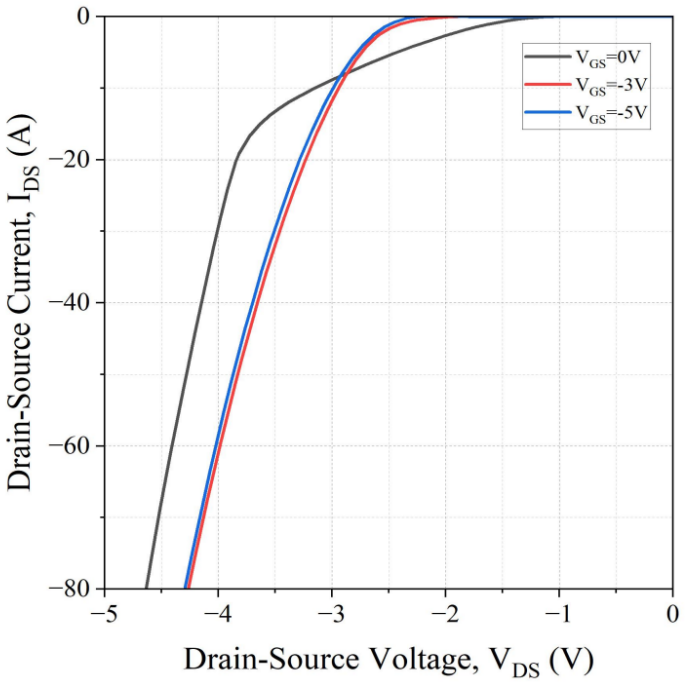


Fig 14. Body Diode Characteristics at Tj= 175°C

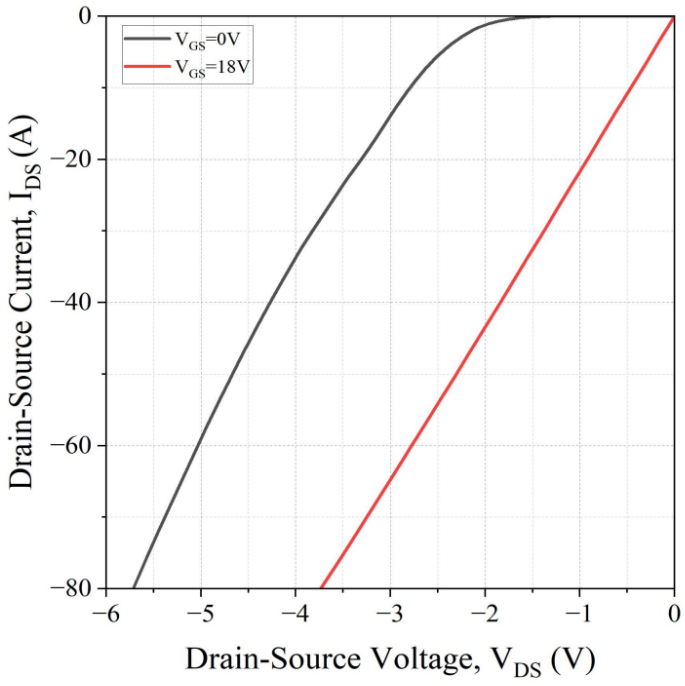


Fig 15. 3rd Quadrant Characteristic at Tj= 25°C

