DACO SEMICONDUCTOR CO., LTD.

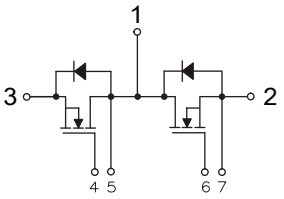
DACMH120N1200

Silicon Carbide Enhancement Mode MOSFET

Features

Preliminary

- V_{DSS} = 1200V
- $R_{DS(ON)}$ < 25 mΩ@ V_{GS} = 20 V
- Fully Avalanche Rated
- Pb Free & RoHS Compliant
- Isolation Type Package
- Electrically Isolation base plate



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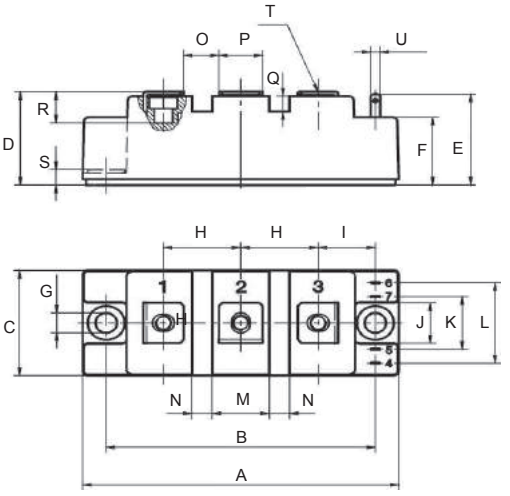
Applications

- Solar Inverters
- Power Converters
- Motor Drive
- Switch Mode Power Supplies
- Battery Chargers



Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	1200	V
Gate-Source Voltage	V_{GS}	-10/+20	V
Drain Current-Continuous @ T_C =25°C @ T_C =100°C	I_D	120 76	A
Drain Current-Pulsed @ T_C =25°C Note1	I_{DM}	300	A
Maximum Power Dissipation	P_D	500	W
Storage Temperature Range	T_{STG}	-50 to +150	°C
Operating Junction Temperature Range	T_J	-50 to +150	°C
Thermal Resistance, Junction-to-Case	$R\theta_{JC}$	0.22	°C/W
Isolation Voltage (A.C. 1 minute)	V_{iso}	4000	V
Mounting torque (M5 Screw)	M_d	3-5	N_m

DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MXA	MIN	MXA	
A	···	3.700	···	94.0	
B	3.134	3.165	79.6	80.4	
C	···	1.339	···	34.0	
D	···	1.201	···	30.5	
E	···	1.181	···	30.0	
F	···	.866	···	22.0	
G	···	.252	···	6.4	Ø
H	.894	.917	22.7	23.3	
I	···	.670	···	17.0	
J	···	.512	···	13.0	
K	···	.677	···	17.2	
L	···	1.024	···	26.0	
M	···	.699	···	17.0	
N	···	.236	···	6.0	
O	···	.413	···	10.5	
P	···	.512	···	13.0	
Q	···	.217	···	5.5	
R	···	.512	···	13.0	
S	···	.197	···	5.0	
T	M5				
U	···	110*20	···	2.8*0.5	

