N Channel Enhancement

- High speed switching
- Very low switching losses
- High blocking voltage with low on-resistance
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant

- Cooling effort reduction
- Efficiency improvement
- Reduced cooling requirements
- Increased power density
- Increased system switching frequency



- EV motor drive
- PV string inverters
- Solar power optimizer
- Switch mode power supplies

(Tc = 25°C unless otherwise specified)

$V_{DS,max}$	Drain source voltage	1700	V	V_{GS} = 0V, I_D = 100 μA	
$V_{GS,max}$	Gate source voltage	-8 /+22	V	Absolute maximum values	Note1
$V_{GSpulse}$	Gate-source voltage,max. transient voltage	-10 /+25	V	$t_p \leq 0.5\mu s$, D 0.01	
V_{GSop}	Gate source voltage	-4 /+18	V	Recommended operational values	
I_D	Continuous drain current	110 78	A	V_{GS} = 18V, T_C = 25˚C V_{GS} = 18V, T_C = 100˚C	Fig.19
$I_{D(pulse)}$	Pulsed drain current	347	A	Pulse width t_P=100μs limited by $T_{J,max}$	Fig.22
P_D	Power dissipation	535	W	T_C = 25˚C, T_J = 175˚C	Fig.20
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	
T_M	Mounting torque	1 8.8	Nm lbf-in	M3 or 6-32 screw	

(Tc = 25°C unless otherwise specified)

$V_{(BR)DSS}$	Drain-source breakdown voltage	1700	-	-	V	V_{GS} = 0V, I_D = 100μA	
$V_{GS(th)}$	Gate threshold voltage	2.5	3.1	4	V	V_{DS} = V_{GS}, I_D = 24mA	Fig.11
		-	2.3	-	V	V_{DS} = V_{GS}, I_D = 24mA, T_J = 175°C	
I_{DSS}	Zero gate voltage drain current	-	1	10	μA	V_{DS} = 1700V, V_{GS} = 0V	
I_{GSS}	Gate source leakage current	-	-	100	nA	V_{GS} = 18V, V_{DS} = 0V	
$R_{DS(on)}$	Current drain-source on-state resistance	-	23	35	mΩ	V_{GS} = 15V, I_D = 75A	Fig.4,5,6
		-	44	-		V_{GS} = 15V, I_D = 75A, T_J = 175°C	
		-	20	28		V_{GS} = 18V, I_D = 75A	
		-	42	-		V_{GS} = 18V, I_D = 75A, T_J = 175°C	
gfs	Transconductance	-	51	-	S	V_{DS} = 20V, I_D = 75A	Fig.7
		-	41	-		V_{DS} = 20V, I_D = 75A, T_J = 175°C	
$R_{g,int}$	Internal gate resistance	-	2.7	-	Ω	V_{AC} = 25mV, f = 1MHz, open drain	

(Tc = 25°C unless otherwise specified)

C_{iss}	Input capacitance	-	5265	-	pF	V_{DS} = 1400V, V_{GS} = 0V, T_J = 25°C, V_{AC} = 25mV, f = 100kHz	Fig.17,18
C_{oss}	Output capacitance	-	188	-			
C_{rss}	Reverse capacitance	-	7.5	-			
E_{oss}	Coss stored energy	-	189	-	μJ		Fig.16

Q_{gs}	Gate source charge	-	75	-	nC	V_{DS} = 1200V, V_{GS} = -4/+18V, I_D = 75A	Fig.12
Q_{gd}	Gate drain charge	-	56	-			
Q_g	Gate charge	-	209	-			

(Tc = 25°C unless otherwise specified)

E_{on}	Turn on switching energy	-	2229	-	μJ	V_{DS} = 1200V, V_{GS} = -4/+18V, I_D = 75A, Rg = 2.5Ω, L = 16.7μH	Fig.26
E_{off}	Turn off switching energy	-	501	-			
$t_{d\ on}$	Turn on delay time	-	39	-	ns		Fig.27
t_r	Rise time	-	21	-			
$t_{d\ off}$	Turn off delay time	-	49	-			
t_f	Fall time	-	14	-			

