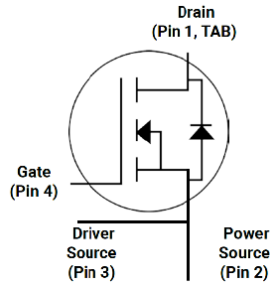
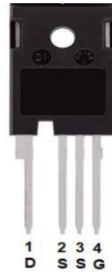


Product Summary

Product Type	V _{DS}	I _D	R _{DS(ON)}	Package	Product Type
ATSCM60G65W	650V	51A	59mΩ	TO247-4	ATSCM60G65W



Features

- High Blocking Voltage
- High Frequency Operation
- Low on-resistance
- Fast intrinsic diode with low reverse recovery

Benefits

- Higher system efficiency
- Parallel device convenience without thermal runaway
- High Temperature Application
- Hard switching & higher Reliability
- Easy to drive.

Applications

- Motor Drives
- Solar / Wind Inverters
- Onboard EV Charger
- AC/DC converters
- DC/DC converters
- Uninterruptable power supplies

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

Parameter	Symbol	Test conditions	Value	Unit
Drain - Source Voltage	V _{DSmax}	V _{GS} =0V, I _D =100μA	650	V
Gate - Source Voltage (dynamic)	V _{GSmax}	AC (f>1 Hz)	-8 / +23	V
Gate - Source Voltage (static)	V _{GSop}	static	-4 / +18	V
Continuous Drain Current	I _D	V _{GS} = 18V, T _C =25°C V _{GS} = 18V, T _C =100°C	51 36	A
Pulsed Drain Current	I _{D(pulse)}	T _C =25°C	97	A
Short Circuit Capability	t _{SC}	V _{DD} =400V, V _{GS} =18V	9	μS
Short Circuit Capability	I _{DS}	V _{DD} =400V, V _{GS} =18V	300	A
Total power dissipation	P _D	T _C =25°C	208	W
Operating Junction Temperature	T _J		-55 to 175	°C
Storage Temperature	T _{STG}		-55 to 175	°C

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

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 100μA	650			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 5mA,	1.9	2.7	3.9	V
		V _{DS} = V _{GS} , I _D = 5mA, T _J = 150°C		2.0		
		V _{DS} = V _{GS} , I _D = 5mA, T _J = 175°C		1.9		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V,	0	1	100	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 18V, V _{DS} = 0V	0	10	200	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = -4V, V _{DS} = 0V	-200	-10	0	nA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 16V, I _D = 15 A		68		mΩ
		V _{GS} = 16V, I _D = 15 A, T _J = 150°C		68		
		V _{GS} = 16V, I _D = 15 A, T _J = 175°C		72		
		V _{GS} = 18V, I _D = 20 A		59	75	
		V _{GS} = 18V, I _D = 20 A T _J = 150°C		64		
		V _{GS} = 18V, I _D = 20 A T _J = 175°C		68		
Transconductance	g _{fs}	V _{DS} = 20V, I _D = 20 A		11		S
		V _{DS} = 20V, I _D = 20 A, T _J = 150°C		10.7		
		V _{DS} = 20V, I _D = 20 A, T _J = 175°C		10.5		
Input capacitance	C _{iss}	V _{DS} = 400V, V _{GS} = 0V f = 1MHz		1600		pF
Output capacitance	C _{oss}			145		
Reverse transfer capacitance	C _{rss}			11		
C _{oss} Stored Energy	E _{oss}			14		μJ
Total gate charge	Q _g	V _{DS} = 400V, V _{GS} = -4V / 18V I _D = 20 A,		78		nC
Gate-source charge	Q _{gs}			21		
Gate-drain charge	Q _{gd}			34		
Internal gate input resistance	R _{g(int)}	f = 1MHz, I _D = 0A		2.1		Ω
Turn-On Switching Energy	E _{ON}	V _{DS} = 400V , V _{GS} = -4V/18V, I _D = 20A, R _{G(ext)} = 2Ω, L=200μH		15		μJ
Turn-Off Switching Energy	E _{OFF}			12		
Turn-On Delay Time	t _{d(on)}			10		ns
Rise Time	t _r			8		
Turn-Off Delay Time	t _{d(off)}			19		
Fall Time	t _f			5		
Avalanche Capability	E _{AS}	V _{DD} = 100V, V _{GS} =20V, L=1mH		200		mJ
Avalanche Capability	I _{AV}			20		A

