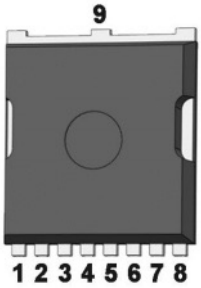
750V G1 Silicon Carbide Power MOSFET

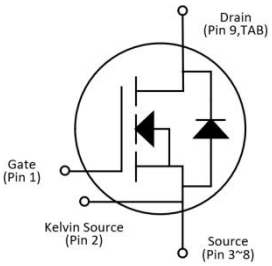
N-Channel Enhancement Mode

V_{DS}	=	750V
$R_{DS(ON)}$	=	40mΩ
$I_{D(MAX)@25^{\circ}C}$	=	65A

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitances
- Very low switching losses
- Avalanche ruggedness
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant
- Optimized package with separate kelvin source pin





Benefits

- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

Applications

- Motor drives
- High voltage DC/DC converters
- Switched mode power supplies
- EV battery chargers
- On-board charger/PFC

Part number	Package Type
CC3M04075A	TOLL

Maximum Ratings (T_C=25˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	750	V	V_{GS} = 0V, I_D = 100μA
V_{GSmax}	Gate - Source Voltage	-10 /+22	V	Absolute maximum values
V_{GSop}	Gate - Source Voltage	-5 /+18	V	Recommended operational values
I_D	Continuous Drain Current	65	A	V_{GS} = 18V, T_C = 25˚C
		50		V_{GS} = 18V, T_C = 100˚C
$I_{D(pluse)}$	Pulsed Drain Current	160	A	Pulse width t_P limited by $T_{j,max}$
P_D	Power Dissipation	272	W	T_C = 25˚C, T_J = 175˚C
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C	/
T_L	Soldering Temperature	260	˚C	1.6mm (0.063”) from case for 10s

Electrical Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	750	-	-	V	V_{GS} = 0V, I_D = 100μA
$V_{GS(th)}$	Gate Threshold Voltage	2.0	3.0	4.0	V	V_{DS} = V_{GS}, I_D = 5mA
		-	2.3	-		V_{DS} = V_{GS}, I_D = 5mA T_J = 175˚C
I_{DSS}	Zero Gate Voltage Drain Current	-	1	50	μA	V_{DS} = 750V, V_{GS} = 0V
I_{GSS}	Gate-Source Leakage Current	-	-	200	nA	V_{GS} = 22V, V_{DS} = 0V
		-200	-	-		V_{GS} = -10V, V_{DS} = 0V
$R_{DS(on)}$	Drain-Source On-State Resistance	-	40	50	mΩ	V_{GS} = 18V, I_D = 20A
		-	48	-		V_{GS} = 18V, I_D = 20A T_J = 175˚C
g_{fs}	Transconductance	-	20	-	S	V_{DS} = 20V, I_D = 20A
		-	18	-		V_{DS} = 20V, I_D = 20A T_J = 175˚C
C_{iss}	Input Capacitance	-	1629	-	pF	V_{DS} = 500V, V_{GS} = 0V V_{AC} = 25mV f = 100KHz
C_{oss}	Output Capacitance	-	85	-		
C_{rss}	Reverse Transfer Capacitance	-	7	-		
E_{oss}	Coss Stored Energy	-	24	-	μJ	
E_{ON}	Turn-On Switching Energy	-	88	-	μJ	V_{DS} = 500V, V_{GS} = -5/+18V I_D = 20A, R_G = 2.5Ω L = 100μH
E_{OFF}	Turn-Off Switching Energy	-	77	-		
$t_{d(on)}$	Turn-On Delay Time	-	165	-	ns	
t_r	Rise Time	-	10	-		
$t_{d(off)}$	Turn-Off Delay Time	-	21	-		
t_f	Fall Time	-	30	-		
$R_{g(int)}$	Internal Gate Resistance	-	14	-	Ω	V_{AC} = 25mV, f = 1MHz
Q_{gs}	Gate to Source Charge	-	4.5	-	nC	V_{DS} = 500V, V_{GS} = -5/+18V I_D = 20A
Q_{gd}	Gate to Drain Charge	-	22	-		
Q_g	Total Gate Charge	-	11	-		

Reverse Diode Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	3.5	-	V	V_{GS} = -5V, I_{SD} = 10A
		3.2	-		V_{GS} = -5V, I_{SD} = 10A T_J = 175˚C
I_{SD}	Continuous Diode Forward Current	-	91	A	V_{GS} = -5V
		-	45		V_{GS} = -5V, T_C = 100˚C
t_{rr}	Reverse Recover Time	14	-	ns	V_R = 500V, V_{GS} = -5V I_D = 20A di/dt = 1000A/μs
Q_{rr}	Reverse Recovery Charge	66	-	nC	
I_{rrm}	Peak Reverse Recovery Current	7.8	-	A	