V_{SD}	Diode forward voltage	-	3.8	-	V	V_{GS} = -4V, I_{SD} = 37.5A	Fig.8,9,10
		-	3.3	-	V	V_{GS} = -4V, I_{SD} = 37.5A, T_J = 175°C	
I_S	Continuous diode forward current	-	110	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	28	-	ns	V_R = 1200V, V_{GS} = -4V, I_D = 75A, di/dt = 6770A/μs T_J = 175°C	
Q_{rr}	Reverse recovery charge	-	1066	-	nC		
I_{rrm}	Peak reverse recovery current	-	65	-	A		

Note2 -



Figure 7. Transfer characteristic for various junction temperatures

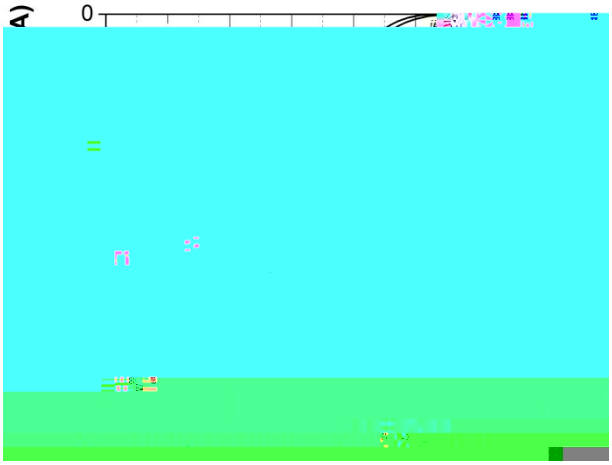


