CMS120N080B

SiC N-Channel 1200-V (D-S) MOSFET

Features

- High speed switching
- High blocking voltage
- Fast reverse recovery

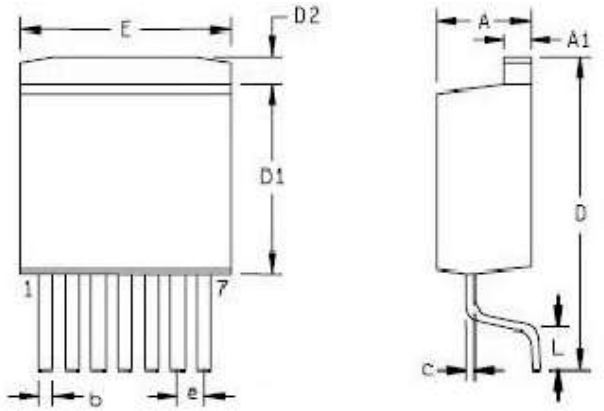
Benefits

- Low capacitance
- High system efficiency
- Easy to parallel Applications

Typical Applications

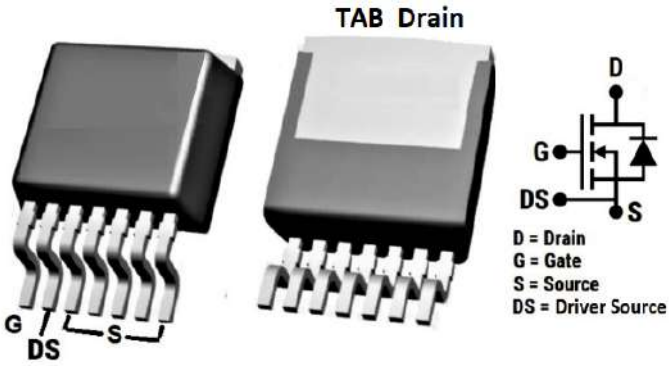
- Solar inverters
- Switch mode power supplies, UPS
- Induction heating and welding
- EV charging stations
- High voltage DC/DC converters
- Motor drive

Package Dimension

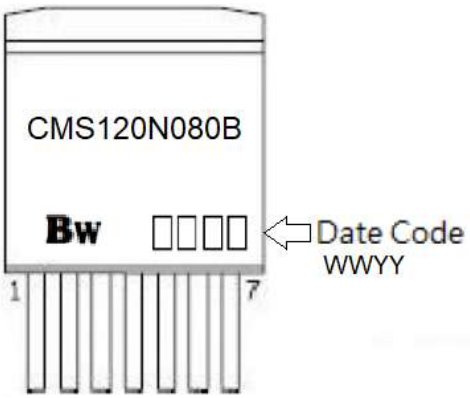


Symbol	Dimensions Millimeters		Symbol	Dimensions Millimeters	
	Min	Max		Min	Max
A	4.40	4.64	D1	8.39	8.89
A1	1.22	1.32	D2	---	1.27
b	0.56	0.81	e	---	1.27
c	0.38	0.76	E	10.04	10.41
D	---	14.35	L	---	1.98

Package type：TO-263-7



Marking



RoHS Compliant

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SiC N-Channel 1200-V (D-S) MOSFET

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings			
Symbol	**Parameter**	**Value**	**Units**
V_{DS}	Drain-Source Voltage	1200	V
V_{GS}	Gate-Source Voltage	-5/20	V
I_D	Continuous Drain Current (T_C =25°C)	35	A
	Continuous Drain Current(T_C =100°C)	25	A
$I_{D,pulse}$	Pulsed Drain Current	80	A
P_{tot}	Power Dissipation (T_C =25°C)	188	W
E_{AS}	Single Pulse Avalanche Energy, I_{AS}=20A ,V=50V, L =1mH	200	mJ
T_J/T_{STG}	Operating Junction and Storage Temperature	-55…175	°C

