DOSEMI

SiC MOSFET

DM170S12TDRB

1200V/17mΩ SIC Mosfet without Diode

General Description

DOSEMI MOSFET Power Discrete provides ultra low conduction loss as well as low switching loss. They are designed for the applications such as hybrid and electric vehicle.

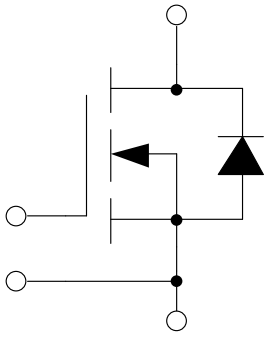
Features

- SiC power MOSFET
- Low $R_{DS(on)}$
- Chip sintering technology
- Low inductance case avoid oscillations
- ROHS

Typical Applications

- Automotive application
- Hybrid and electric vehicle
- Inverter for motor drive

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

Mosfet

Symbol	Description	Value	Unit
V_{DSS}	Drain-Source Voltage	1200	V
V_{GSSmax}	Gate-Source Voltage	-8/+19	V
V_{GSSop}	Gate-Source Voltage	-4/+15	V
I_D	Drain Current @ T_{vj}=175°C	118	A
P_D	Maximum Power Dissipation @ T_{vj}=175°C	355	W

Body Diode

Symbol	Description	Value	Unit
I_F	Source Current@ T_{vj}=175°C	157	A

Discrete

Symbol	Description	Values	Unit
T_{jop}	Operating Junction Temperature	-40 to +175	°C
T_{STG}	Storage Temperature Range	-55 to +150	°C
T_S	Soldering Temperature,1.6mm from case for 10s	260	°C

Mosfet Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	I_D=76A,V_{GS}=15V, T_{vj}=25°C		17.0		mΩ
		I_D=76A,V_{GS}=15V, T_{vj}=150°C		26.4		
		I_D=76A,V_{GS}=15V, T_{vj}=175°C		29.0		
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=23mA,V_{DS}=V_{GS}, T_{vj}=25°C		3.10		V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_{vj}=25°C			100	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=V_{GSS},V_{DS}=0V, T_{vj}=25°C			200	nA
R_{Gint}	Internal Gate Resistance			0		Ω
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=800V, f=100kHz		6.25		nF
C_{oss}	Output Capacitance			0.37		nF
C_{rss}	Reverse Transfer Capacitance			0.02		nF
Q_g	Total Gate Charge	I_D=76A,V_{DS}=800V, V_{GS}=-4/+15V		0.17		μC
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=800V,I_D=76A, R_{Gon}=3.9Ω, R_{Goff}=5.1Ω, V_{GS}=-4/+15V, L_S=40nH,T_{vj}=25 °C		39		ns
t_r	Rise Time			66		ns
$t_{d(off)}$	Turn-Off Delay Time			55		ns
t_f	Fall Time			34		ns
E_{on}	Turn-On Switching Loss			5.33		mJ
E_{off}	Turn-Off Switching Loss			0.99		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=800V,I_D=76A, R_{Gon}=3.9Ω, R_{Goff}=5.1Ω, V_{GS}=-4/+15V, L_S=40nH,T_{vj}=150 °C		34		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-Off Delay Time			67		ns
t_f	Fall Time			39		ns
E_{on}	Turn-On Switching Loss			5.89		mJ
E_{off}	Turn-Off Switching Loss			1.49		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=800V,I_D=76A, R_{Gon}=3.9Ω, R_{Goff}=5.1Ω, V_{GS}=-4/+15V, L_S=40nH,T_{vj}=175 °C		33		ns
t_r	Rise Time			59		ns
$t_{d(off)}$	Turn-Off Delay Time			68		ns
t_f	Fall Time			39		ns
E_{on}	Turn-On Switching Loss			6.08		mJ
E_{off}	Turn-Off Switching Loss			1.52		mJ

Body Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	I_S=38A,V_{GS}=-4V, T_{vj}=25°C		4.15		V
		I_S=38A,V_{GS}=-4V, T_{vj}=175°C		3.60		