Thermal/Package Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.55	˚C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	30	˚C/W

Typical Performance

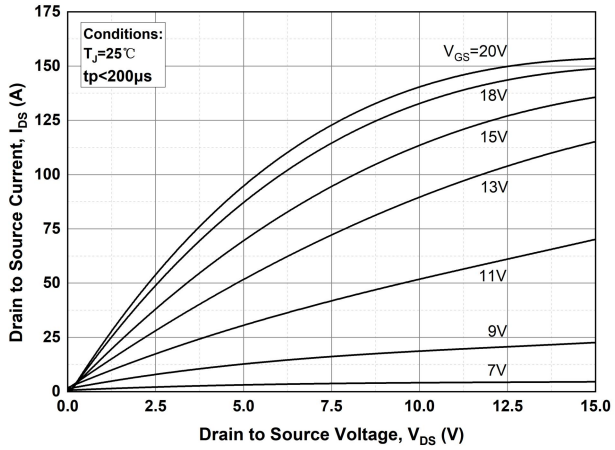


Figure 1. Output Characteristics T_J=25℃

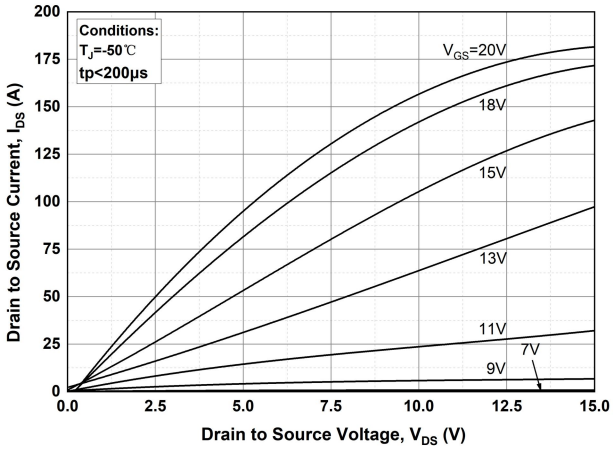


Figure 2. Output Characteristics T_J=-50℃

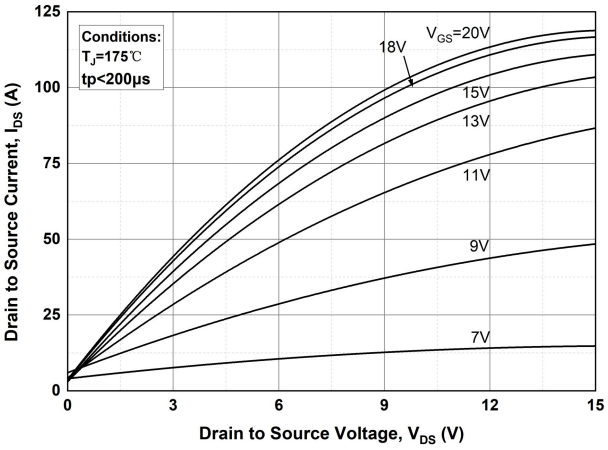


Figure 3. Output Characteristics T_J=175℃

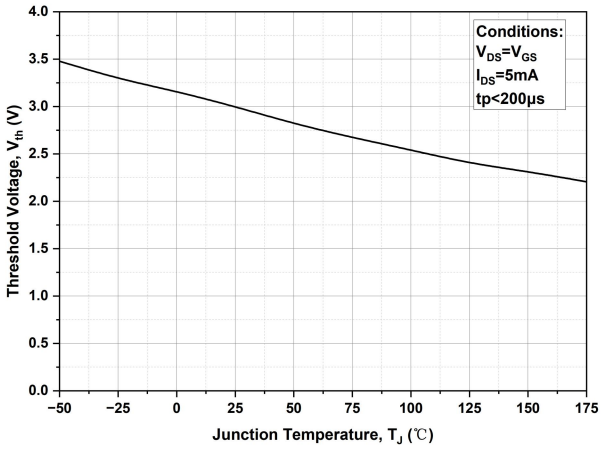