Thermal Resistance Ratings			
Symbol	**Parameter**	**Maximum**	**Units**
$R_{\theta JA}$	Maximum Junction-to-Ambient	40	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case	0.8	°C/W

Static Electrical Characteristics, (T_J=25°C unless otherwise specified)						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
$V_{GS\ (th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =10mA	2.0	2.8	4.0	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =1mA	1200	-	-	V
I_{GSS}+	Gate-Source Leakage Current	V_{DS} =0V, V_{GS} =20V	-	0.1	100	nA
I_{GSS}-		V_{DS} =0V, V_{GS} =-5V	-	-	-100	
I_{DSS}	Drain-Source Leakage Current	V_{DS} =1200V, V_{GS} =0V	-	-	1.0	μA
		V_{DS} =1200V, V_{GS} =0V, T_J =175°C	-	1.0	-	
$R_{DS\ (on)}$	Static Drain-Source On-Resistance	V_{GS} =20V, I_D =20A	-	77	100	mΩ
		V_{GS} =20V, I_D =10A	-	71	90	
		V_{GS} =20V, I_D =20A, T_J =125°C	-	106	-	
		V_{GS} =20V, I_D =20A, T_J =175°C	-	134	-	
R_g	Gate Input Resistance	f =1MHz,V_{AC} =25mV, D-S short	-	3.0	-	Ω

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DD}=800 V, I_{DS}=20 A, V_{GS}=-5/20V	-	61	-	nC
Q_{gs}	Gate-Source Charge		-	24	-	
Q_{gd}	Gate-Drain Charge		-	14	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=800 V, I_{DS}=20 A, $R_{G(ext)}$=2.5 Ω, V_{GS}=-5/+20 V, L=975 μH	-	9	-	ns
t_r	Rise Time		-	4	-	
$t_{d(off)}$	Turn-Off Delay Time		-	15	-	
t_f	Fall Time		-	10	-	
C_{ISS}	Input Capacitance	V_{GS}=0 V, V_{DS}=1000 V, f=200 kHz, V_{AC}=25mV	-	1377	-	pF
C_{OSS}	Output Capacitance		-	62	-	
C_{RSS}	Reverse Transfer Capacitance		-	4	-	
E_{oss}	Coss Stored Energy		-	38	-	μJ
E_{on}	Turn-On Switching Energy	V_{DD}=800 V, I_{DS}=20 A, $R_{G(ext)}$=2.5 Ω, V_{GS}=-5/+20 V, L=975 μH	-	208	-	
E_{off}	Turn-Off Switching Energy		-	25	-	
E_{tot}	Total Switching Energy		-	233	-	

Body Diode Characteristics, (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Max Continuous Diode Forward Current	V_{GS}=-5 V, T_C=25 °C	-	-	43	A
V_{SD}	Diode Forward Voltage	V_{GS}=-5 V, I_S=10 A	-	3.8	-	V
t_{rr}	Reverse Recovery Time	I_S=20 A, V_R=800 V, V_{GS}=-5 V, di/dt=8 A/μs	-	8	-	ns
Q_{rr}	Reverse Recovery Charge		-	130	-	nC
I_{rrm}	Peak Reverse Recovery Current		-	29	-	A

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- **Typical Electrical Characteristics**

