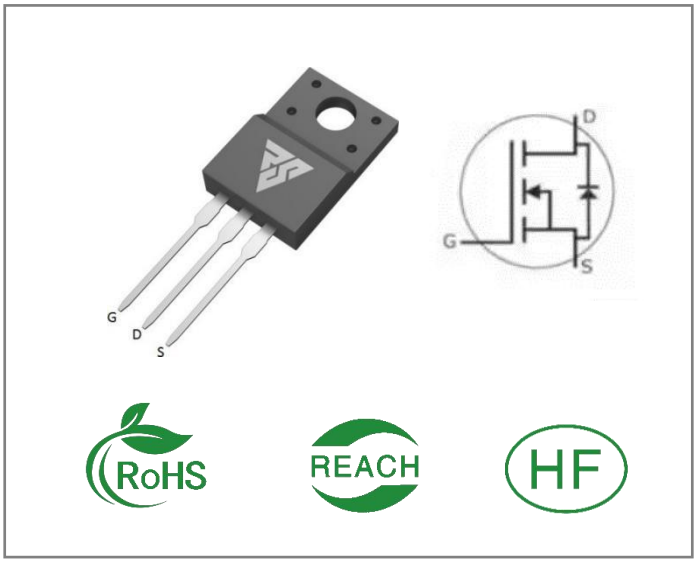
V_{DS}	$R_{DS(on)Typ}$	I_D@25℃
800V	190mΩ	14A



Applications:

- LED driver
- PD charger
- PC adapter
- Air-conditioning
- E-bike charger

Features:

- Revolutionary semiconductor material Silicon Carbide
- High blocking voltage with low on-resistance
- High-speed switching with very low switching losses
- High-speed and high robust intrinsic body diode

Ordering Information

Part Number	Package	Marking	Packing	Qty.
RSM080190BF	TO-220F	RSM080190BF	Tube	50 PCS

Maximum Ratings (TJ= 25℃ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DS}	Drain - Source Voltage	800	V	V_{GS}=0V,I_D=250μA
V_{GS}	Gate - Source Voltage	-10/+22	V	Absolute maximum values
V_{GSOP}	Recommended Operation Voltage of Gate to Source	0/+18	V	Recommended operational values
I_D	Continuous Drain Current	14 9.9	A	T_C =25℃ T_C =100℃
I_{DM}	Pulsed Drain Current	22	A	T_C =25℃
E_{AS}	Single Pulse Avalanche Energy L=0.5mH,I_{AS}=9.2A,V_{DD}=50V,V_{GS}=15 V	21.2	mJ	
P_D	Power Dissipation	30	W	T_C =25℃
T_J, T_{stg}	Operating Junction and StorageTemperature	-55 to + 175	℃	
T_{sold}	Soldering Temperature, Wave Soldering only Allowed at Leads 1.6mm from Case for 10s	260	℃	

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Electrical Characteristics (TJ= 25℃ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	800			V	V_{GS}=0V,I_D=250μA	
$V_{GS(th)}$	Gate Threshold Voltage	2.7	3.4		V	V_{GS}= V_{DS}, I_D=3.5mA	
I_{DSS}	Zero Gate Voltage Drain Current	1		50	μA	V_{DS}=800V, V_{GS}=0V	
I_{GSS}	Gate-Source Leakage Current			250	nA	V_{GS}=22V, V_{DS}=0V	
$R_{DS(on)}$	Drain-Source on-state Resistance		250	320	mΩ	V_{GS}=15V, I_D =8A	
			190	260		V_{GS}=18V, I_D =8A	
C_{iss}	Input Capacitance		277		pF	V_{GS}=0V, V_{DS}=400V f=1MHz,T_j=25℃	
C_{oss}	Output Capacitance		61				
C_{rss}	Reverse Transfer Capacitance		7.5				
gfs	Transconductance		5.4		S	V_{DS}=20V,I_D=8A	
R_G	Internal Gate Resistance		33		Ω	f=1MHz,V_{AC}=25mV	
Q_g	Total Gate Charge		10.81		nC	V_{DS}=400V V_{GS}=0/+15V I_D=8A	
Q_{gs}	Gate to Source Charge		4.06				
Q_{gd}	Gate to Drain Charge		1.37				
$t_{d(on)}$	Turn-On Delay Time		18.3		ns	V_{DD}=400V V_{GS} =0/15V L=600μH I_D=8A $R_{G(on)}$=2.2Ω $R_{Goff)}$=2.2Ω	T_j=25℃
			17.5				T_j=175℃
t_r	Rise Time		11.6				T_j=25℃
			10.5				T_j=175℃
$t_{d(off)}$	Turn-Off Delay Time		18.1				T_j=25℃
			21.9				T_j=175℃
t_f	Fall Time		12.7				T_j=25℃
			12.3				T_j=175℃
Eon	Turn−On Switching Loss		76.8		μJ		T_j=25℃
			75.6				T_j=175℃
Eoff	Turn−Off Switching Loss		14.5				T_j=25℃
			13.8				T_j=175℃
Etot	Total Switching Energy		91.3				T_j=25℃
			89.4				T_j=175℃

