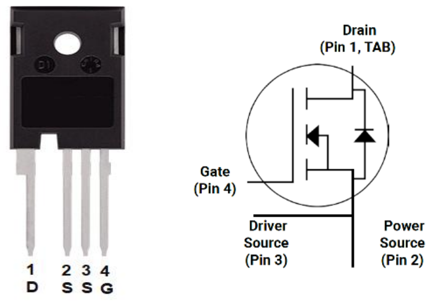
Product Summary

V_{DS} = 1200 V
I_D@25°C = 102A
$R_{DS(ON)}$ = 20mΩ
AEC-Q101 in Progress



TO-247-4

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
- EV Charging Station
- 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	1200	V
Gate - Source Voltage (dynamic)	V_{GSmax}	AC (f>1 Hz)	-10 / +25	V
Gate - Source Voltage (static)	V_{GSop}	static	-5 / +20	V
Continuous Drain Current	I_D	V_{GS} = 20V, T_C=25°C V_{GS} = 20V, T_C=100°C	102 72	A
Pulsed Drain Current	$I_{D(pulse)}$	T_C=25°C	210	A
Short Circuit Capability	t_{SC}	V_{DD}=800V, V_{GS}=20V	4.5	µS
Short Circuit Capability	I_{DS}	V_{DD}=800V, V_{GS}=20V	600	A
Total power dissipation	P_D	T_C=25°C	500	W
Operating Junction Temperature	T_J		-55 to 175	°C
Storage Temperature	T_{STG}		-55 to 175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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	1200			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 20mA	1.9	2.5	3.8	V
		V_{DS} = V_{GS}, I_D = 20mA, T_J = 150°C		1.9		
		V_{DS} = V_{GS}, I_D = 20mA, T_J = 175°C		1.8		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 1200V, V_{GS} = 0V	0	5	100	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = 20V, V_{DS} = 0V	0	10	200	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = -5V, V_{DS} = 0V	-200	-10	0	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 20V, I_D = 50 A		20	29	mΩ
		V_{GS} = 20V, I_D = 50 A, T_J = 150°C		32		
		V_{GS} = 20V, I_D = 50 A, T_J = 175°C		36		
Transconductance	g_{fs}	V_{DS} = 20V, I_D = 50 A,		36		S
		V_{DS} = 20V, I_D = 50 A, T_J = 150°C		34		
		V_{DS} = 20V, I_D = 50 A, T_J = 175°C		31		
Input capacitance	C_{iss}	V_{DS} = 1000V, V_{GS} = 0V f = 1MHz		4900		pF
Output capacitance	C_{oss}			225		
Reverse transfer capacitance	C_{rss}			13		
C_{oss} Stored Energy	E_{oss}			146		μJ
Total gate charge	Q_g	V_{DS} = 800V, V_{GS} = -5V / 20V I_D = 50 A,		256		nC
Gate-source charge	Q_{gs}			71		
Gate-drain charge	Q_{gd}			98		
Internal gate input resistance	$R_{g(int)}$	f = 1MHz, I_D = 0A		2.0		Ω
Turn-On Switching Energy	E_{ON}	V_{DS} = 800 V, V_{GS} = -5V/20V, I_D = 50A, $R_{G(ext)}$ =2Ω, L=200μH		360		μJ
Turn-Off Switching Energy	E_{OFF}			165		
Turn-On Delay Time	$t_{d(on)}$			16		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(off)}$			49		
Fall Time	t_f			12		
Avalanche Capability	E_{AS}	V_{DD} = 100V, V_{GS}=20V, L=2mH		784		mJ
Avalanche Capability	I_{AV}	V_{DD} = 100V, V_{GS}=20V, L=2mH		28		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} = -5V, I_{SD} = 25A,		3.8		V
		V_{GS} = -5V, I_{SD} = 25A, T_J = 150°C		3.5		
		V_{GS} = -5V, I_{SD} = 25A, T_J = 175°C		3.4		
Continuous Diode Forward Current	I_S	V_{GS} = -5V		95		A
Reverse Recovery time	t_{rr}	V_{GS} = -5V, I_{SD} = 50A, V_R= 800V, dif/dt = 1800 A/μs		30		ns
Reverse Recovery Charge	Q_{rr}			420		nC
Peak Reverse Recovery Current	I_{rrm}			23		A