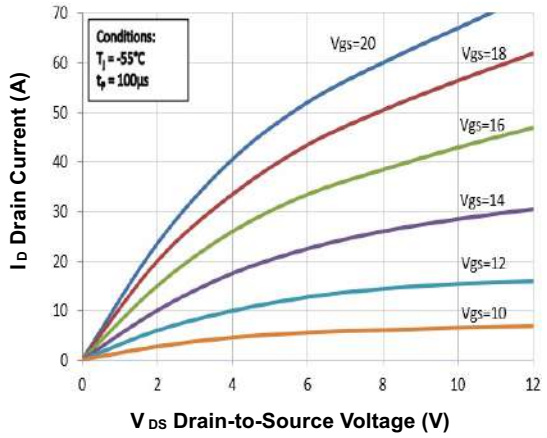

FIG.1-Output Characteristics T_J=-55°C

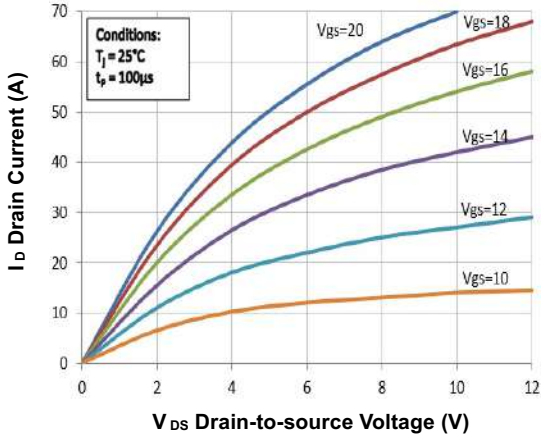

FIG.2- Output Characteristics T_J=25°C

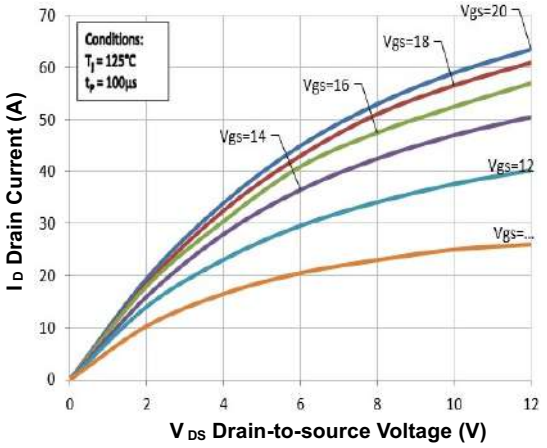

FIG.3- Output Characteristics T_J=125°C

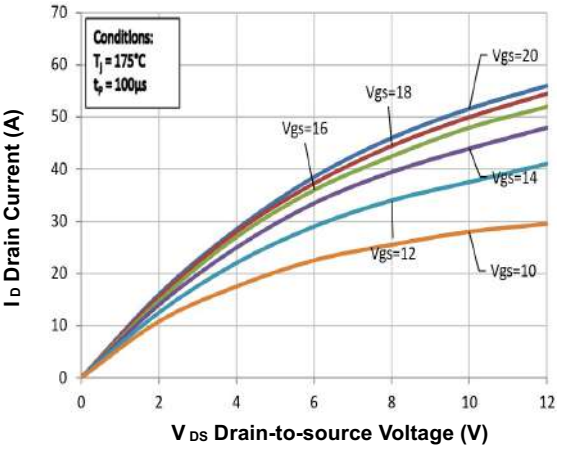

FIG.4- Output Characteristics T_J=175°C

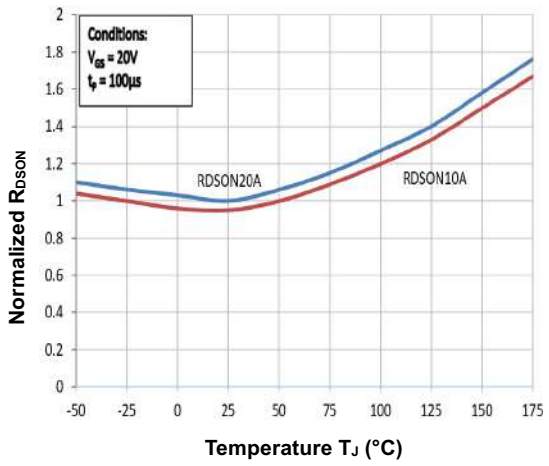

FIG.5-Normalized R_{DSON} vs. Temperature T_J

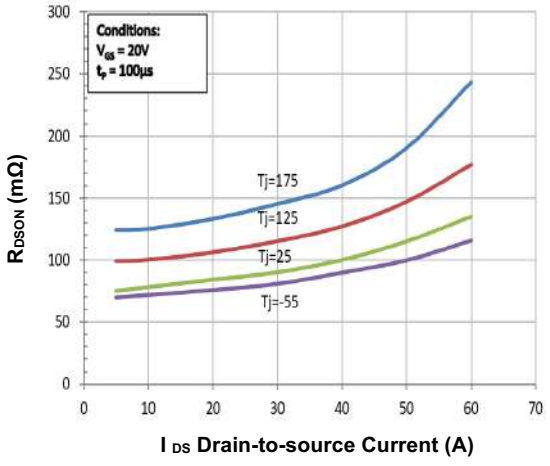

FIG.6- On-Resistance vs. Drain Current For Various Temperature

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- **Typical Electrical Characteristics**