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Electrical Characteristics @ T_J =25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V，I_{DS}=0.3mA	1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V，V_{DS}=1200V	-	-	100	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=20V ，V_{DS}=0V	-	-	500	nA
ON Characteristics						
Gate Threshold Voltage	V_{TH}	V_{DS}=V_{GS}，I_{DS}=8mA	2.0	2.5	3.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=20V，I_{DS}=120A	-	20	25	mΩ
Gate Resistance	R_G		-	1.6	2.9	Ω
Forward Transconductance	g_{fs}	V_{DS}=20V，I_D=50A Note1	-	28	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=800V V_{GS}=0V V_{AC}=25mV Freq.=1MHz	-	4500	-	pF
Output Capacitance	C_{oss}		-	276	-	
Reverse Transfer Capacitance	C_{rss}		-	60	-	
Turn-On Switching Energy	E_{on}	V_{DD}=600V，V_{GS}=-5V/+20V I_D =50A ，$R_{G(ext)}$=2.5Ω Load=142μH ，T_J=150°C	-	1.6	-	mJ
Turn-Off Switching Energy	E_{off}		-	0.6	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=800V V_{GS}=20V I_{DS}=50A R_G=2.5Ω	-	20	-	ns
Rise Time	t_r		-	32	-	
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	
Fall Time	t_f		-	32	-	
Total Gate Charge at 10V	Q_g	V_{DS}=800V V_{GS}=20V I_{DS}=50A	-	170	-	nC
Gate to Source Charge	Q_{gs}		-	46	-	
Gate to Drain Charge	Q_{gd}		-	50	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_F	T_J=25°C，I_F=120A	-	-	6.5	V
Diode Continuous Forward Current	I_F		-	-	76	A
Diode Pulsed Current Note1	$I_{F,pulse}$		-	-	300	A
Reverse Recovery time	T_{RR}	I_F=0.5V，I_R=1.0A， I_{RR}=0.25A	-	-	135	ns

Notes:

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle > 2%.

