Features:

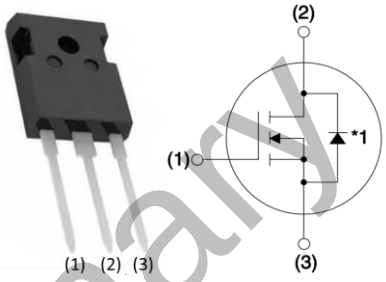
- High-speed switching performance
- low capacitances
- Fast intrinsic diode with low reverse recovery (Q_{RR})
- Halogen-free，RoHS compliant (Note 1)

Applications:

- motor drive
- DC/DC converters
- Switched mode power supplies
- Solar inverters
- OBC

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	1200	V
$R_{DSON,TYP}$ @V_{GS} = 18 V	30	mΩ
I_D	73	A
P_D	375	W



(1) Gate
(2) Drain
(3) Source

*1 Body Diode

Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
AMPCW120R30CV	TO-247-3L	AMP120R30CV	Tube	450 per box

Preliminary

Notes:

1. Contact Marching Power sales for detail informations

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Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current - Continuous (T_C = 25°C) (Note 1)	73	A
	Drain Current - Continuous (T_C = 100°C) (Note 1)	53	A
I_{DM}	Drain Current - Pulsed (Note 2)	120	A
V_{GS}	Gate-Source Voltage (dynamic)	-10/+22	V
V_{GS}	Gate-Source Voltage (static)	-4/+18	V
P_D	Power Dissipation (T_C = 25°C)	375	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Steady-State	0.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady-State	36	°C/W

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Notes:

1. The max drain current limited by maximum junction temperature
2. Repetitive Rating: Pulse width limited by maximum junction temperature

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Electrical Characteristics (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 100 μA	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1200 V, V_{GS} = 0 V		5	50	μA
I_{GSS}	Gate Leakage Current	V_{GS} = + 18 V, V_{DS} = 0 V			100	nA
		V_{GS} = - 4 V, V_{DS} = 0 V			100	nA
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 9.5 mA	1.8	2.5	3.5	V
		V_{DS} = V_{GS}, I_D = 9.5 mA, T_J = 175 °C		1.8		V
$R_{DS(ON)}$	Drain-Source on-state resistance	V_{GS} = 18 V, I_D = 33.3 A	20	30	40	mΩ
		V_{GS} = 18 V, I_D = 33.3 A, T_J = 175 °C		50		mΩ
G_{FS}	Forward Transconductance	V_{DS} = 20 V, I_D = 33.3 A		TBD		S
		V_{DS} = 20 V, I_D = 33.3 A, T_J = 175 °C		TBD		S
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{DS} = 800 V, V_{GS} = 0 V, F = 100 kHz, V_{AC} = 25 mV		2380		pF
C_{OSS}	Output Capacitance			165		pF
C_{RSS}	Reverse Transfer Capacitance			11		pF
E_{OSS}	C_{OSS} Stored Energy			TBD		μJ
R_G	Gate Resistance	F = 1 MHz, V_{AC} = 25 mV		1.0		Ω
Q_{GS}	Gate-Source Charge	V_{DS} = 800V , I_D =33.3 A, V_{GS} = -4/+18 V		TBD		nC
Q_{GD}	Gate-Drain Charge			TBD		nC
Q_G	Total Gate Charge			TBD		nC

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Switching Characteristics (Note3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$T_{D(ON)}$	Turn On Delay Time	V_{DD} = 800 V , I_D = 33.3 A, V_{GS} = -4/+18 V, $R_{G,EXT}$ = 5.1 Ω L = 500 μH Diode： Body Diode at V_{GS} = -5V T_J = 25 °C		69		ns
T_R	Rise Time			30		ns
$T_{D(OFF)}$	Turn Off Delay Time			60		ns
T_F	Fall Time			41		ns
E_{ON}	Turn On Energy			904		μJ
E_{OFF}	Turn Off Energy			648		μJ
$T_{D(ON)}$	Turn On Delay Time	V_{DD} = 800 V , I_D = 33.3 A, V_{GS} = -4/+18 V, $R_{G,EXT}$ = 5.1 Ω L = 500 μH Diode： Body Diode at V_{GS} = -5V T_J = 175 °C		65		ns
T_R	Rise Time			30		ns
$T_{D(OFF)}$	Turn Off Delay Time			65		ns
T_F	Fall Time			42		ns
E_{ON}	Turn On Energy			1020		μJ
E_{OFF}	Turn Off Energy			673		μJ

Note3: All switching charateristics reference TO247-3L.

Drain-Source Diode Characteristics (T_J = 25 °C unless otherwise noted)

I_S	Maximum Continuous Drain-Source Diode Forward Current			73		A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current			140		A
V_{SD}	Diode Forward Voltage	V_{GS} = -4 V , I_{SD} = 20 A		3.9		V
		V_{GS} = -4 V , I_{SD} = 20 A, T_J = 175 °C		3.5		V
I_{RM}	Peak Reverse Recovery Current	V_{GS} = -4 V , I_{SD} = 33.3 A, V_R = 800 V, di/dt = 1400 A/μs T_J = 25 ℃		17		A
T_{RR}	Reverse Recovery Time			21		ns
Q_{RR}	Reverse Recovery Charge			210		nC
I_{RM}	Peak Reverse Recovery Current	V_{GS} = -4 V , I_{SD} = 33.3 A, V_R = 800 V, di/dt = 1400 A/μs T_J = 175 °C		18		A
T_{RR}	Reverse Recovery Time			33		ns
Q_{RR}	Reverse Recovery Charge			406		nC

