

Features

- Easy to use, compatible with standar gate drivers
- Excellent $Q_G \times R_{DS(on)}$ figure of merit (FOM)
- Low Q_{RR} , no free-wheeling diode required
- Low switching loss
- RoHS compliant and Halogen-free

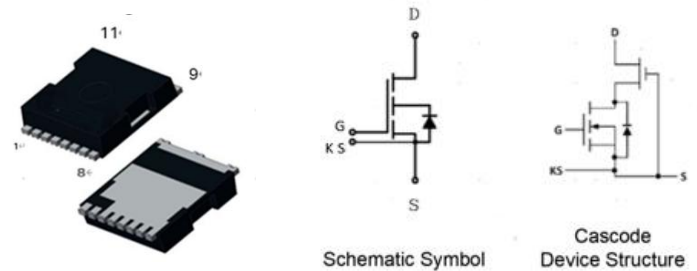
Product Summary		
V_{DSS}	650	V
$R_{DS(on)}$	35	mΩ
Q_G , typ	12.5	nC
Q_{RR} , typ	155	nC

Applications

- High efficiency power supplies
- Telecom and datacom
- Automotive
- Servo motors

Packaging

Pin	Description
1-6	Source
7	Kelvin Source
8	Gate
9-11	Drain



Part Number	Marking	Package	Packaging	Base QTY
CRNZ035C65H	Z035C65H	TOLL	Tape and Reel	1800

Maximum ratings, at $T_C=25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Limit Value	Unit
I_D	Continuous drain current @ $T_C=25^\circ\text{C}$		58	A
	Continuous drain current @ $T_C=125^\circ\text{C}$		37	A
$I_{D,pulse}$	Pulsed drain current @ $T_C=25^\circ\text{C}$ (pulse width: 100us)		175	A
	Pulsed drain current @ $T_C=125^\circ\text{C}$ (pulse width: 100us)		120	A
V_{DSS}	Drain to source voltage		650	V
$V_{DSS,puls}$	Drain to source pulse voltage ^a		800	V
V_{GSS}	Gate to source voltage		± 20	V
P_D	Gate to source pulse voltage		227	W
T_C	Operating junction temperature	Case	-55 to 150	$^\circ\text{C}$
T_J		Junction	-55 to 150	$^\circ\text{C}$
T_S	Storage temperature		-55 to 150	$^\circ\text{C}$
T_{CSOLD}	Soldering peak temperature		260	$^\circ\text{C}$

Thermal Resistance

Symbol	Parameter	Min	Typ.	Max	Unit
R _{thJC}	Junction-to-case	-	0.55	-	° C/W
R _{thJA}	Junction-to-ambient ^b	-	50	-	° C/W

Notes:

- a. Off-state spike duty cycle < 0.01, spike duration < 2 μ s
- b. Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm² copper area and 70 μ m thickness)

Electrical Parameters, at $T_J=25^\circ\text{C}$, unless otherwise specified

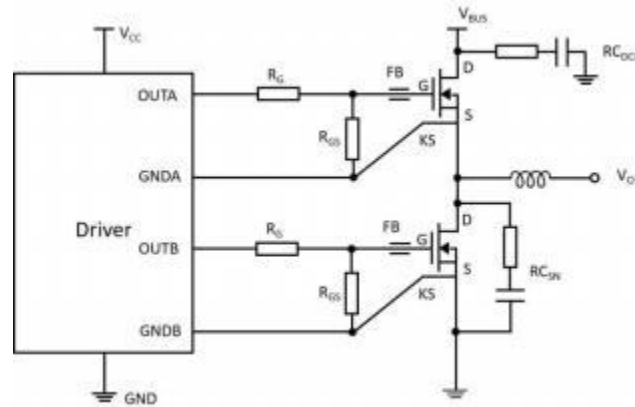
Symbol	Min	Typ	Max	Unit	Test Conditions
Forward Characteristics					
V _{DSS-MAX}	650	-	-	V	V _{GS} =0V
V _{GS(th)}	3	4	5	V	V _{DS} =V _{GS} , I _D =500 μ A
R _{DS(on)} ^c	-	35	45	m Ω	V _{GS} =12V, I _D =4A, T _J =25 ° C
	-	70	-		V _{GS} =12V, I _D =4A, T _J =150 ° C
I _{DSS}	-	8	20	μ A	V _{DS} =650V, V _{GS} =0V, T _J =25 ° C
	-	50	-	μ A	V _{DS} =650V, V _{GS} =0V, T _J =150 ° C
I _{GSS}	-	2	20	nA	V _{GS} =20V
	-	-2	-20	nA	V _{GS} =-20V
C _{ISS}	-	1916	-	pF	V _{GS} =0V, V _{DS} =400V, f=1MHz
C _{OSS}	-	135	-	pF	
C _{RSS}	-	5.7	-	pF	
C _{O(er)}	-	203	-	pF	V _{GS} =0V, V _{DS} =0 - 400V
C _{O(tr)}	-	388	-	pF	
Q _{oss}	-	155	-	nC	
Q _G	-	12.5	-	nC	V _{DS} =400V, V _{GS} =0 - 12V, I _D =36A
Q _{GS}	-	2.6	-		
Q _{GD}	-	4.4	-		
t _{D(on)}	-	30	-	ns	V _{DS} =400V, V _{GS} =0 - 12V, I _D =36A, R _G =47 Ω
t _R	-	16	-		
t _{D(off)}	-	80	-		
t _F	-	10	-		
Reverse Characteristics					
V _{SD}	-	1.3	-	V	V _{GS} =0V, I _S =18A, T _J =25 ° C
	-	1.8	-		V _{GS} =0V, I _S =36A, T _J =25 ° C
	-	2.4	-	A	V _{GS} =0V, I _S =36A, T _J =150 ° C
Q _{RR}	-	155	-	nC	I _S =36A, V _{GS} =0V, di/dt=1000A/us, V _{DD} =400V
t _{RR}	-	43	-	nS	