Typical Characteristics

Figure 1. Maximum Power Dissipation (MOSFET) Derating vs. Case Temperature

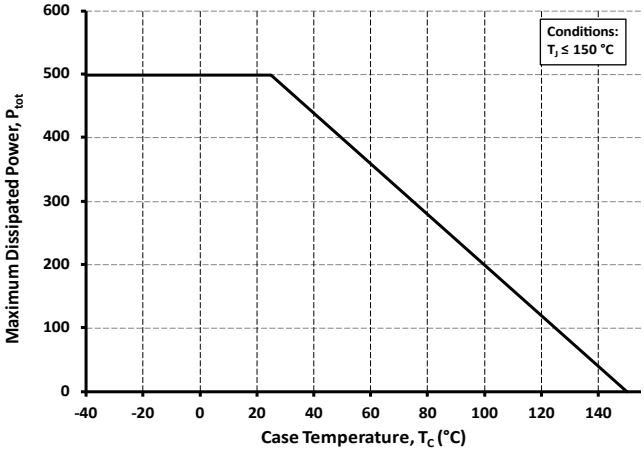


Figure 2. Continous Drain Current (MOSFET) Derating vs Case Temperature

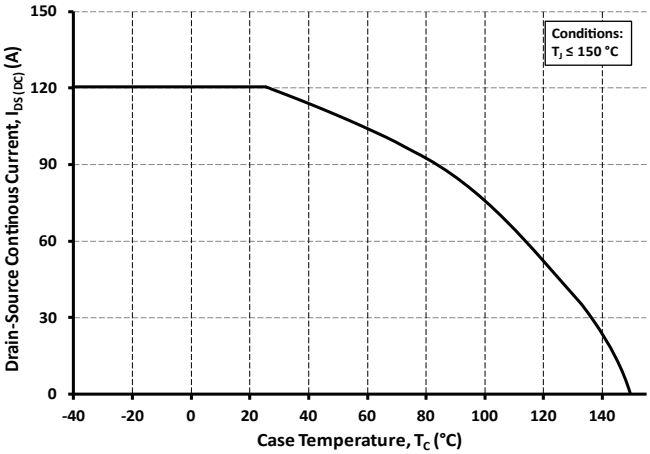


Figure 3. Maximum Power Dissipation (MOSFET) Derating vs. Case Temperature

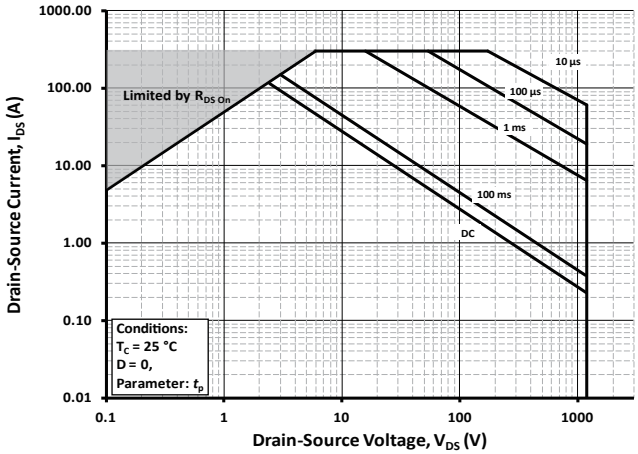


Figure 4. MOSFET Junction to Case Thermal Impedance

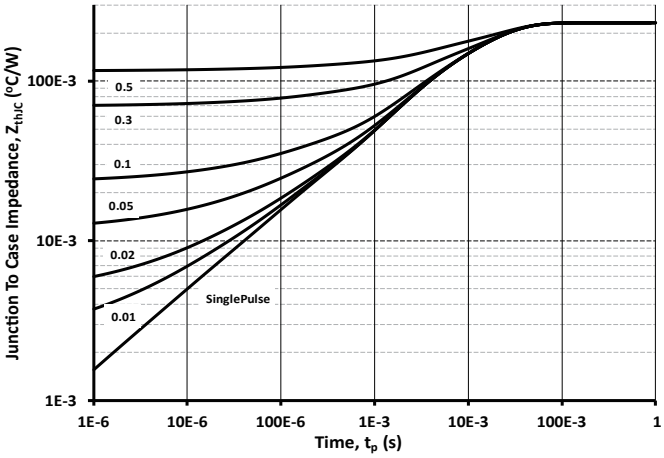


Figure 5. Output Characteristics T_J = 25 °C

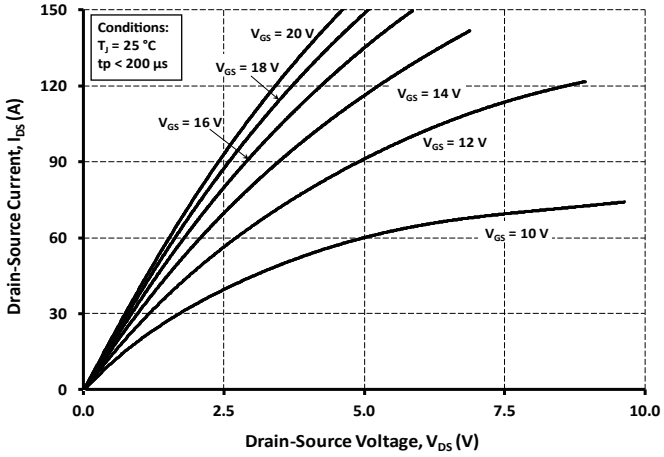
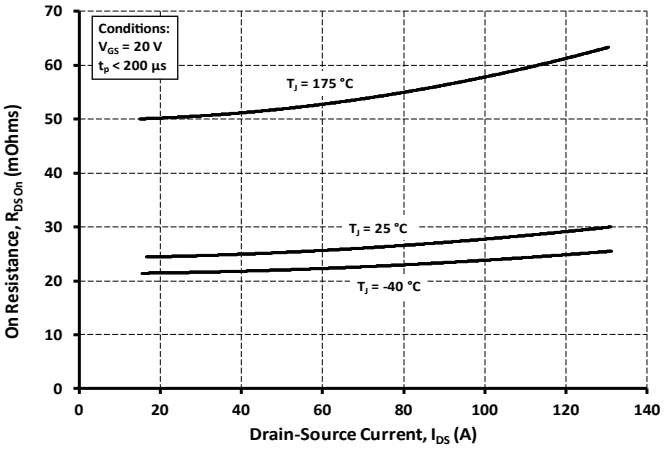