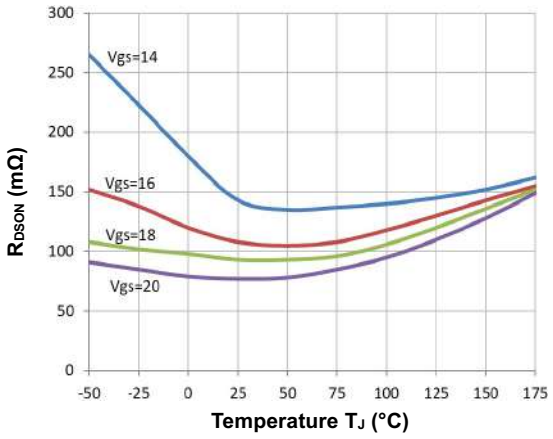

FIG.7- On-Resistance vs. Temperature For Various Gate Voltages

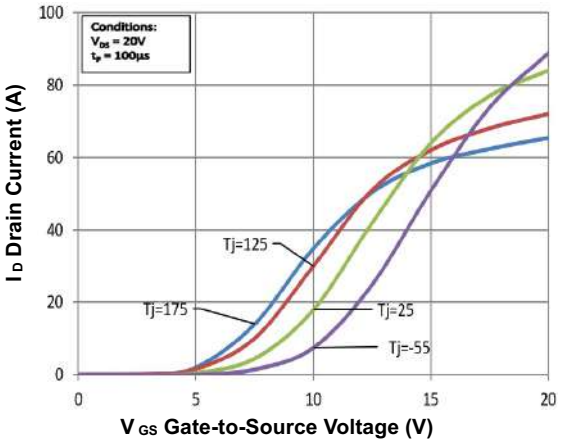

FIG.8-Transfer Characteristic for Various Junction Temperatures

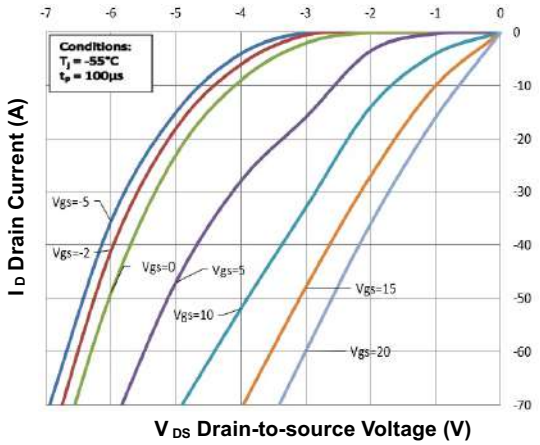

FIG.9- Body Diode Characteristics at T_J=-55°C

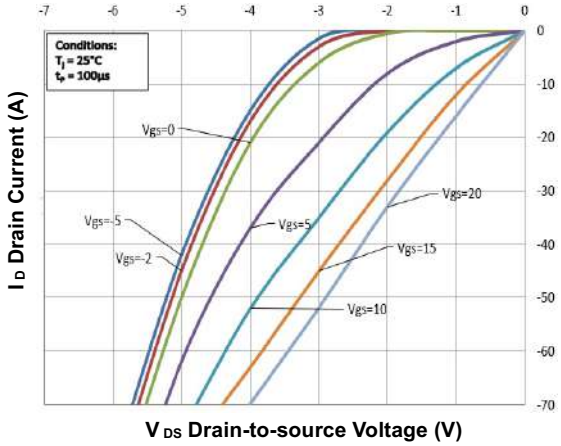