Notes:

c. Dynamic on-resistance; see Figure 18 and 19 for test circuit and configuration

Circuit Implementation

Half bridge and full bridge topology



Recommended Half-bridge Circuit

Recommended gate drive: (0 V, 12 V)

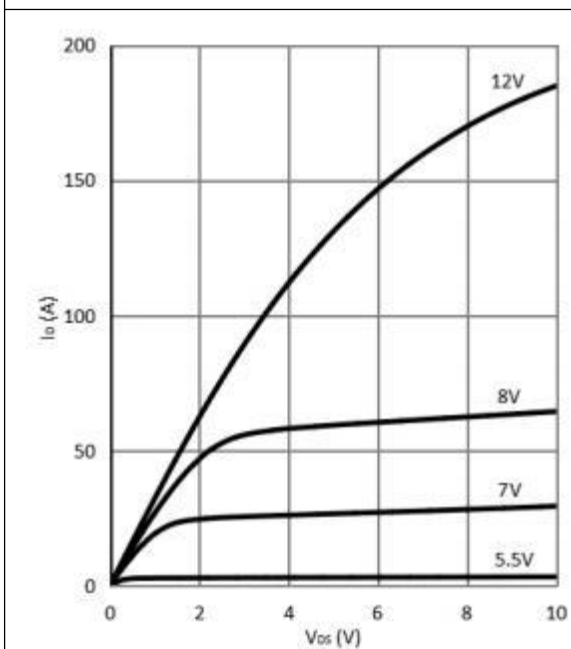
Gate Ferrite Bead(FB)	Gate Resistance (RG)	Gate Source Resistance (RGS)	Switching RC Snubber (RCSN)	DC Link RC Snubber (RCDCL)
300 - 600 Ω@100MHz	33 Ω	10 kΩ	15 Ω + 470 pF	5 Ω + 4.7 nF

Notes:

- d. RCSN should be placed as close as possible to the drain pin
- e. The layout and wiring of the drive circuit should be as short as possible

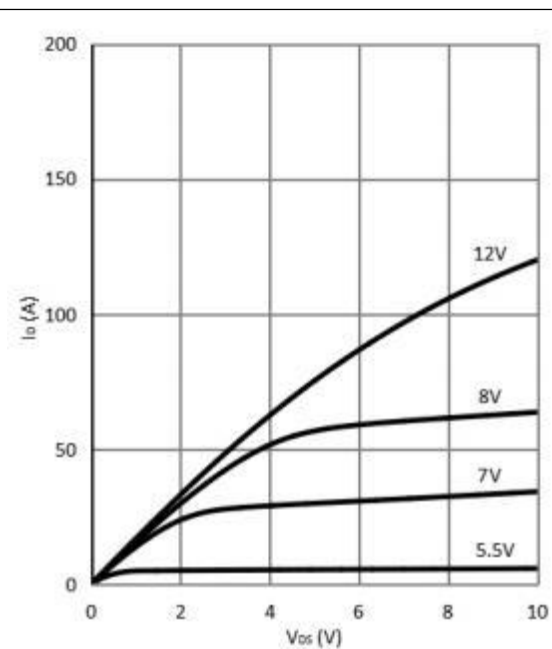
Typical Characteristics, at $T_C=25^\circ\text{C}$, unless otherwise specified

