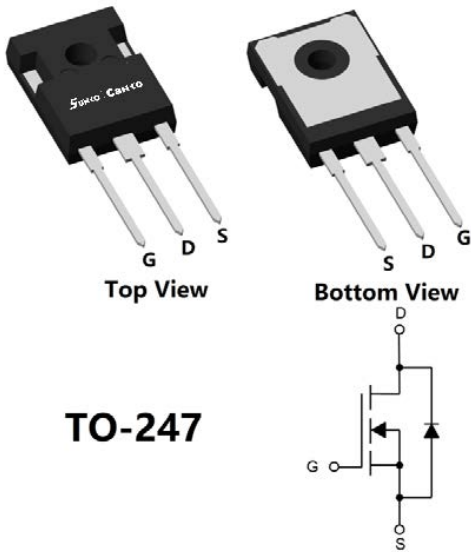


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 600V
- I_D 102A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 18.5m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- EV Charger
- AC-DC Power Management
- Server/Telecom/PC Power

Limiting Values

Parameter	Conditions	Symbol	Min	Max	Unit	
Drain-source Voltage		V_{DS}	-	600	V	
Gate-source Voltage		V_{GS}	-20	20		
Continuous Drain Current (Note 1,2)	Steady-State	I_D	$T_A=25^\circ C, V_{GS}=10V$	-	8.2	A
			$T_A=100^\circ C, V_{GS}=10V$	-	5.2	
Continuous Drain Current (Note 1,3)	Steady-State		$T_C=25^\circ C, V_{GS}=10V, \text{Chip limitation}$	-	102	
			$T_C=100^\circ C, V_{GS}=10V$	-	64.5	
Pulsed Drain Current	$T_C=25^\circ C, t_p \leq 10\mu s$	I_{DM}	-	408		
Maximum Body-Diode Continuous Current	$T_C=25^\circ C$	I_S		102		
Maximum Body-Diode Pulsed Current	$T_C=25^\circ C, t_p \leq 10\mu s$	I_{SM}	-	408		
Avalanche energy (non-repetitive)	$T_J=25^\circ C, V_G=10V, R_G=25\Omega, L=30mH, I_{AS}=12A$	EAS	-	2160	mJ	
Total Power Dissipation (Note 1,2)	Steady-State	P_D	$T_A=25^\circ C$	-	3.1	W
			$T_A=100^\circ C$	-	1.2	
Total Power Dissipation (Note 1,3)	Steady-State		$T_C=25^\circ C$	-	480	
			$T_C=100^\circ C$	-	192	
MOSFET dv/dt ruggedness	$V_{DS}=0 \dots 300V, R_G=0\Omega$	dv/dt	-	50	V/ns	
Reverse diode dv/dt	$V_{DS}=0 \dots 300V, I_D \leq 100A, di/dt=200A/\mu s$	dv/dt	-	28		
Maximum diode commutation speed	$V_{DS}=0 \dots 300V, I_D \leq 100A, R_G=0\Omega$	dif/dt	-	6940	A/ μs	
Junction and Storage Temperature Range		T_J, T_{STG}	-55	150	$^\circ C$	

Thermal resistance

Parameter	Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	$R_{\theta JA}$	-	40	$^\circ C/W$
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	0.26	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCW018C60CF	B1	YJW018C60CF	30	360	1800	Tube

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =1mA, T _j =25°C	600	-	-	V
		V _{GS} = 0V, I _D =30mA, T _j =25°C	600	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V, T _j =25°C	-	-	10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V, T _j =25°C	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =1mA, T _j =25°C	3	-	5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =58A, T _j =25°C	-	15.5	18.5	mΩ
		V _{GS} =10V, I _D =58A, T _j =150°C	-	38.64	46.12	
Diode Forward Voltage	V _{SD}	I _S =58A, V _{GS} =0V, T _j =25°C	-	0.99	1.3	V
Gate resistance	R _G	f=1MHz, T _j =25°C	-	0.9	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =300V, V _{GS} =0V, f=1MHz, T _j =25°C	-	11085	-	pF
Output Capacitance	C _{oss}		-	190	-	
Reverse Transfer Capacitance	C _{rss}		-	10	-	
Effective output capacitance, energy related	C _{o(er)}	V _{DS} =0...300V, V _{GS} =0V, f=1MHz, T _j =25°C	-	546	-	pF
Effective output capacitance, time related	C _{o(tr)}		-	5340	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =300V, I _D =58A, T _j =25°C	-	278.3	-	nC
Gate-Source Charge	Q _{gs}		-	69.5	-	
Gate-Drain Charge	Q _{gd}		-	132.7	-	
Reverse Recovery Charge	Q _{rr}	I _F =58A, di/dt=100A/us, V _{GS} =0V, V _R =300V, T _j =25°C	-	1588	-	nC
Reverse Recovery Time	t _{rr}		-	200	-	ns
Peak Reverse Recovery Current	I _{rrm}		-	12	-	A
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DS} =300V, I _D =58A, R _{GEN} =3Ω, T _j =25°C	-	140	-	ns
Turn-on Rise Time	t _r		-	32	-	
Turn-off Delay Time	t _{D(off)}		-	137	-	
Turn-off fall Time	t _f		-	6.5	-	

Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- The value of R_{θJA} is measured in the still air environment with TA =25°C. The maximum allowed junction temperature of 150°C.
- Thermal resistance from junction to soldering point (on the exposed drain pad)

Typical Electrical and Thermal Characteristics Diagrams

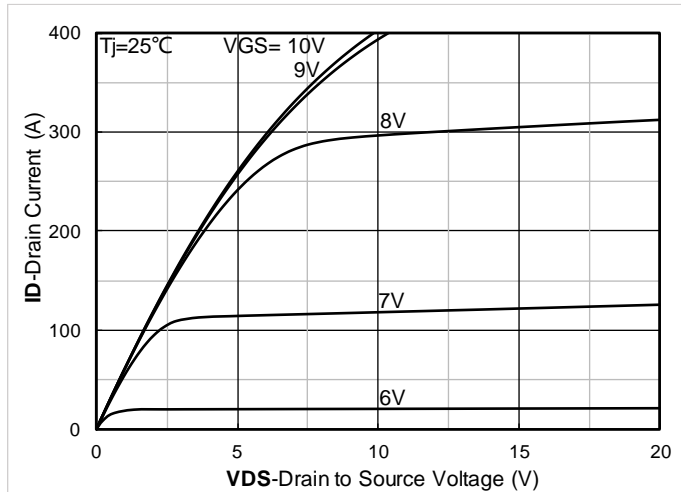


Figure 1. Output Characteristics; typical values

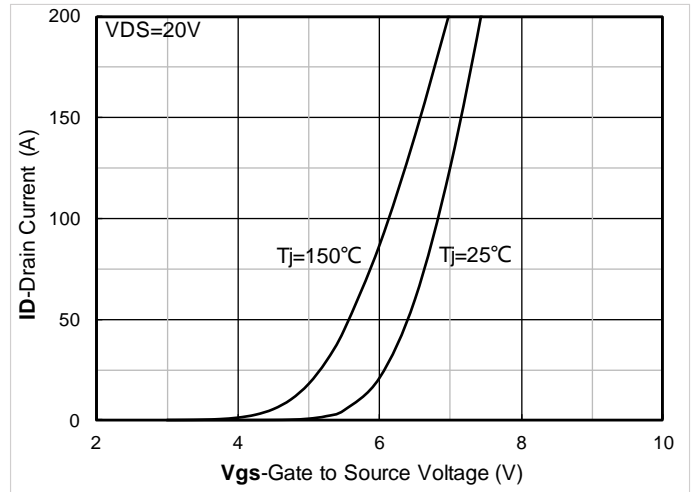


Figure 2. Transfer Characteristics; typical values

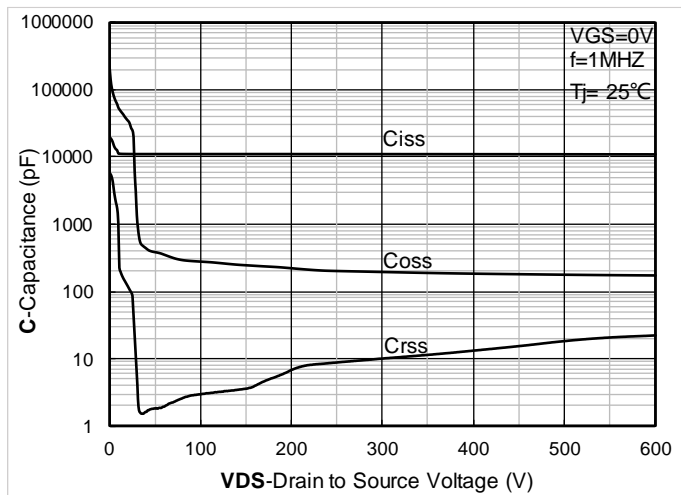


Figure 3. Capacitance Characteristics; typical values

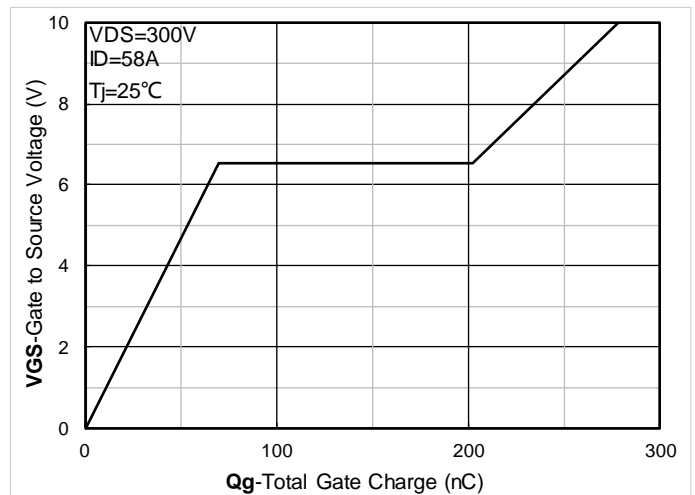