FIG.10- Body Diode Characteristics at T_J=25°C

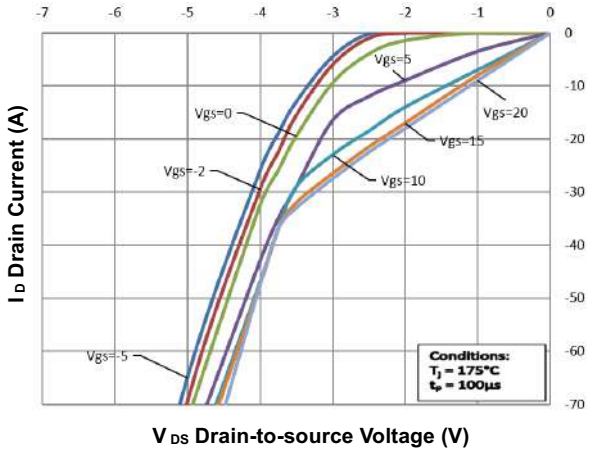

FIG.11- Body Diode Characteristics at T_J=175°C

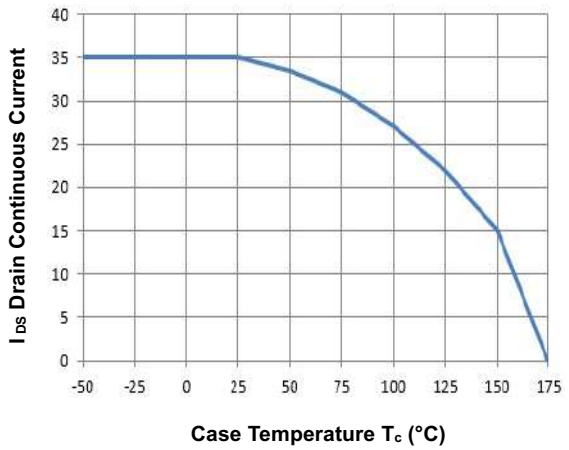

FIG.12- Continuous Drain Current Derating vs. Tc

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- **Typical Electrical Characteristics**