Figure 1. Typical Output Characteristics $T_J=25^\circ\text{C}$



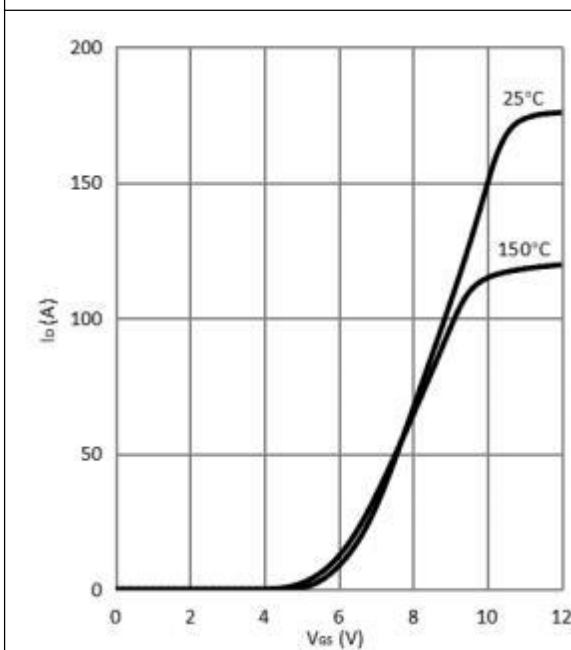
Parameter: V_{GS}

Figure 2. Typical Output Characteristics $T_J=150^\circ\text{C}$



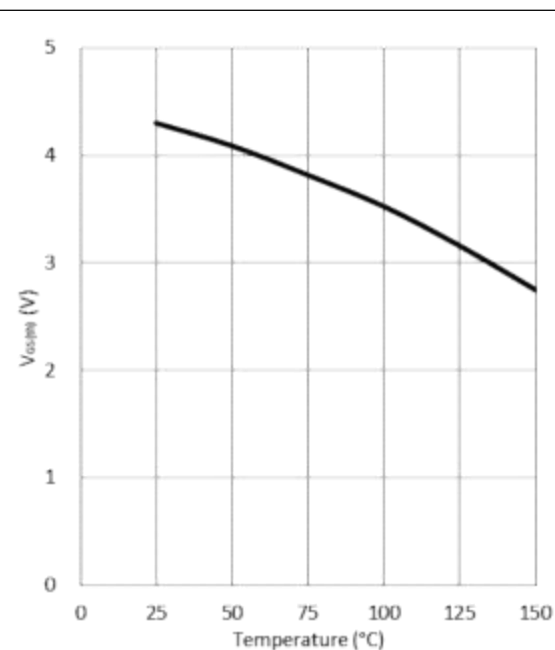
Parameter: V_{GS}

Figure 3. Typical Transfer Characteristics



$V_{DS}=10\text{V}$, Parameter: T_J

