T2M200080F

SiC N-MOSFET 800V, 200mΩ, 13.3A

Features

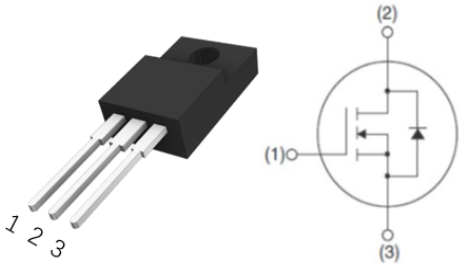
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

Product Summary

V_{DS}	800V
$R_{DS(on)\_typ}$	200mΩ
I_D	13.3A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Batterry Chargers



RoHS

Halogen Free

Package Marking and Ordering Information

Part #	Marking	Package
T2M200080F	2M200080F	TO-220F

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Continuous drain current T_C = 25°C , V_{GS} = 18V T_C = 125°C, V_{GS} = 18V	I_D	 13.3 7.7	A
Source current(Body Diode) T_C = 25°C , V_{GS} = -4V T_C = 125°C, V_{GS} = -4V	I_S	 13.3 7.7	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	I_{DM}	45	A
Avalanche energy, single pulse (L=10mH)	E_{AS}	180	mJ
Gate-Source voltage	V_{GS}	-4/+18	V
Gate-Source voltage（Absolute maximum values）	V_{GSmax}	-8/+22	V
Power dissipation (T_C = 25°C)	P_{tot}	50	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

●Example of acceptable V_{GS} waveform

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	3.0	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	800	-	-	V	V_{GS}=0V, I_D=100uA
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	V_{DS}=V_{GS},I_D=1mA
Zero gate voltage drain current	I_{DSS}	-	1	5	μA	V_{DS}=800V,V_{GS}=0V T_C=25°C
		-	5	-		T_C=175°C
Gate-source leakage current	I_{GSS}	-		100	nA	V_{GS}=18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	200	260	mΩ	V_{GS}=18V, I_D=3.6A, T_J=25°C
		-	240	-		T_J=175°C
Drain-source on-state resistance	$R_{DS(on)}$	-	250	320	mΩ	V_{GS}=15V, I_D=3.6A, T_J=25°C
		-	310	-		T_J=175°C
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	338.2	-	pF	V_{DS} = 600V V_{GS} = 0V T_J = 25°C V_{AC}=25mV f = 1MHz
Output Capacitance	C_{oss}	-	16.7	-		
Reverse Transfer Capacitance	C_{rss}	-	3.8	-		
Gate Total Charge	Q_G		15.6	-	nC	V_{DS} = 600V V_{GS} = 0/+18V I_D = 3.6A I_G=10mA
Gate-Source charge	Q_{gs}	-	2.76	-		
Gate-Drain charge	Q_{gd}	-	7.86	-		
Turn-On Switching Energy	E_{ON}	-	52.1	-	uJ	V_{DD} = 600V V_{GS} = -4/+18V I_D = 3.6A R_G = 5Ω L = 1mH T_J = 25°C
Turn-Off Switching Energy	E_{OFF}	-	12.62	-		
Turn-on delay time	$t_{d(on)}$	-	4.2	-	ns	
Rise time	t_r	-	2	-		
Turn-off delay time	$t_{d(off)}$	-	10.2	-		
Fall time	t_f	-	9.8	-		
Gate resistance	R_G	-	3.0	-	Ω	V_{AC} = 25mV, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	4.2	-	V	V_{GS}=-4V,I_{SD}=1.8A, T_J=25°C
		-	3.8	-		V_{GS}=-4V,I_{SD}=1.8A, T_J=175°C
Reverse Recovery Time	t_{rr}	-	22.2	-	ns	V_R = 600V I_D = 3.6A di/dt = 1000A/μS V_{GS}= -4V T_J = 25°C
Reverse Recovery Charge	Q_{rr}	-	36	-	nC	
Reverse Recovery Energy	E_{REC}	-	14.74	-	uJ	
Peak Reverse Recovery Current	I_{rrm}	-	2.67	-	A	
Charge Time	t_A	-	10.8	-	ns	
DisCharge Time	t_B	-	11.4	-	ns	