Figure 4. Threshold Voltage vs. Temperature

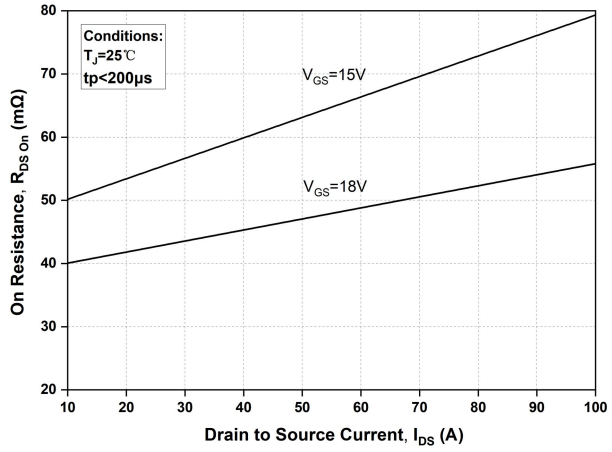


Figure 5. On Resistance vs. Drain to Source Current and Gate to Source Voltage

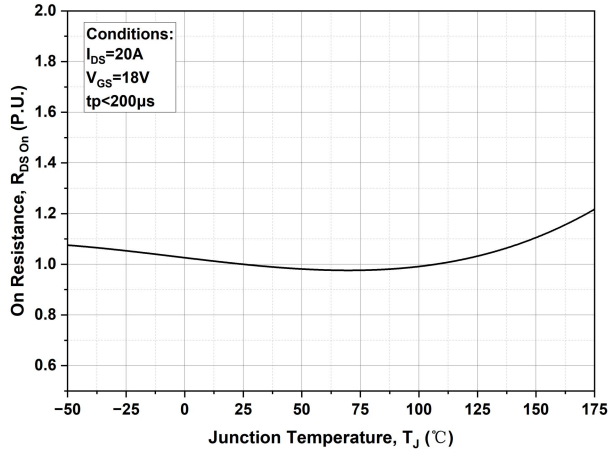


Figure 6. Normalized On Resistance vs. Temperature

Typical Performance

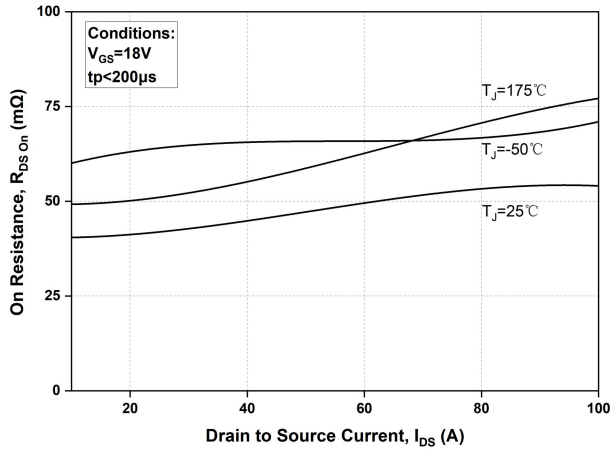


Figure 7. On Resistance vs. Drain to Source Current

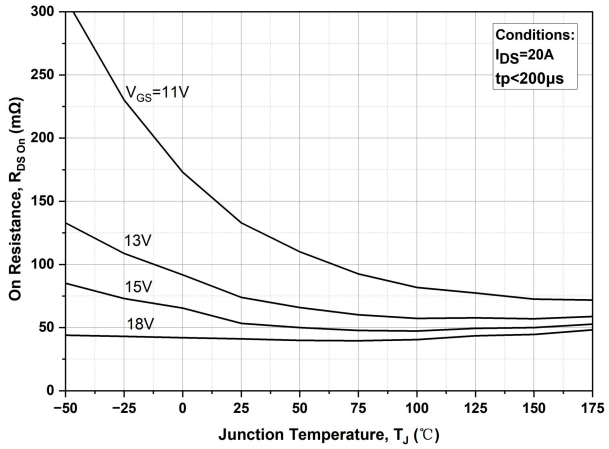


Figure 8. On Resistance vs. Temperature for Various Gate Voltage