Figure 4. Gate Charge; typical values

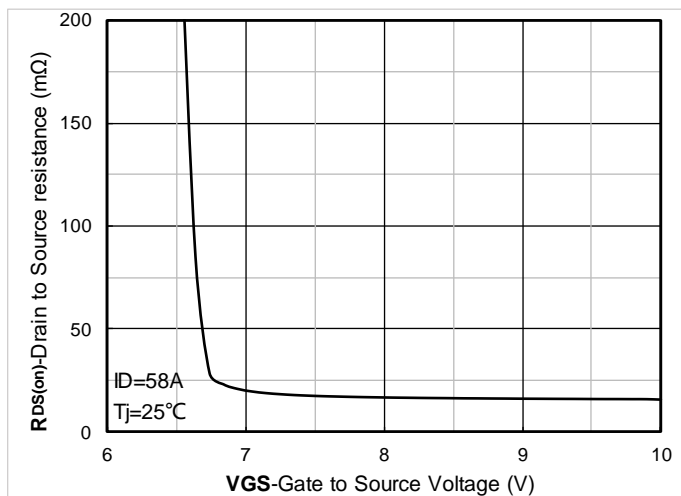


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

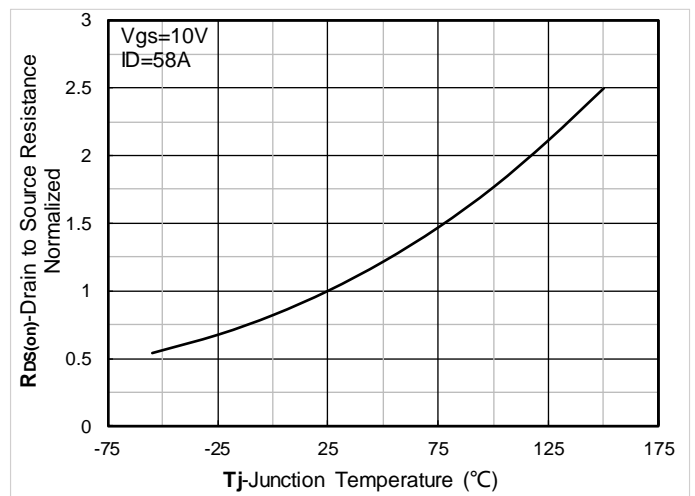


Figure 6. Normalized On-Resistance

SCW018C60CF

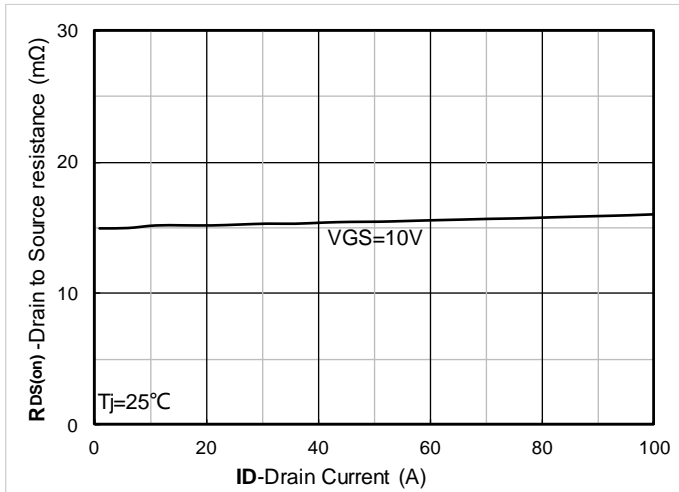


Figure 7. RDS(on) VS Drain Current; typical values