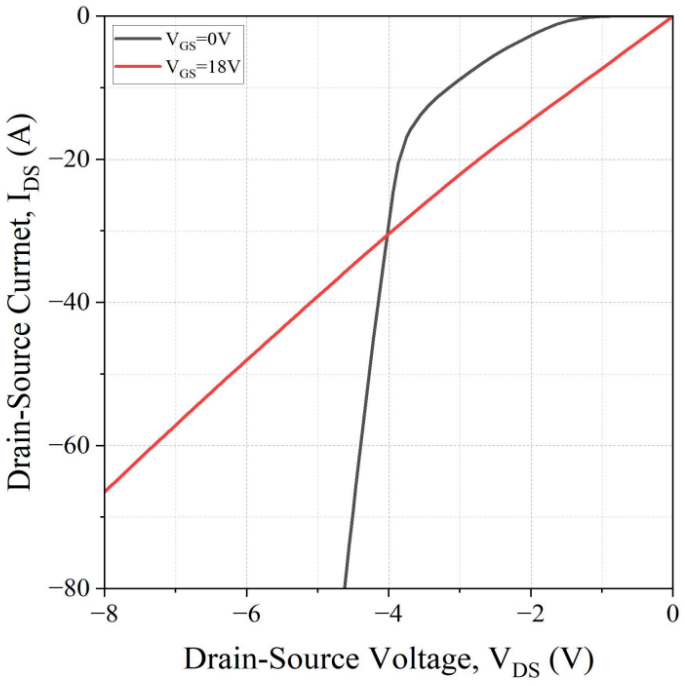


Fig 16. 3rd Quadrant Characteristic at Tj= 175°C

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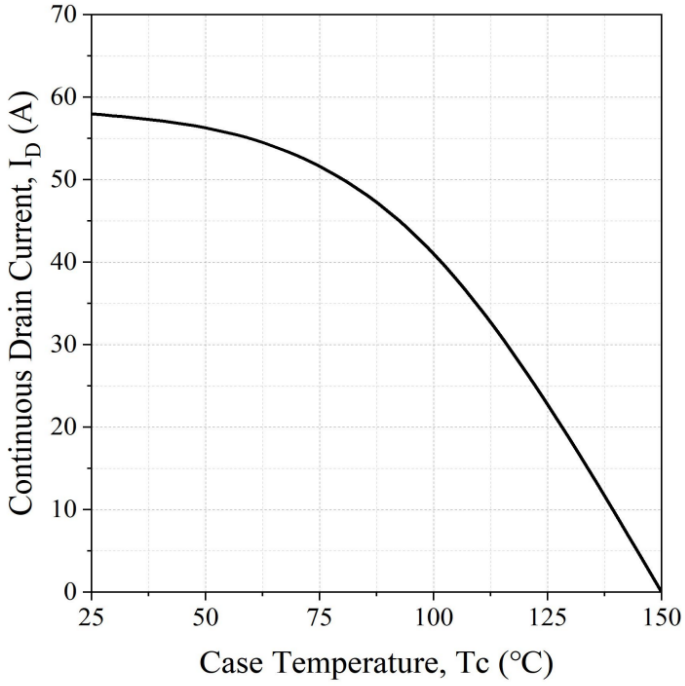