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Electrical Characteristics Diagrams (Note4)

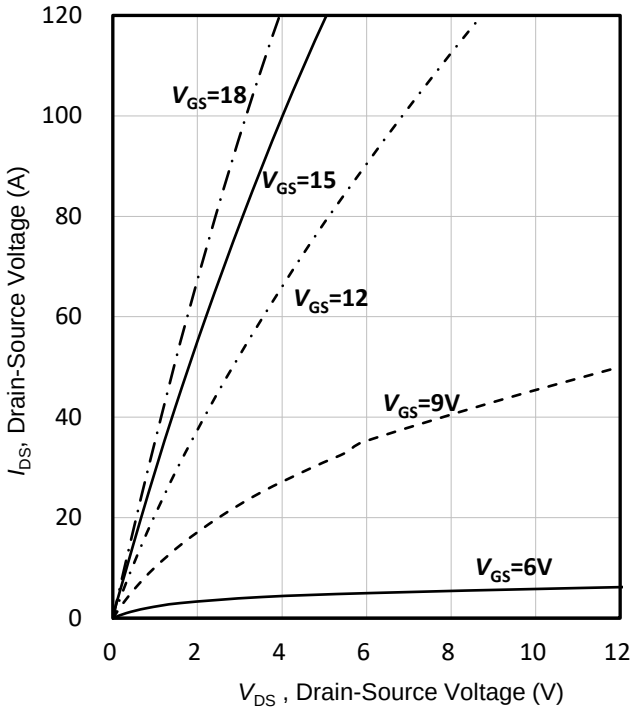

Figure 1. Output Characteristics (T_{vj} = 25℃)

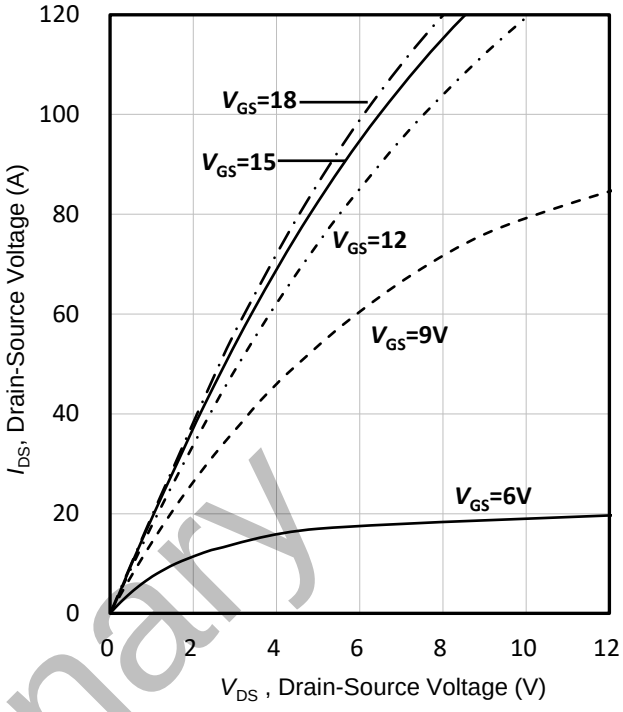

Figure 2. Output Characteristics (T_{vj} = 175℃)

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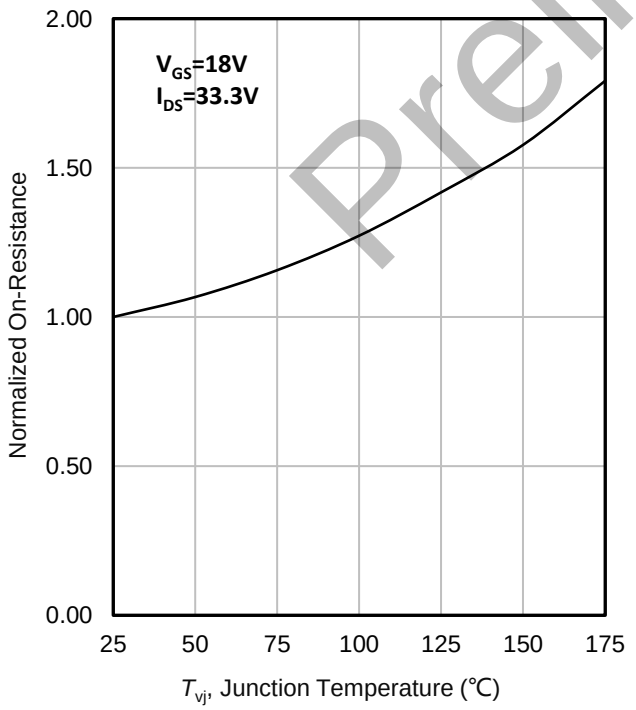