Typical Performance Characteristics

Fig 1. Output Characteristic (T_J=-55℃)

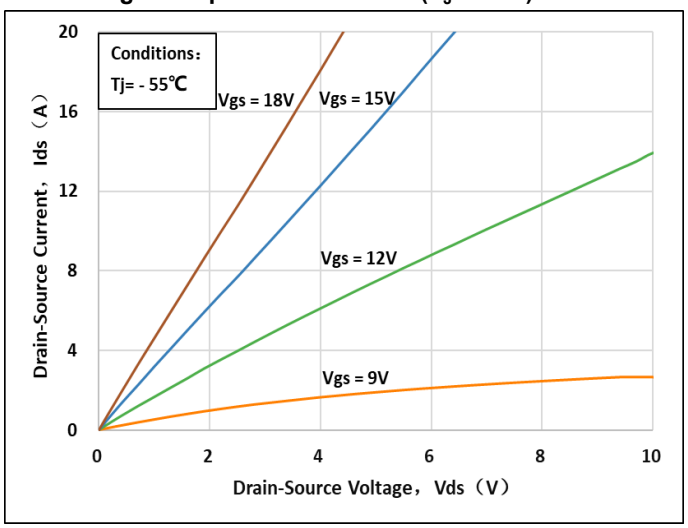


Fig 2. Output Characteristic (T_J=25℃)

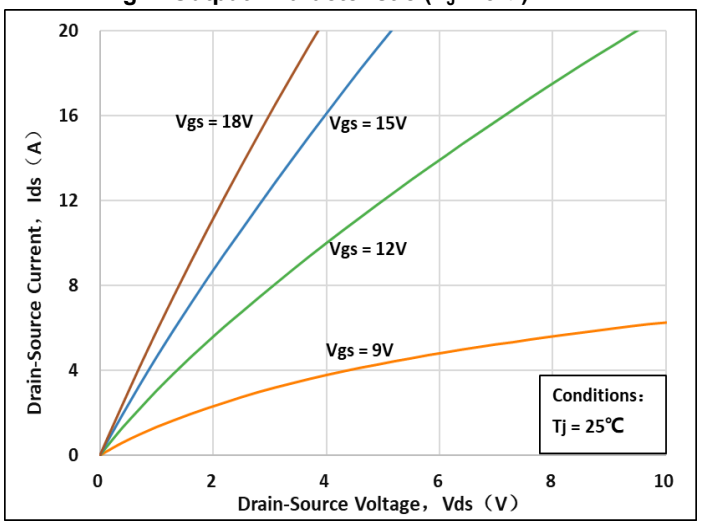


Fig 3. Output Characteristic (T_J=175℃)