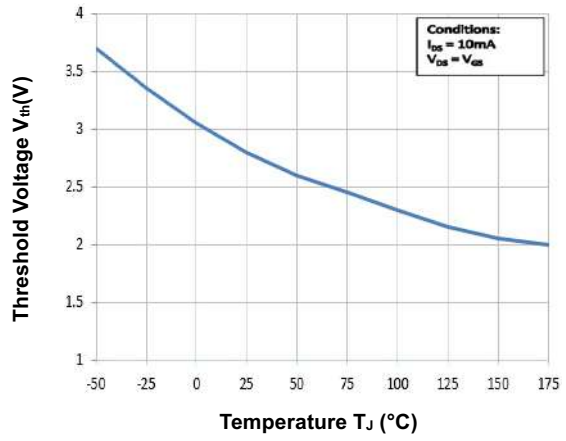

FIG.13-Threshold Voltage vs. Temperature

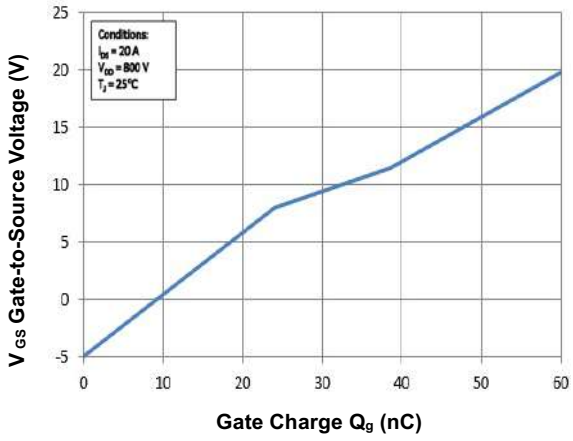

FIG.12- Gate Charge Characteristics

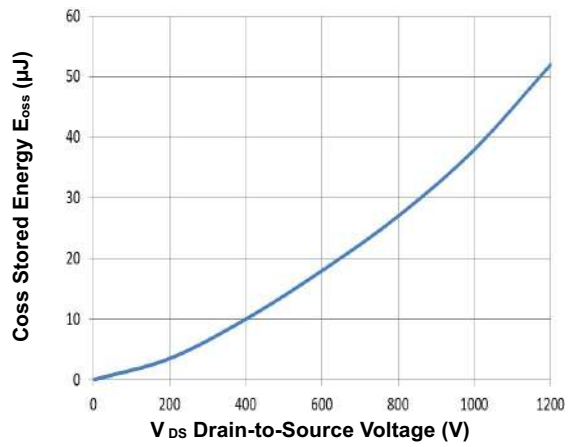

FIG.15- Output Capacitor Stored Energy

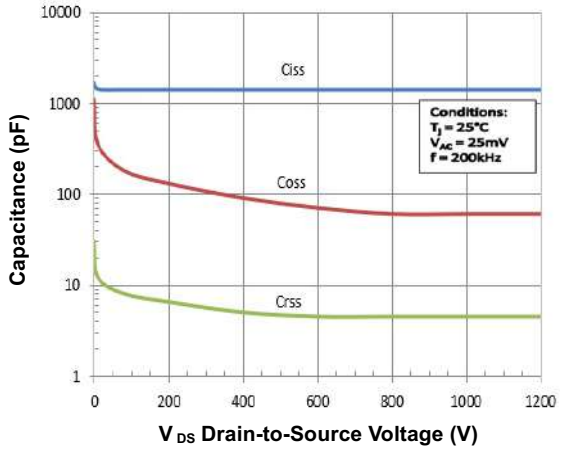

FIG.16- Capacitance vs Drain-Source Voltage

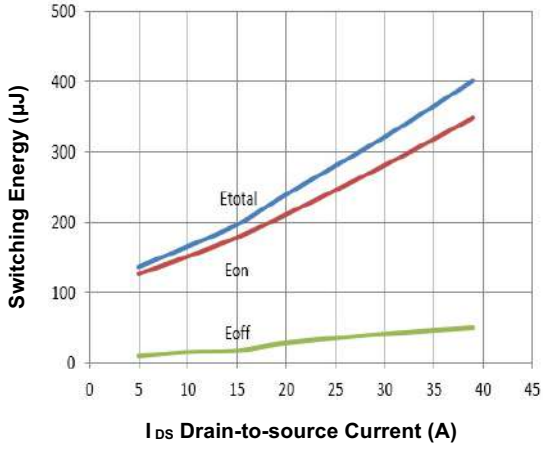

FIG.17- Clamped Inductive Switching Energy vs. Drain Current Various

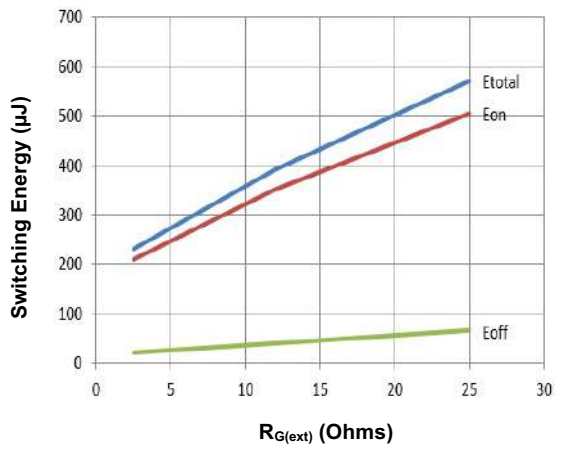