Figure 8. Body diode characteristic at T_J = -55 ºC

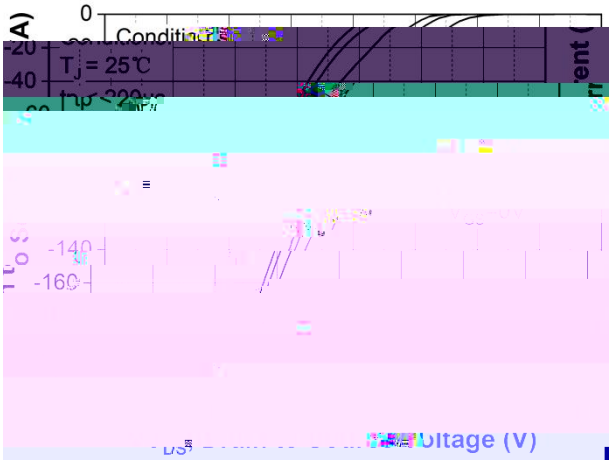


Figure 9. Body diode characteristic at T_J = 25 ºC

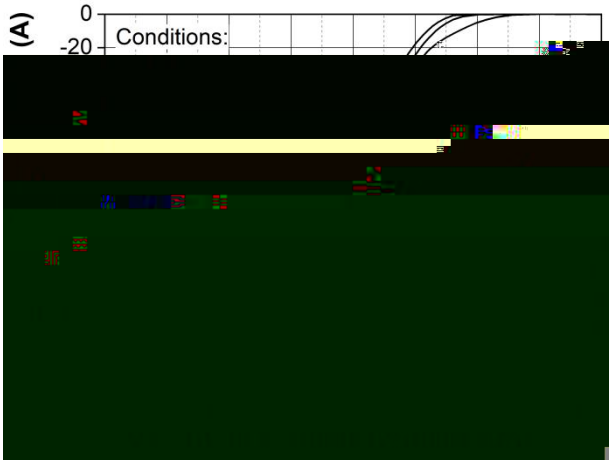


Figure 10. Body diode characteristic at T_J = 175ºC

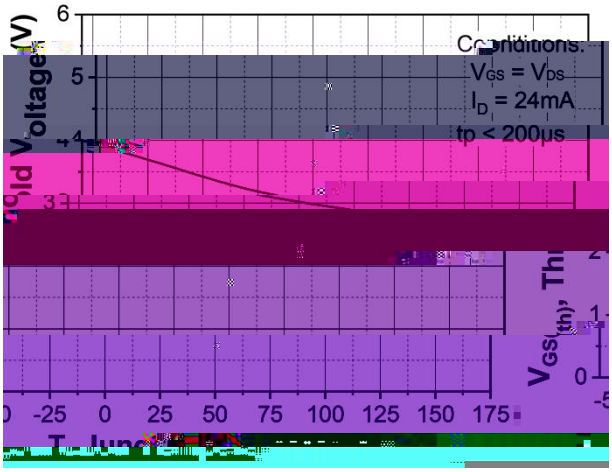


Figure 11. Threshold voltage vs. temperature

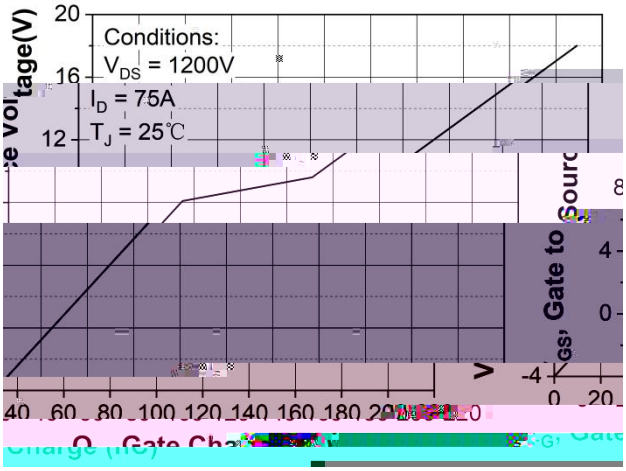


Figure 12. Gate charge characteristic

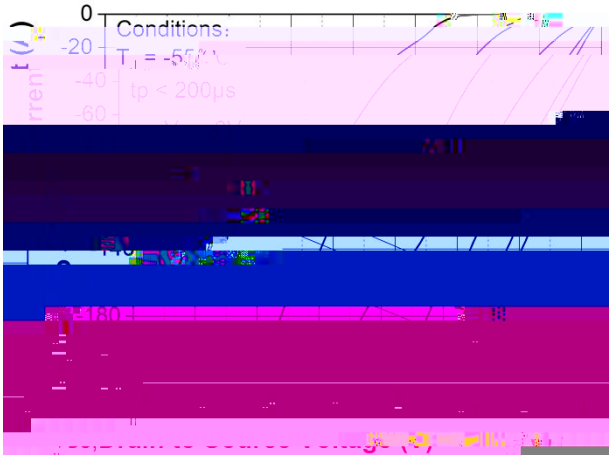


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