Thermal Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Thermal Resistance (per device)	$R_{th(j-c)}$	junction-case		0.23	0.3	^{0}C/W

Typical Performance

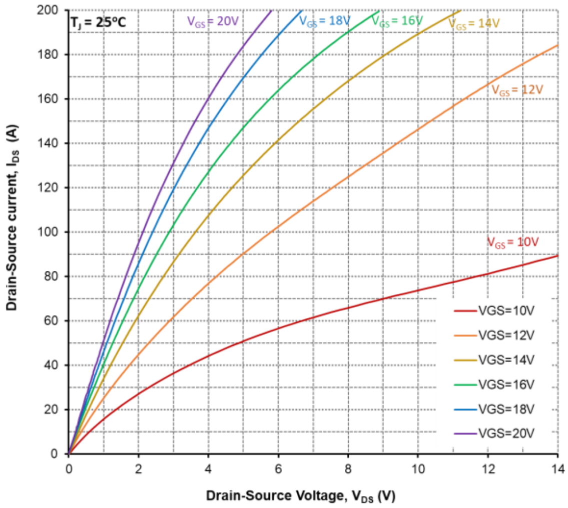


Figure 1. Output Characteristics, T_J = 25°C

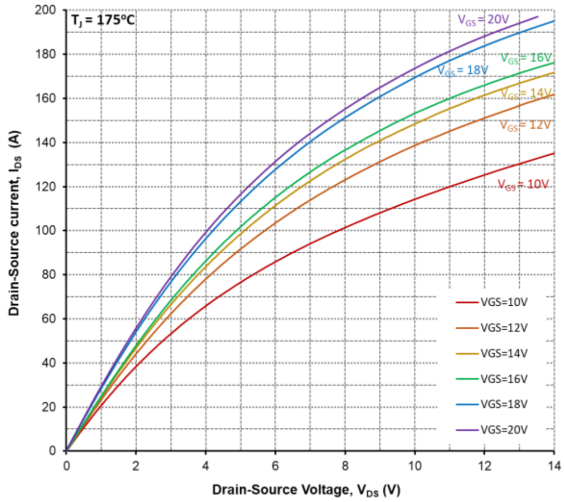


Figure 2. Output Characteristics, T_J = 175°C

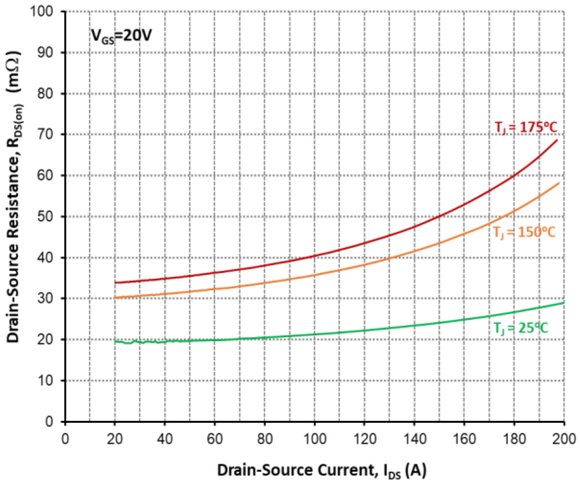


Figure 3. On-Resistance vs. Drain Current For Various Temperatures