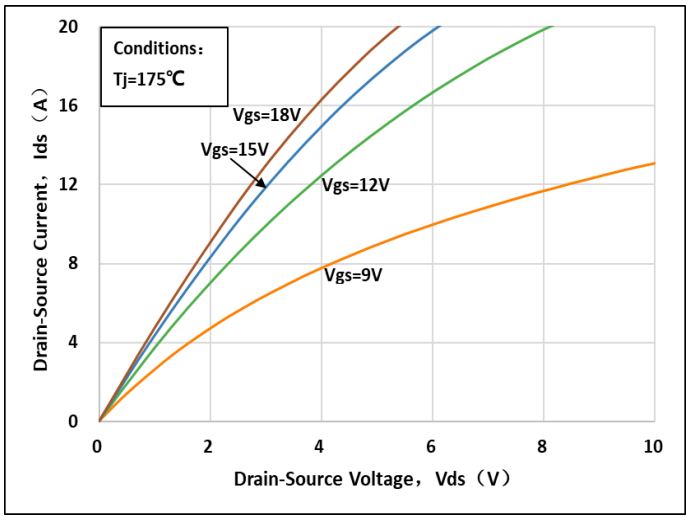


Fig 4: Rdson Vs Ids Characteristic

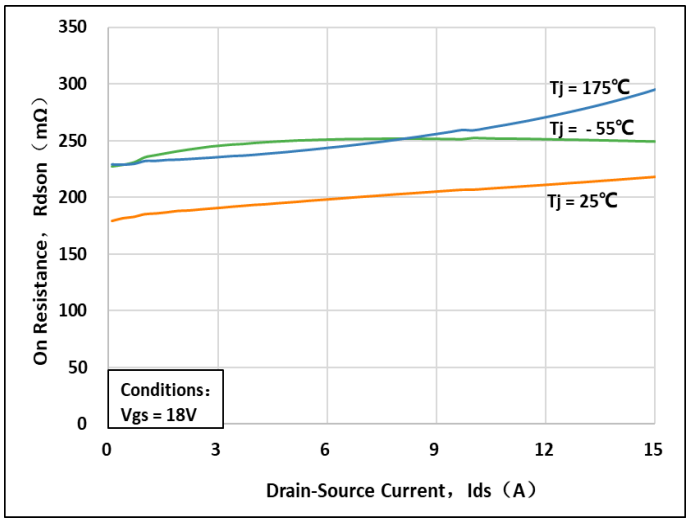


Fig 5: Rds(on) vs. Temperature

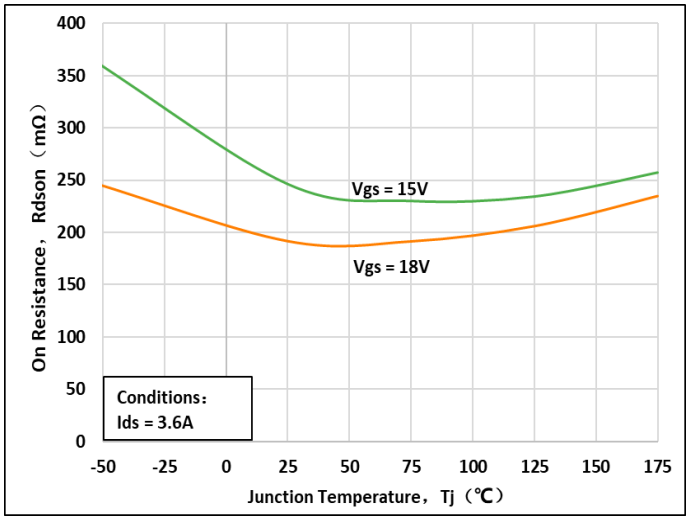


Fig 6: Transfer Characteristic

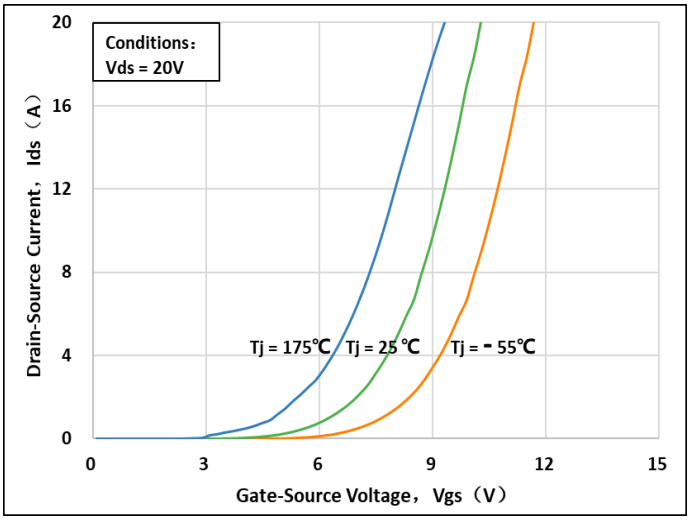


Fig 7: Body-diode Characteristic (T_J=-55℃)

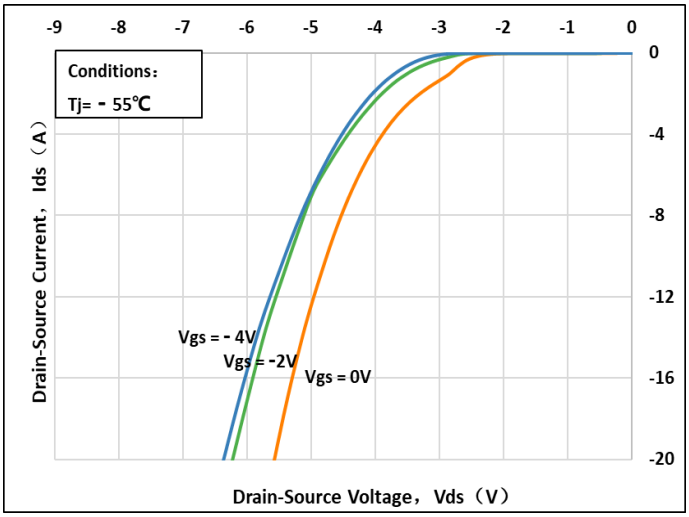


Fig 8: Body-diode Characteristic (T_J=25℃)