Discrete Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per Mosfet)		0.255	0.281	K/W

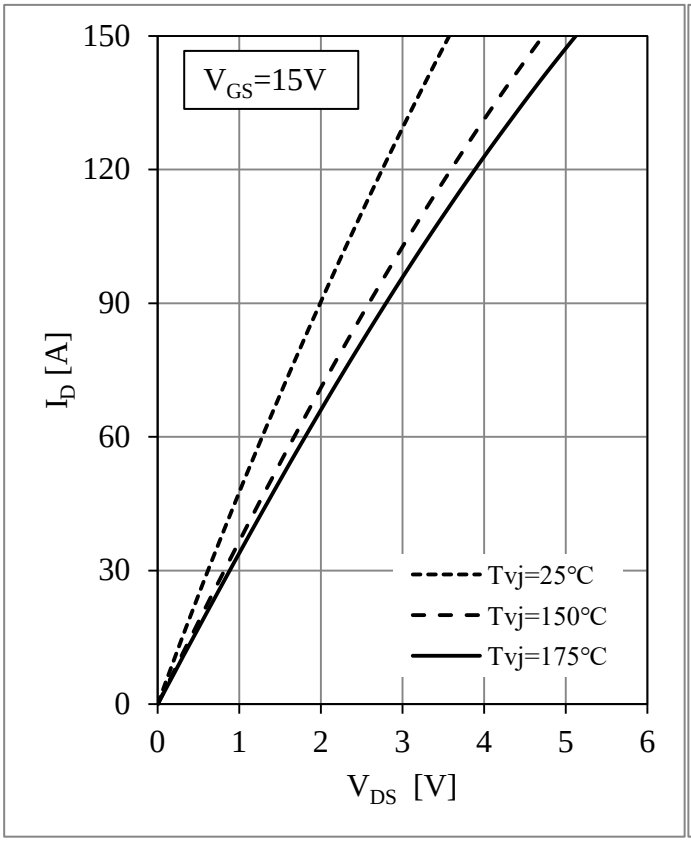


Fig 1. MOSFET Output Characteristics

