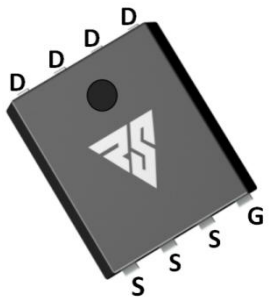
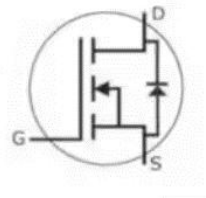
V_{DS}	$R_{DS(on)Typ}$	I_D@25℃
800V	300mΩ	8.8A





RoHS REACH HF

Applications:

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

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.
RSM080300BG	DFN5*6	RSM080300BG	Tape&reel	5000 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	8.8 6.8	A	T_C =25℃ T_C =100℃
I_{DM}	Pulsed Drain Current	14	A	T_C =25℃
E_{AS}	Single Pulse Avalanche Energy L=10mH,I_{AS}=1.5A,V_{DD}=50V,V_{GS}=15 V	11	mJ	
P_D	Power Dissipation	45	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	2.9	3.8		V	V_{GS}= V_{DS}, I_D=3.5mA	
I_{DSS}	Zero Gate Voltage Drain Current			20	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		430	560	mΩ	V_{GS}=15V, I_D =4.5A	
			300	400		V_{GS}=18V, I_D =4.5A	
C_{iss}	Input Capacitance		203		pF	V_{GS}=0V, V_{DS}=400V f=1MHz,T_j=25℃	
C_{oss}	Output Capacitance		67				
C_{rss}	Reverse Transfer Capacitance		7				
gfs	Transconductance		2.9		S	V_{DS}=20V,I_D=4.5A	
R_G	Internal Gate Resistance		25		Ω	f=1MHz,V_{AC}=25mV	
Q_g	Total Gate Charge		9.0		nC	V_{DS}=400V V_{GS}=0/+15V I_D=4.5A	
Q_{gs}	Gate to Source Charge		3.2				
Q_{gd}	Gate to Drain Charge		1.3				
$t_{d(on)}$	Turn-On Delay Time		17		ns	V_{DD}=400V V_{GS} =0/15V L=600μH I_D=4.5A $R_{G(on)}$=9.1Ω $R_{Goff)}$=9.1Ω	T_j=25℃
			14.3				T_j=175℃
t_r	Rise Time		12.2				T_j=25℃
			9.3				T_j=175℃
$t_{d(off)}$	Turn-Off Delay Time		14.5				T_j=25℃
			16.8				T_j=175℃
t_f	Fall Time		13.1				T_j=25℃
			13.0				T_j=175℃
Eon	Turn−On Switching Loss		45.4		μJ		T_j=25℃
			42.2				T_j=175℃
Eoff	Turn−Off Switching Loss		3.86				T_j=25℃
			3.40				T_j=175℃
Etot	Total Switching Energy		49.2				T_j=25℃
			45.6				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	3.8 3.2		V	V_{GS}=0V, I_{SD} =2.5A	T_j=25℃ T_j=175℃
I_S	Continuous DC Source Current, Limited by $T_{VJ(max)}$	8 5		A	T_C=25℃ T_C=100℃	
I_{SM}	Peak Reverse Drain Current, tp Limited by $T_{VJ(max)}$	14		A	T_C=25℃	
I_{rrm}	Peak Reverse Recovery Current	4.1 4.6		A	V_{DS}=400V V_{GS}=0V I_{SD}=4.5A di/dt=1.1KA/us	T_j=25℃ T_j=175℃
Q_{rr}	Reverse Recovery Charge	23 27		nC		T_j=25℃ T_j=175℃
t_{rr}	Reverse Recovery time	9.4 10.1		ns		T_j=25℃ T_j=175℃
Err	Reverse Recovery Energy	0.16 0.32		μJ		T_j=25℃ T_j=175℃

Thermal Characteristics (TJ= 25℃ unless otherwise specified)