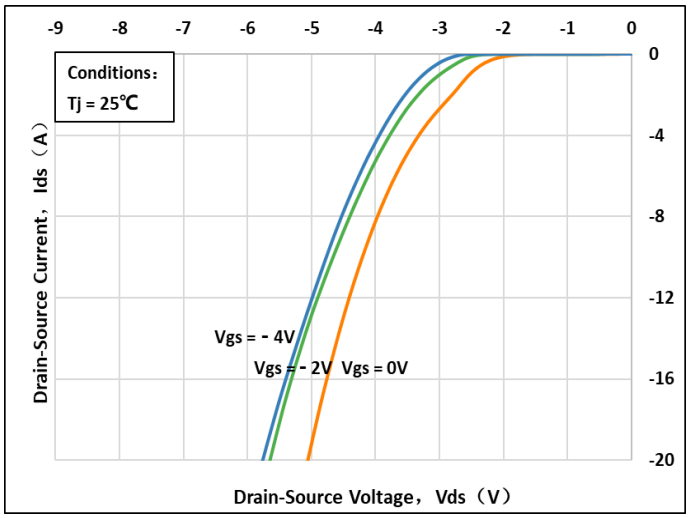


Fig 9: Body-diode Characteristic (T_J=175℃)

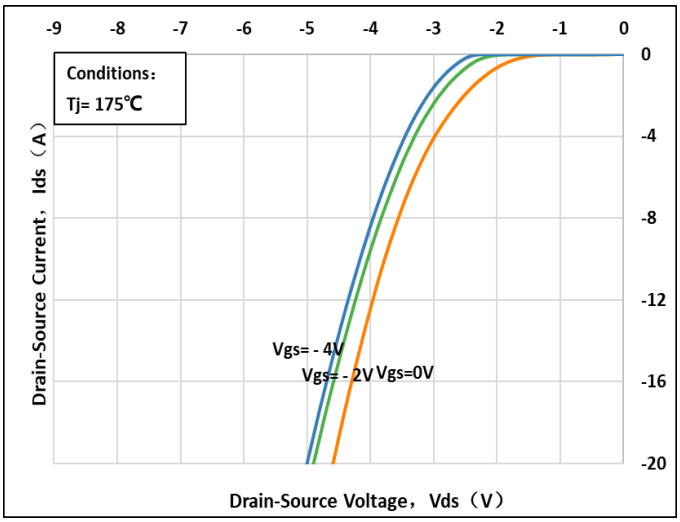


Fig 10: V_{TH} Vs T_J Temperature Characteristic

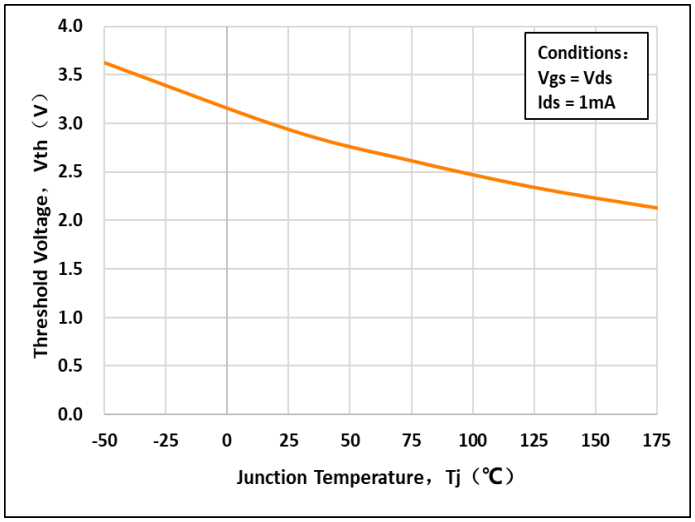


Fig 11: 3rd Quadrant Characteristic(T_J=-55℃)