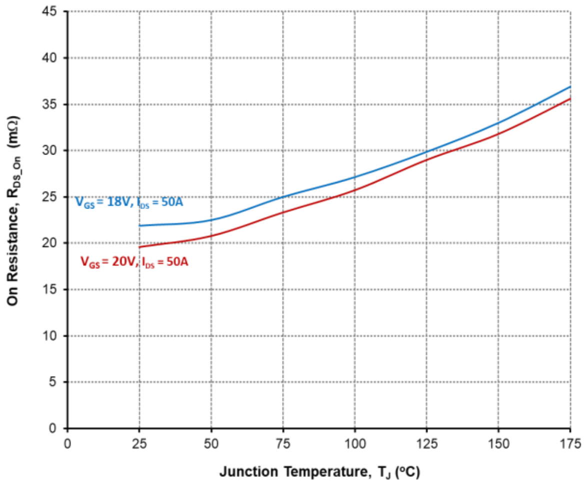


Figure 4. On-Resistance vs. Temperature

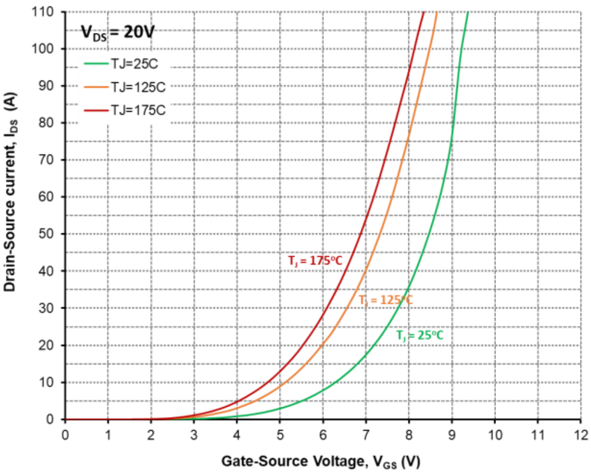


Figure 5. Transfer Characteristic For Various Junction Temperatures

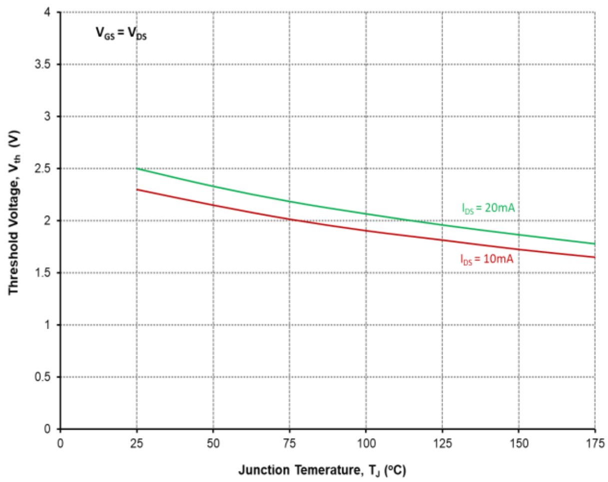


Figure 6. Threshold Voltage vs. Temperature

Typical Performance

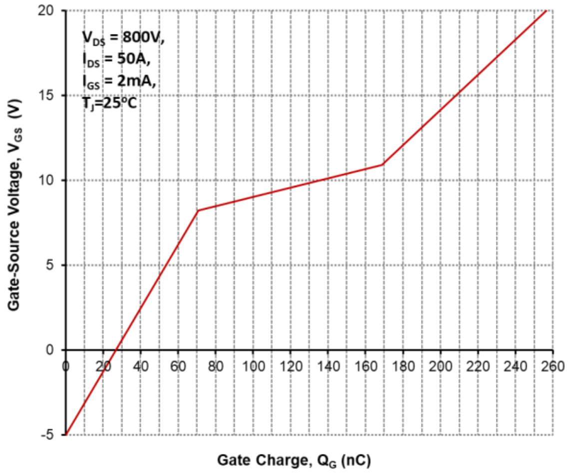


Figure 7. Gate Charge Characteristics

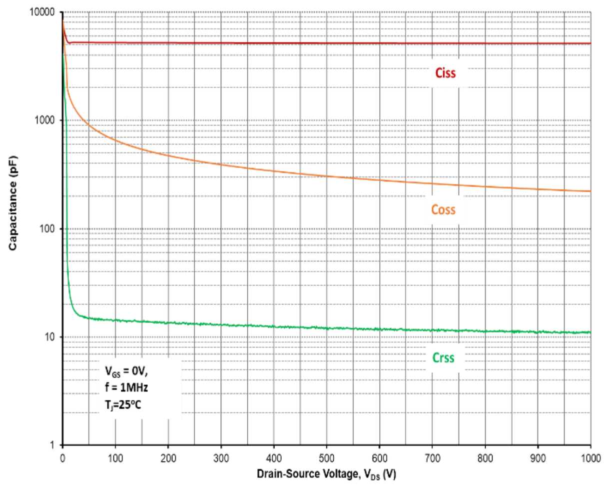


Figure 8. Capacitances vs. Drain-Source Voltage (0-1000V)