Figure 3. Normalized On-Resistance vs. Temperature

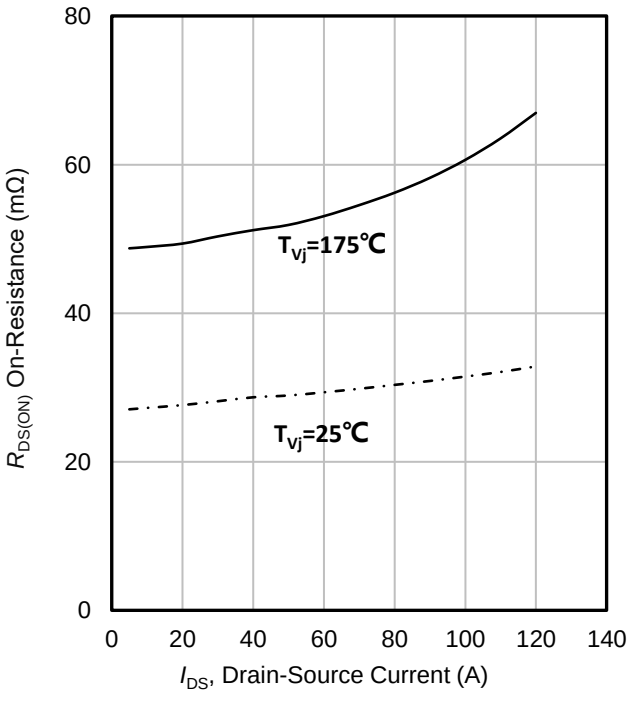

Figure 4. On-Resistance vs. Drain Current For Various Temperatures

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Electrical Characteristics Diagrams (Note4)

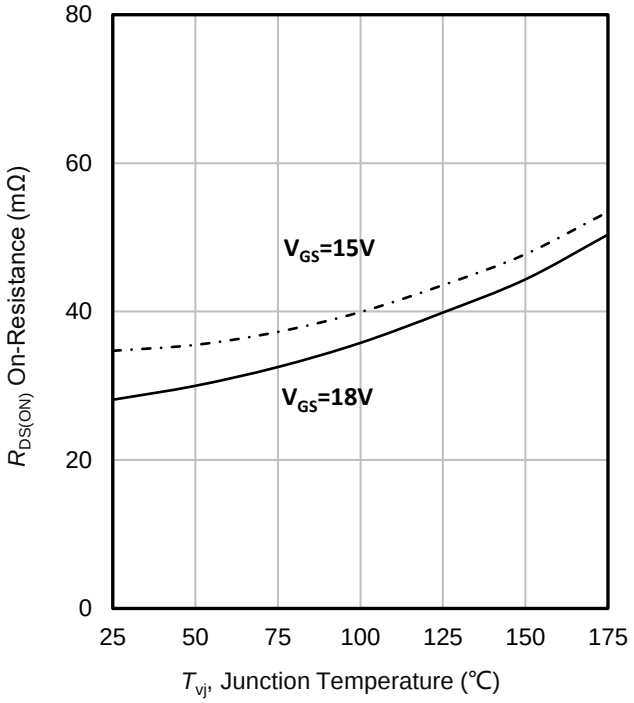

Figure 5. On-Resistance vs. Temperature For Various Gate Voltage

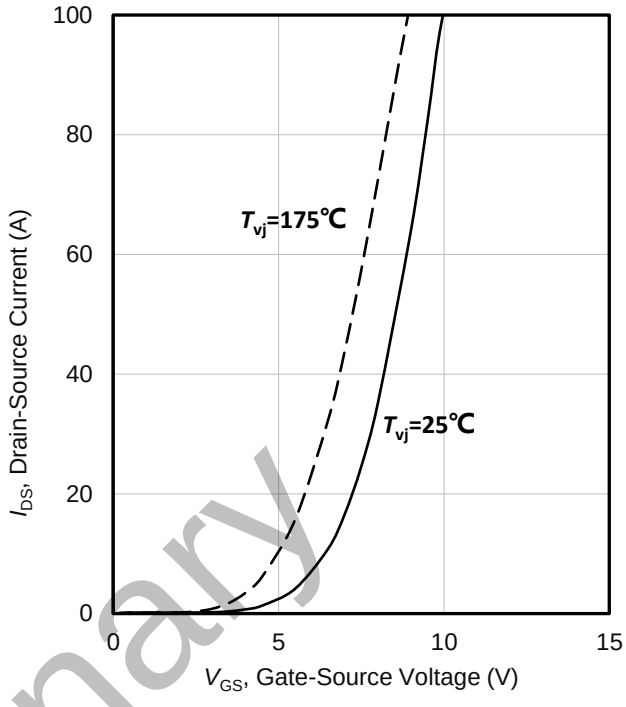

Figure 6. Transfer Characteristics For Various Junction Temparature

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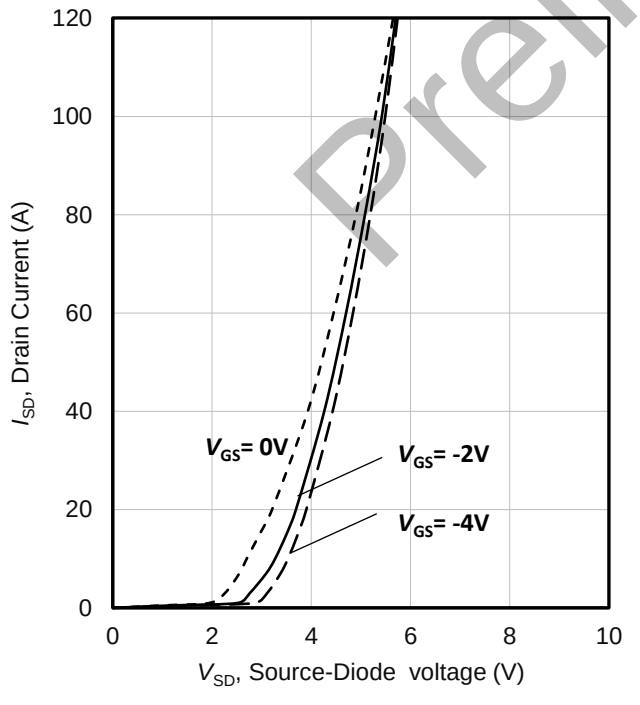