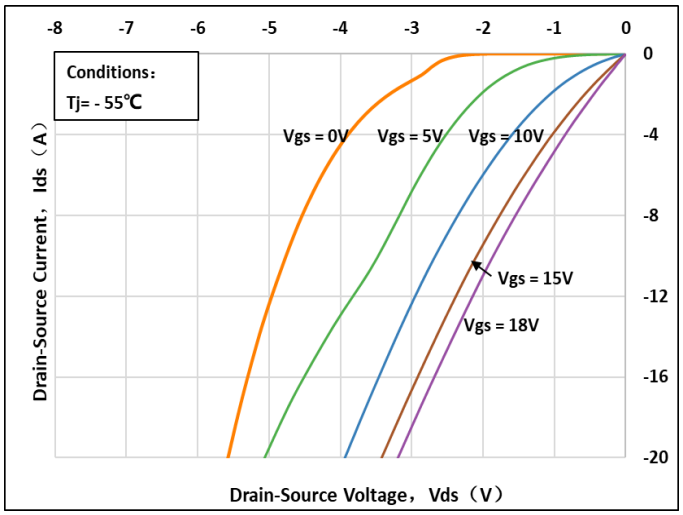


Fig 12: 3rd Quadrant Characteristic(T_J=25℃)

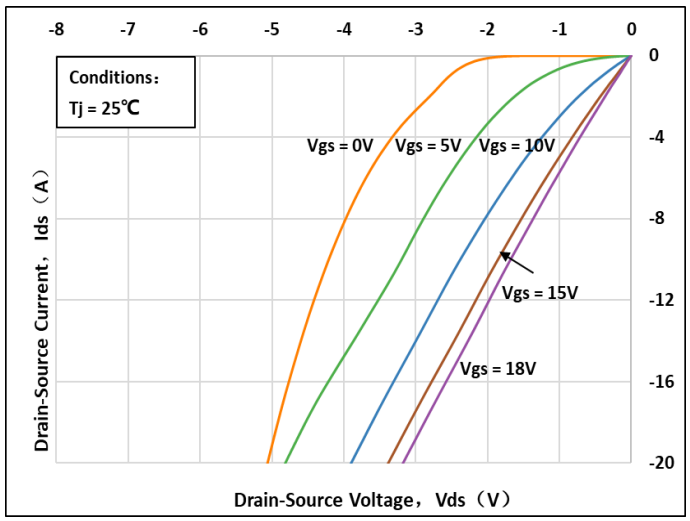


Fig 13: 3rd Quadrant Characteristic(T_J=175℃)