Figure 4. $V_{GS(th)}$ Vs Temperature Characteristics



$V_{DS}=10\text{V}$, Parameter: T_J

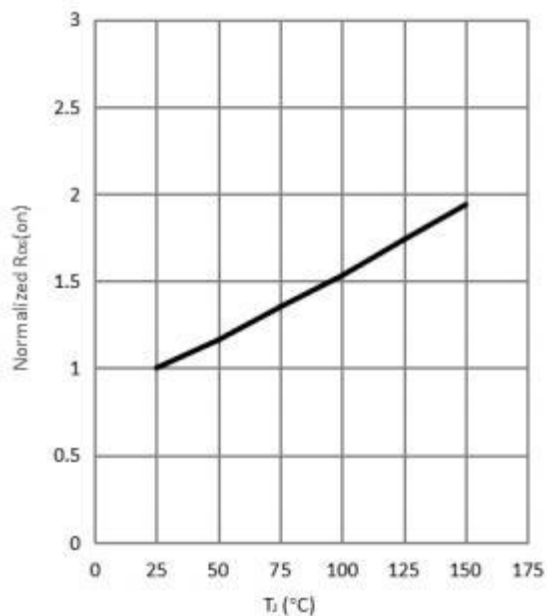
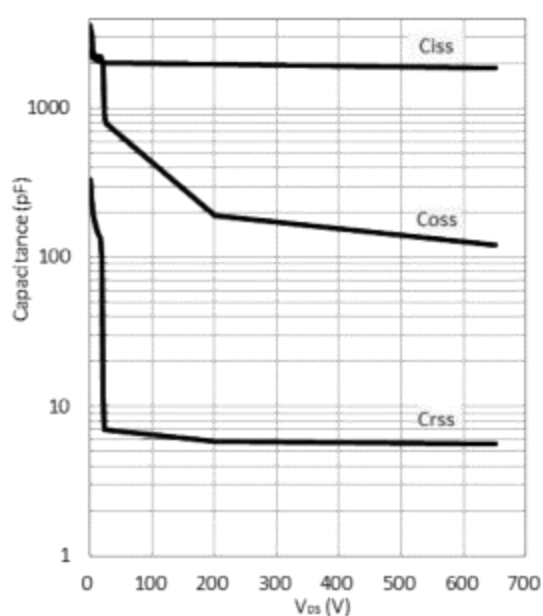
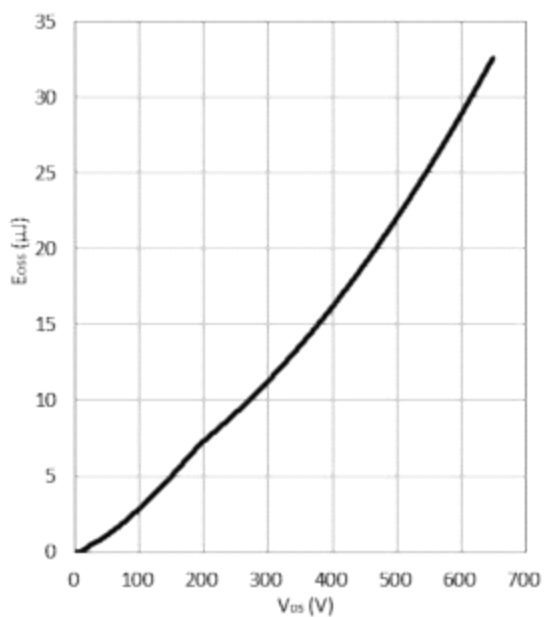
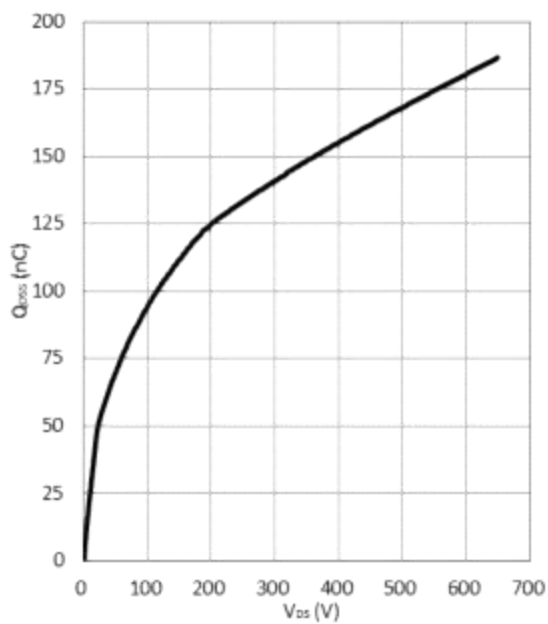
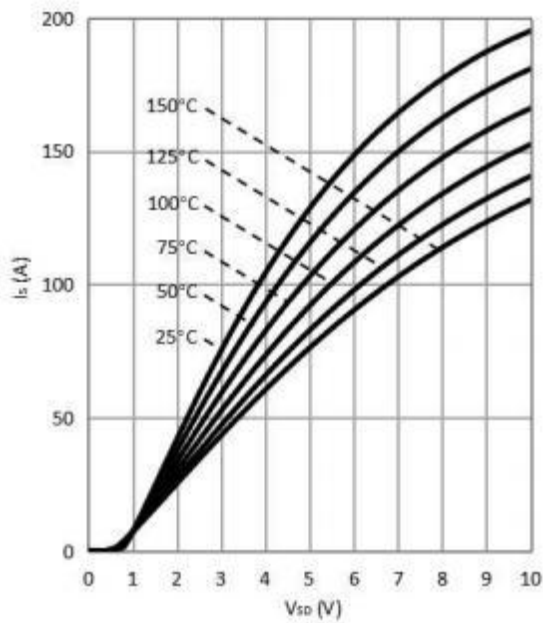
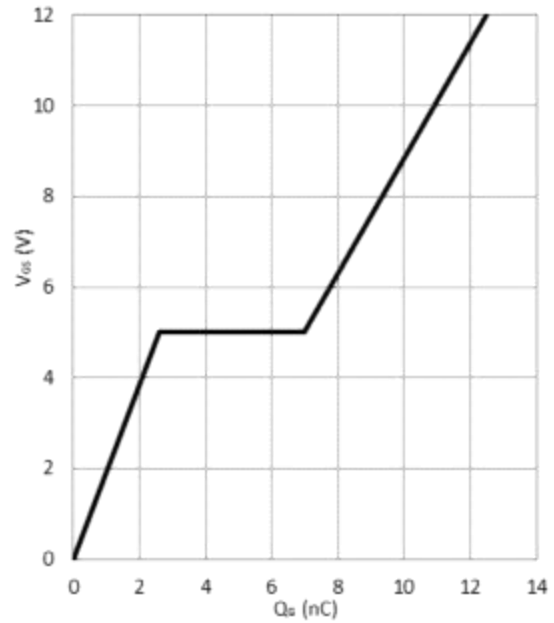
Figure 5. Normalized On-resistance