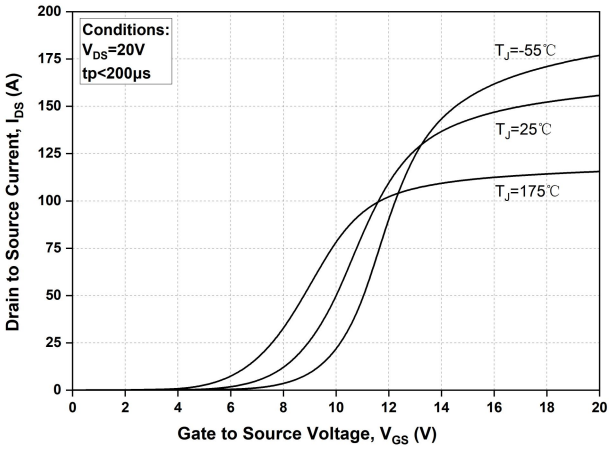


Figure 9. Transfer Characteristic for Various Junction Temperature

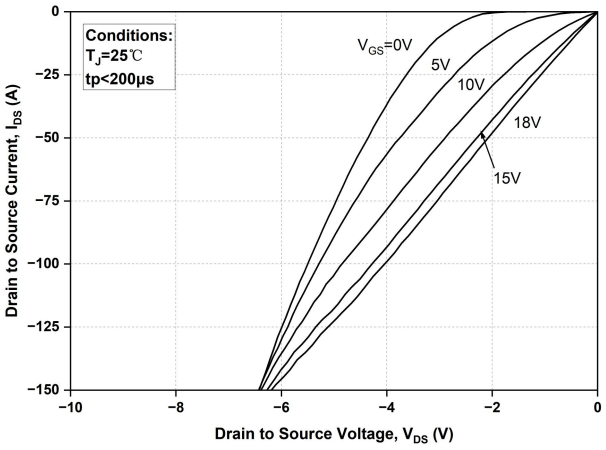


Figure 10. 3rd Quadrant Characteristic at T_J=25℃

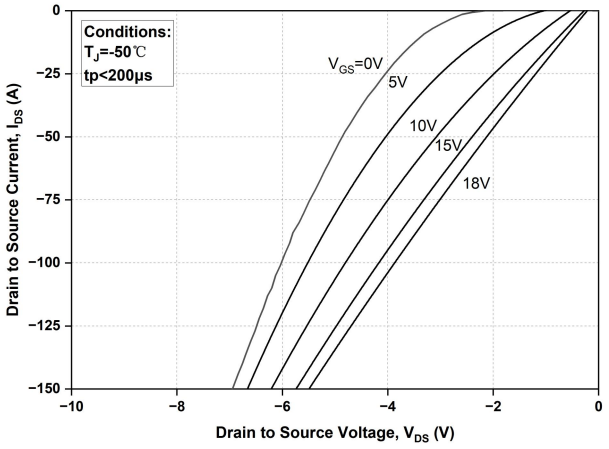


Figure 11. 3rd Quadrant Characteristic at T_J=-50℃

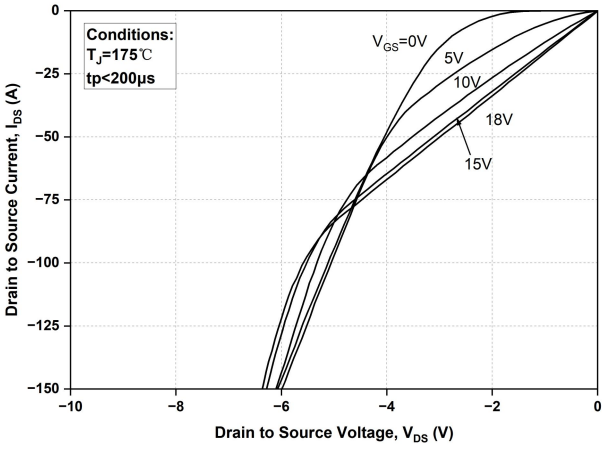


Figure 12. 3rd Quadrant Characteristic at T_J=175℃

Typical Performance

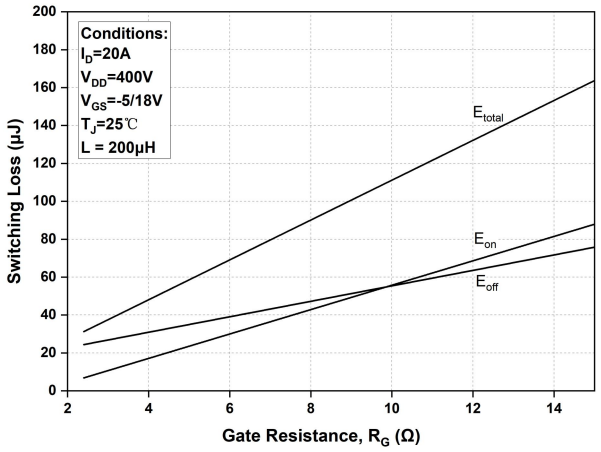