Figure 7. Body Diode Characteristics (T_{vj} = 25℃)

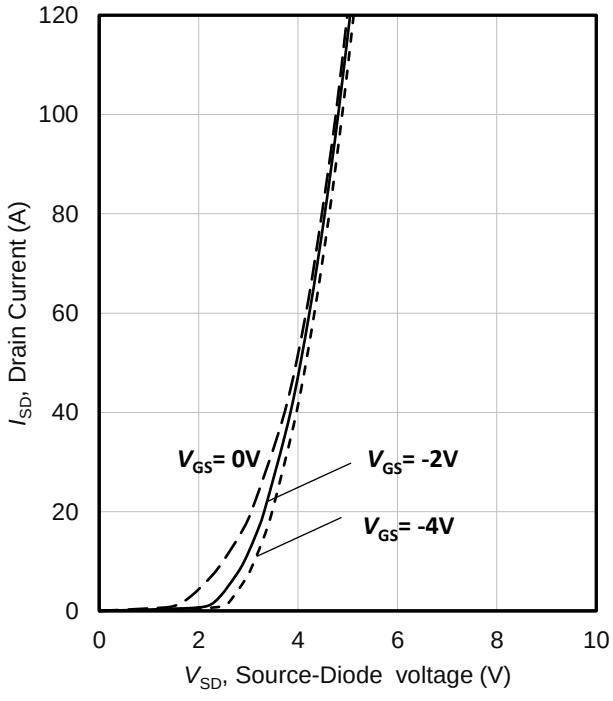

Figure 8. Body Diode Characteristics (T_{vj} = 175℃)

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Electrical Characteristics Diagrams (Note4)

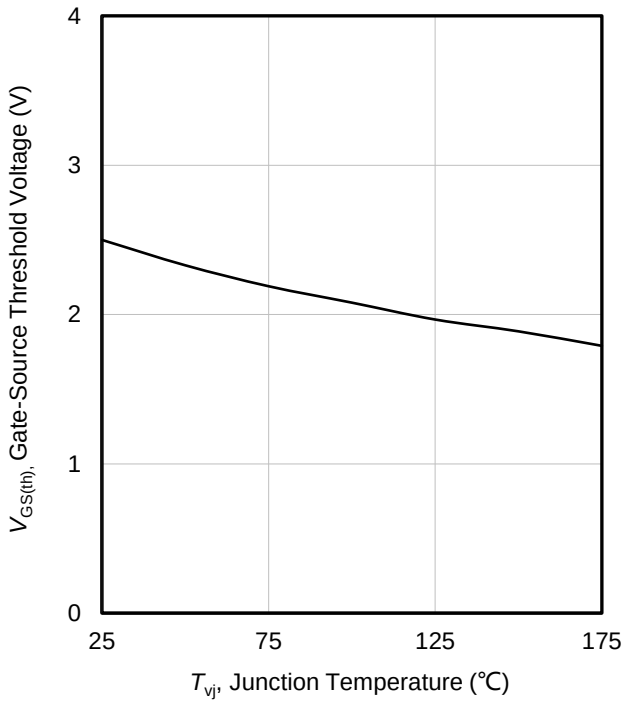

Figure 9. Threshold Voltage vs. Temperature

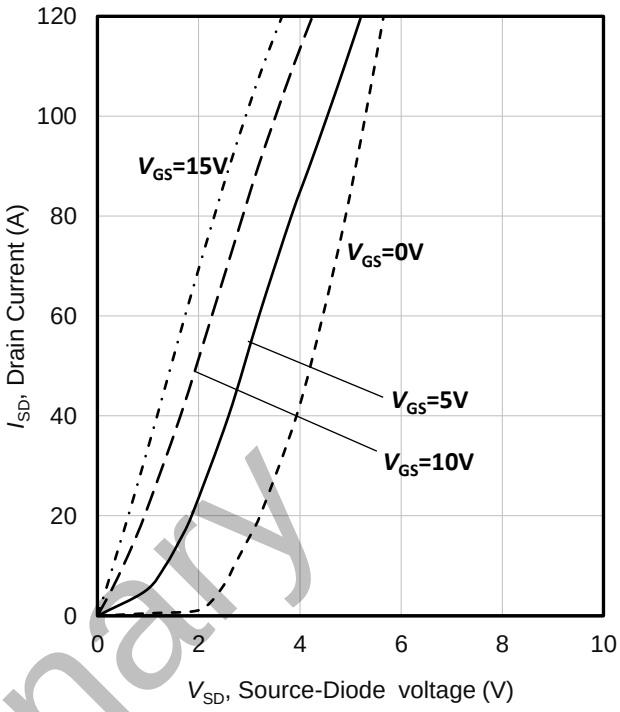

Figure 10. 3rd Quadrant Characteristics (T_{vj} = 25℃)