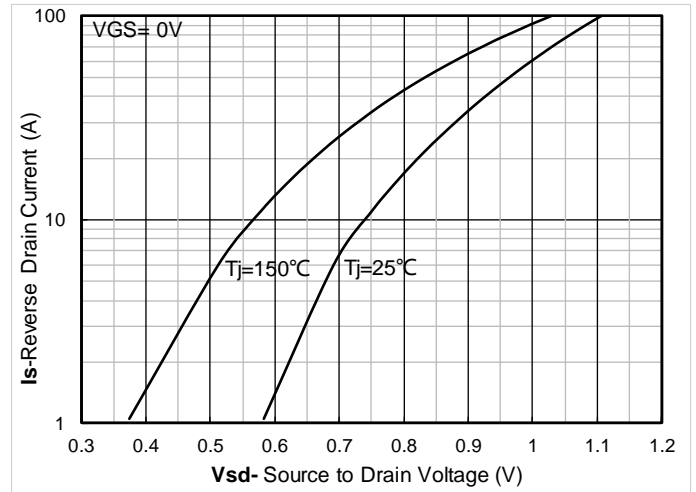


Figure 8. Forward characteristics of reverse diode; typical values

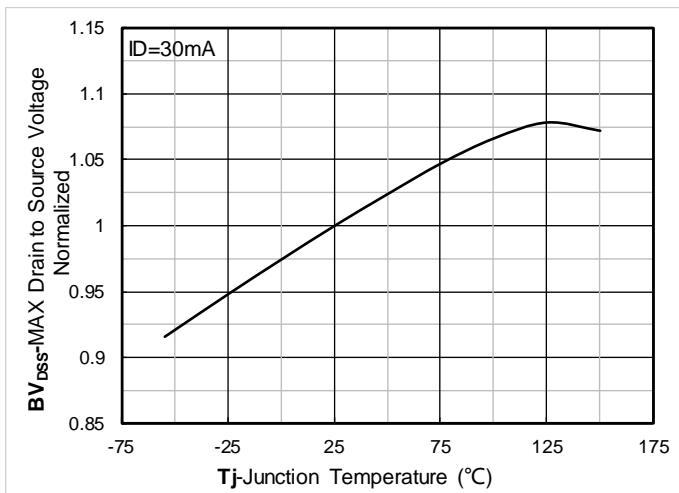


Figure 9. Normalized breakdown voltage

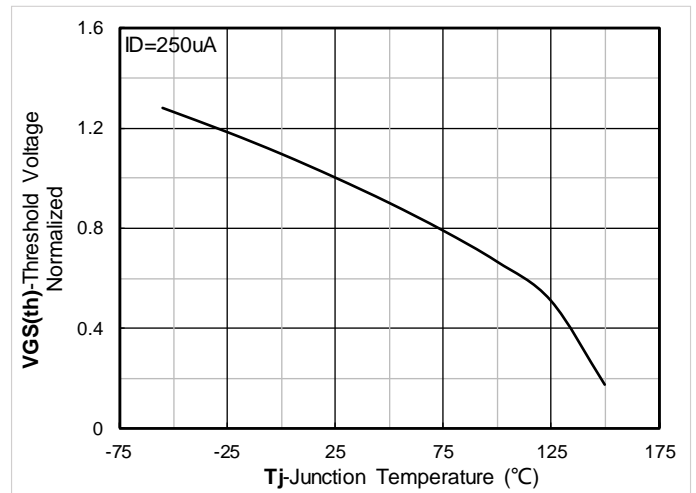


Figure 10. Normalized Threshold voltage

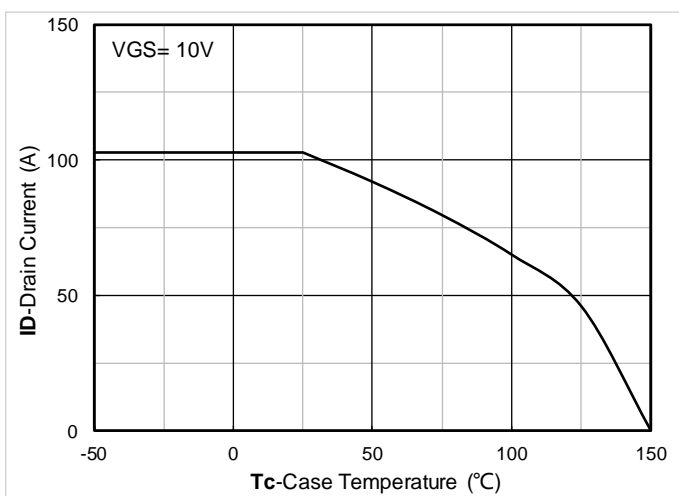


Figure 11. Current dissipation