Figure 13. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

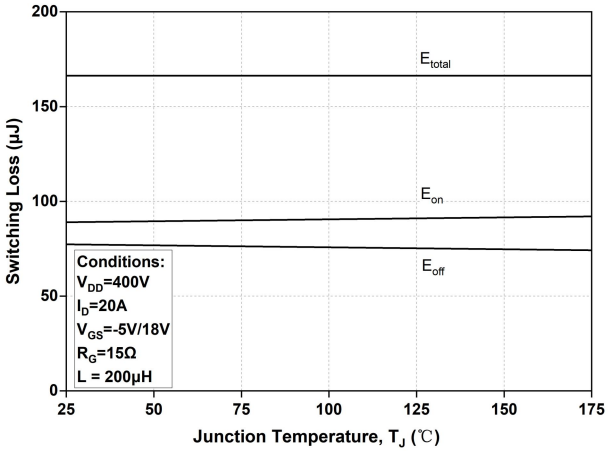


Figure 14. Clamped Inductive Switching Energy vs. Temperature

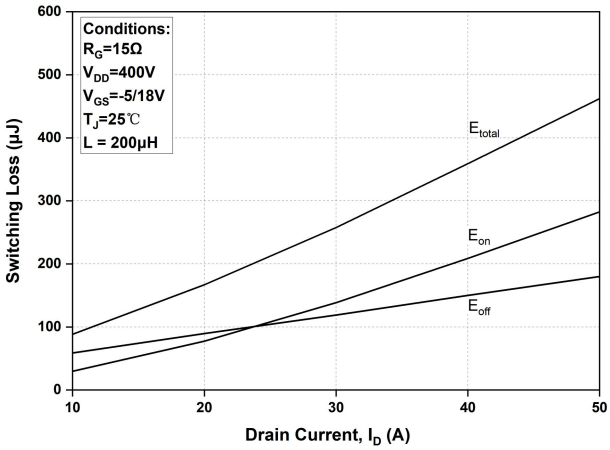


Figure 15. Clamped Inductive Switching Energy vs. Drain Current

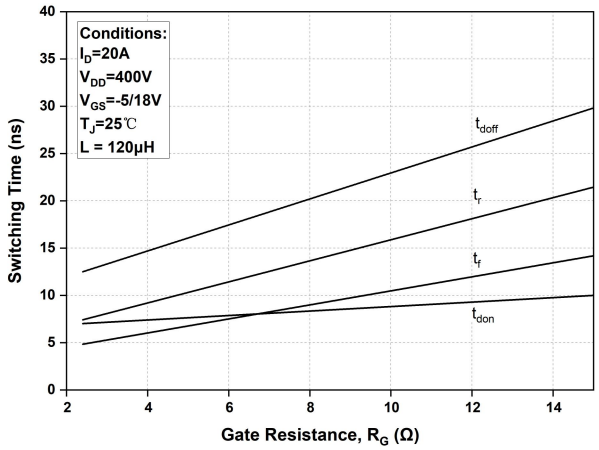


Figure 16. Switching Time vs. Gate Resistance

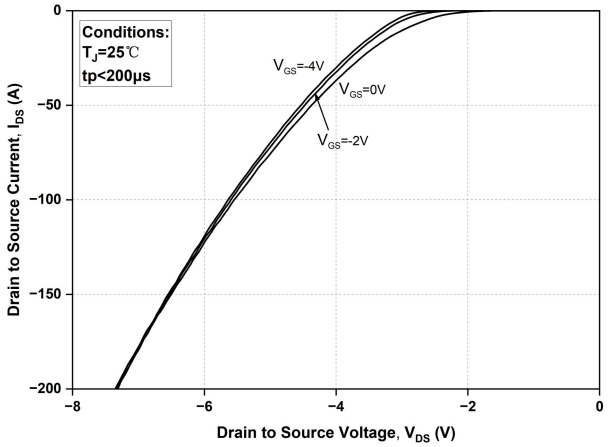


Figure 17. Body Diode Characteristic at T_J=25℃

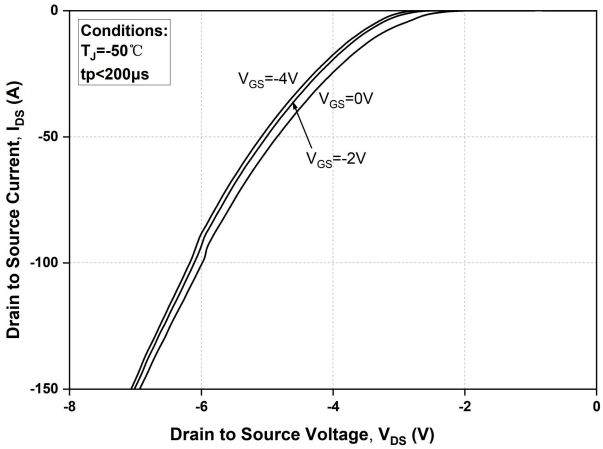