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Reverse Diode Characteristics (TJ= 25℃ unless otherwise specified)

Symbol	Parameter	Typ.	Max	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.6 3.2		V	V_{GS}=0V, I_{SD} =4A	T_j=25℃ T_j=175℃
I_S	Continuous DC Source Current, Limited by $T_{VJ(max)}$	11 7		A	T_C=25℃ T_C=100℃	
I_{SM}	Peak Reverse Drain Current, tp Limited by $T_{VJ(max)}$	21		A	T_C=25℃	
I_{rrm}	Peak Reverse Recovery Current	5.3 6.4		A	V_{DS}=400V V_{GS}=0V I_{SD}=8A di/dt=1.6KA/us	T_j=25℃ T_j=175℃
Q_{rr}	Reverse Recovery Charge	31.4 39.9		nC		T_j=25℃ T_j=175℃
t_{rr}	Reverse Recovery time	11.3 10.3		ns		T_j=25℃ T_j=175℃
Err	Reverse Recovery Energy	0.31 0.43		μJ		T_j=25℃ T_j=175℃

Thermal Characteristics (TJ= 25℃ unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	5.85		℃/W	

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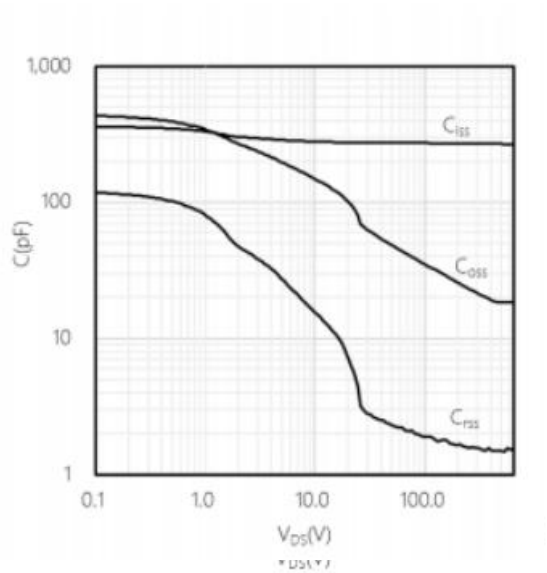
Typical Feature Curve

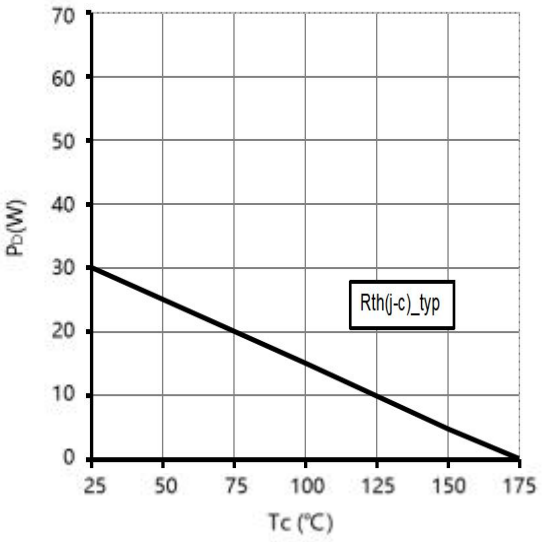
Typical capacitance as a function of drain-source voltage