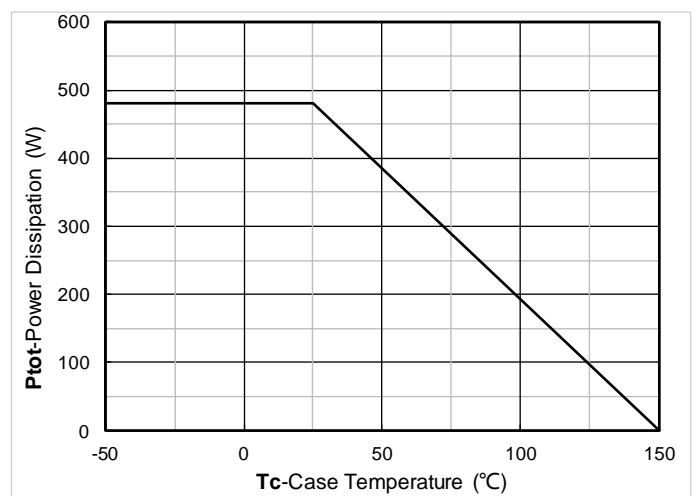


Figure 12. Power dissipation

SCW018C60CF

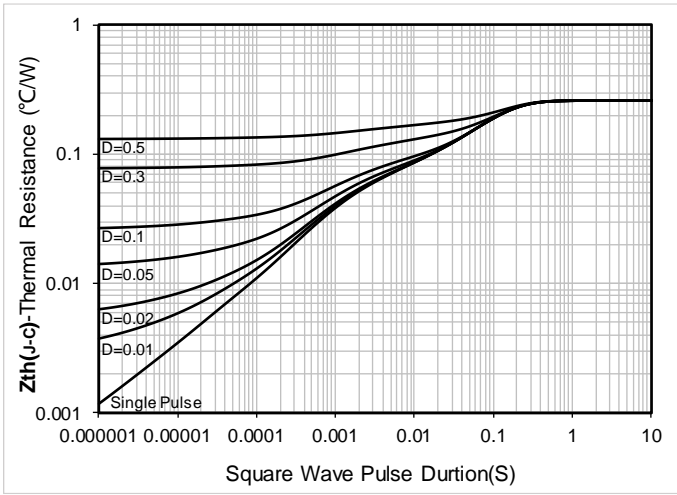


Figure 13. Maximum Transient Thermal Impedance

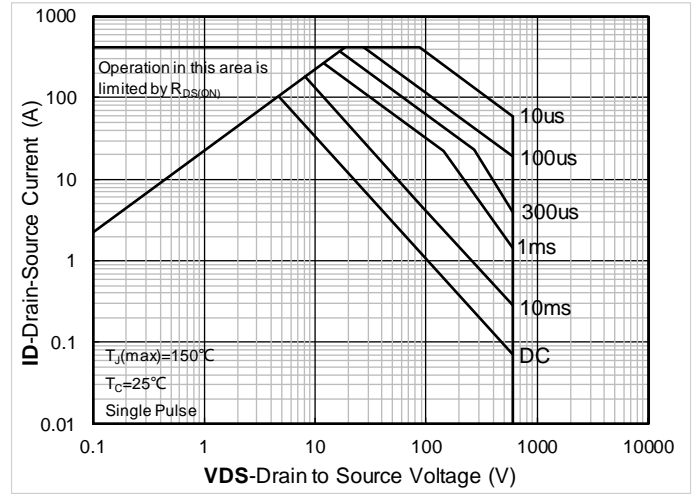


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

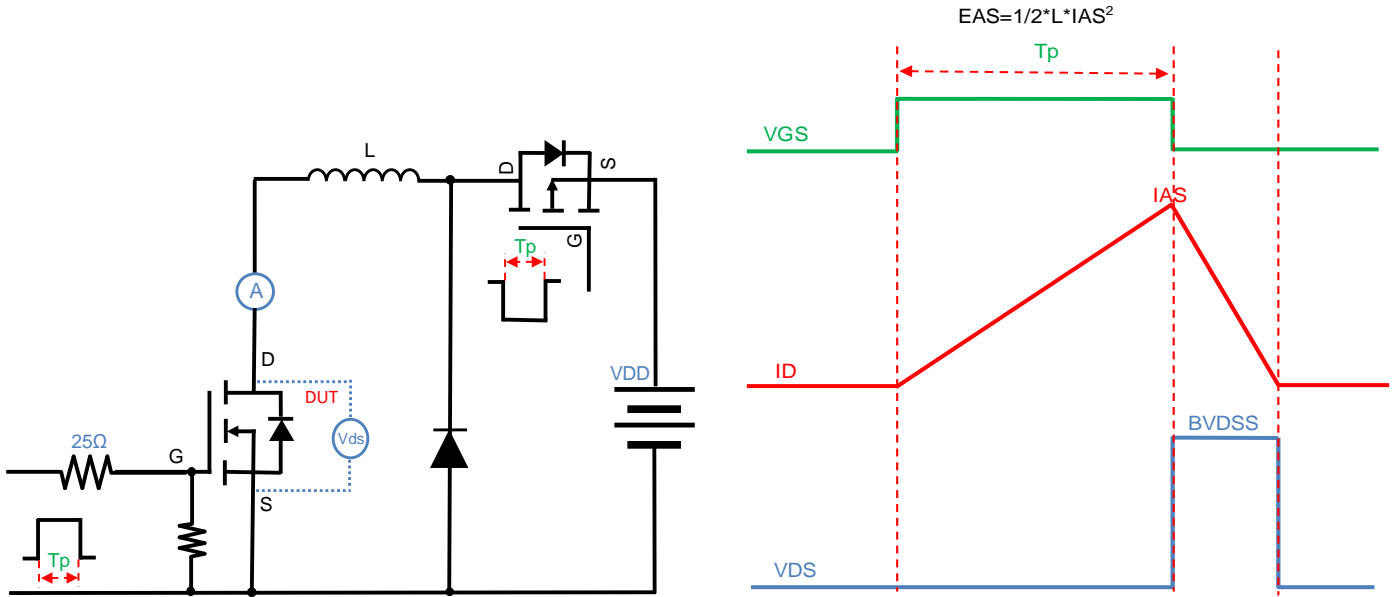