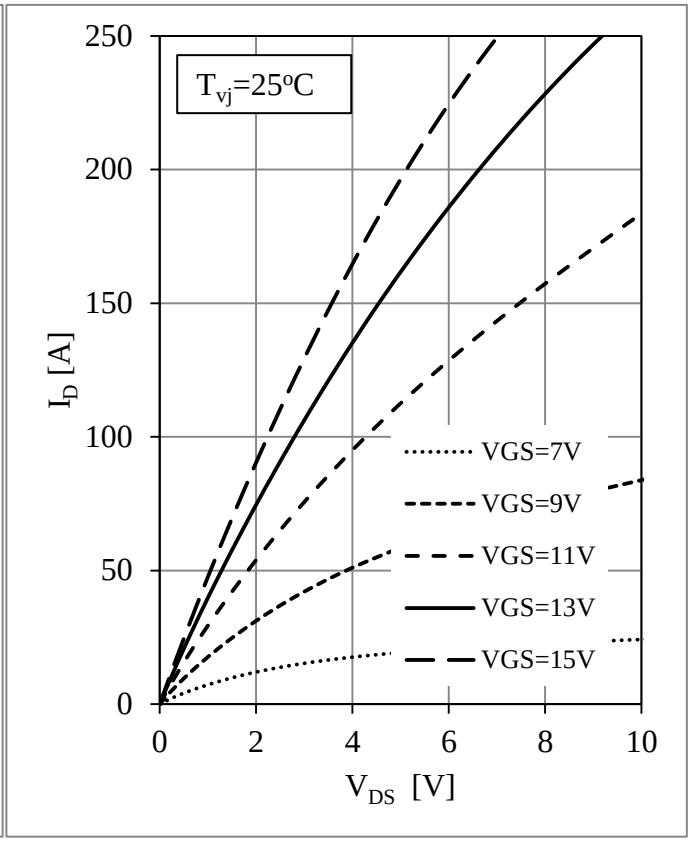


Fig 2. MOSFET Output Characteristics

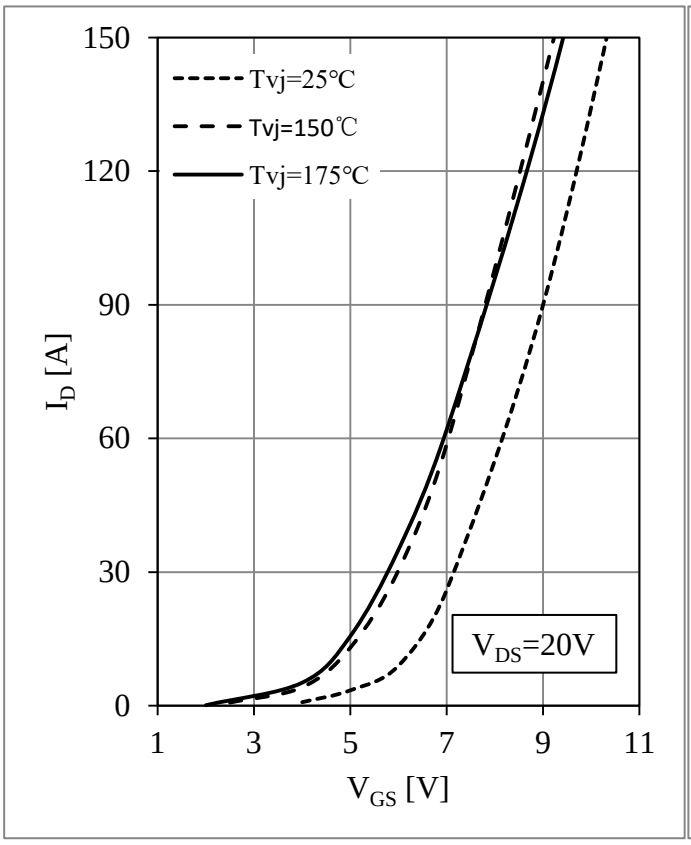


Fig 3. MOSFET Transfer Characteristics

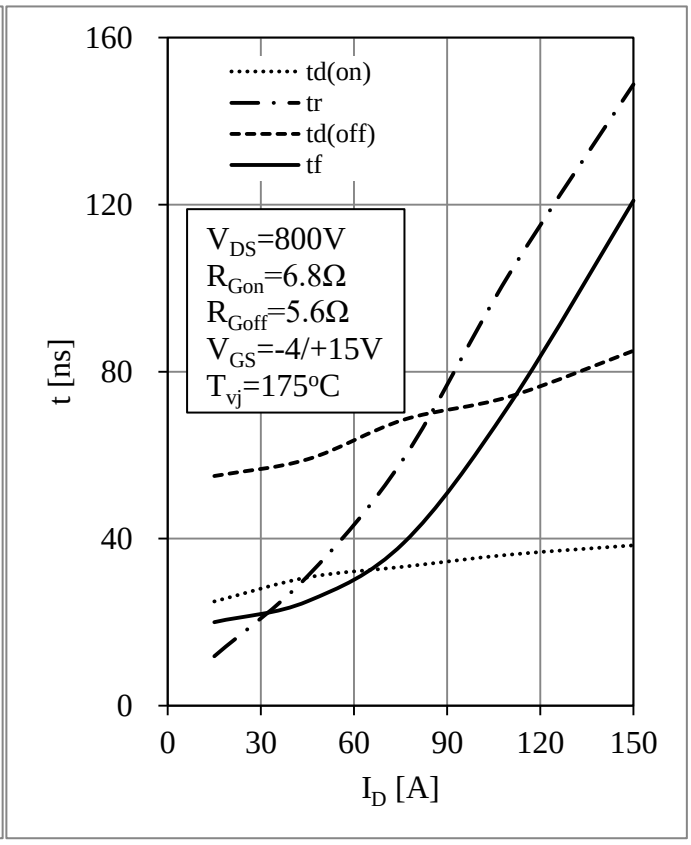