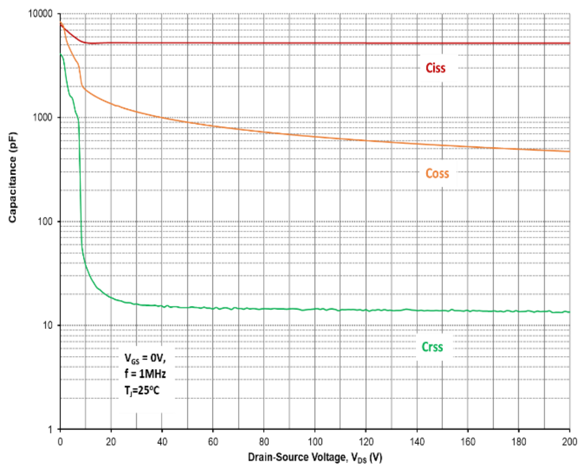


Figure 9. Capacitances vs. Drain-Source Voltage (0-200V)

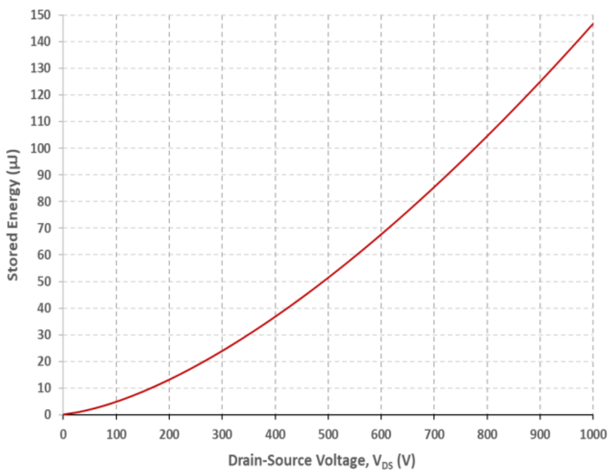


Figure 10. Output Capacitor Stored Energy

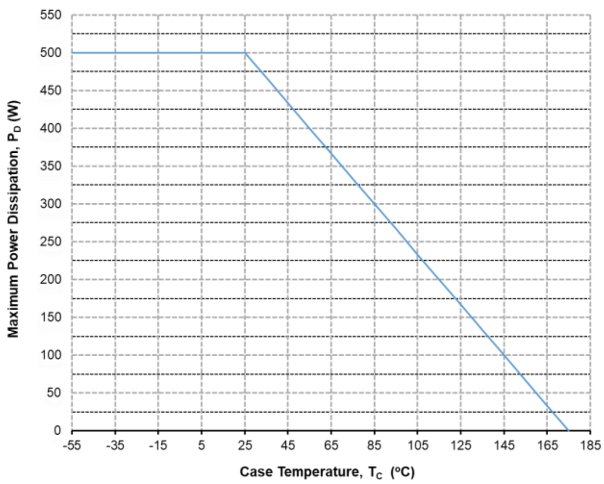


Figure 11. Maximum Power Dissipation Derating vs. Case Temperature