FIG.18- Clamped Inductive Switching Energy vs. $R_{G(ext)}$

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- **Typical Electrical Characteristics**

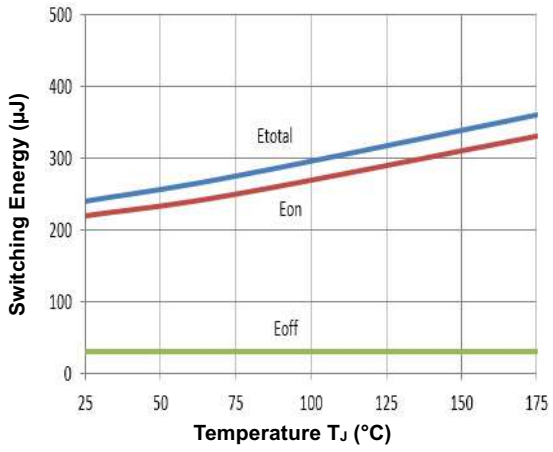

FIG.19-Clamped Inductive Switching Energy vs. Temperature

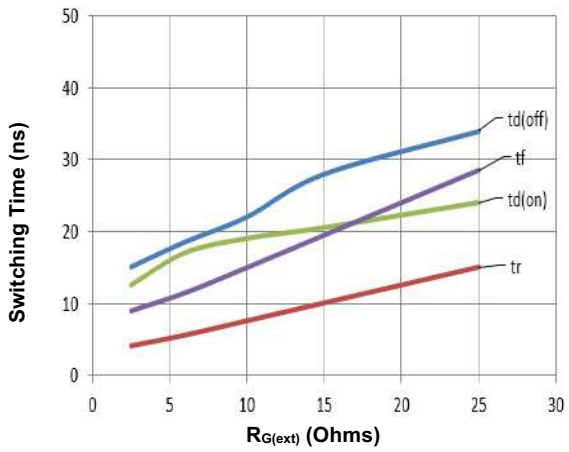

FIG.20- Switching Times vs $R_{G(ext)}$

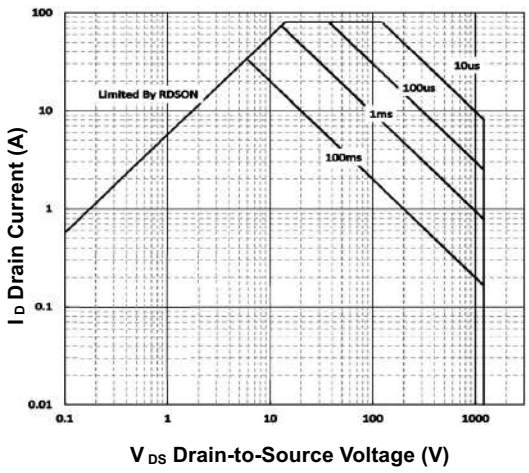

FIG.21- Safe Operating Area

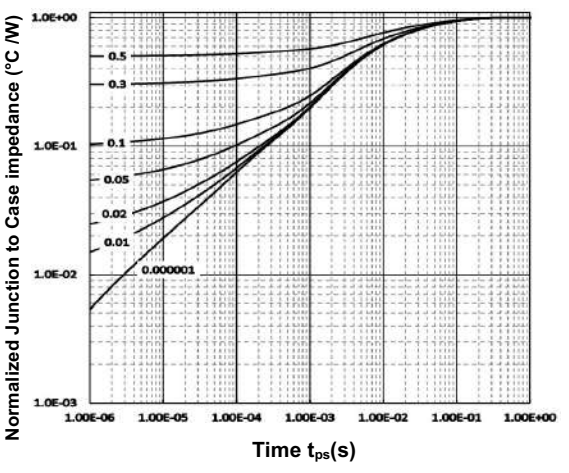

FIG.22- Transient Thermal impedance (Junction to Case)