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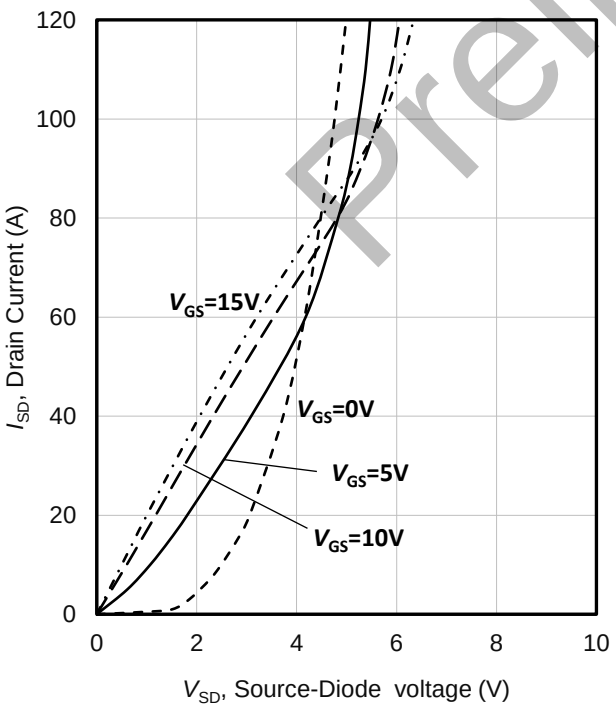

Figure 11. 3rd Quadrant Characteristics (T_{vj} = 175℃)

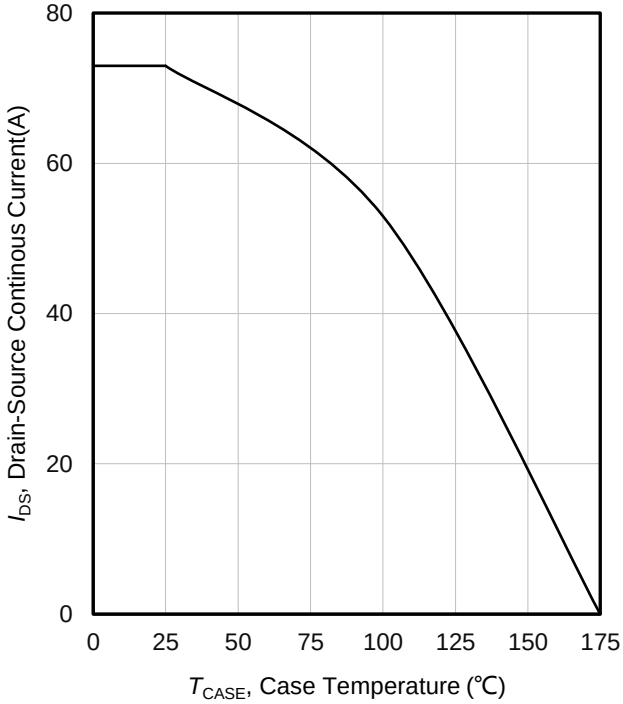

Figure 12. Current De-rating

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Electrical Characteristics Diagrams (Note4)

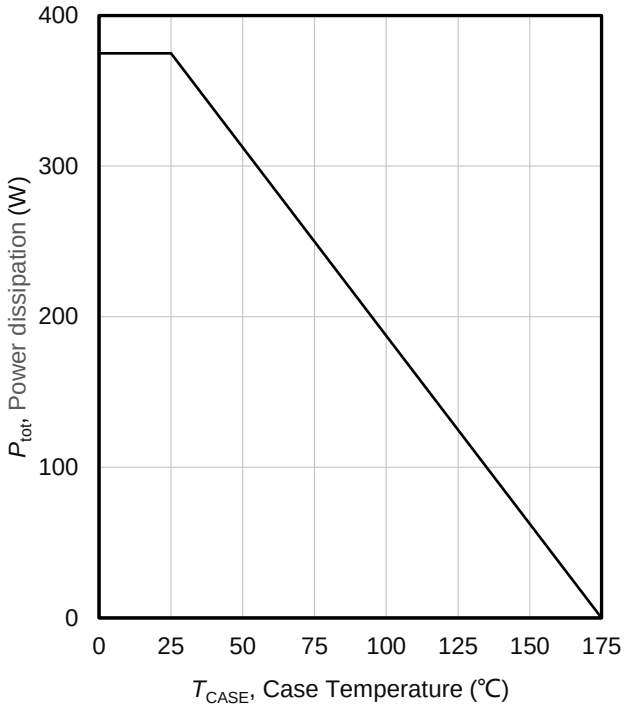

Figure 13. Maximum Power Dissipation Derating vs Case Temperature

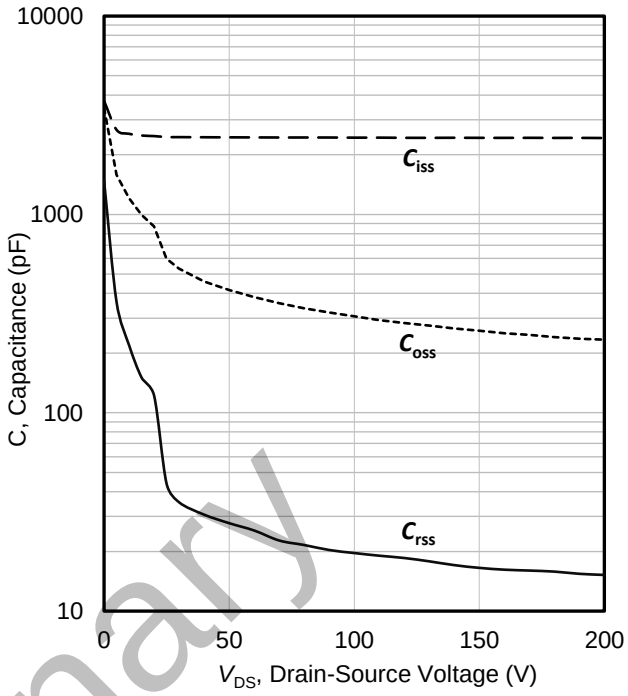

Figure 14. Capacitance Characteristics (0 - 200V)