Fig 4. MOSFET Switching Times as.I_{DS}

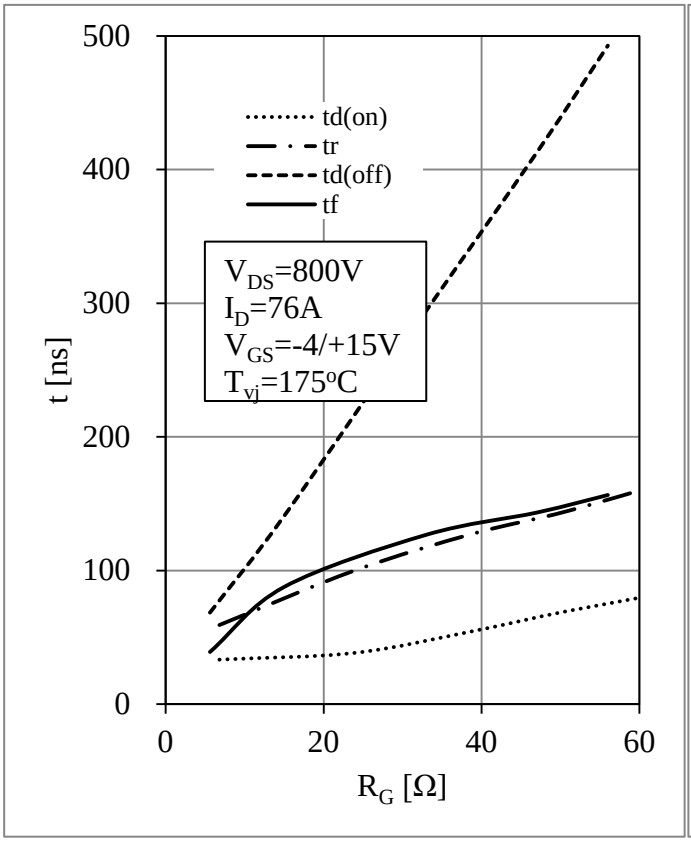


Fig 5. MOSFET Switching Times as. R_G

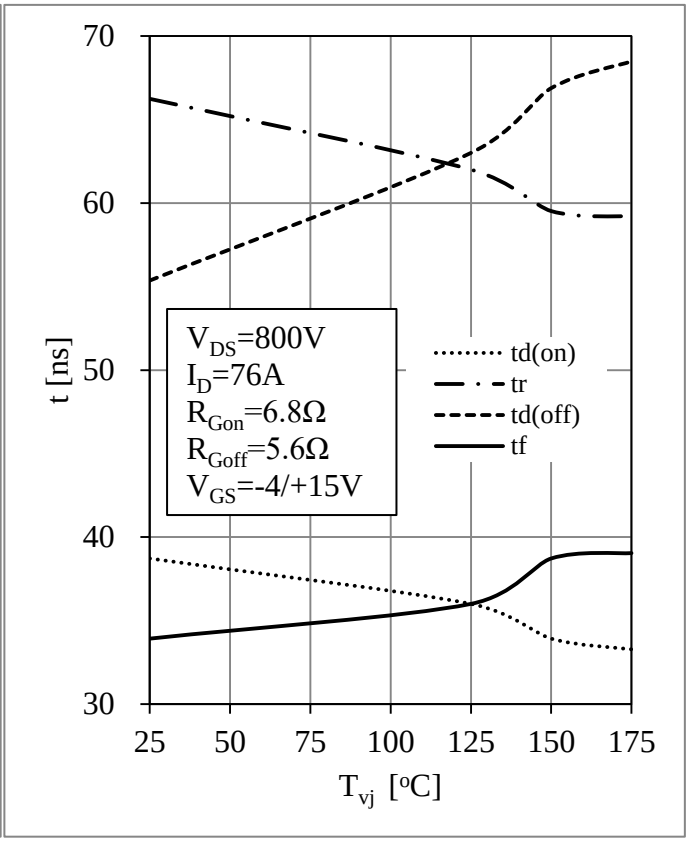