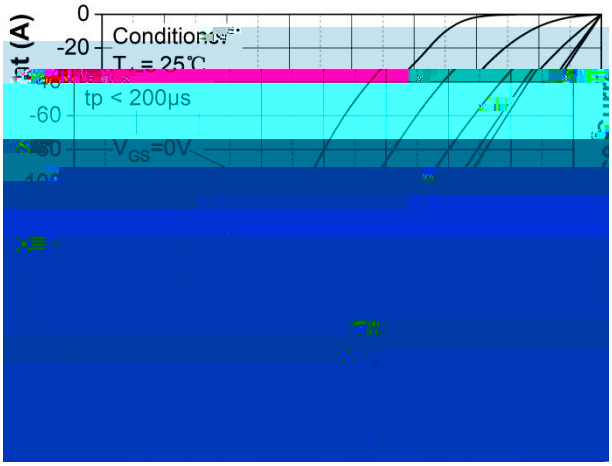


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

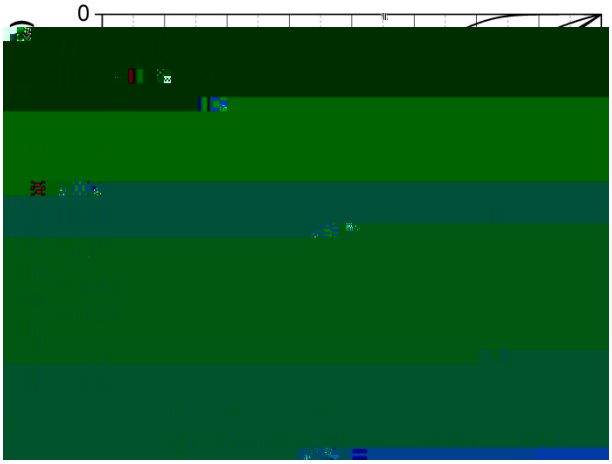


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

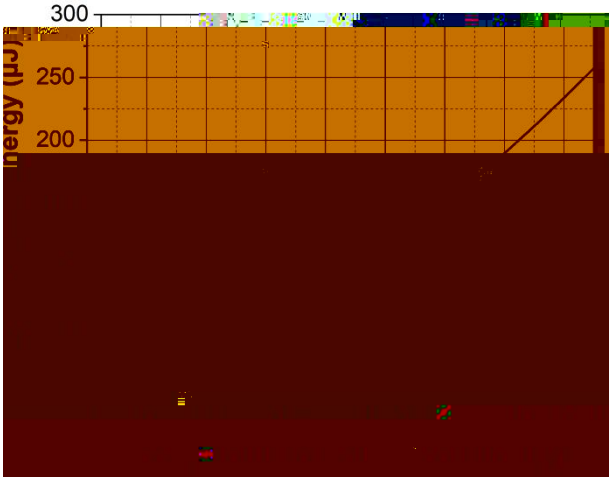


Figure 16. Output capacitor stored energy

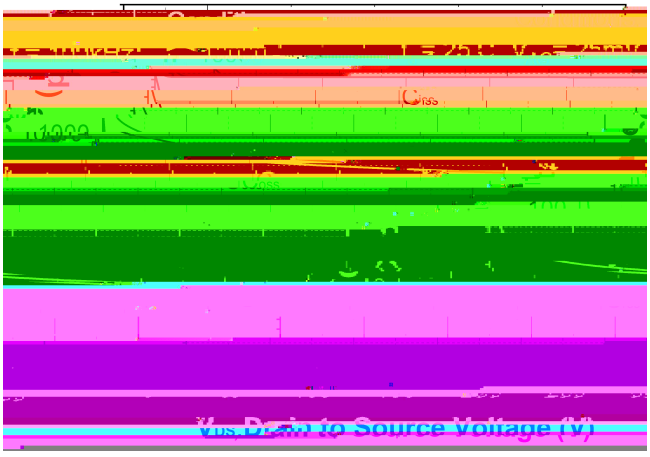


Figure 17. Capacitances vs. drain-source voltage (0 - 300V)

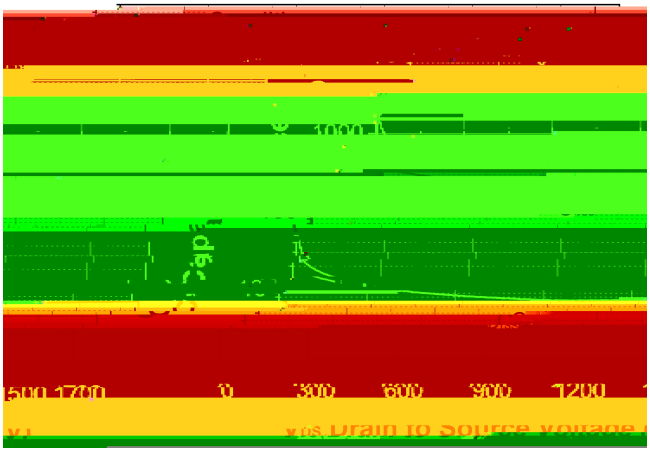


Figure 18. Capacitances vs. drain-source voltage (0 - 1700V)