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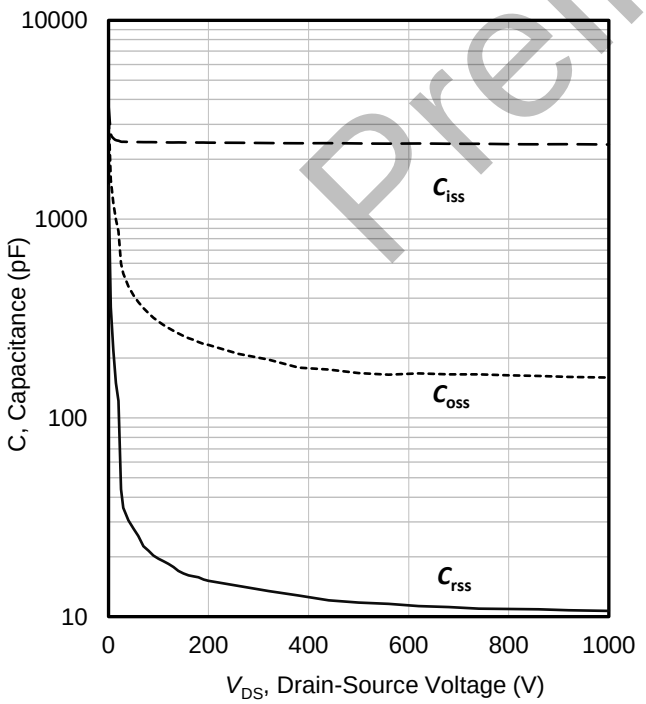

Figure 15. Capacitance Characteristics (0 - 1000V)

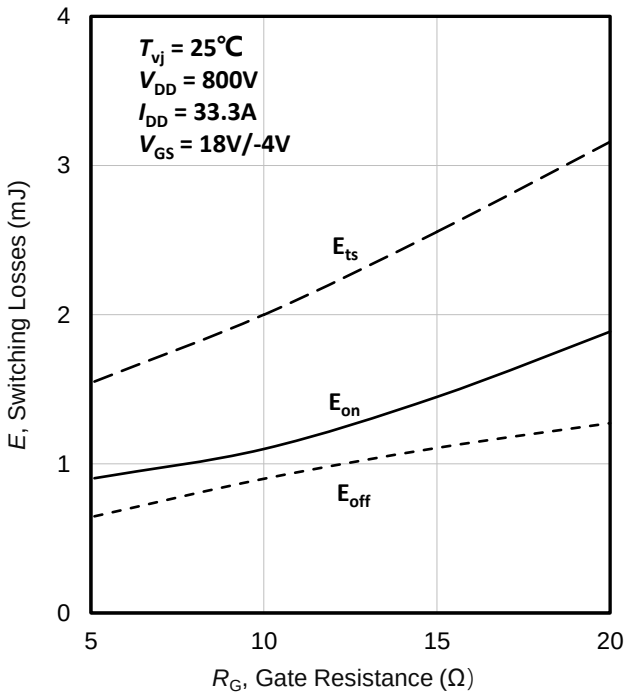

Figure 16. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

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Electrical Characteristics Diagrams (Note4)