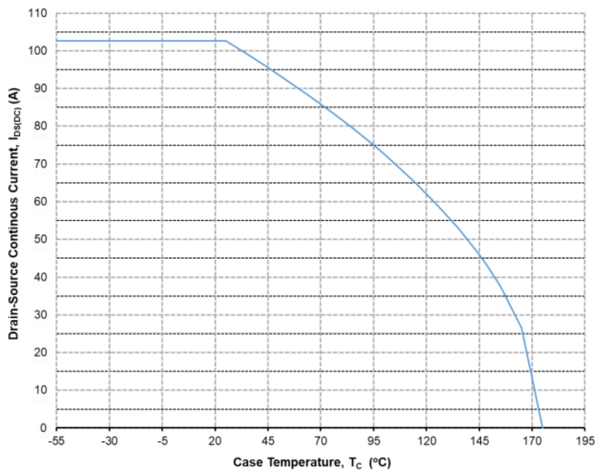


Figure 12. Continuous Drain Current Derating vs. Case Temperature

Typical Performance

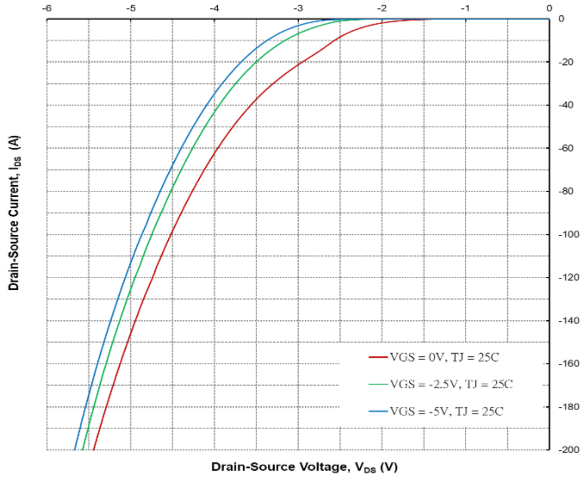


Figure 13. Body Diode Characteristics @ 25°C

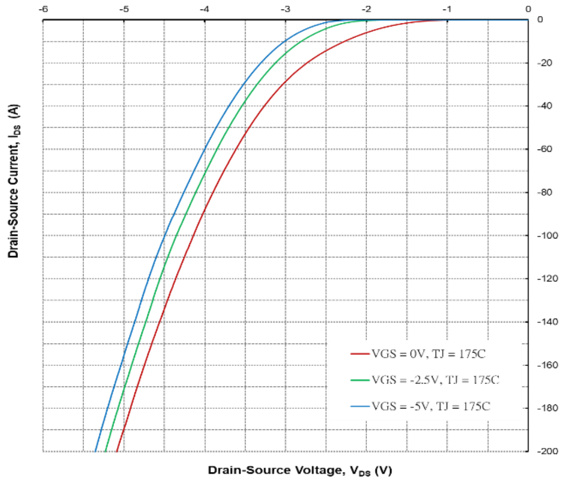


Figure 14. Body Diode Characteristics @ 175°C