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode Forward Voltage	V _{SD}	V _{GS} = -4V, I _{SD} = 10A,		3.9		V
		V _{GS} = -4V, I _{SD} = 10A, T _J = 150°C		3.5		
		V _{GS} = -4V, I _{SD} = 10A, T _J = 175°C		3.4		
Continuous Diode Forward Current	I _S	V _{GS} = -4V		35		A
Reverse Recovery time	t _{rr}	V _{GS} = -4V, I _{SD} = 20A, V _R = 400V, dif/dt = 2000 A/μs		20		ns
Reverse Recovery Charge	Q _{rr}			160		nC
Peak Reverse Recovery Current	I _{rrm}			14		A

Thermal Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Thermal Resistance (per device)	R _{th(j-c)}	junction-case		0.6	0.75	°C/W

Typical Performance

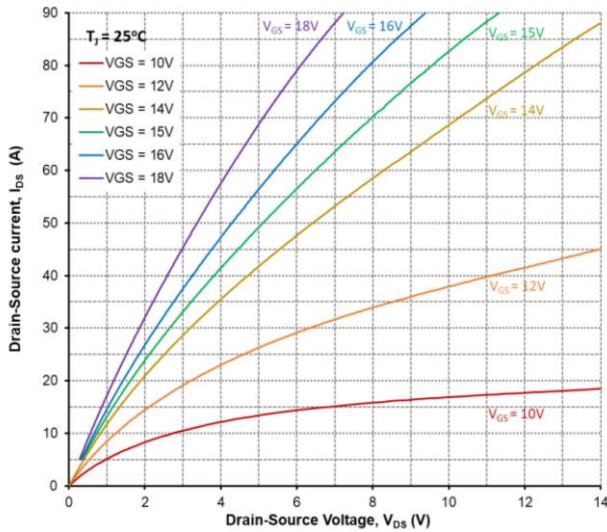


Figure 1 Output Characteristics, $T_J = 25^\circ\text{C}$

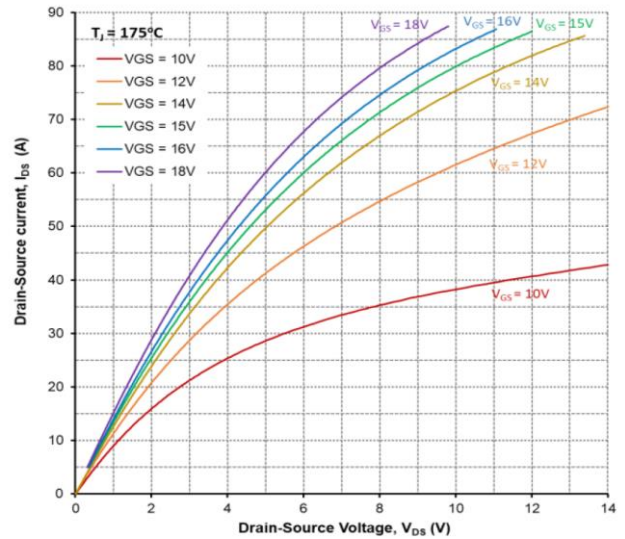


Figure 2 Output Characteristics, $T_J = 175^\circ\text{C}$

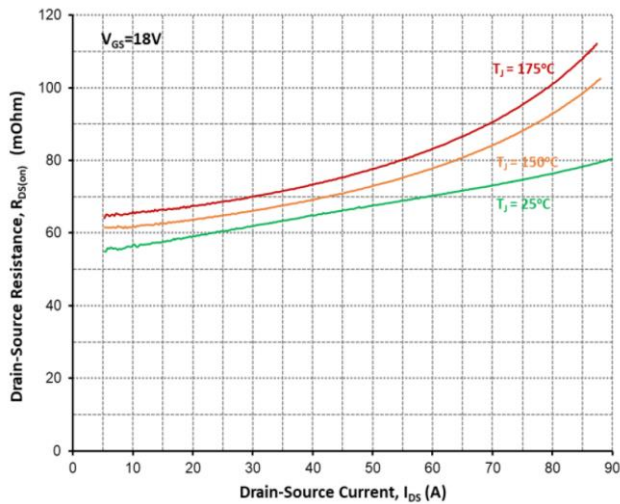


Figure 3. On-Resistance vs. Drain Current For Various Temperatures