 $I_D=4A, V_{GS}=12V$
Figure 6. Typical Capacitance

 $V_{GS}=0V, f=1MHz$
Figure 7. Typical Coss Stored Energy

 $V_{GS}=0V, f=1MHz$
Figure 8. Typical Qoss

 $V_{GS}=0V, f=1MHz$

Figure 9. Forward Characteristic of Rev. Diode


$$I_s = f(V_{SD}), \text{ Parameter } T_j$$

Figure 10. Typical Gate Charge


$$I_{DS}=36A, V_{DS}=400V$$

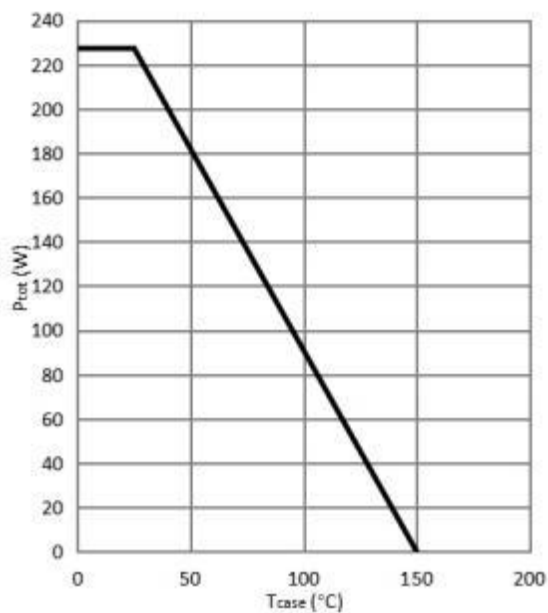
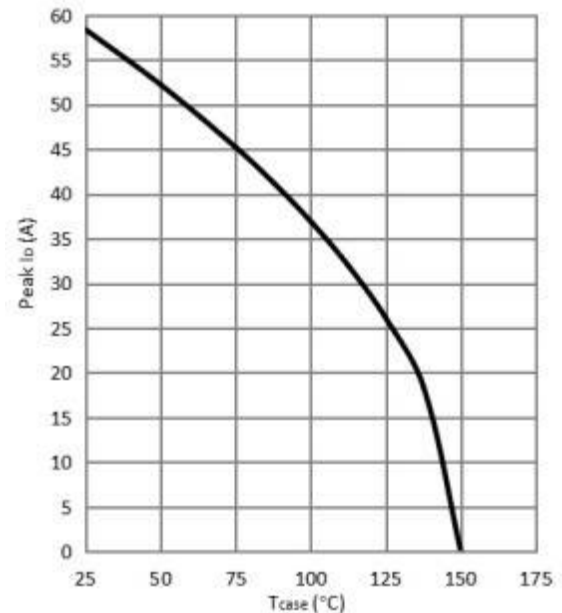
Figure 11. Power Dissipation