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

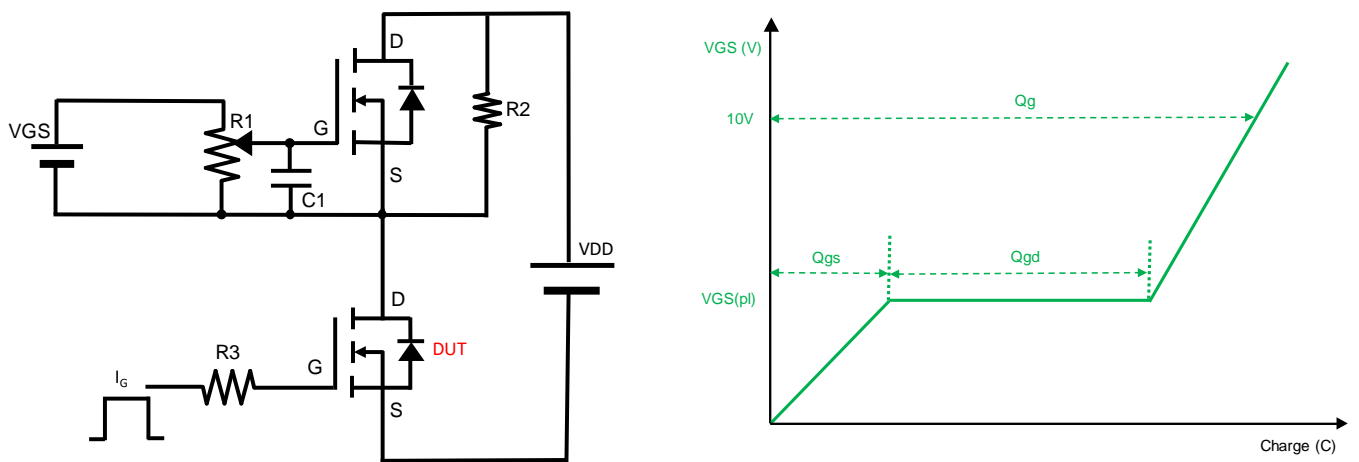


Figure B. Gate Charge Test Circuit & Waveform

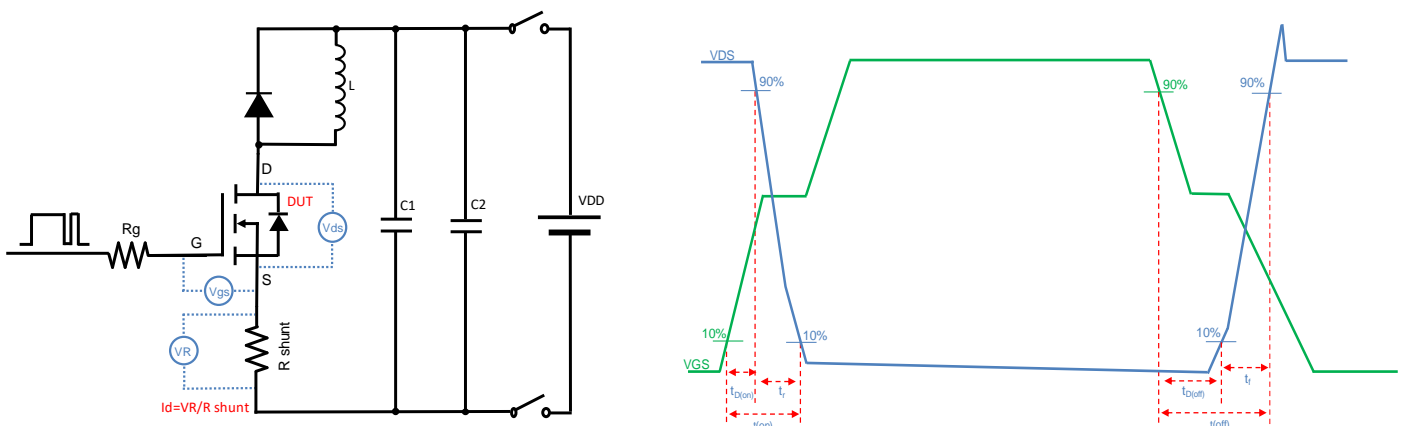


Figure C. Resistive Switching Test Circuit & Waveform

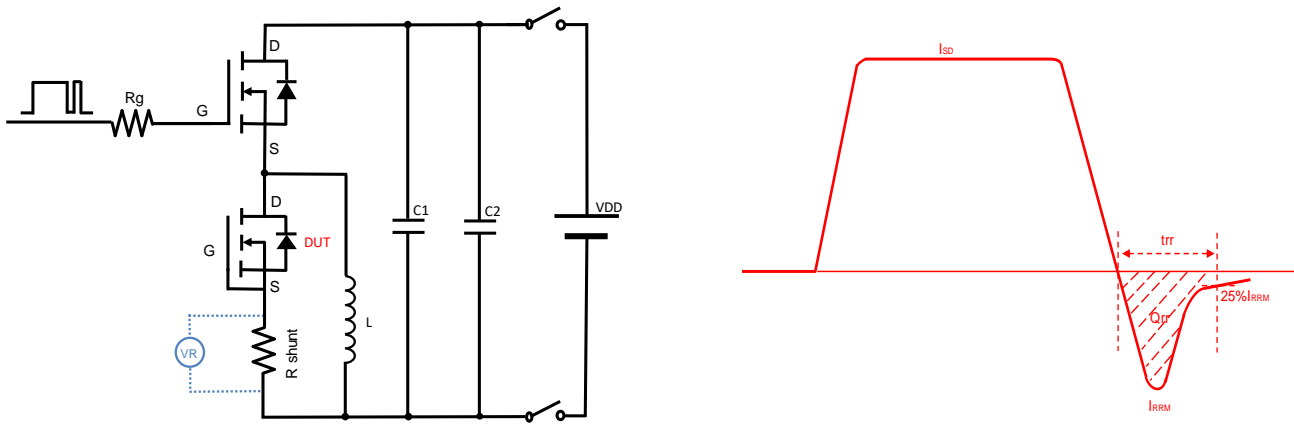
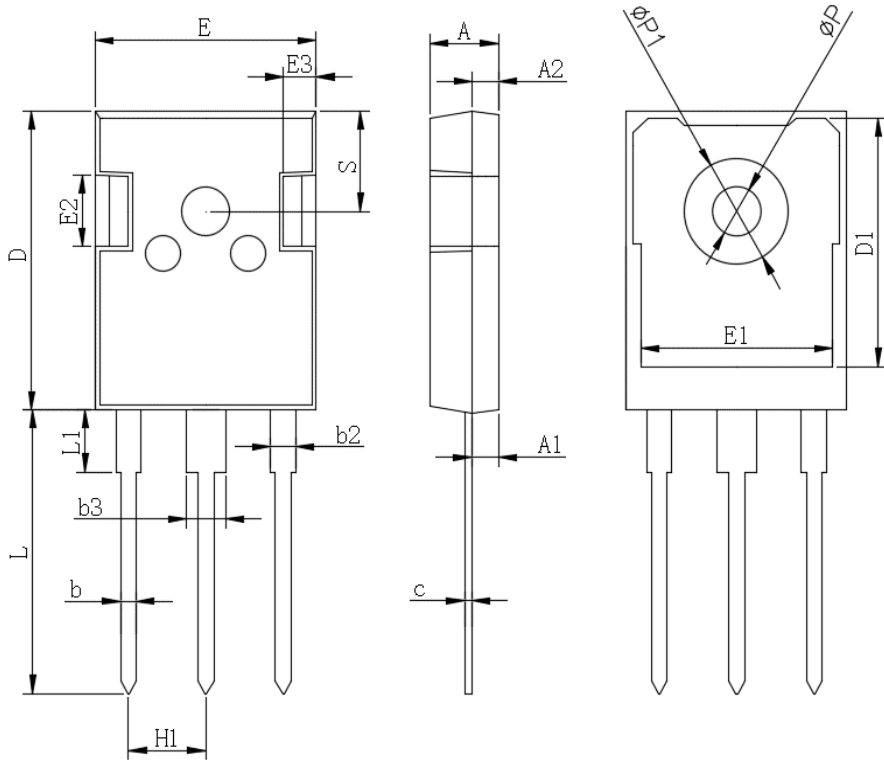