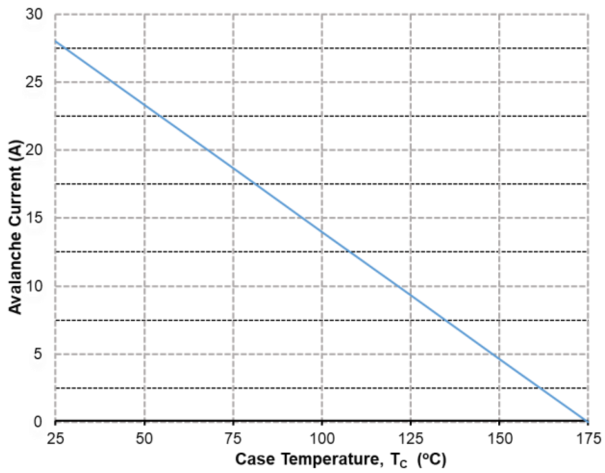


Figure 15. Single Avalanche vs. Temperature

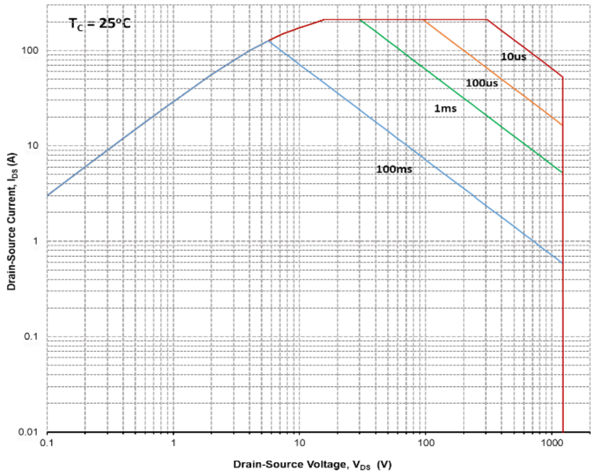


Figure 16. Safe Operating Area

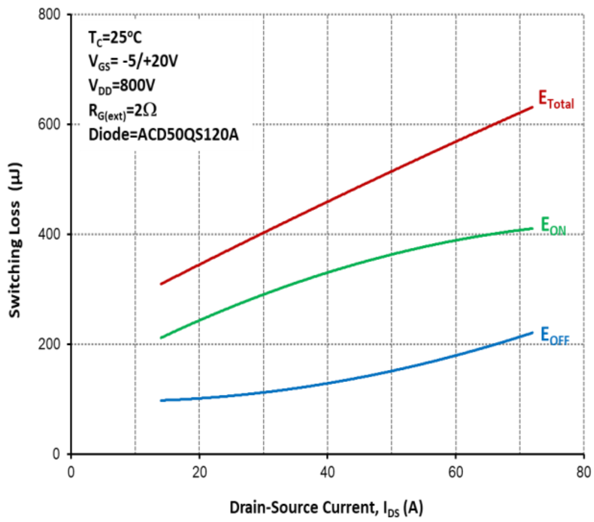
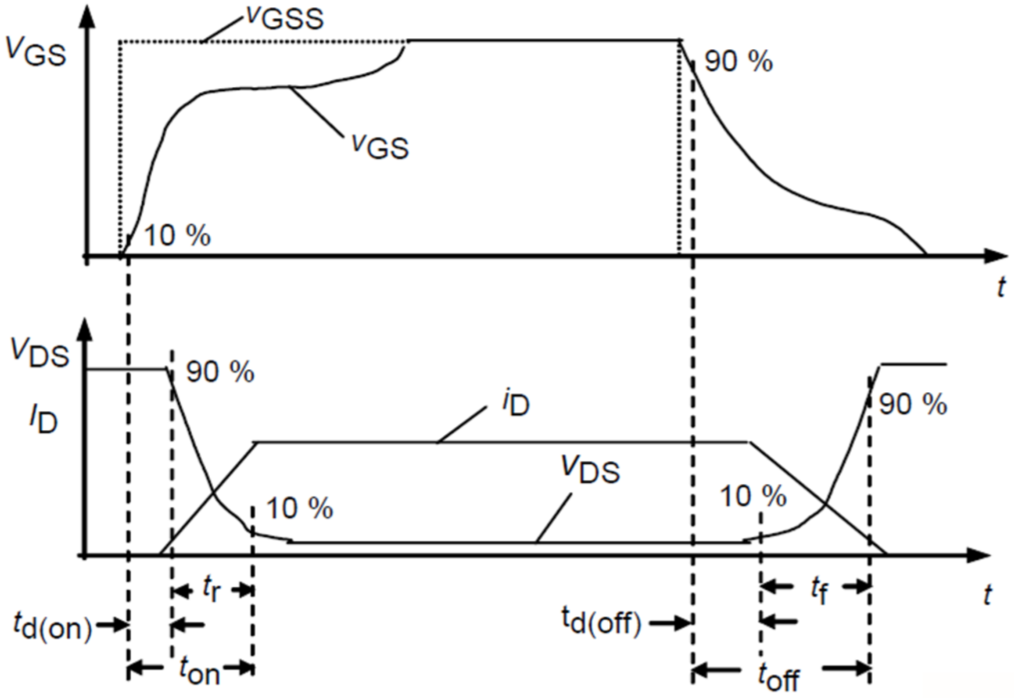
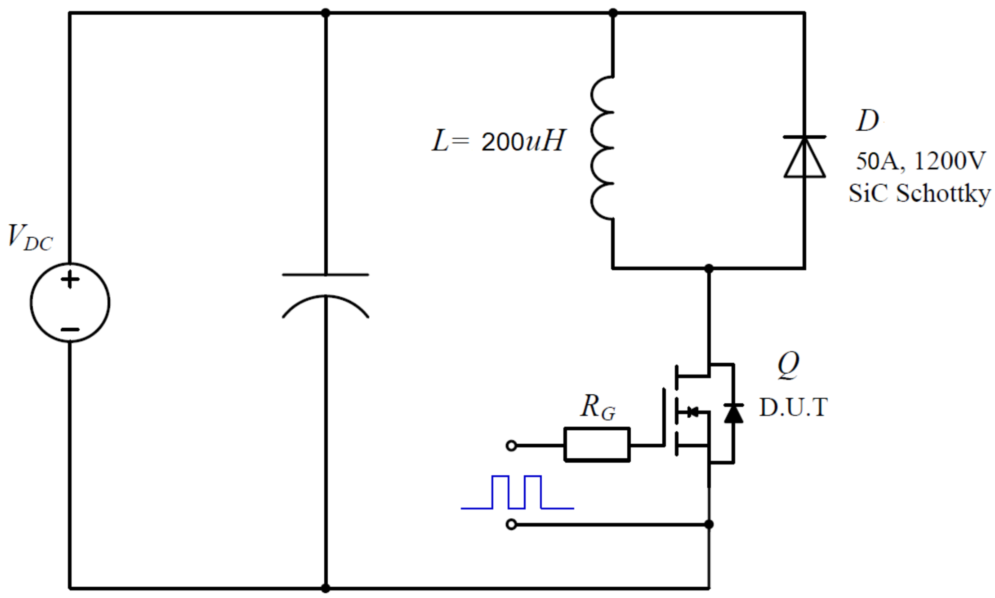