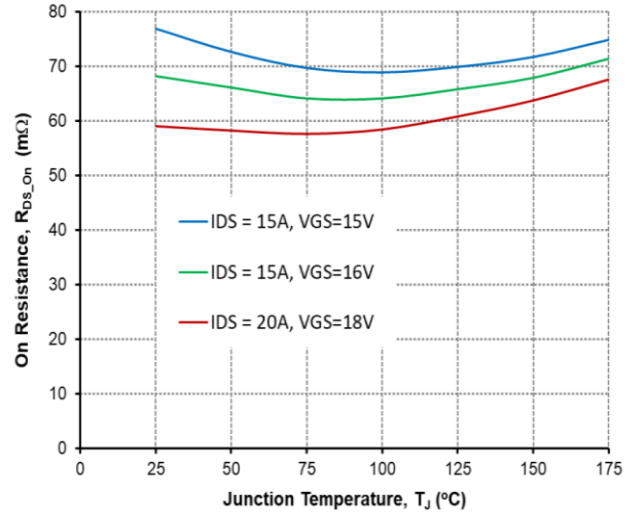


Figure 4. On-Resistance vs. Temperature

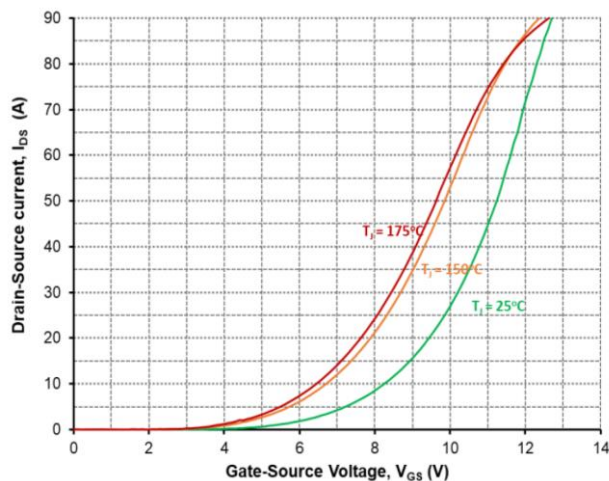


Figure 5. Transfer Characteristic For Various Junction Temperatures

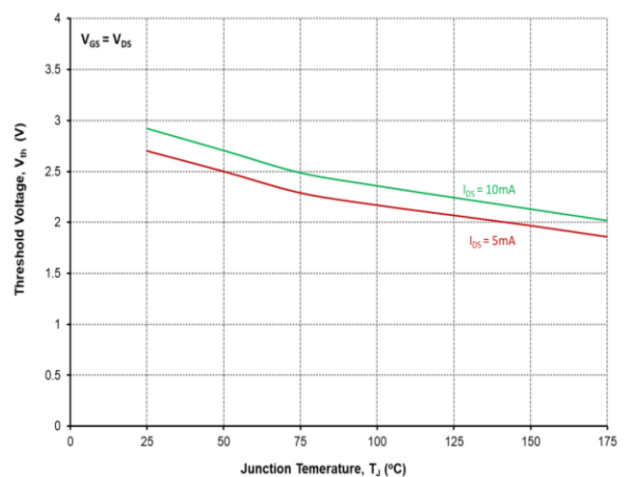
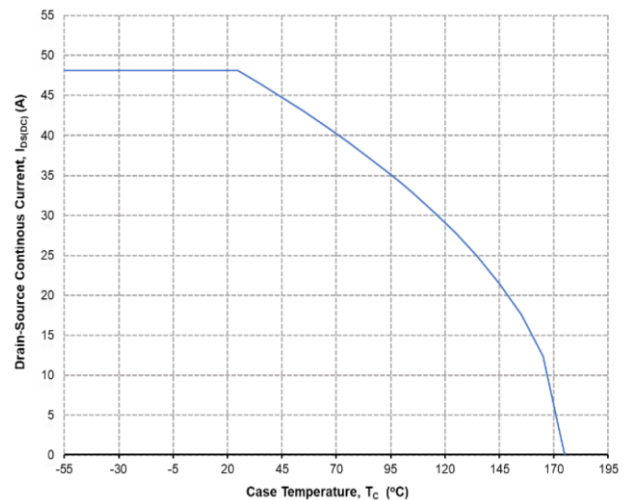
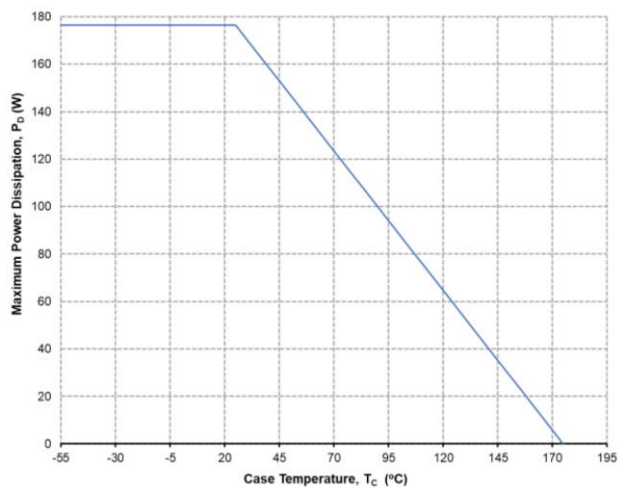
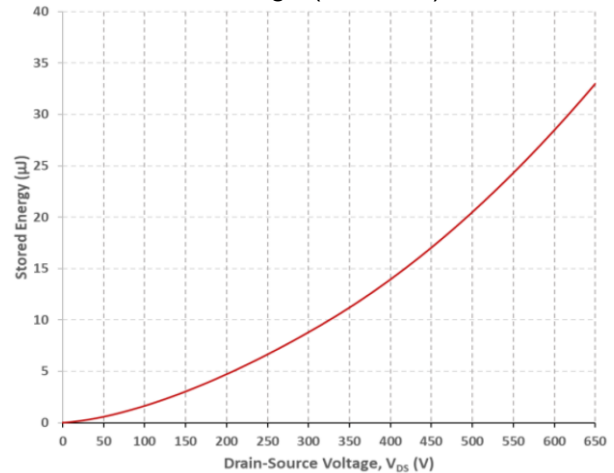
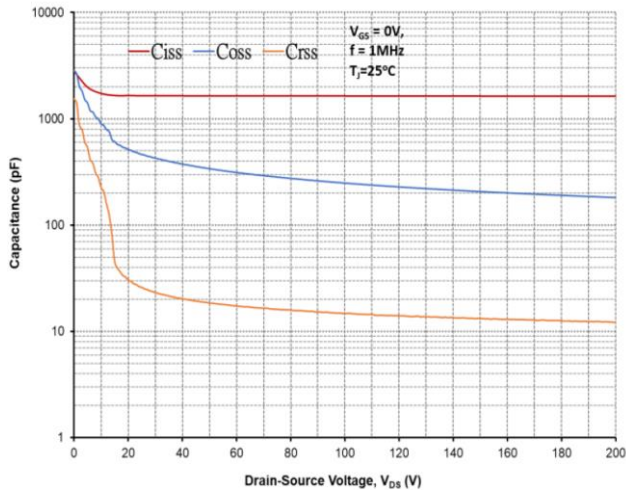
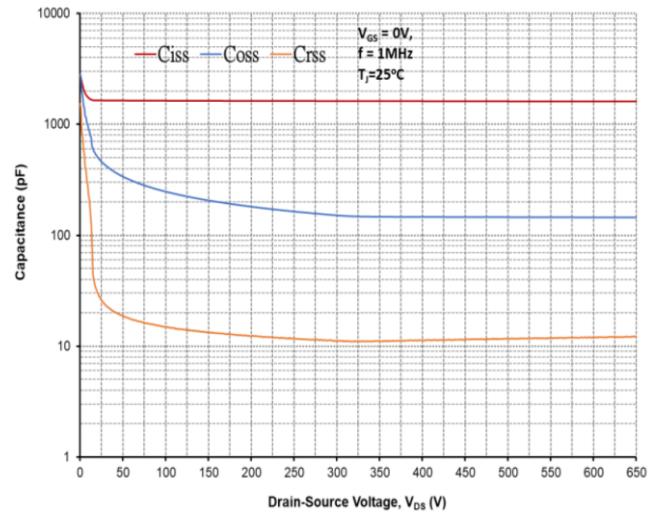
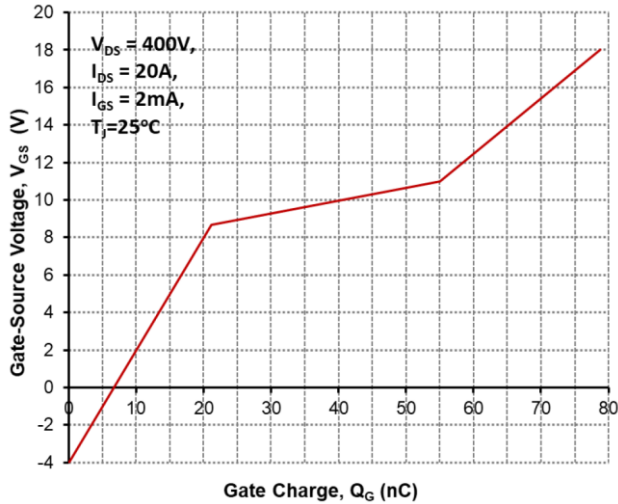