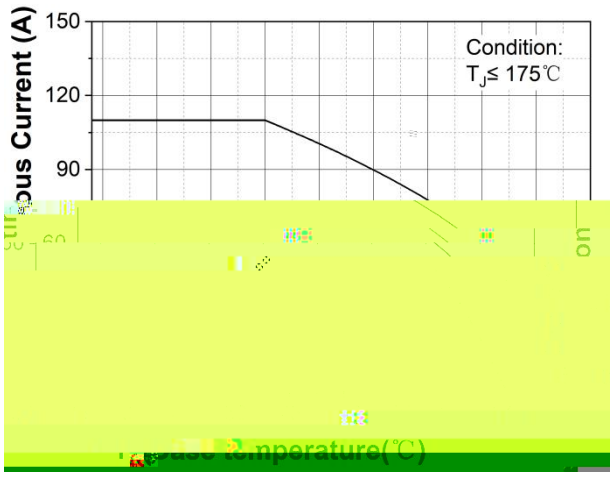


Figure 19. Continuous drain current derating vs. case temperature

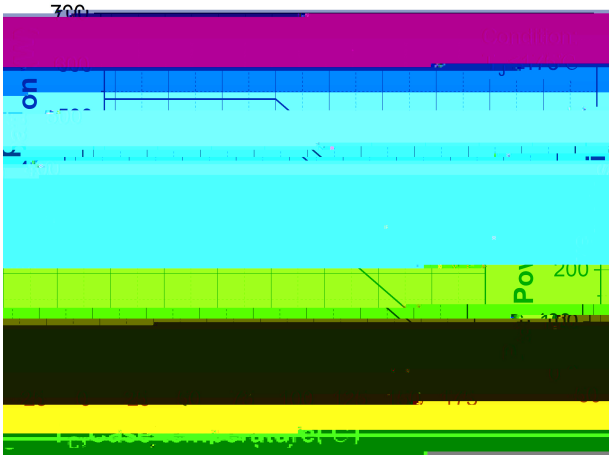


Figure 20. Maximum power dissipation derating vs. case temperature

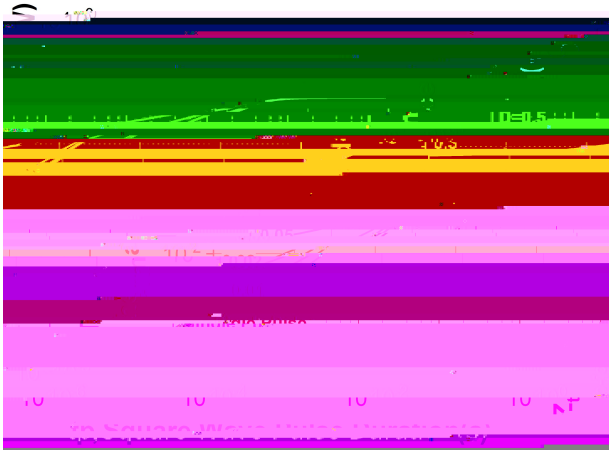


Figure 21. Transient thermal impedance (junction - case)

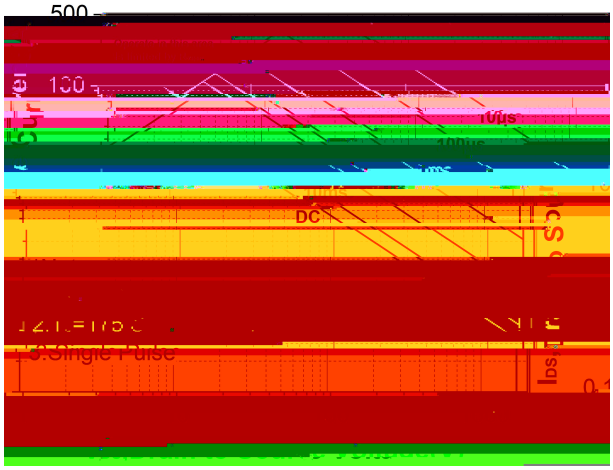


Figure 22. Safe operating area

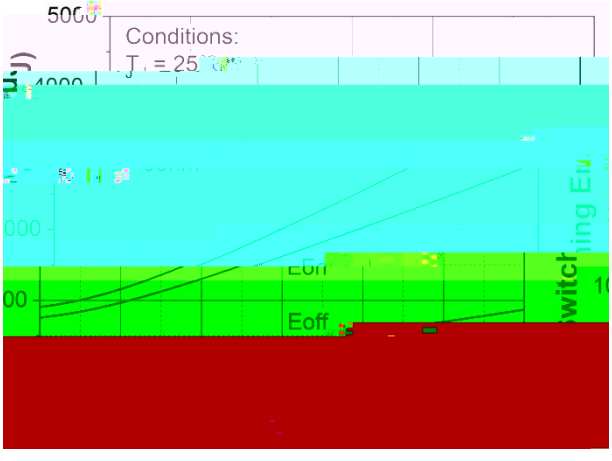


Figure 23. Clamped Inductive switching energy vs. drain current (V_{DD} = 1000V)

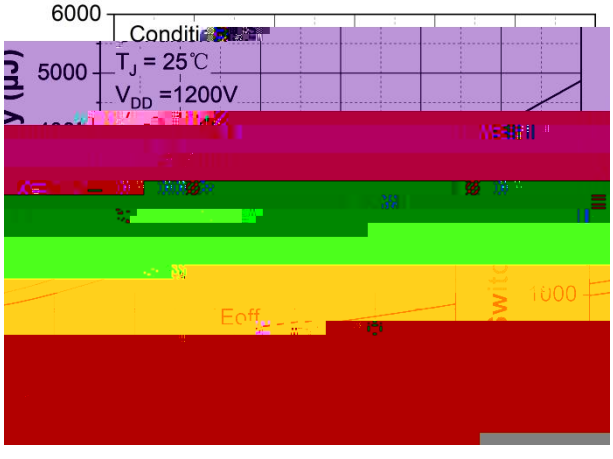


Figure 24. Clamped inductive switching energy vs. drain current (V_{DD} = 1200V)