Figure 6. On-Resistance vs. Drain Current For Various Temperatures



Typical Characteristics

Figure 7. On-Resistance vs. Temperature For Various Gate-Source Voltage

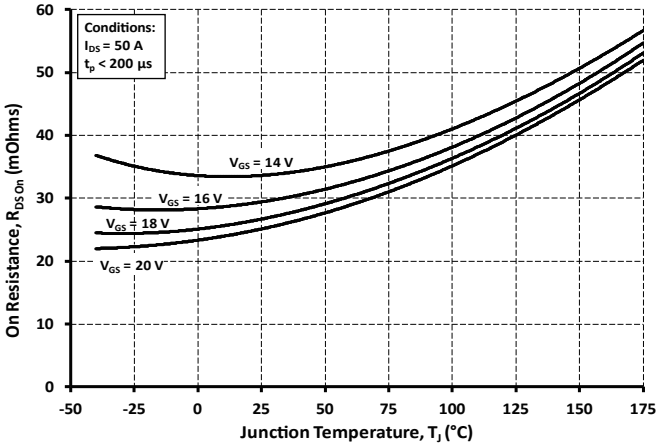


Figure 8. Threshold Voltage vs. Temperature

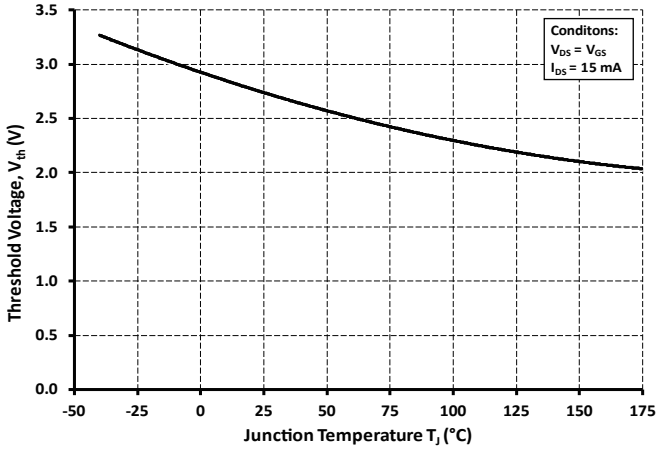


Figure 9. Transfer Characteristic for Various Junction Temperatures

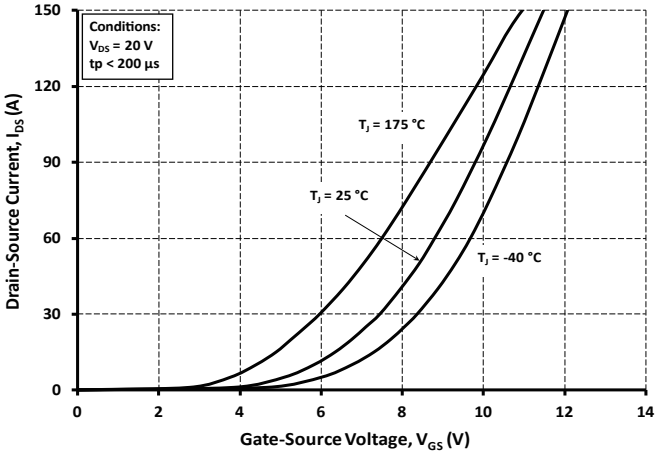


Figure 10. Capacitances vs. Drain-Source Voltage (0 - 1 kV)