Fig 6. MOSFET Switching Times vs. T_{vj}

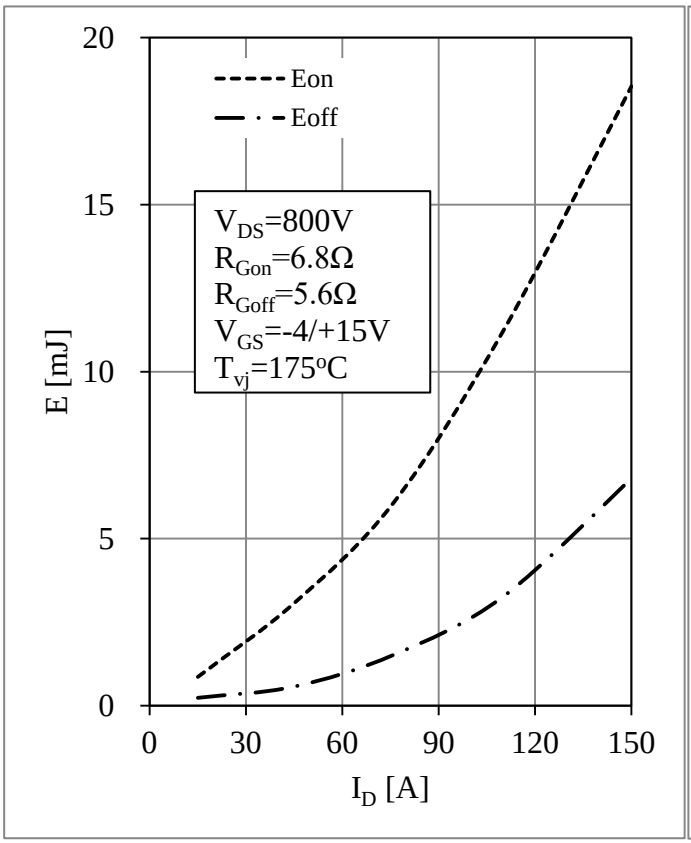


Fig 7. Switching Energy Loss vs. I_{DS}

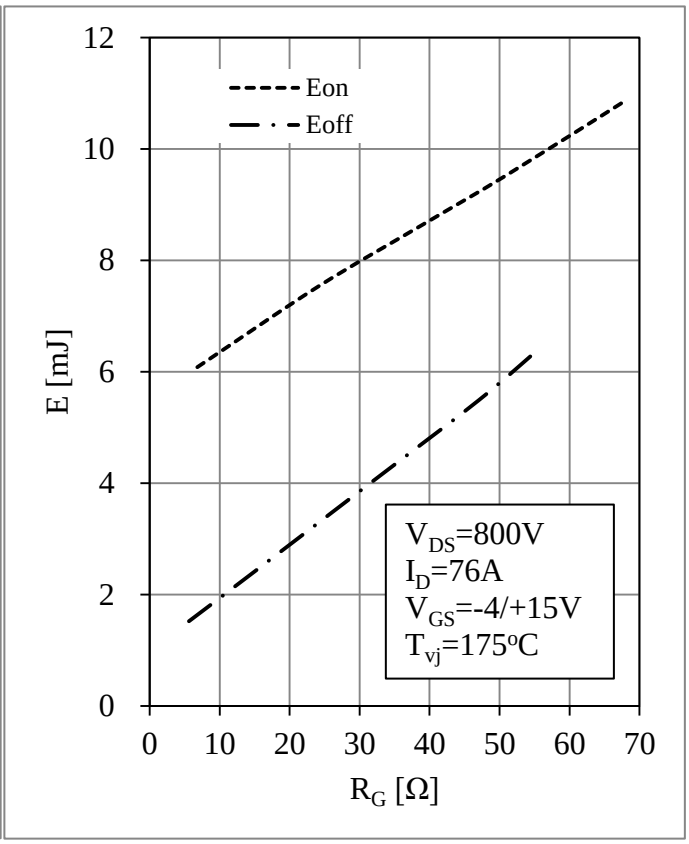