$C = f(V_{DS})$, V_{GS} = 0V, f = 1MHz



Power dissipation as a function of case temperature limited by bond wire

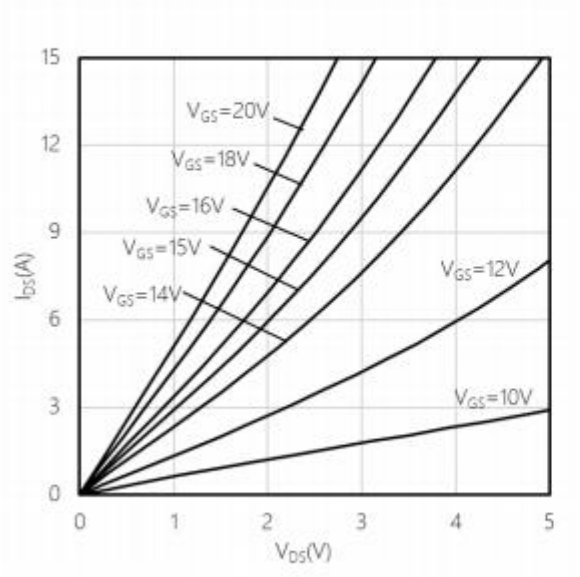
$P_D = f(T_C)$



Typical output characteristic, V_{GS} as parameter

$I_{DS} = f(V_{DS})$

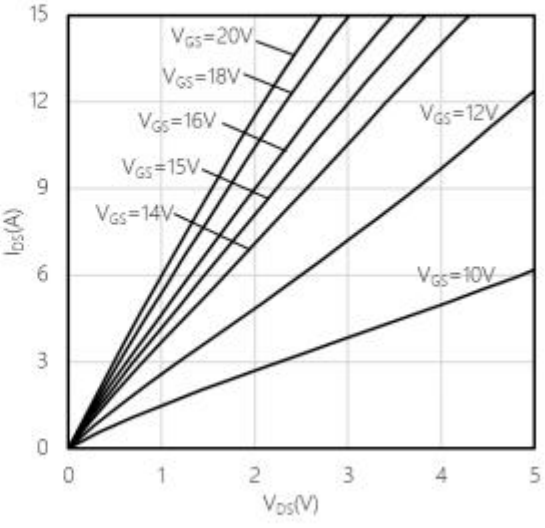
T_{VJ} = -55 ℃



Typical output characteristic, V_{GS} as parameter

$I_{DS} = f(V_{DS})$

T_{VJ} = 25 ℃



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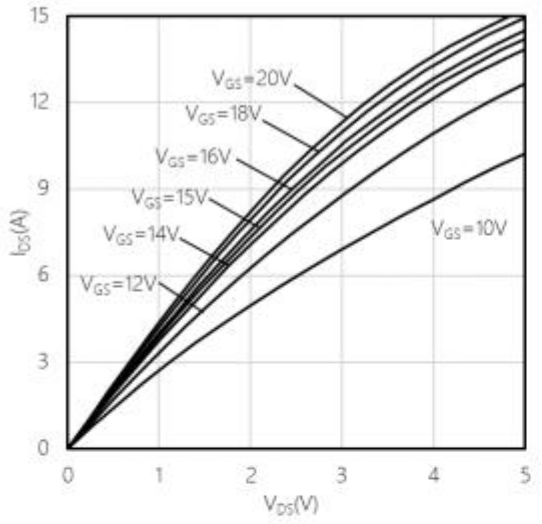
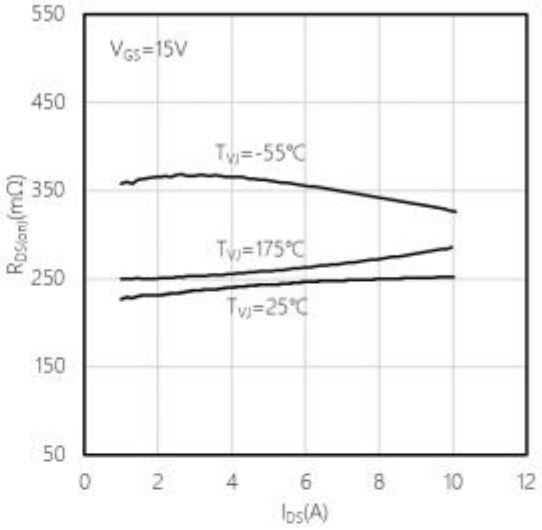
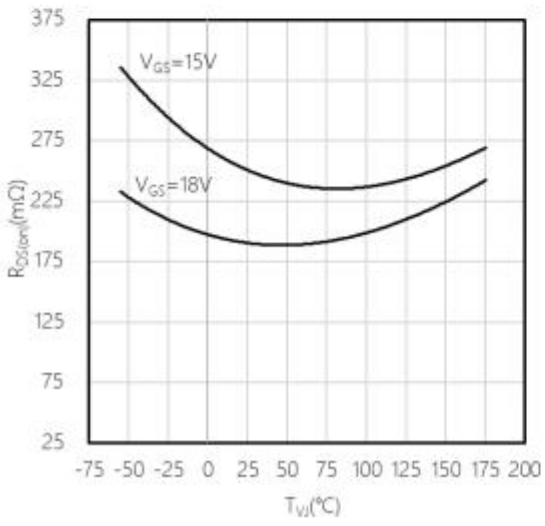
Typical output characteristic, V_{GS} as parameter
$I_{DS} = f(V_{DS})$
$T_{VJ} = 175℃$