Figure 6. Threshold Voltage vs. Temperature

Typical Performance



Typical Performance

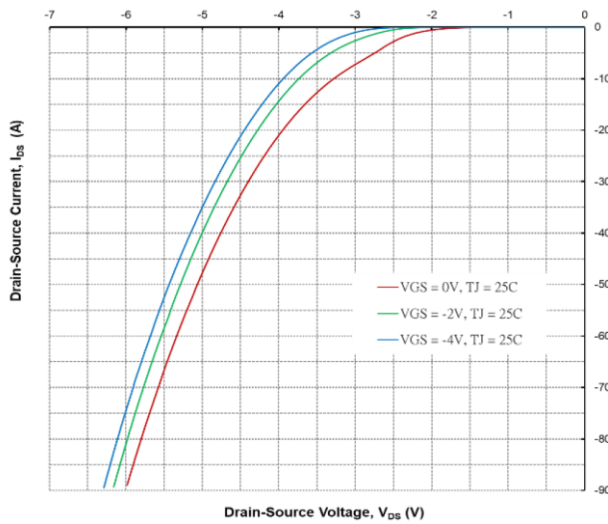


Figure 13. Body Diode Characteristics @ 25°C

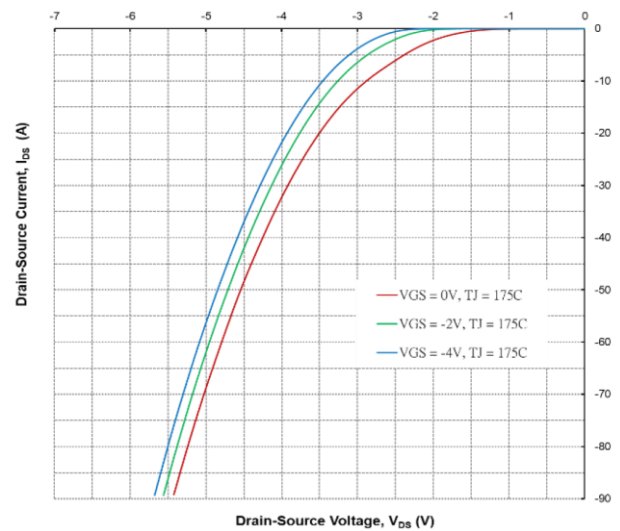


Figure 14. Body Diode Characteristics @ 175°C

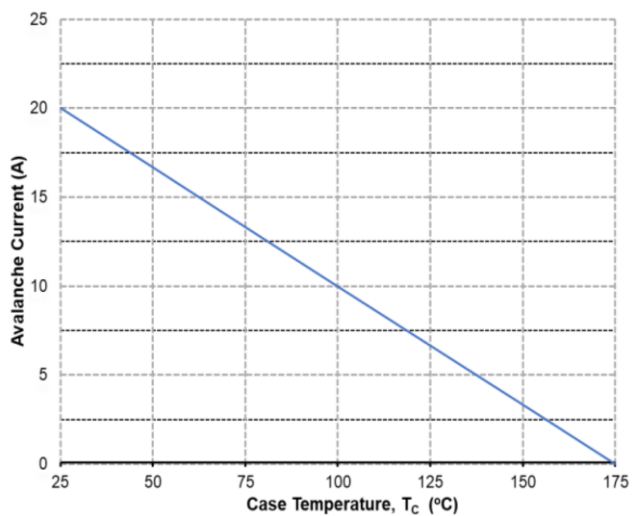


Figure 15. Single Avalanche vs. Temperature