Figure 18. Body Diode Characteristic at T_J=-50℃

Typical Performance

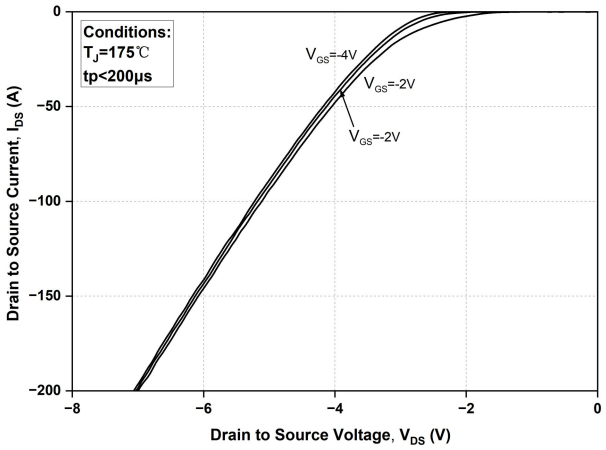


Figure 19. Body Diode Characteristic at T_J=175℃

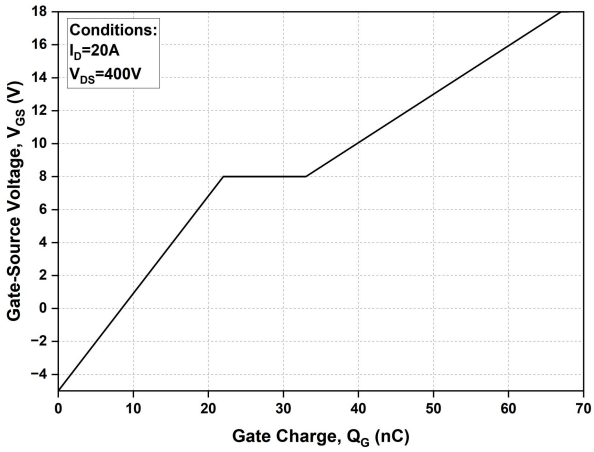


Figure 20. Gate Charge Characteristic

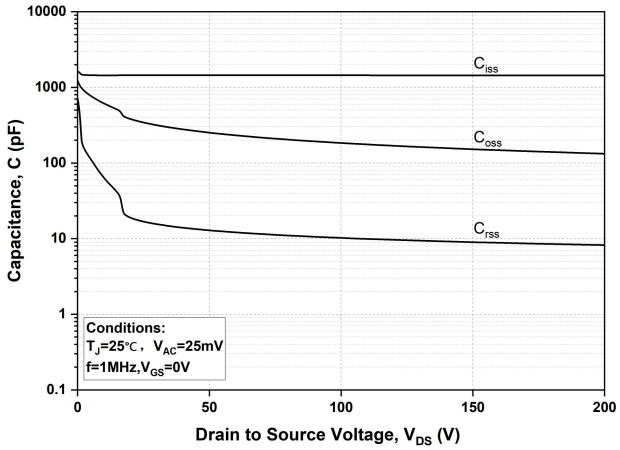


Figure 21. Capacitances vs. Drain to Source Voltage(0~200V)

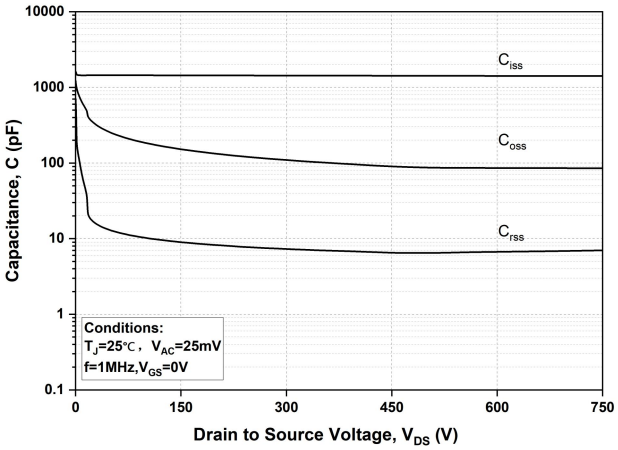


Figure 22. Capacitances vs. Drain to Source Voltage(0~750V)