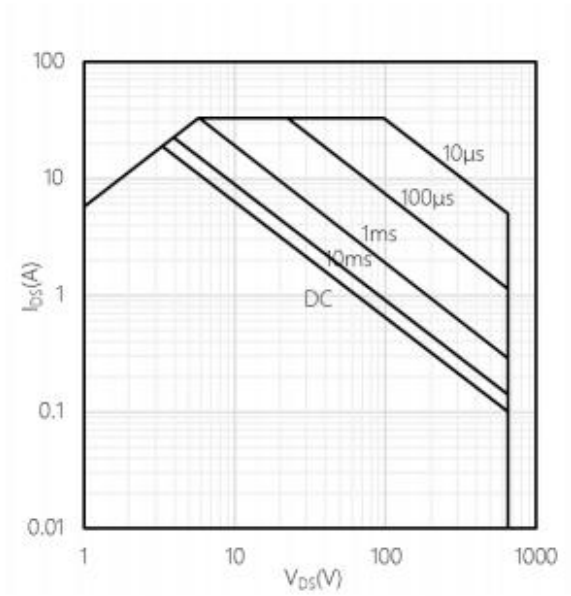
Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	3.3		℃/W	

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Typical Feature Curve

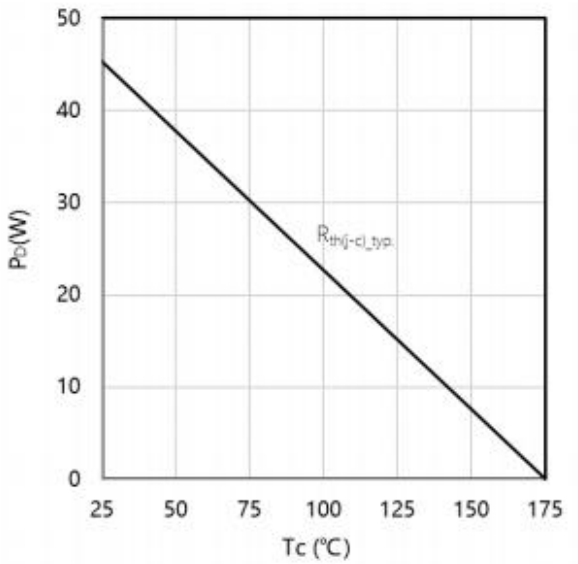
Safe operating area (SOA)