Figure 12. Current Derating


Figure 13. Transient Thermal Resistance

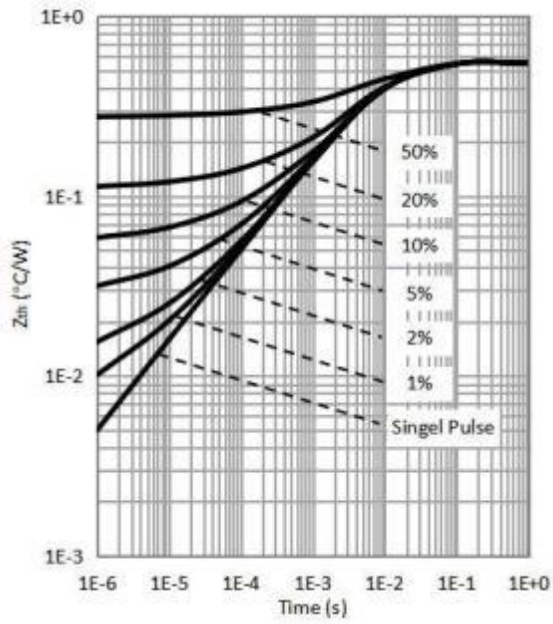
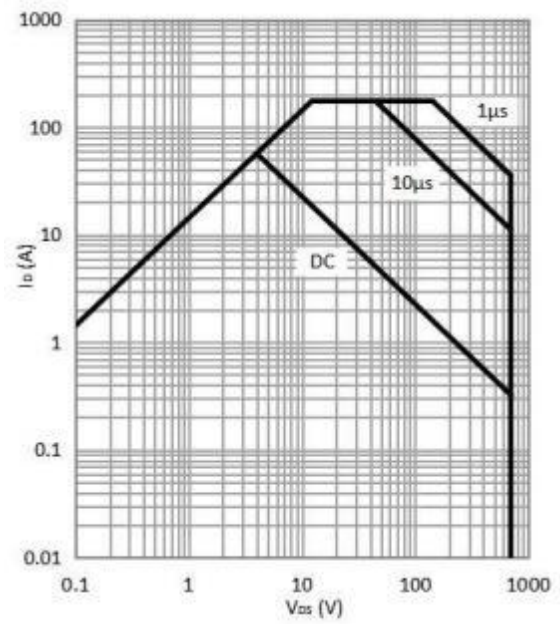
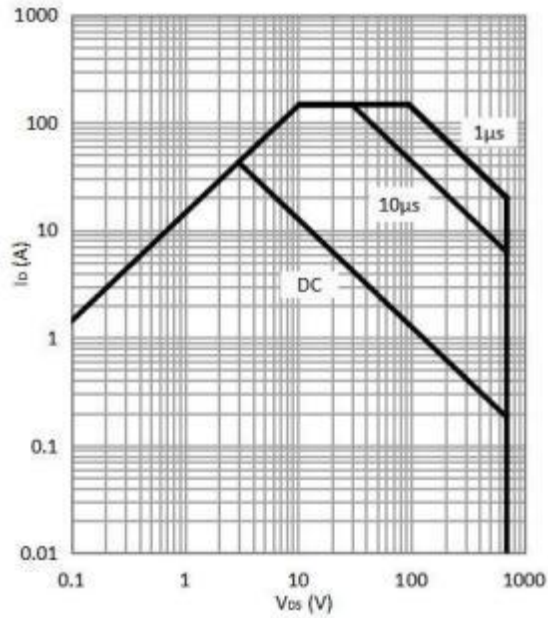