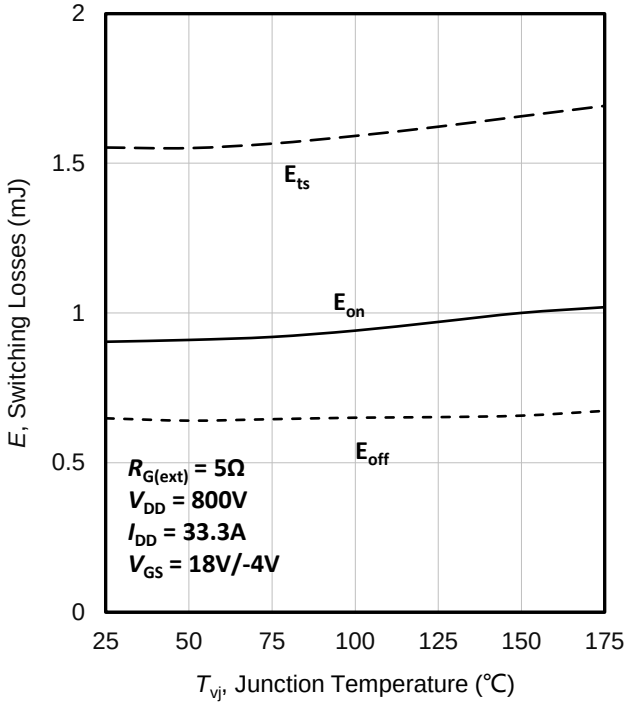

Figure 17. Clamped Inductive Switching Energy vs. Temperature

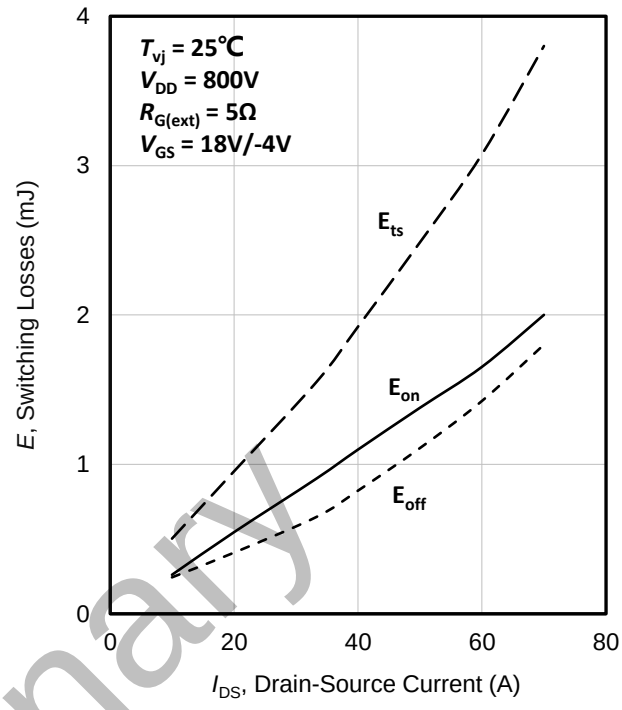

Figure 18. Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 800 V)

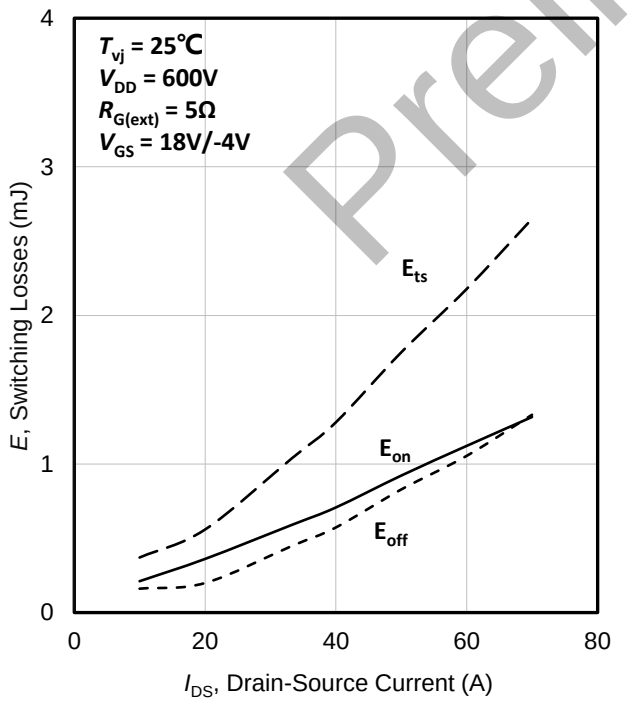

Figure 19. Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 600 V)

Note4: All figures reference TO 247-3L.

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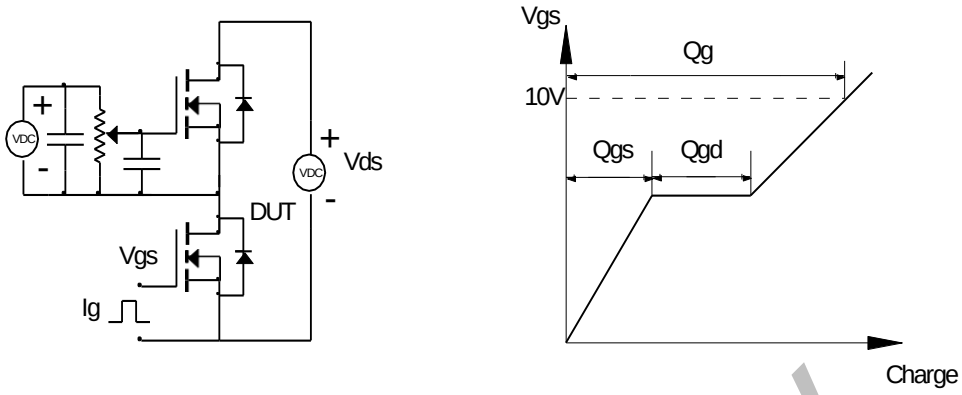
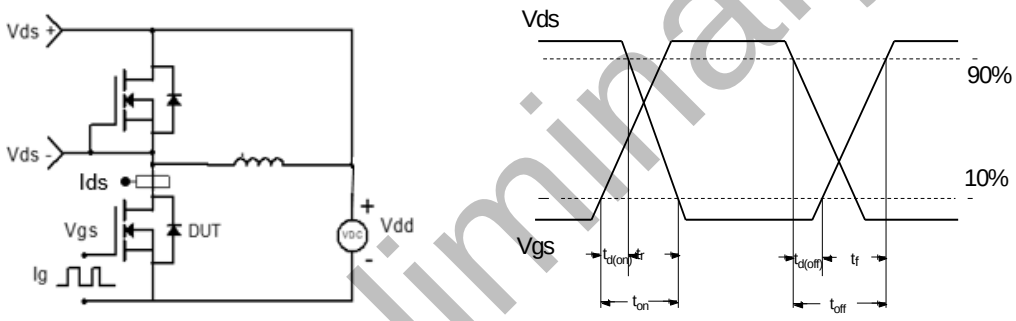
Test Circuit and Waveform