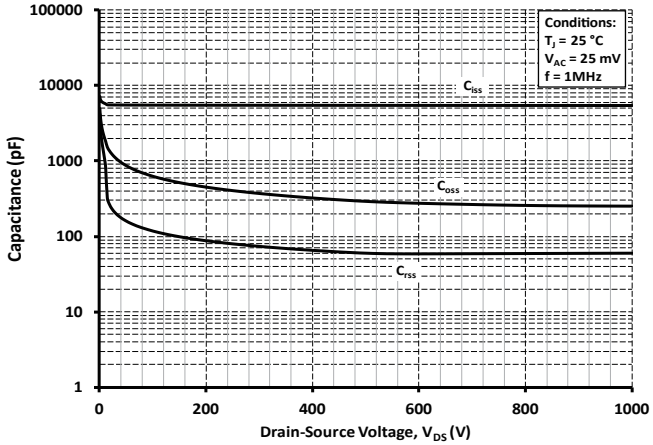


Figure 11. Typical forward characteristics of reverse diode

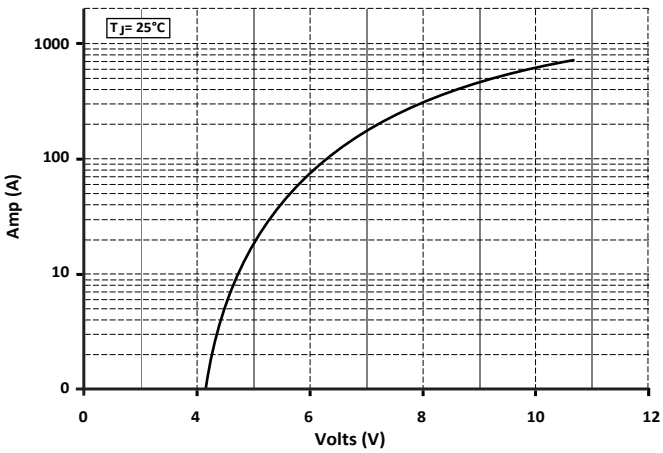
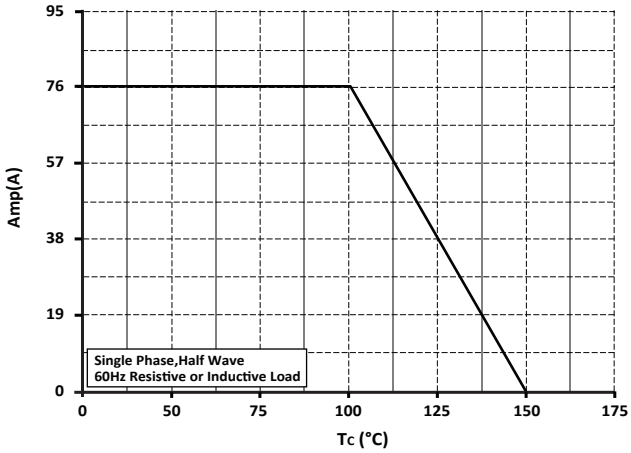