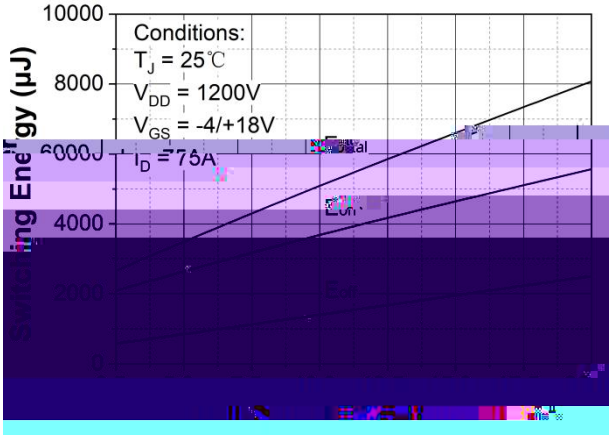


Figure 25. Clamped inductive switching energy vs. R_G(ext)

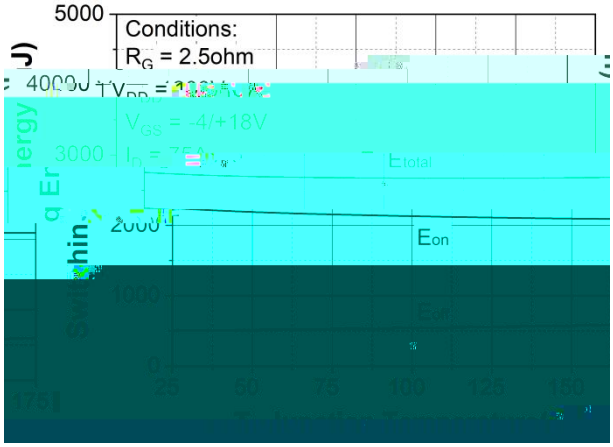


Figure 26. Clamped inductive switching energy vs. temperature

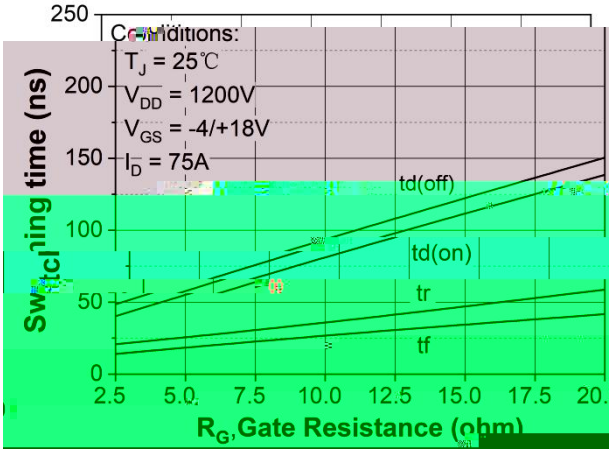
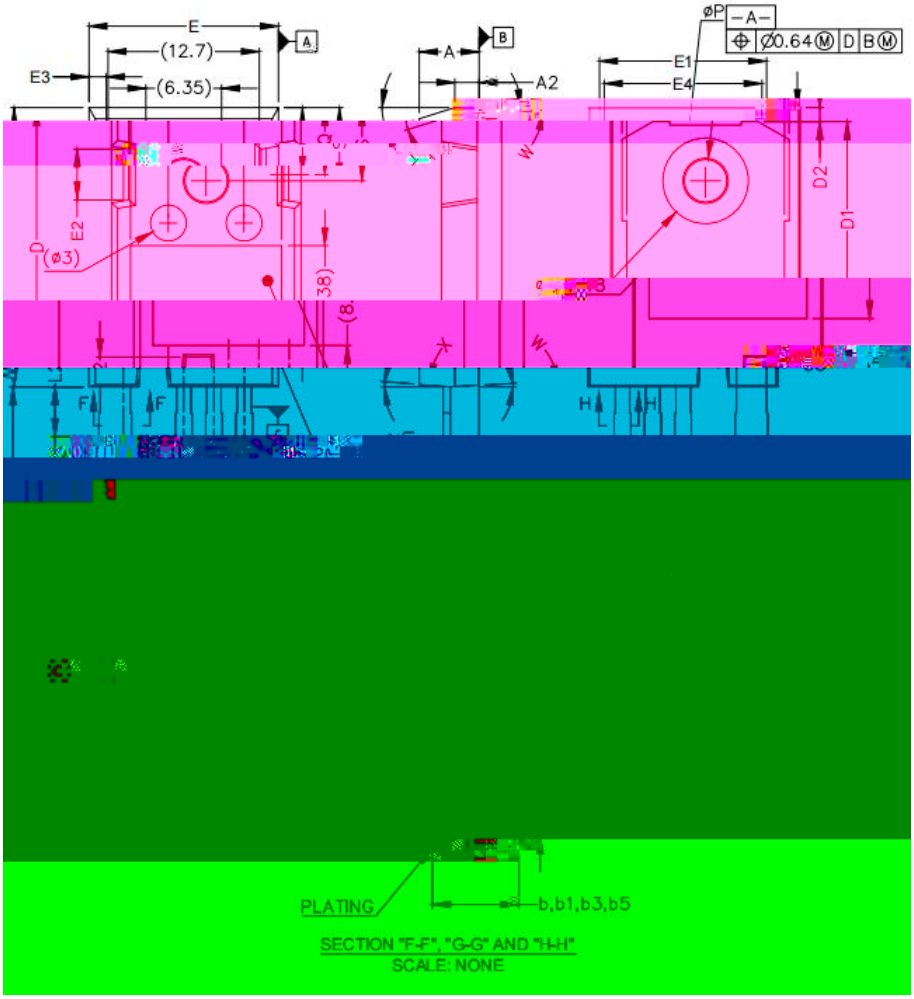