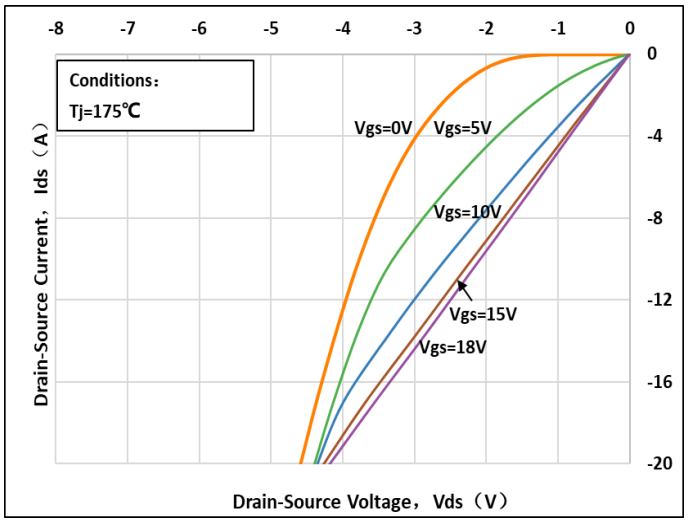


Fig 14: Gate Charge Characteristics

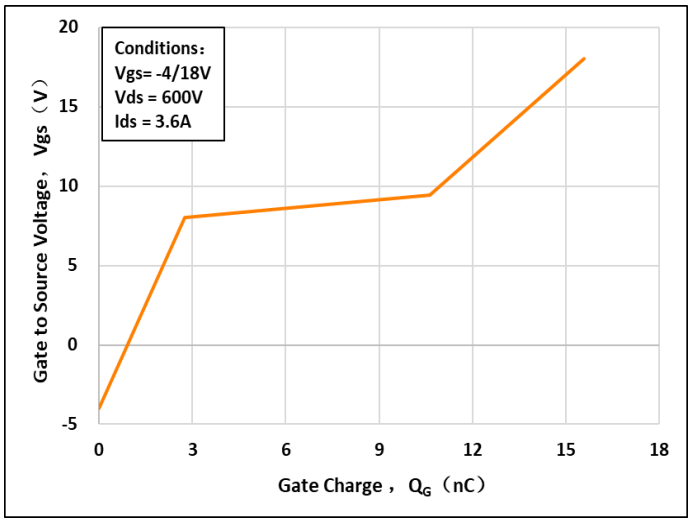


Fig 15: Drain Current vs.Case Temperature

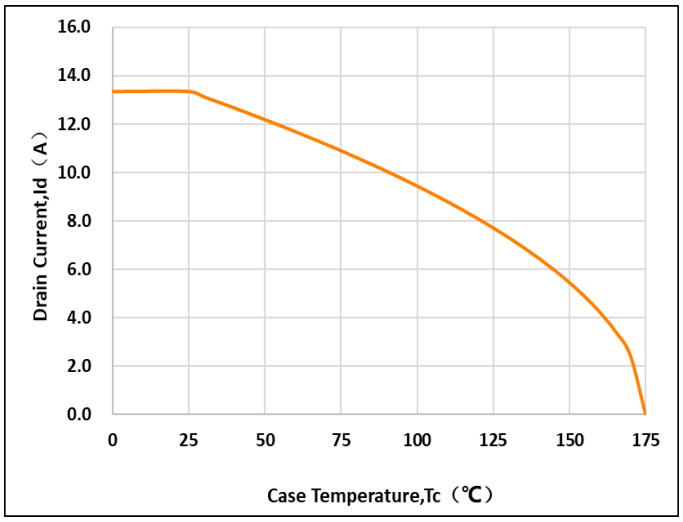