Fig 17. Current De-rating

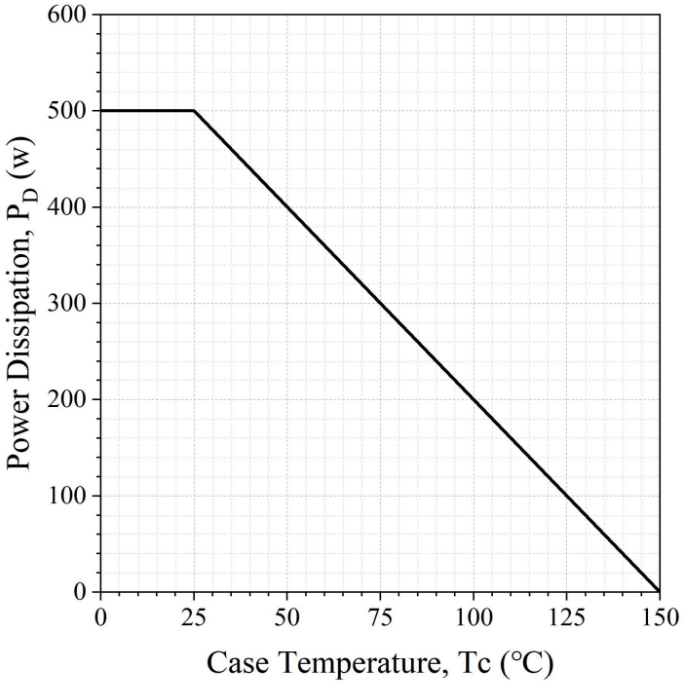


Fig 18. Power Dissipation De-rating

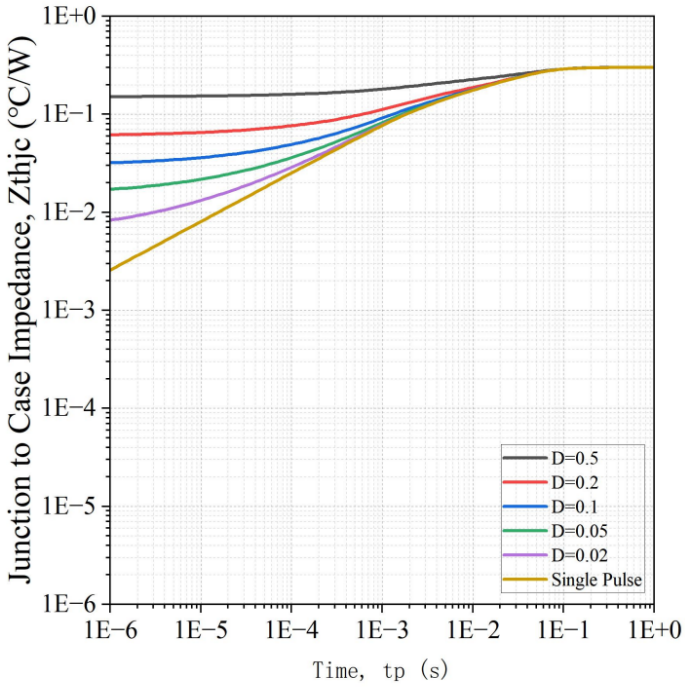


Fig 19. Transient Thermal Impedance

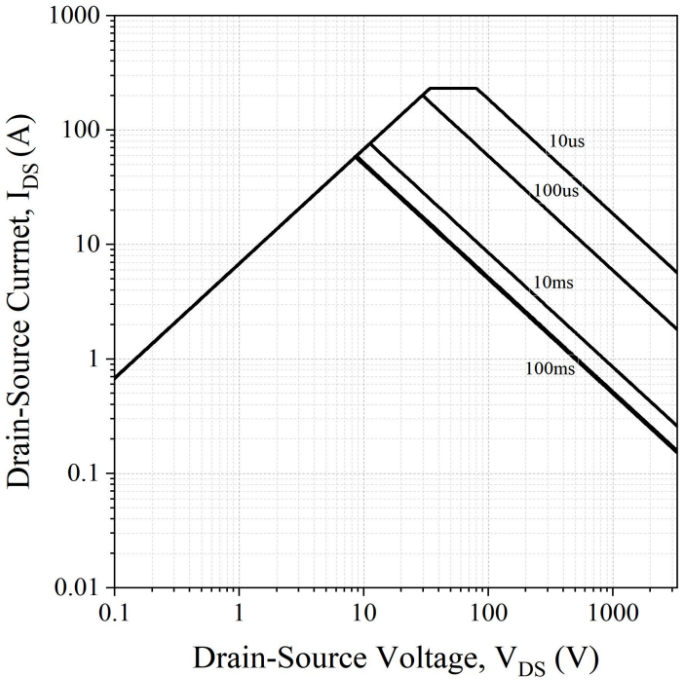
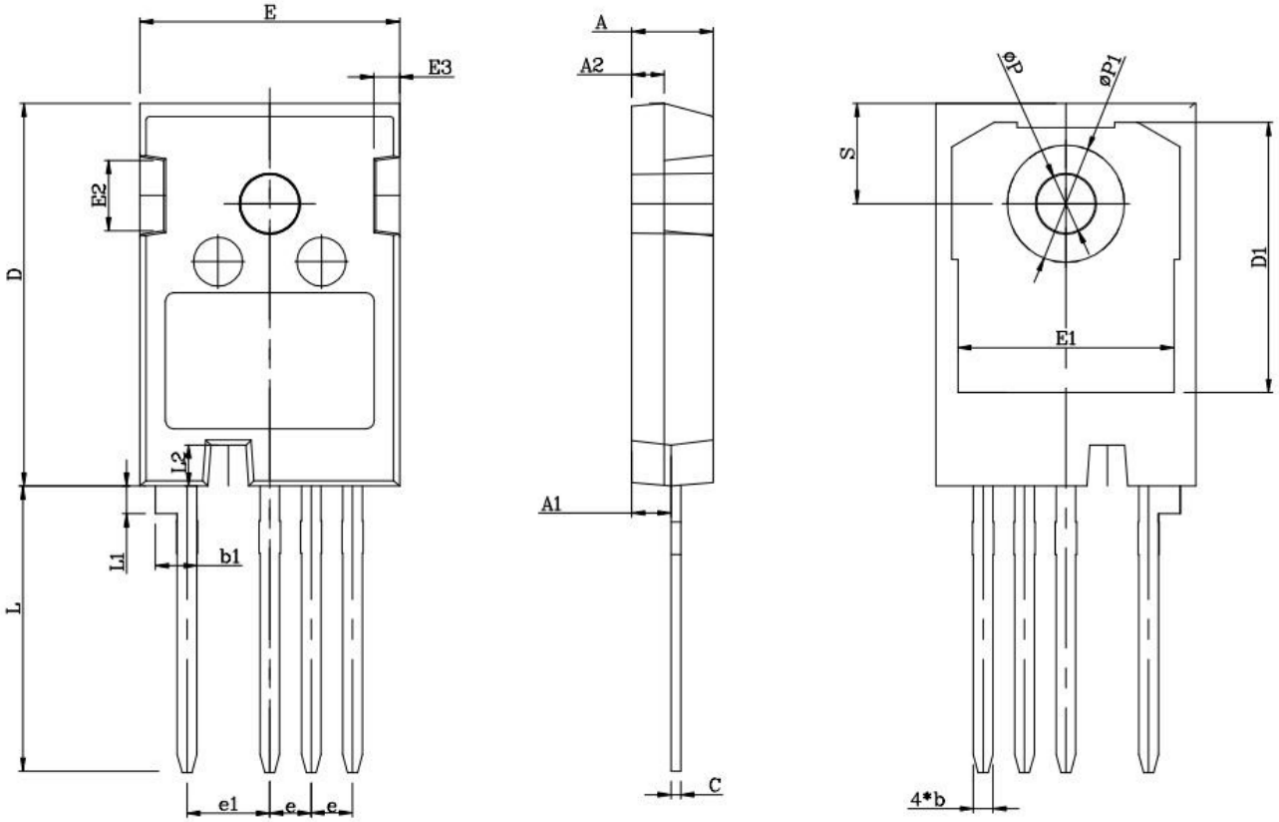


Fig 20. Safe Operating Area

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Package Dimensions: TO-247-4



SYMBOL	mm			SYMBOL	mm		
	Min	Nom	Max		Min	Nom	Max
A	4.80	5.00	5.20	E2	4.00	4.30	4.60
A1	2.23	2.41	2.59	E3	1.15	1.45	1.75
A2	1.85	2.00	2.15	e	2.54BSC		
b	1.11	1.21	1.36	e1	5.08BSC		
b1	2.35	2.55	2.75	L	17.31	17.47	17.82
c	0.51	0.61	0.75	L1	1.50	1.70	1.90
D	23.30	23.45	23.60	L2	2.35	2.5	2.65
D1	16.25	16.55	16.85	ØP	3.51	3.60	3.65
E	15.75	15.94	16.10	ØP1	7.08	7.19	7.30
E1	13.00	13.26	13.43	S	6.15BSC		

Revision History

Revision	Date of Release	Description of Changes
V1.0	2026.10.15	Initial APSEMI release

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