Figure 27. Switching times vs. R_G(ext)

(TO-247-4L-A)



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	
b6	2.39	2.64
c'	0.55	
c		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	

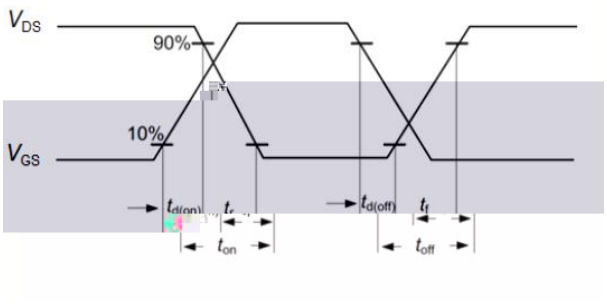


Figure A. Definition of switching times

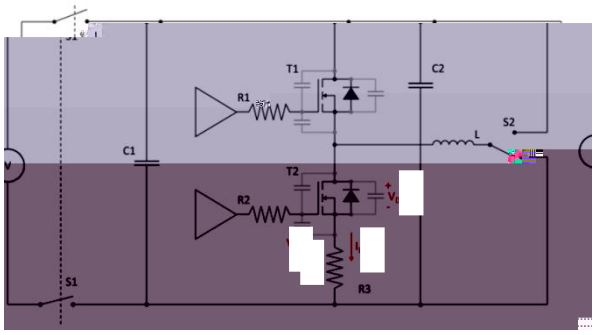


Figure B. Dynamic test circuit

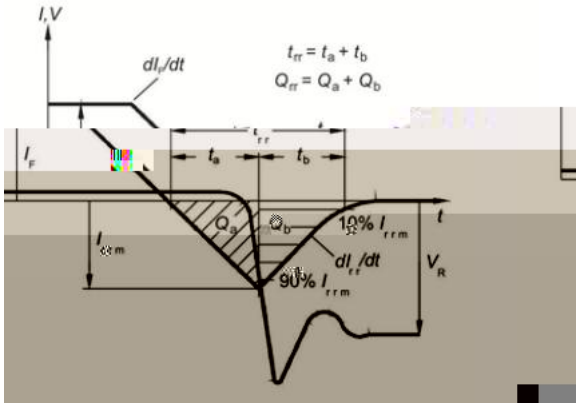


Figure C. Definition of body diode switching characteristics

		——	——
		——	——
		——	——
		——	——
			——

1.
The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2.
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 future, please contact a Sichain representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

3. With respect to information regarding the application of the product, Sichain hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

4. Any information given in this documents subject to customer's compliance with its obligations and any applicable legal requirements, norms and standards concerning any use of the product of Sichain in any customer's applications.

5. Specifications of any and all products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance,characteristics,and functions of the described products as mounted in the customer's products or equipment.

6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sic