Fig 16: Safe Operating Area

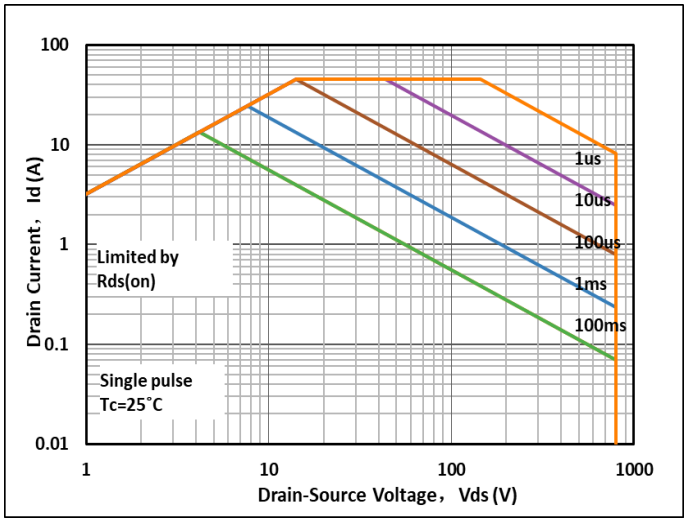


Fig 17: Capacitance Characteristics

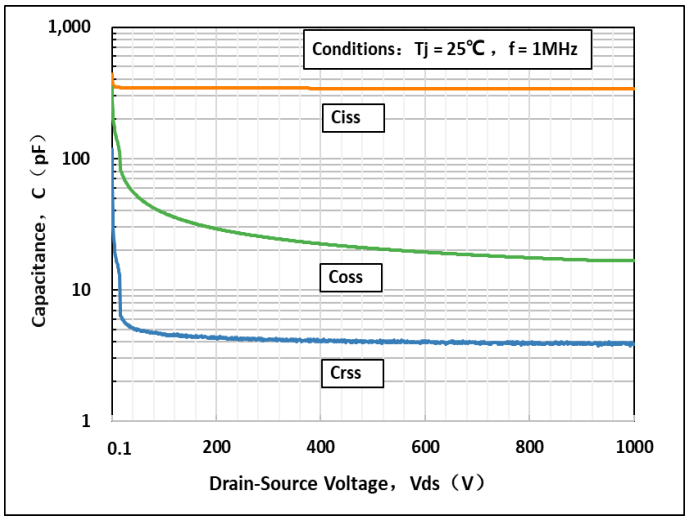
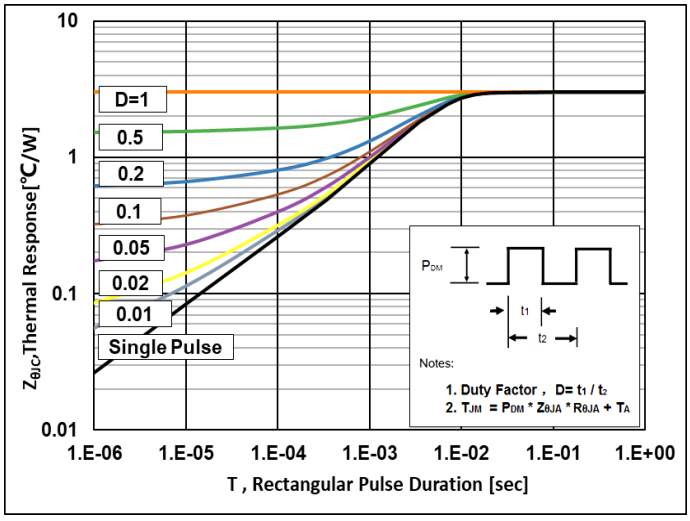
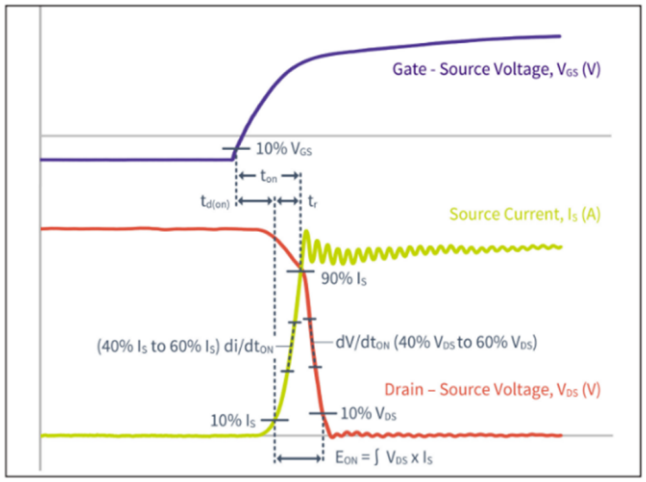