Fig 8. Switching Energy Loss vs. R_G

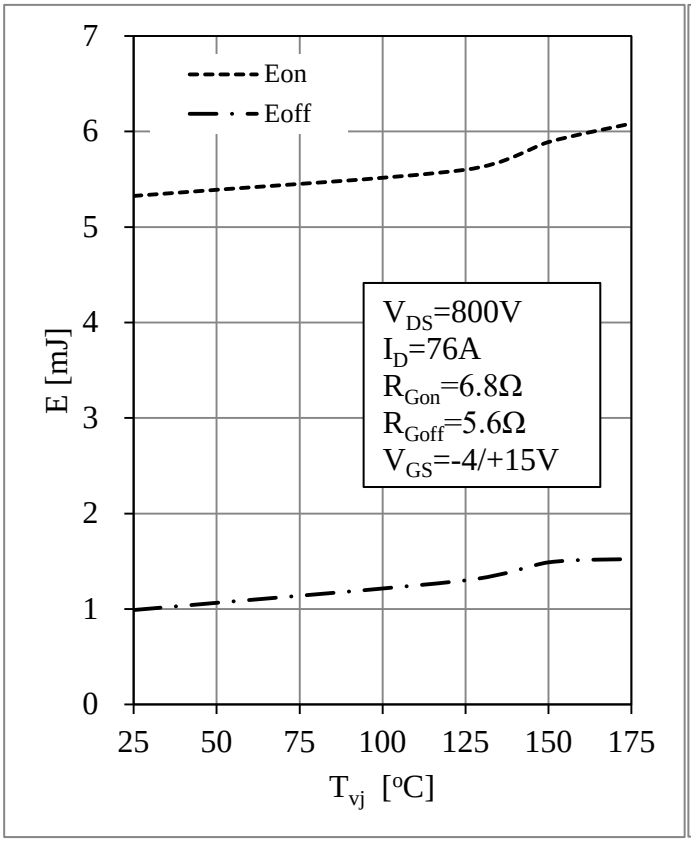


Fig 9. Switching Energy Loss vs. T_{vj}

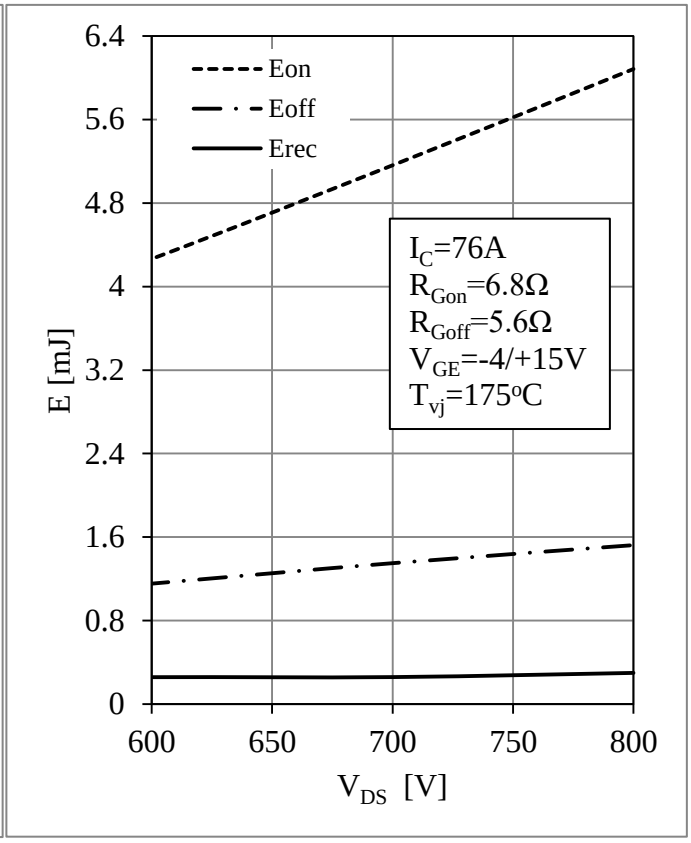


Fig 10. Switching Energy Loss vs.V_{DS}