Figure 14. Safe Operating Area $T_c=25^\circ\text{C}$



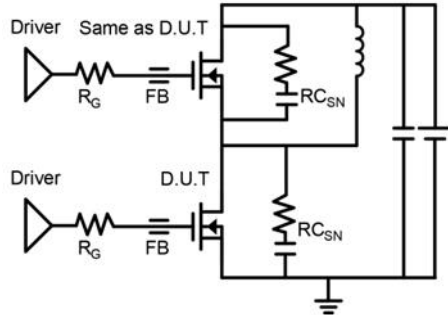
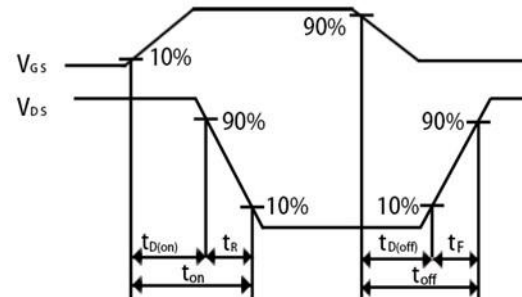
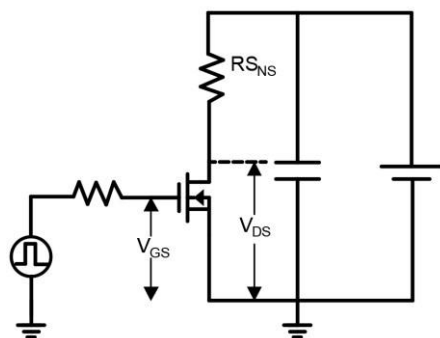
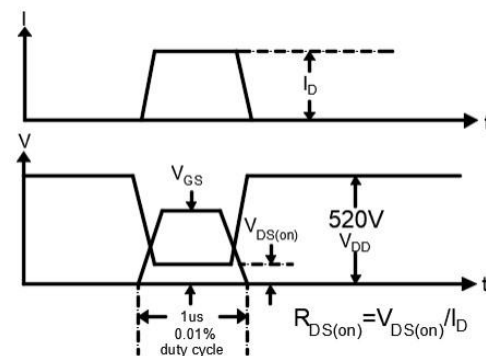
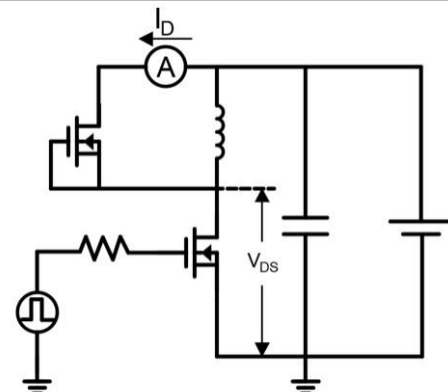
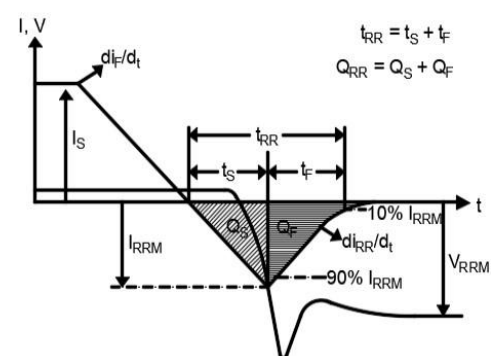
calculated based on thermal limit