$R_{th(j-c)}$ =3.97 °C/W, Single Pulse, T_{VJ} = 25℃



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

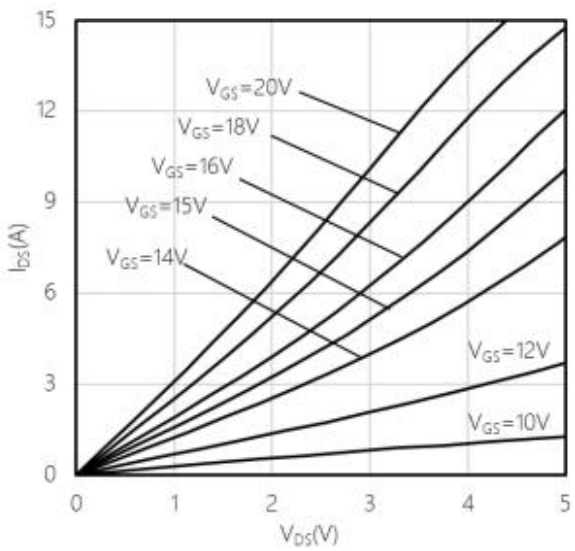
$P_D = f(T_C)$



Typical output characteristic, V_{GS} as parameter

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

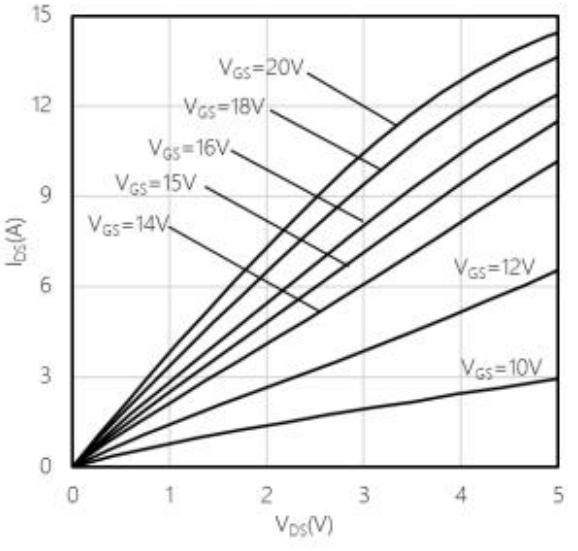
T_{VJ} = -55 ℃



Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = 25 ℃

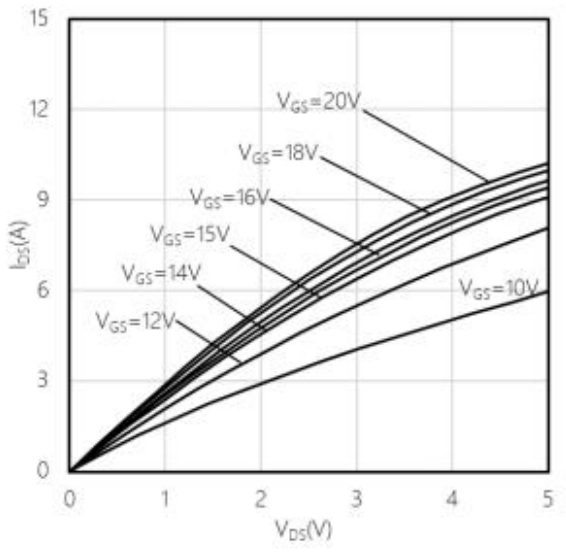


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Typical output characteristic, V_{GS} as parameter

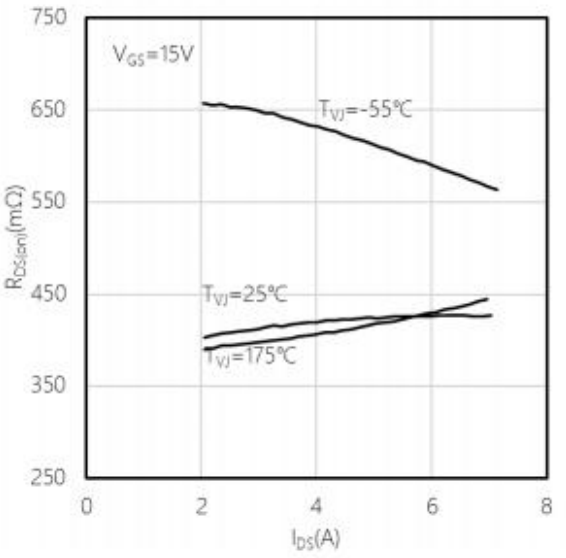
$I_{DS} = f(V_{DS})$

T_{VJ} = 175℃



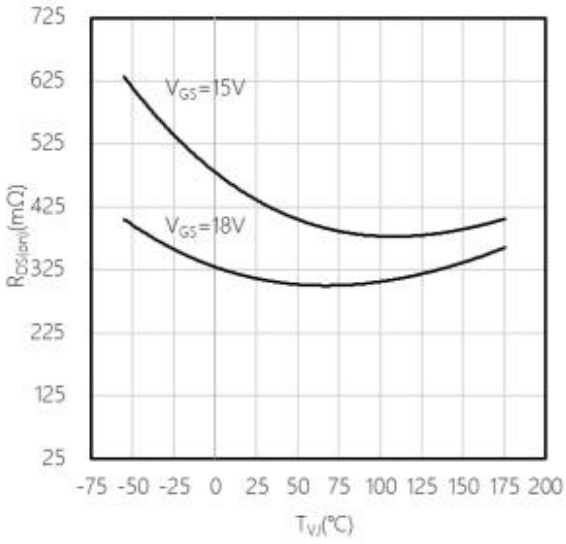
Typical on-state resistance as a function of drain current