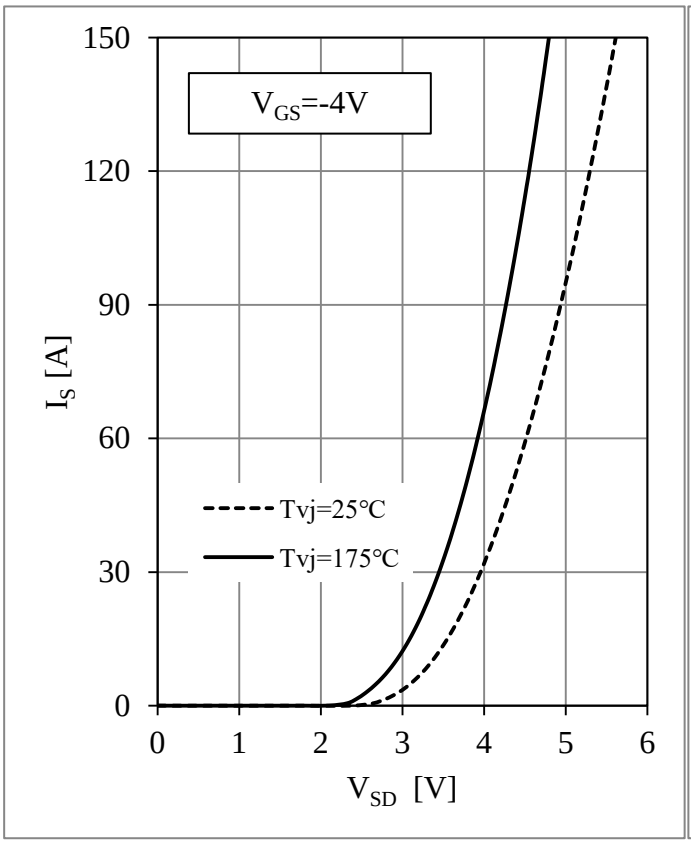


Fig 11. Body Diode Characteristics

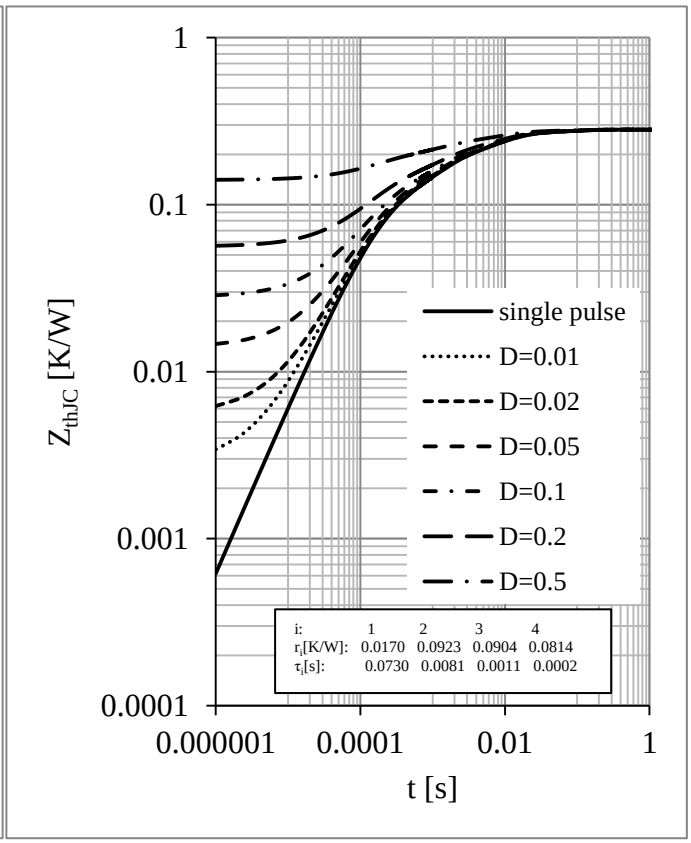
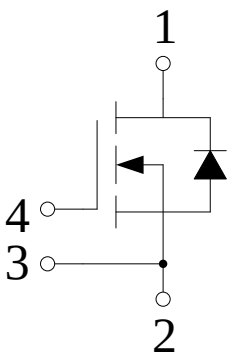