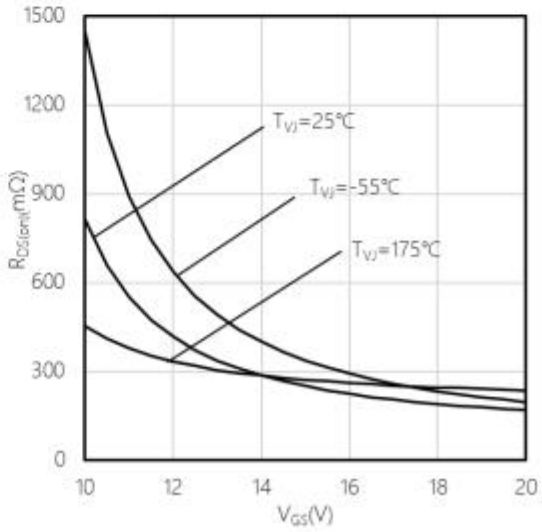
Typical on-state resistance as a function of drain current
$R_{DS(on)} = f(I_{DS})$, $V_{GS} = 15V$



Typical on-state resistance as a function of temperature
$R_{DS(on)} = f(T_{VJ})$, I_{DS} =8 A



Typical on-state resistance as a function of V_{GS}
$R_{DS(on)} = f(V_{GS})$
I_{DS} =8 A



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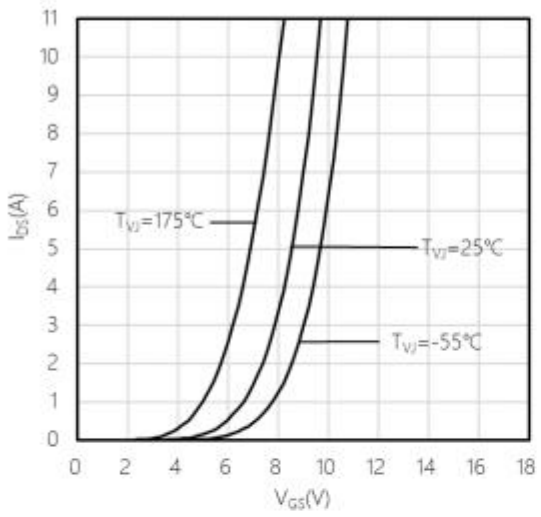
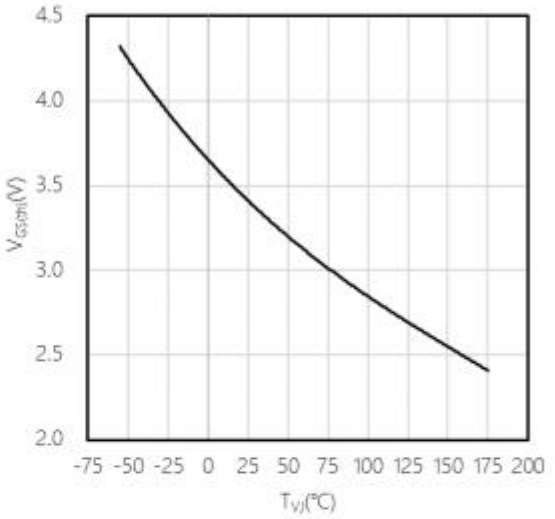
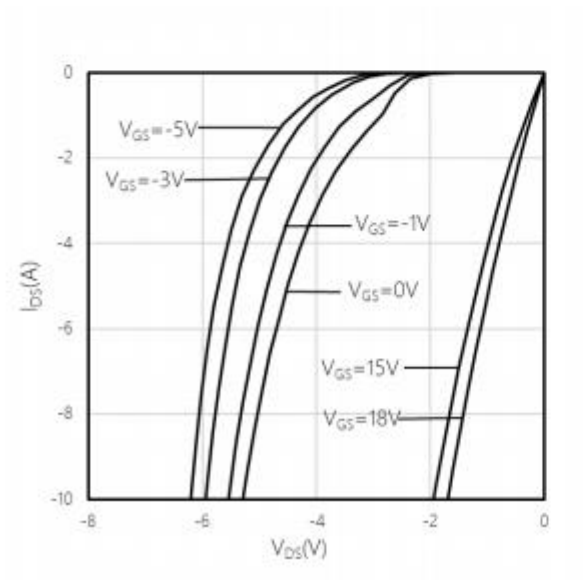
Typical transfer characteristic
$I_{DS} = f(V_{GS})$
V_{DS}= 20 V