Figure 12. Forward derating curve of reverse diode



Typical Characteristics

Figure 13. Peak forward surge current of reverse diode

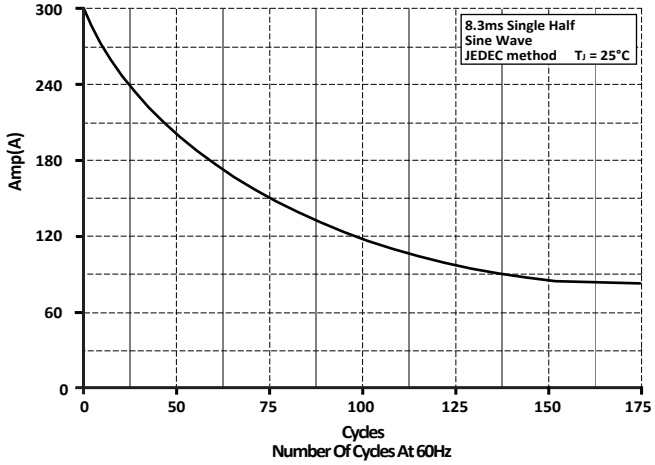


Figure 14. Typical reverse diode characteristics

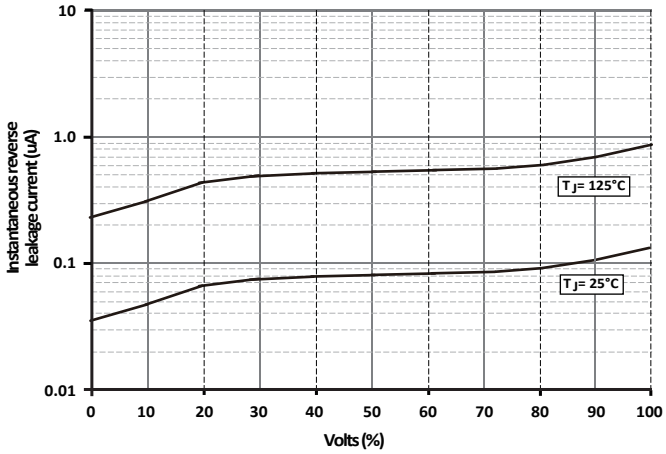


Figure 15. Gate Charge Characteristics

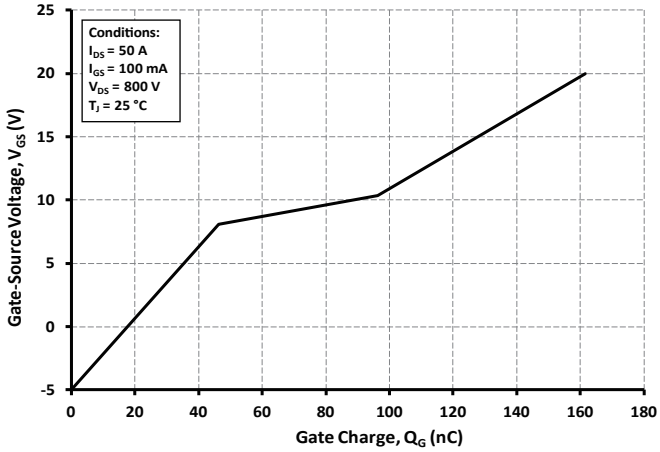


Figure 16. Inductive Switching Energy vs. Temperature

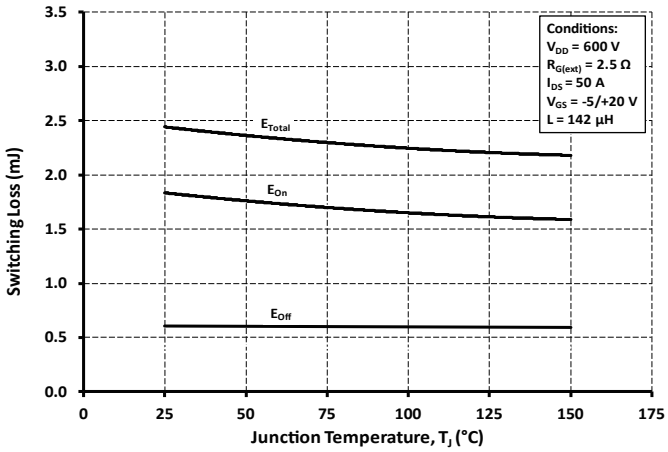


Figure 17. Timing vs. $R_{G(ext)}$

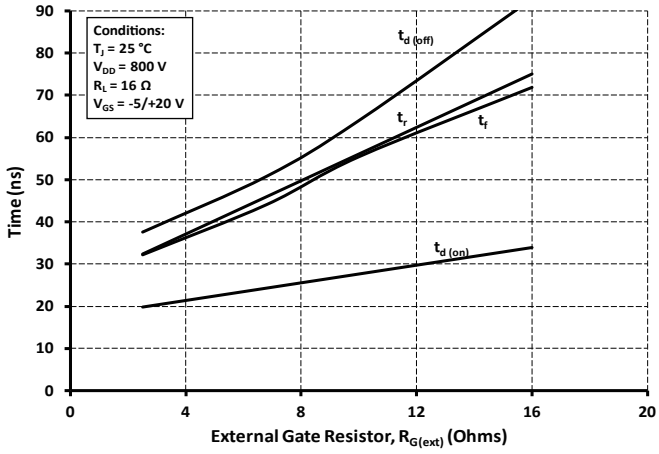
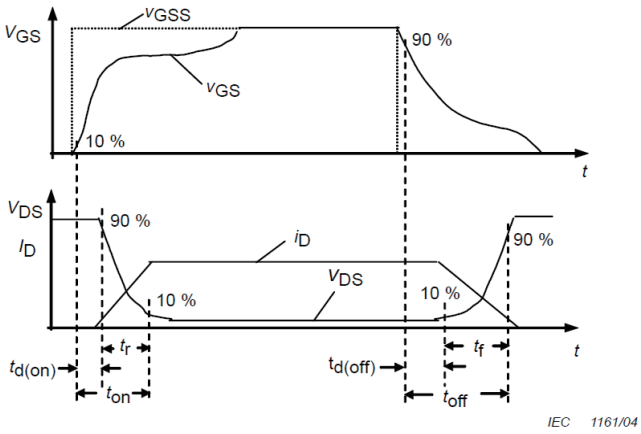



Figure 18. Resistive Switching Time Description