$R_{DS(on)} = f(I_{DS})$, V_{GS} = 15V



Typical on-state resistance as a function of temperature

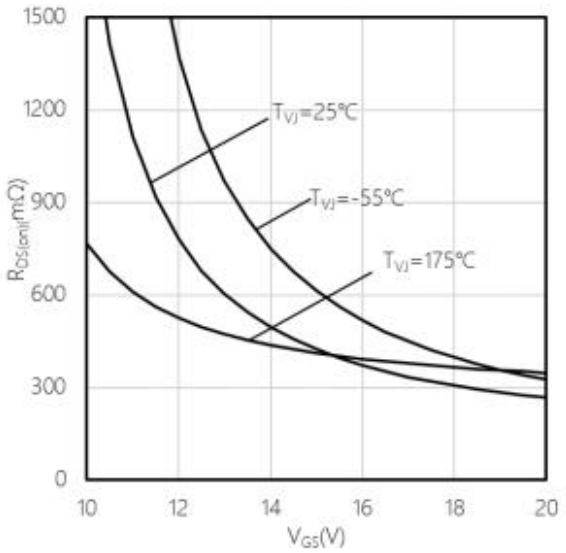
$R_{DS(on)} = f(T_{VJ})$, I_{DS} =4.5 A



Typical on-state resistance as a function of V_{GS}

$R_{DS(on)} = f(V_{GS})$

I_{DS} =4.5 A

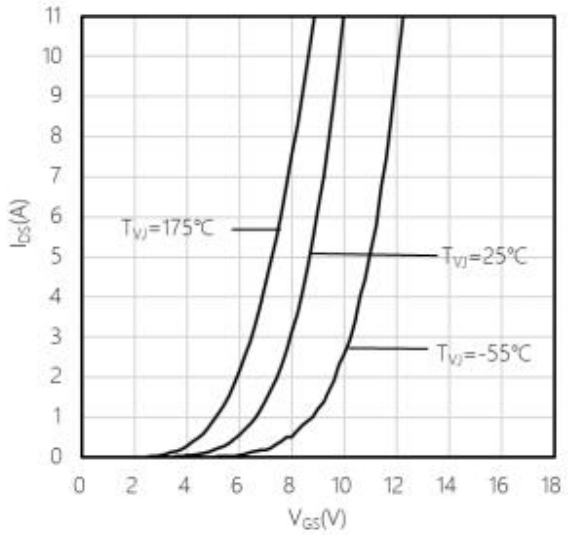


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Typical transfer characteristic

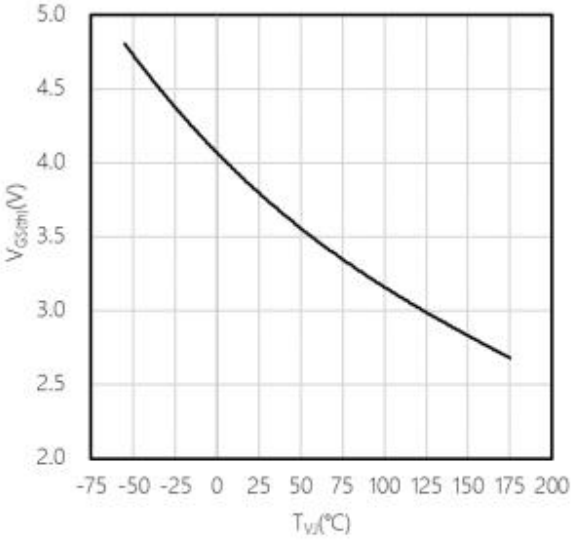
$I_{DS} = f(V_{GS})$

V_{DS}= 20 V



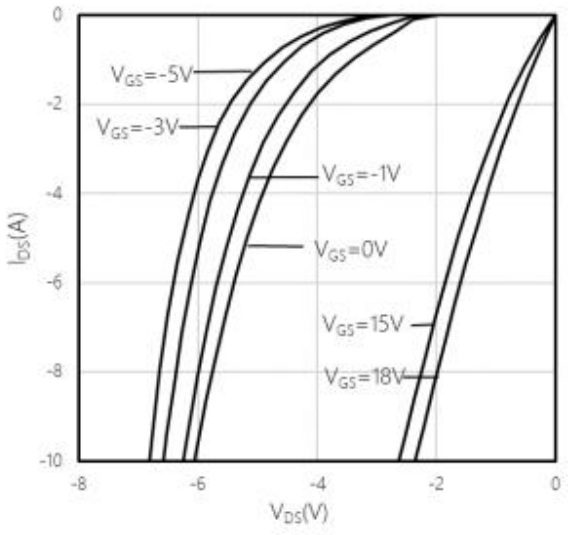
Typical gate-source threshold voltage as a function of junction temperature