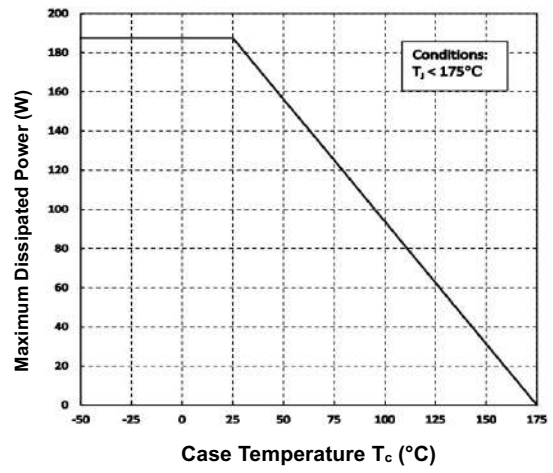

FIG.23- Maximum Power Dissipation Derating vs Case Temperature

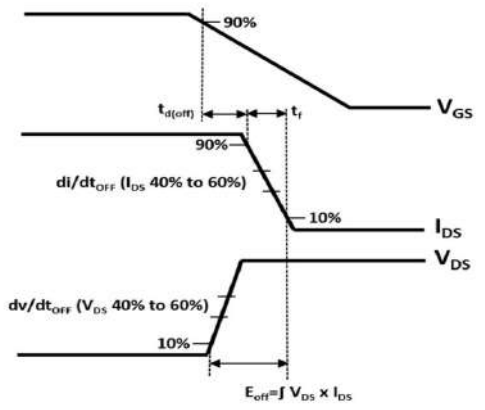

FIG.24- Turn-off Transient Definitions

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- **Typical Electrical Characteristics**

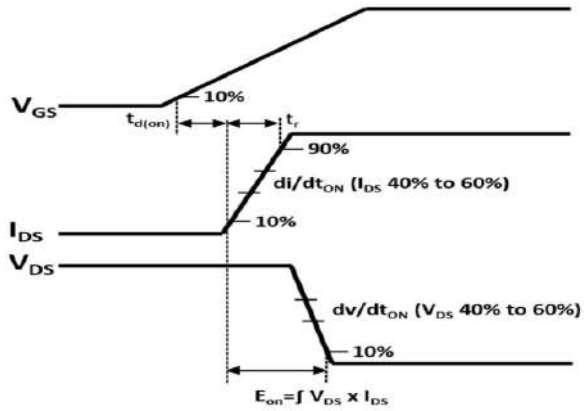

FIG.25-Turn-on Transient Definitions

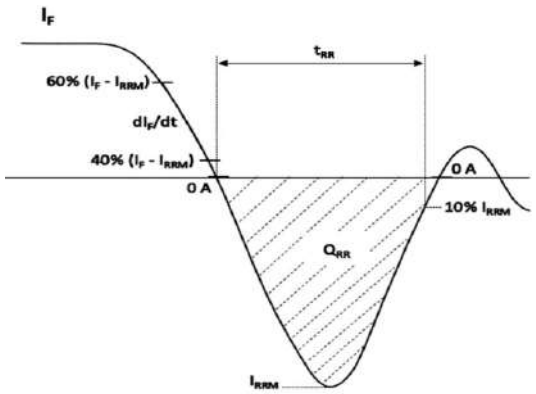

FIG.26- Reverse Recovery Definitions

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