Figure 17. Clamped Inductive Switching Energy vs. Drain Current

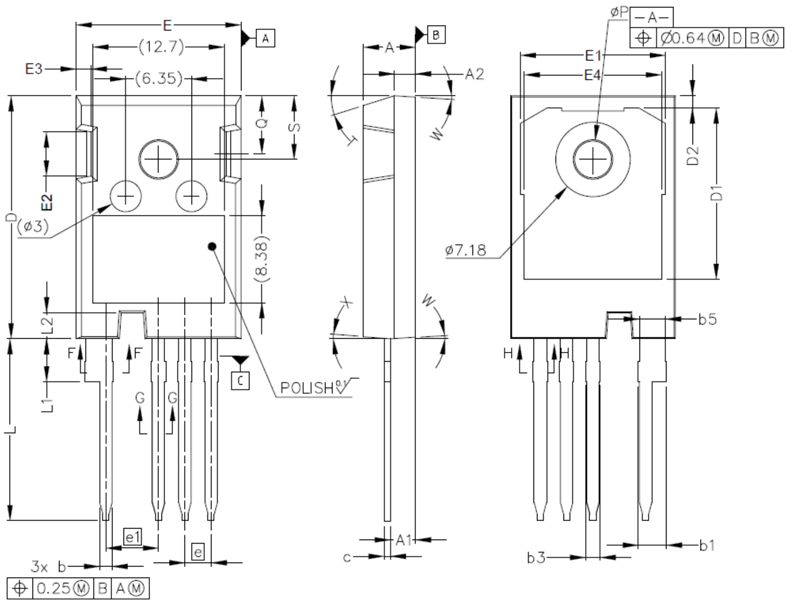
Switching Times Definition and Test Circuit

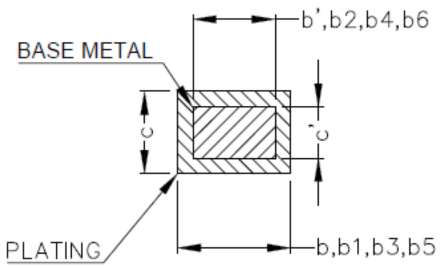




Package Dimensions

(TO-247-4 Package)





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

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
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.