$V_{GS(th)} = f(T_{VJ})$, I_{DS} = 3.5mA



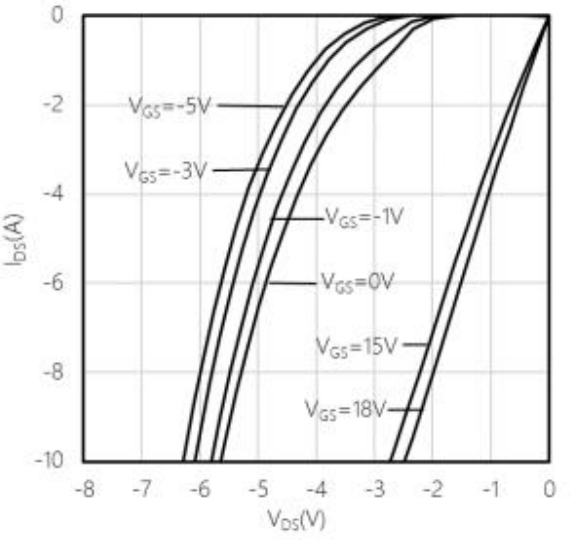
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = -55 °C



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

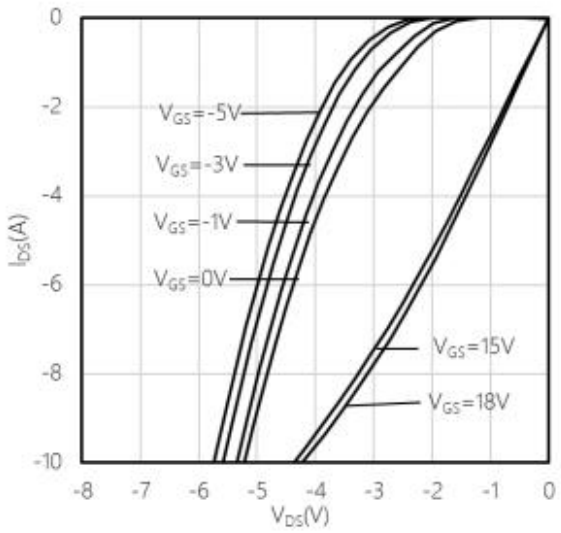
$I_{DS} = f(V_{DS})$, T_{VJ} = 25 °C



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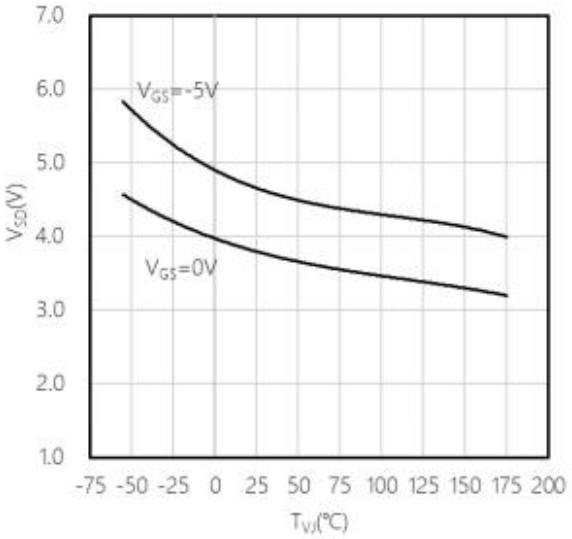
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = 175 °C