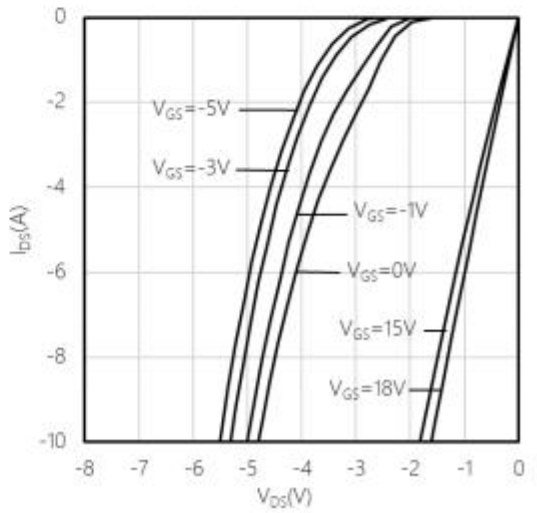
Typical gate-source threshold voltage as a function of junction temperature
$V_{GS(th)} = f(T_{VJ})$, I_{DS} = 3.5mA



Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter
$I_{DS} = f(V_{DS})$, T_{VJ} = -55 °C



Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter
$I_{DS} = f(V_{DS})$, T_{VJ} = 25 °C



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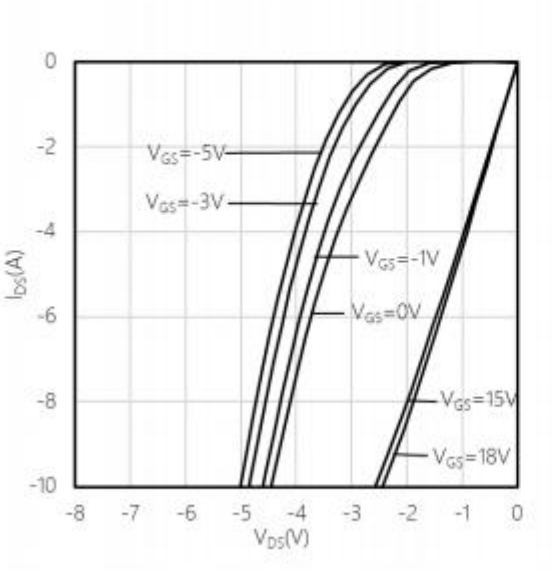
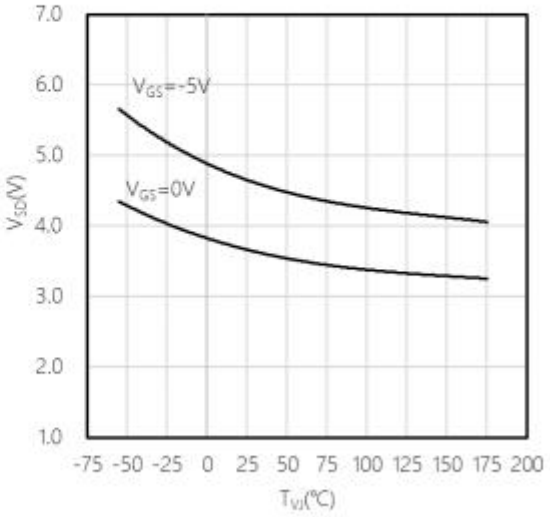
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = 175 °C



Typical reverse drain voltage as function of junction temperature

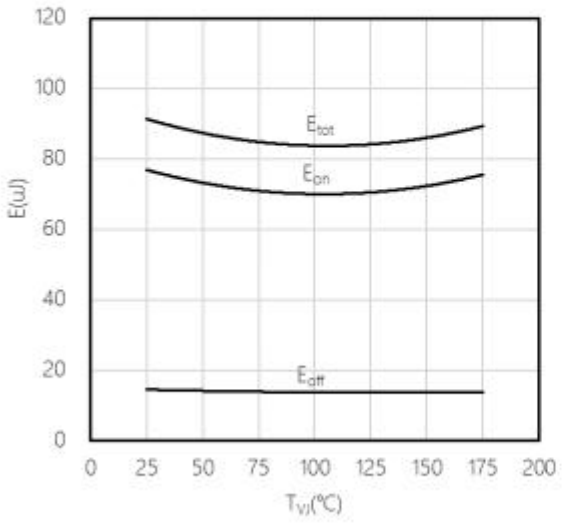
$V_{SD} = f(T_{VJ})$, I_{SD} = 4 A



Typical switching energy as a function of junction temperature, 2nd device own body diode: V_{GS} = 0 V