Figure 15. Safe Operating Area $T_c=80^\circ\text{C}$

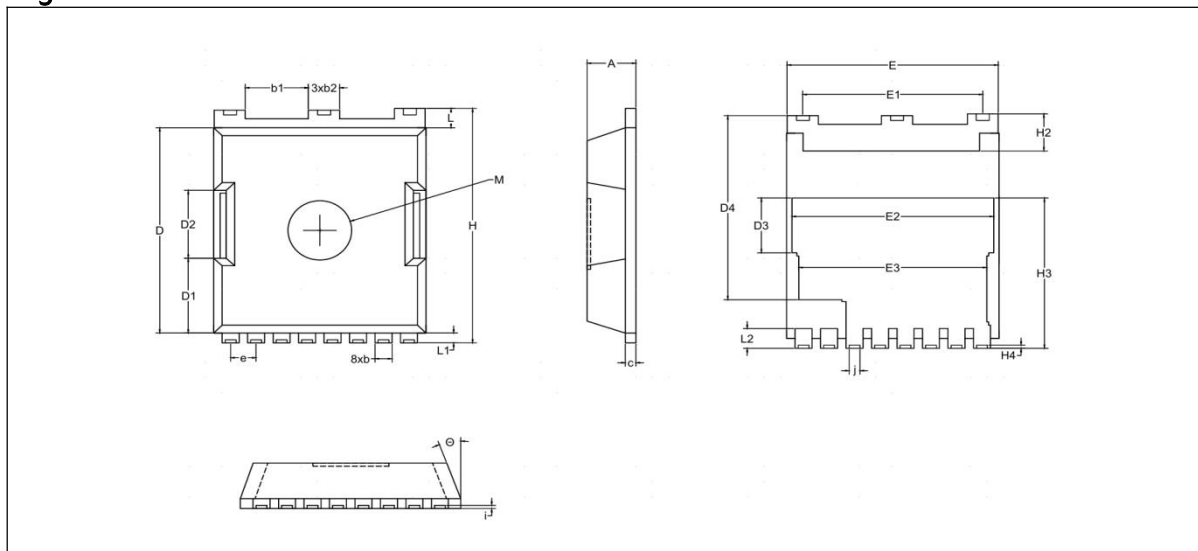


calculated based on thermal limit

Test Circuits and Waveforms

Figure 16. Switching Time Test Circuit

Figure 17. Switching Time Waveform

Figure 18. Dynamic $R_{DS(on)}$ Test Circuit

Figure 19. Dynamic $R_{DS(on)}$ Waveform

Figure 20. Diode Characteristic Test Circuits

Figure 21. Diode Recovery Waveform


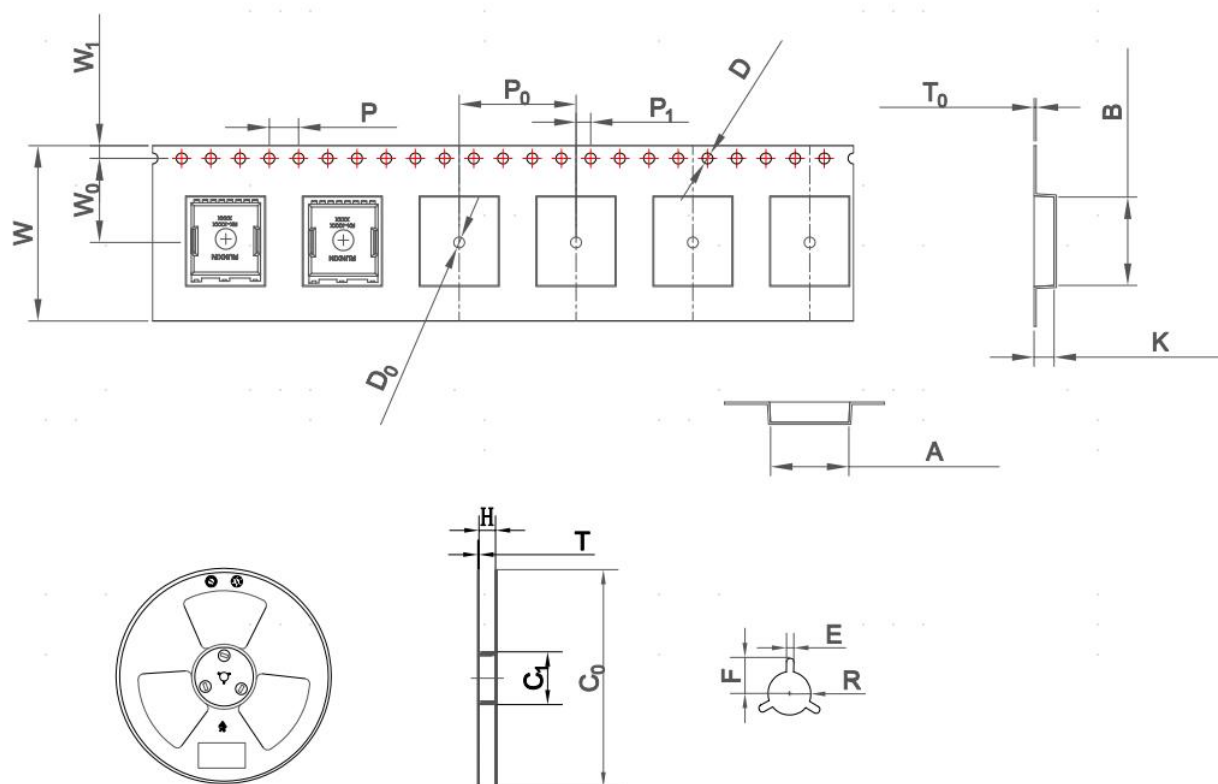
Package Outline



SYMBOL	Millimeter		
	Min	Nom	Max
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	3.00	3.10	3.20
b2	1.10	1.20	1.30
c	0.40	0.50	0.60
D	10.28	10.38	10.58
D1	4.18REF		
D2	3.30 REF		
D3	2.77REF		
D4	9.03REF		
E	9.70	9.90	10.10
E1	8.50REF		
E2	9.40REF		
E3	8.50REF		
e	1.10	1.20	1.30
H	11.48	11.68	11.88
H2	1.10	1.20	1.30
H3	7.50	7.60	7.70
H4	0.13	0.23	0.33
i	0.10	-	-
j	0.42	0.45	0.50
L	0.50	0.70	0.90
L1	0.50	0.60	0.70
L2	1.05	1.20	1.30
M	3REF		
e	10°REF		

Tube Information

Dimensions are shown in millimeters


Tape Dimension(mm)

W	24±0.1	P	4±0.1	A	10.7±0.1
W ₀	11.5±0.1	P ₀	16±0.1	B	12.1±0.1
W ₁	1.75±0.1	P ₁	2±0.1	D ₀	1.5±0.1
K	2.75±0.1	D	1.5±0.1	T ₀	0.30±0.03

Reel Dimension(mm)

H	26±0.1	F	10.5±0.1
T	2±0.2	E	2.8±0.1
C ₀	330±3	R	6.5±0.1
C ₁	100±1		

Revision History

Version	Date	Change(s)
0.5	2025/09/25	Release preliminary datasheet

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.