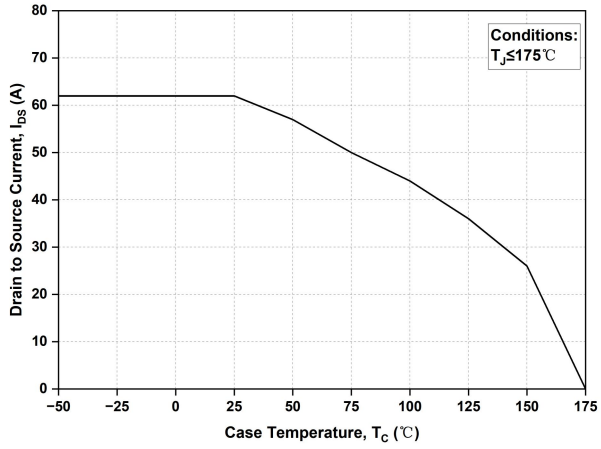


Figure 23. Continuous Drain Current Derating vs. Case Temperature

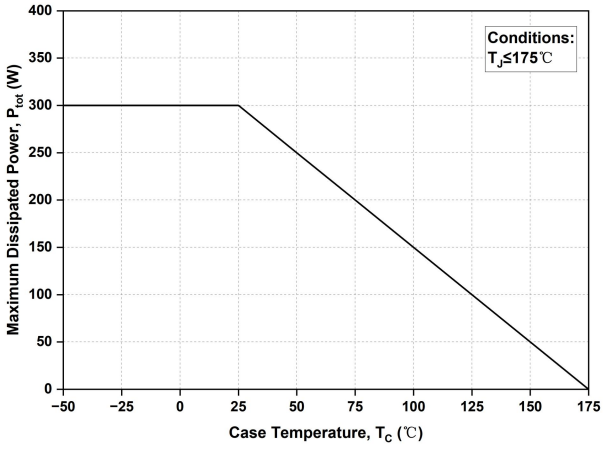


Figure 24. Maximum Power Dissipation Derating vs. Case Temperature

Typical Performance

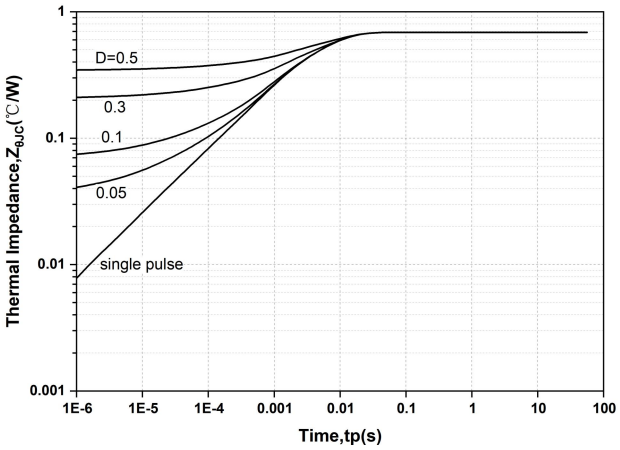


Figure 25. Junction-to-Case Transient Thermal Impedance

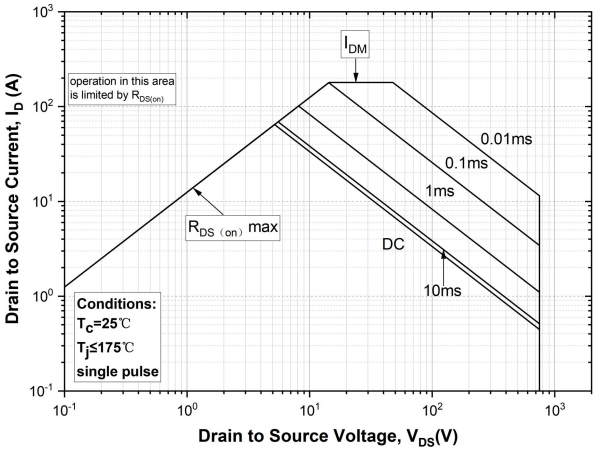


Figure 26. Safe Operating Area

Test conditions

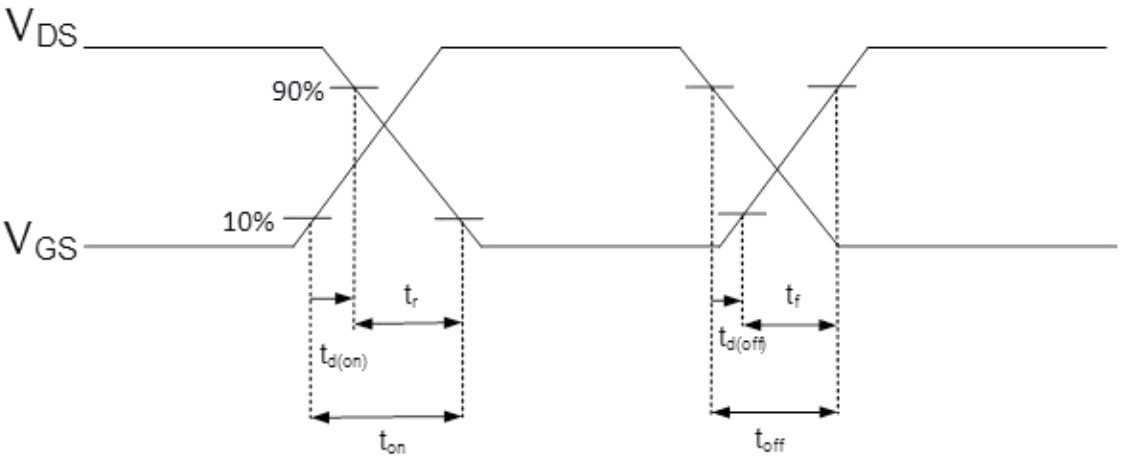


Figure 27. Definition of Switching Times

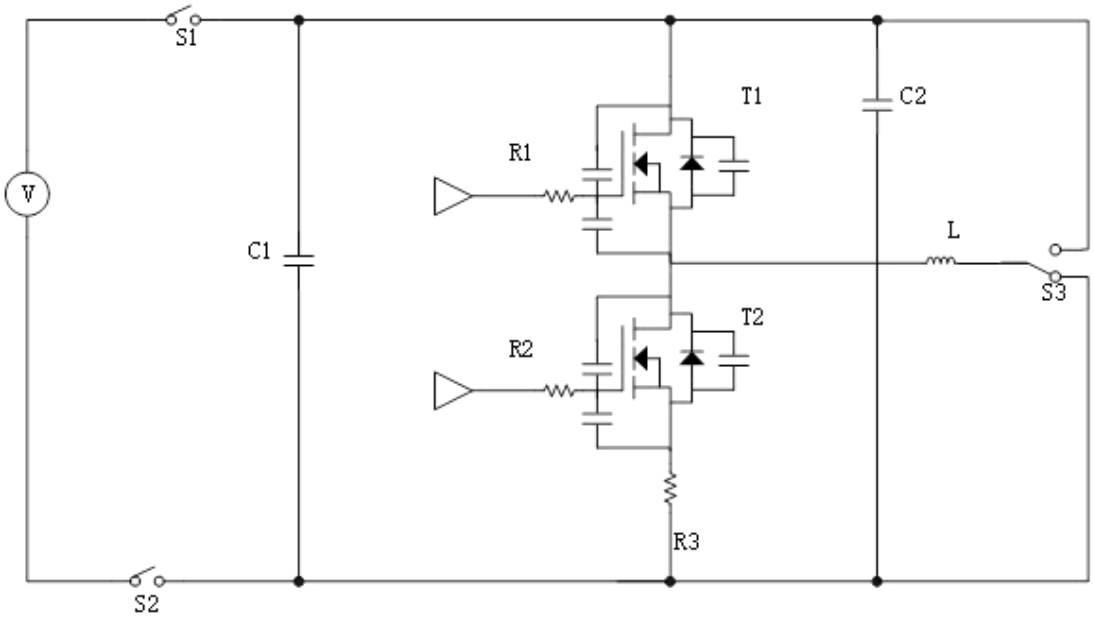
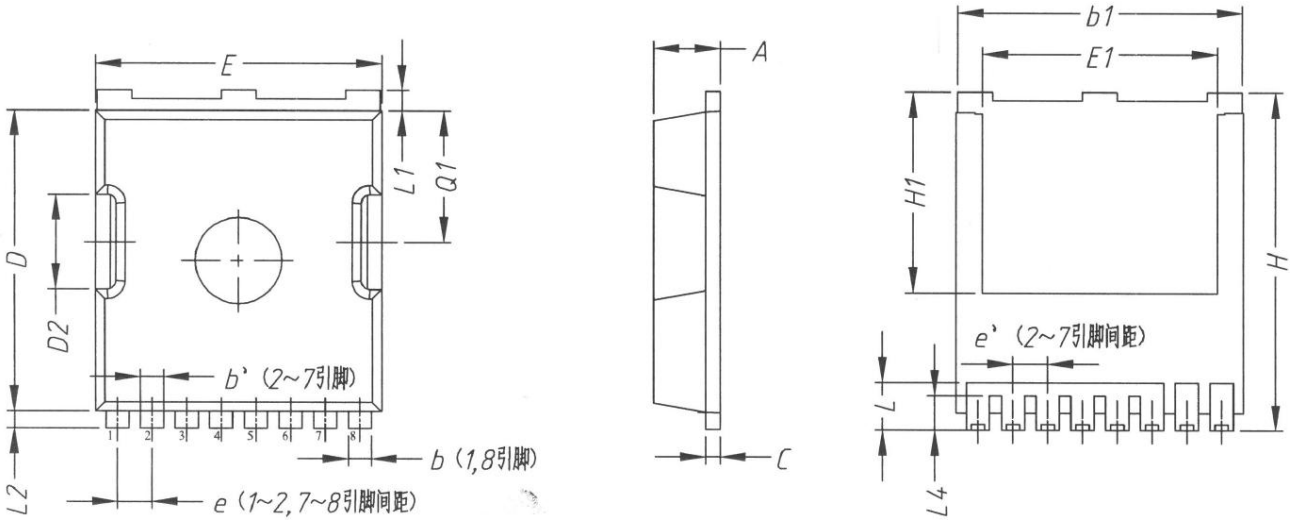


Figure 28. Dynamic Test Circuit

Package Dimensions

TOLL Package Outline



SYMBOL	MM		
	MIN	NOM	MAX
A	2.15	2.30	2.45
b	0.70	0.75	0.85
b'	0.65	0.70	0.80
b1	9.65	9.80	9.95
C	0.45	0.50	0.60
D	10.18	10.38	10.58
D2	3.15	3.30	3.45
E	9.70	9.90	10.10
E1	7.95	8.10	8.25
e	BSC 1.225		
e'	BSC 1.20		
Q1	4.40	4.55	4.70
H	11.48	11.68	11.88
H1	6.80	6.95	7.10
L	1.60	1.80	2.00
L1	0.50	0.70	0.90
L2	0.48	0.60	0.72
L4	1.00	1.15	1.30

Revision History

Document Version	Date of Release	Brief Summary
Rev.01	2026-09-23	Initial Release.

Notes & Disclaimer

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- **REACh Compliance**
  REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable futureplease contact your CLASSICCHIPrepresentative to ensur e youget the most up-to-date REACh SVHC Declaration.
  REACh banned substance information is alsoavailable upon request.