$E = f(T_{VJ})$

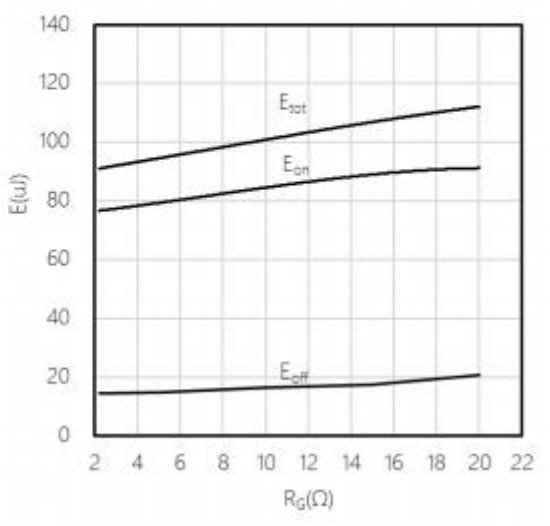
V_{DS} = 400 V, $R_{G(ext)}$ = 2.2 Ω, V_{GS} = 0V / 15 V, I_{DS} = 8 A



Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V

$E = f(R_{G(ext)})$

V_{GS} = 0/15 V, I_{DS} = 8 A, T_{VJ} = 25 °C, V_{DS} = 400 V



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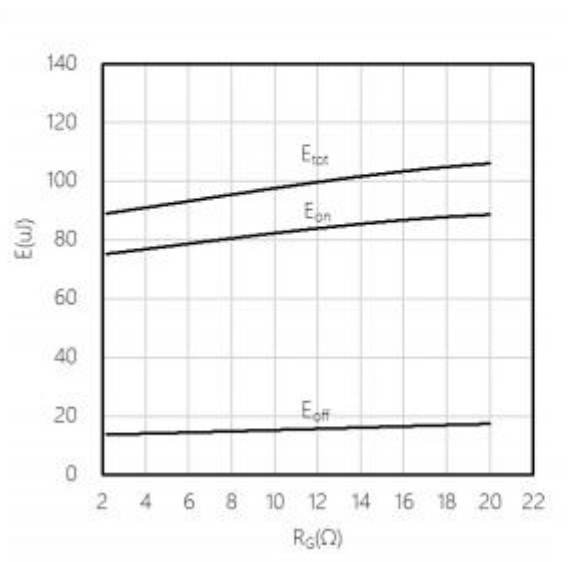
Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V

E = f($R_{G(ext)}$)

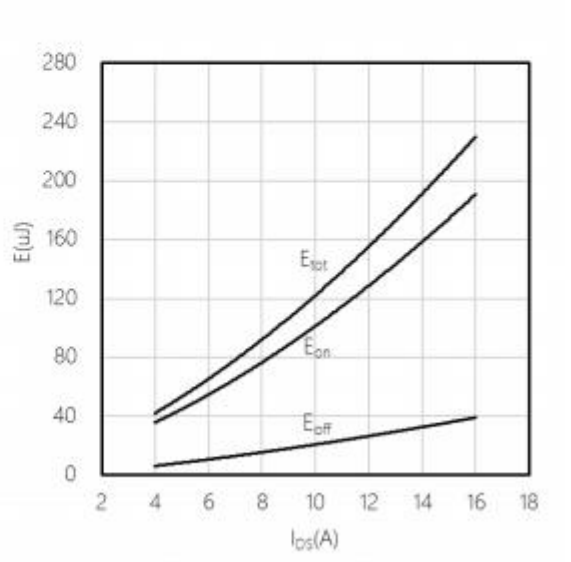
V_{GS} = 0/15 V, I_{DS} =8A, T_{VJ} = 175 °C, V_{DS} = 400 V



Typical switching energy losses as a function of I_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(I_{DS})

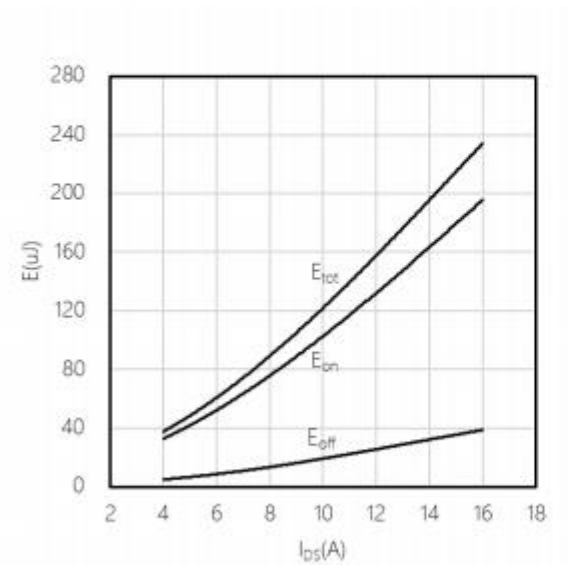
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V