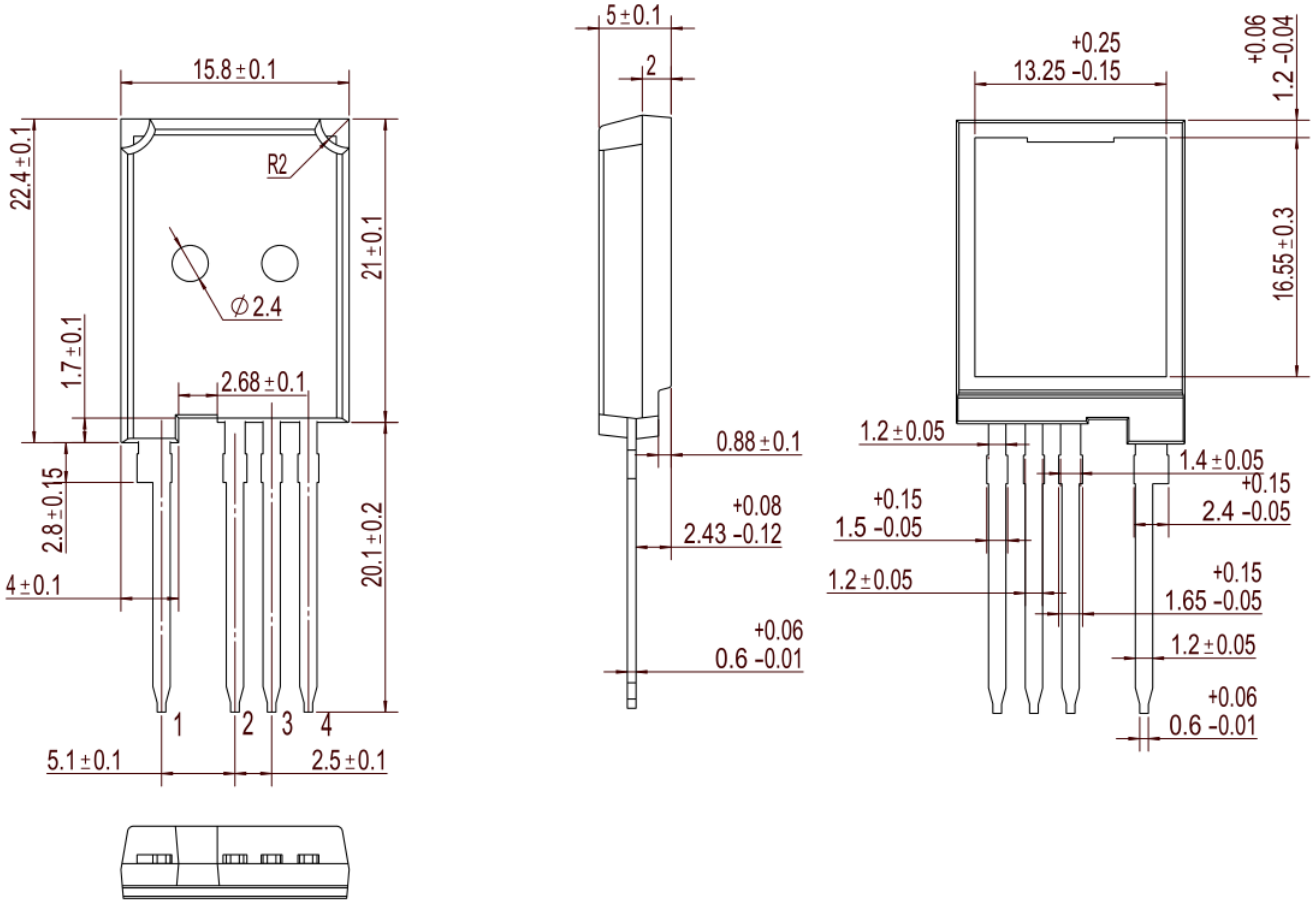
Fig 12. MOSFET Transient Thermal Impedance

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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