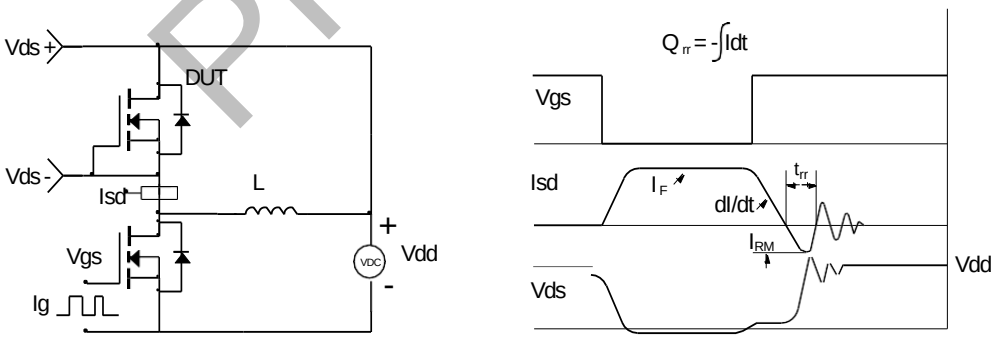
Gate Charge Test Circuit & Waveform



Clamped Inductive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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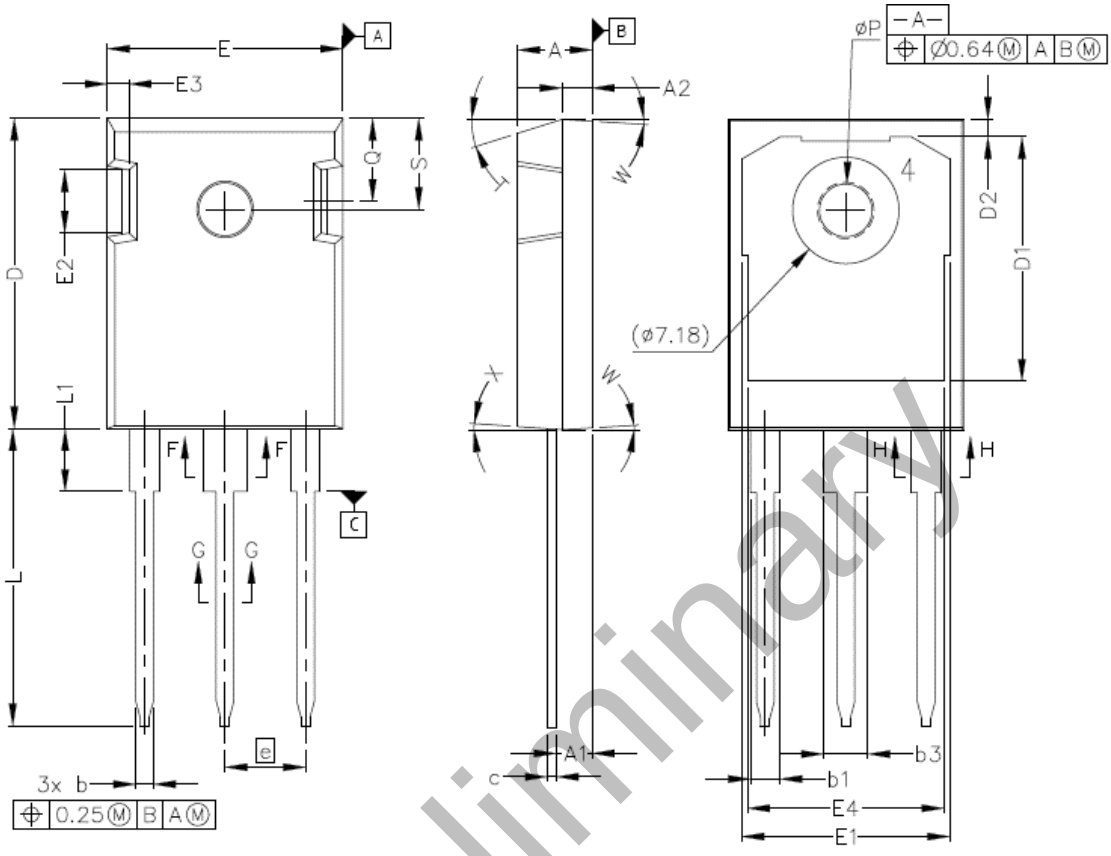
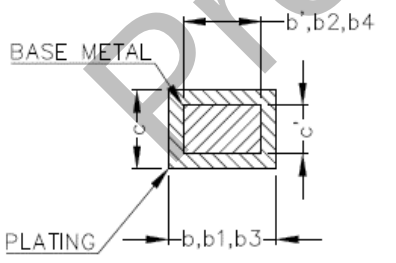
Package Outlines

TO-247-3L PKG Outlines





SECTION "F–F", "G–G" AND "H–H"
SCALE: NONE

SYMBOL	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
b3	2.87	3.38
b4	2.87	3.13
c'	0.55	0.65
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	5.44 BSC	
N	3	
L	19.81	20.32
L1	4.10	4.40
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5° REF.	
X	4° REF.	

NOTE ;
1. ALL METAL SURFACES: TIN PLATED,EXCEPT AREA OF CUT
2. DIMENSIONING & TOLERANCEING CONFIRM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. THIS DRAWING WILL MEET ALL DIMENSIONS REQUIREMENT OF JEDEC outlines TO-247 AD.

1 - GATE
2 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)
4 - DRAIN (COLLECTOR)

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Revision History：

Revision	Date	Subjects (major changes since last revision)
1.0	2023-11-03	Initial Version

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