Typical switching energy losses as a function of I_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(I_{DS})

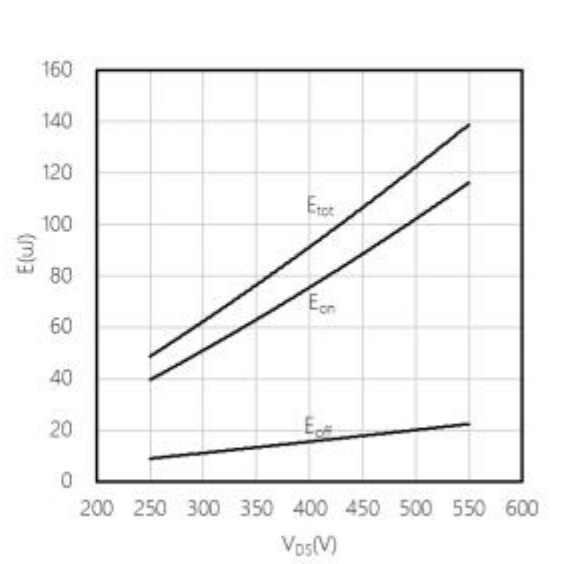
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V



Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(V_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 25 °C, I_{DS} = 8 A



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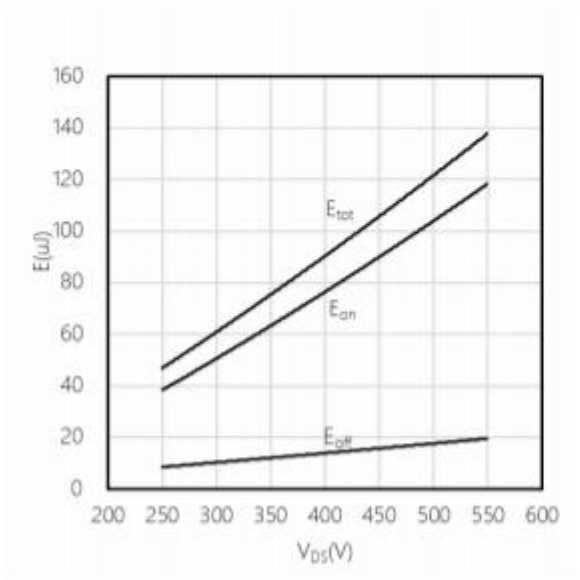
Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V

$E = f(V_{DS})$

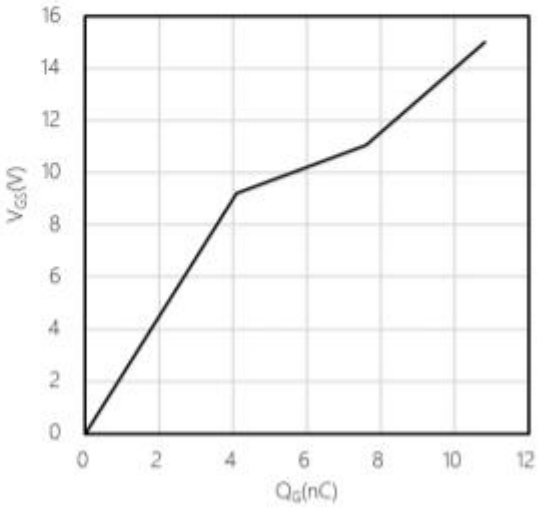
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 175 °C, I_{DS} = 8 A