Fig 18: Transient Thermal Impedance

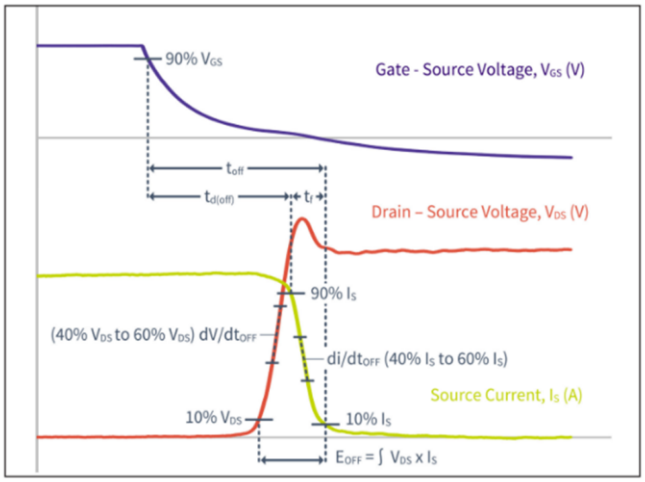


Test Circuit & Waveform

Figure A. Definition of switching times



Turn-on Transient Definitions



Turn-off Transient Definitions

Figure B. Dynamic test circuit

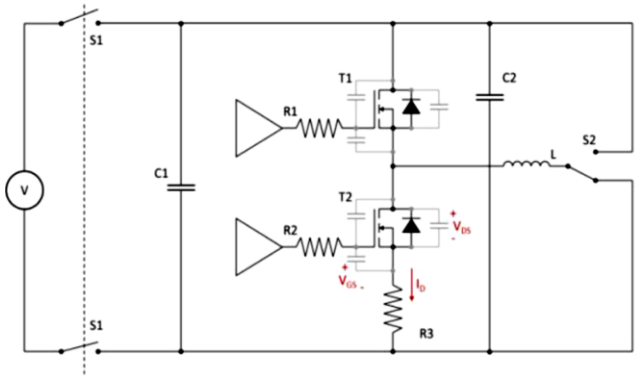
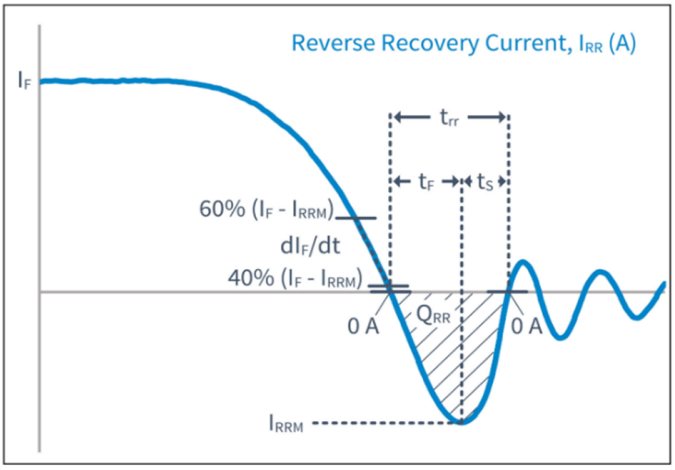
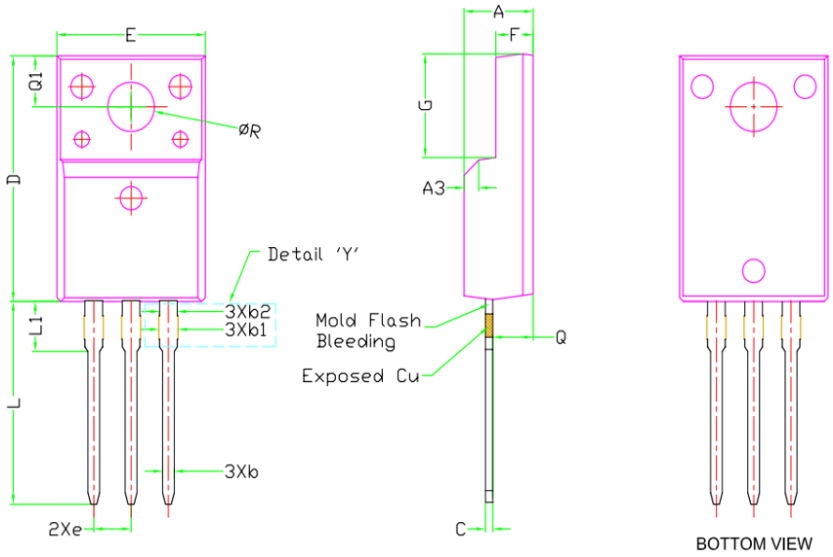


Figure C. Definition of body diodeswitching characteristics



Reverse Recovery Definitions

Package Outline:



SYMBOL	DIMENSIONS		
	Min.	Nom.	Max.
A	4.60	4.70	4.80
b	0.70	0.80	0.91
b1	1.20	1.30	1.47
b2	1.10	1.20	1.30
C	0.45	0.50	0.63
D	15.80	15.87	15.97
e		2.54	
E	10.00	10.10	10.30
F	2.44	2.54	2.64
G	6.50	6.70	6.90
L	12.90	13.10	13.30
L1	3.13	3.23	3.33
Q	2.65	2.75	2.85
Q1	3.20	3.30	3.40
ΦR	3.08	3.18	3.28

Contact Information

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For additional information, please contact your local Sales Representative.