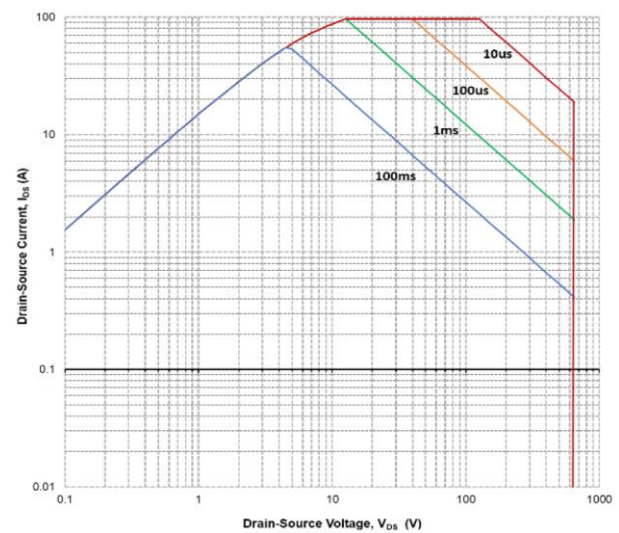
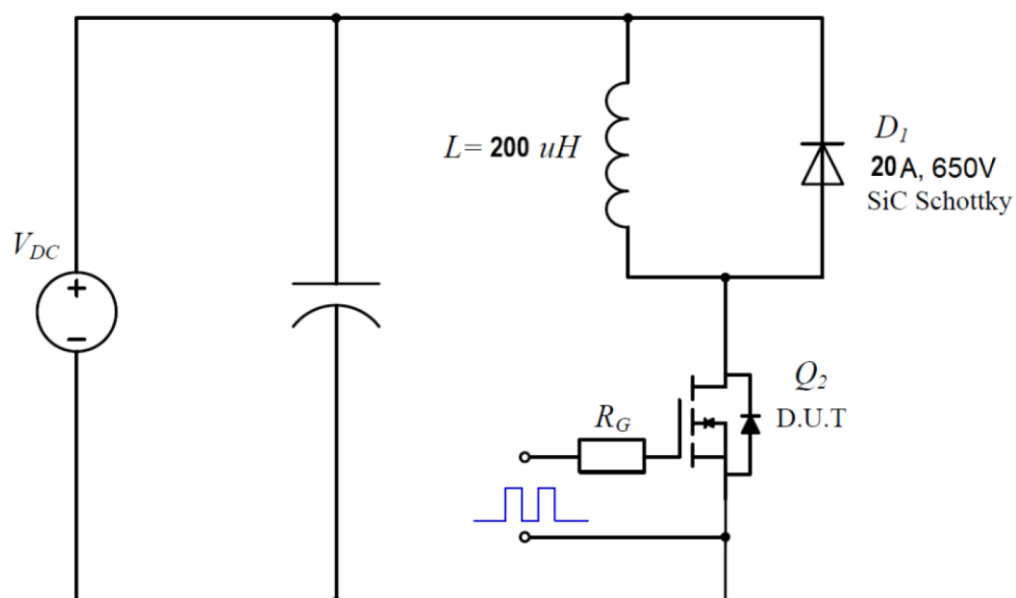
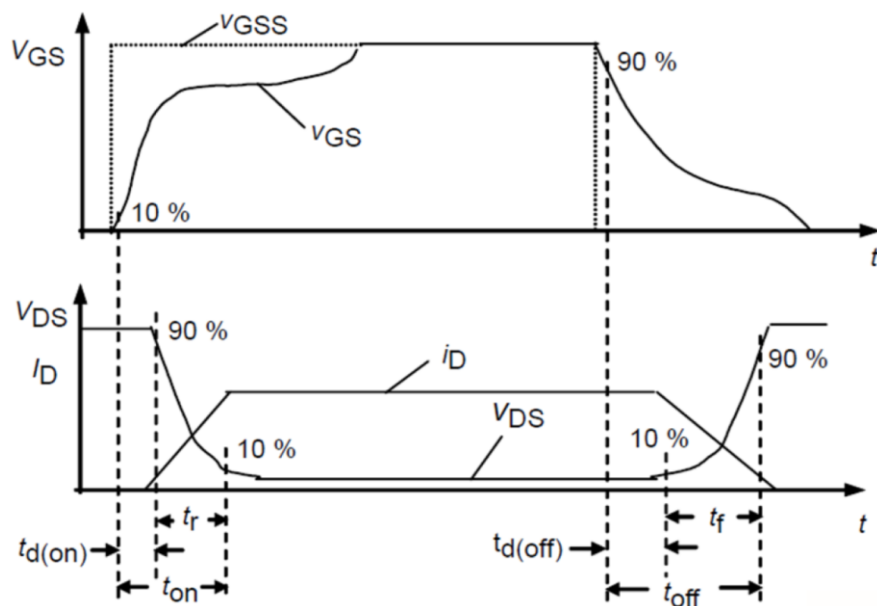
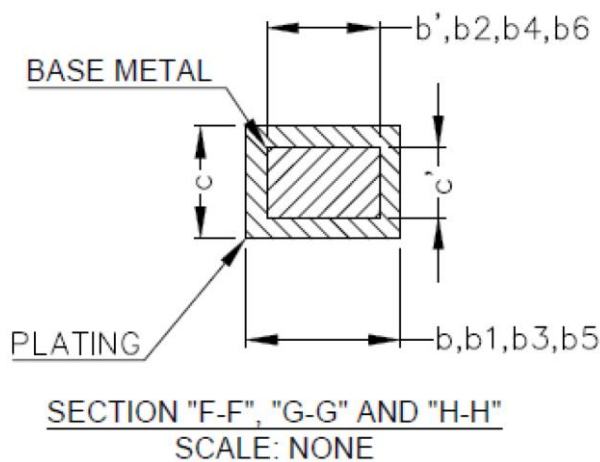
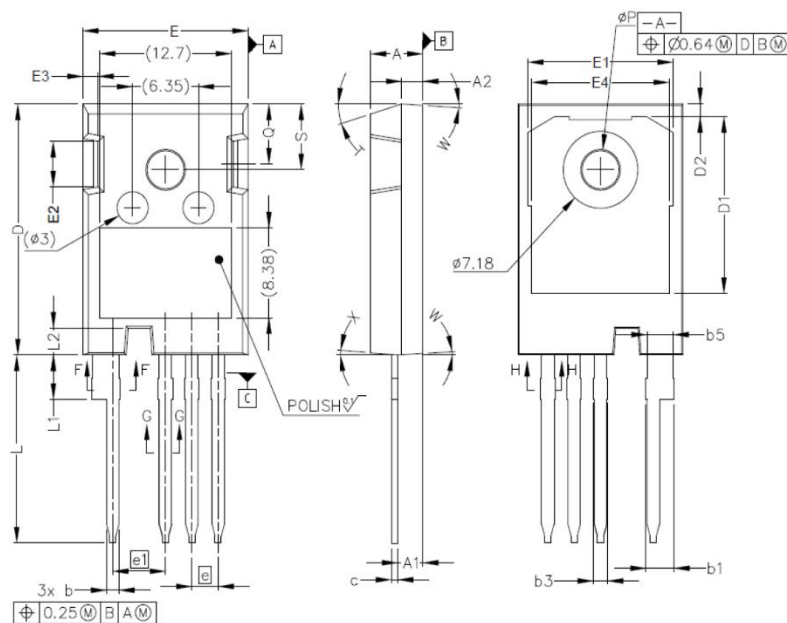


Figure 16. Safe Operating Area

Switching Times Definition and Test Circuit



Package Dimensions (TO-247-4 Package)



SYMBOL	MILLIMETERS	
	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	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
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	2.54 BSC	
e1	5.08 BSC	
N	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
ϕP	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.	