Figure D. Diode Recovery Test Circuit & Waveform

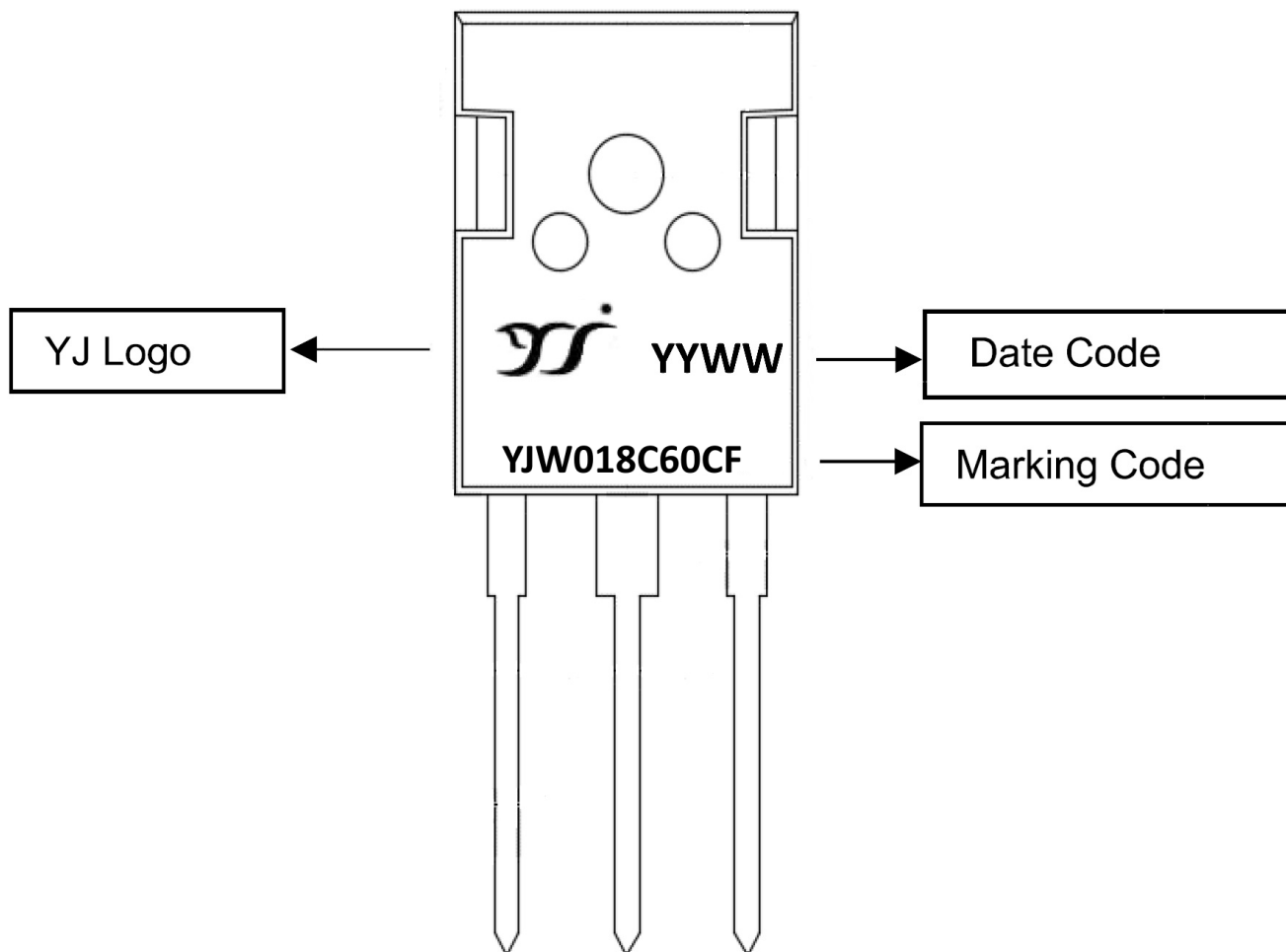
■ TO-247AB Package information

TO-247AB



TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
c	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ϕP	3.40	3.80
$\phi P1$	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. YJW018C60CF is Marking Code, YYWW is date code, "YY" is year, "WW" is week
4. Body color: Black