Typical gate charge

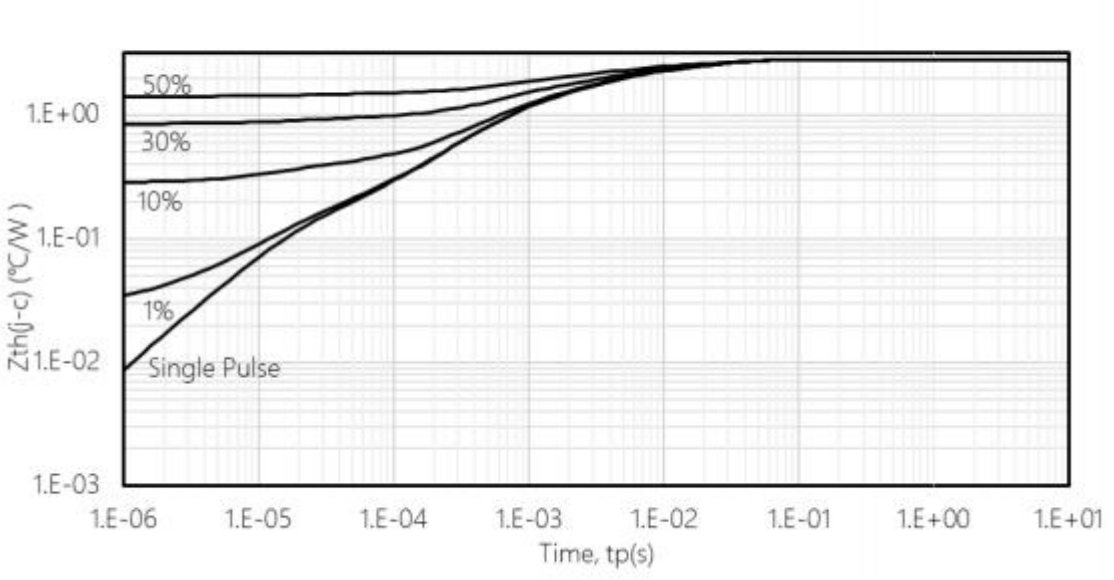
$V_{GS} = f(Q_G)$, I_{DS} = 8A, V_{DS} = 400V

turn-on pulse



Transient thermal resistance (MOSFET)

$(Z_{th(j-c,max)} = f(t_p)$, Parameter $D = t_p/T$



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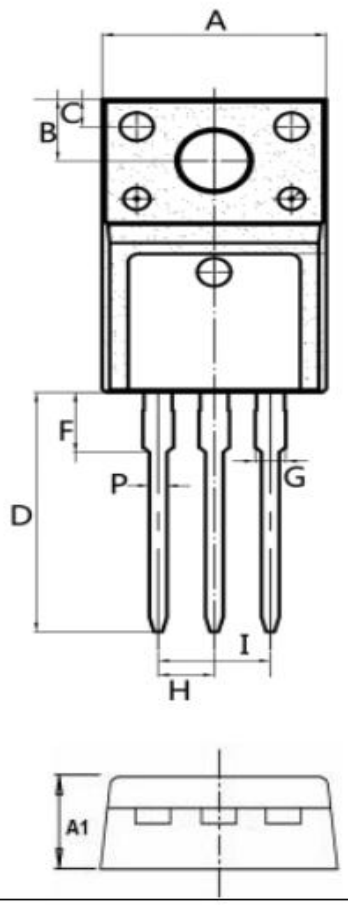
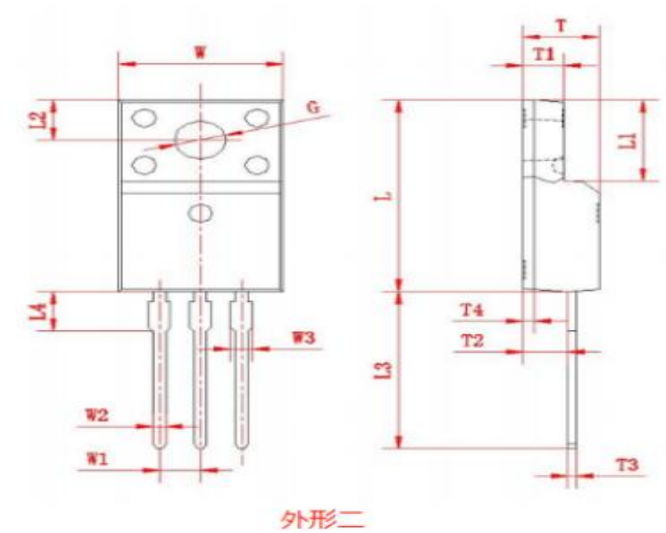
Package outline drawing(TO-220F Unit: mm)



外形一

Dim.	Min.	Max.
A	9.95	10.36
A1	4.5	5.0
B	2.95	3.25
C	1.25	1.45
D	12.60	13.60
E	0.40	0.60
F	2.8	3.5
G	1.30	1.45
H	(2.54)	
I	(5.08)	
J	4.60	4.75
K	2.45	2.65
L	6.5	6.8
M	15.4	16.0
N	2.25	3.05
O	0.45	0.55
P	0.70	0.90

All Dimensions in millimeter



外形二

Dim.	Min.	Max.
W	9.95	10.36
W1	(2.54)	
W2	0.70	0.90
W3	1.25	1.47
L	15.67	16.07
L1	6.48	6.88
L2	3.2	3.4
L3	12.6	13.6
L4	(3.23)	
T	4.50	4.90
T1	2.34	2.74
T2	2.25	2.95
T3	0.45	0.60
T4	(0.70)	
G	3.08	3.28

All Dimensions in millimeter

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