Typical reverse drain voltage as function of junction temperature

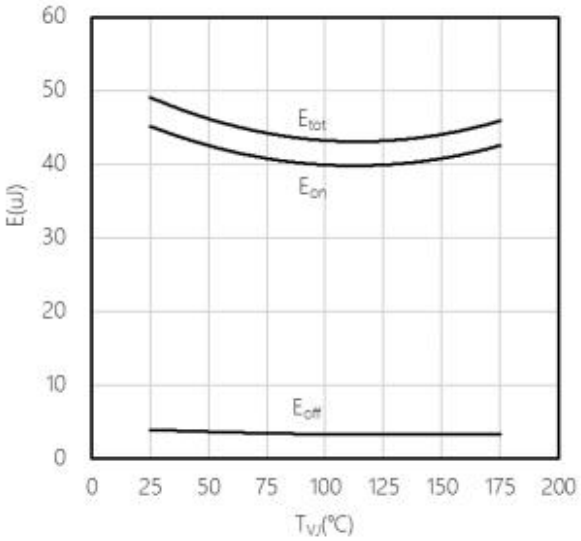
$V_{SD} = f(T_{VJ})$, I_{SD} = 2.5 A



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

$E = f(T_{VJ})$

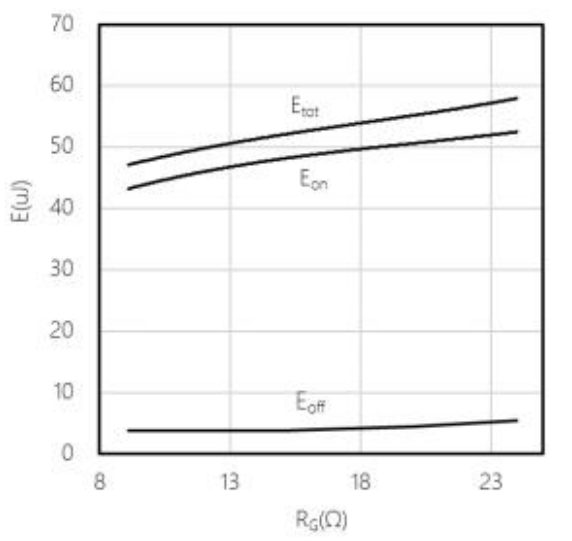
V_{DS} = 400 V, $R_{G(ext)}$ = 9.1 Ω, V_{GS} = 0V / 15 V, I_{DS} = 4.5 A



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} = 4.5 A, T_{VJ} = 25 °C, V_{DS} = 400 V

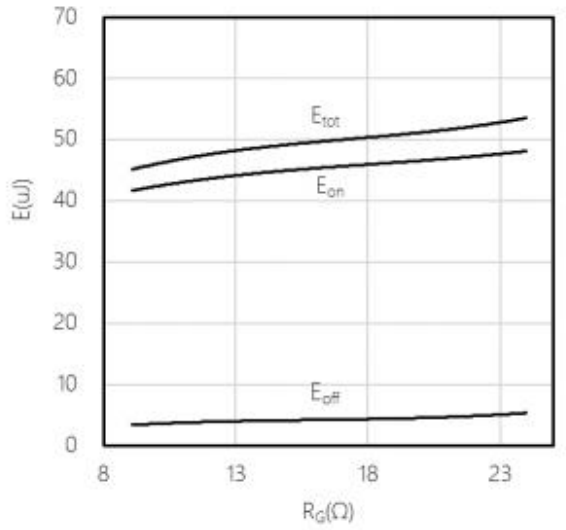


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Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V

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

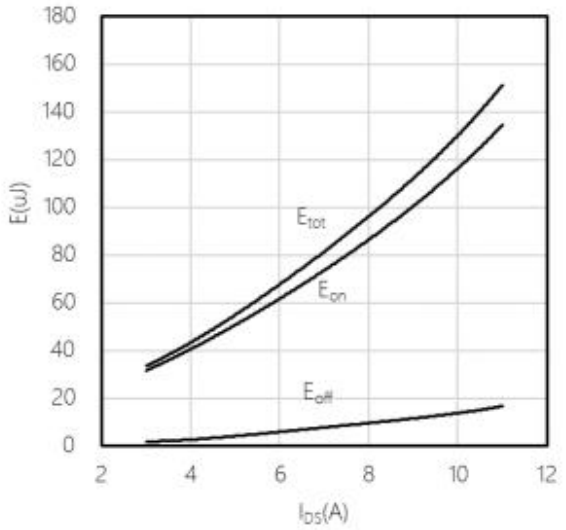
V_{GS} = 0/15 V, I_{DS} = 4 .5A, T_{VJ} = 175 °C, V_{DS} = 400 V



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

E = f(I_{DS})

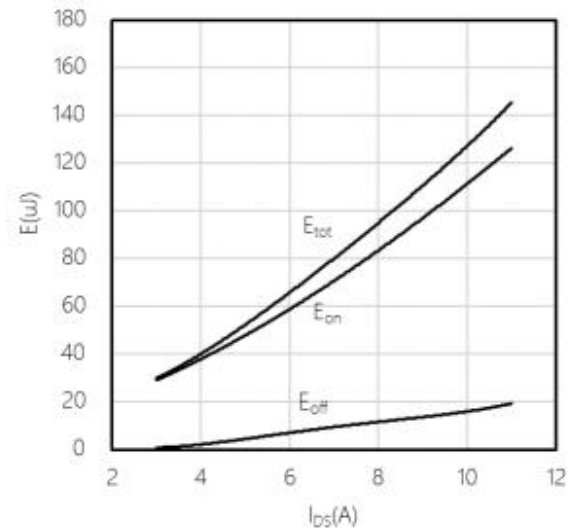
V_{GS} = 0/15 V, $R_{G(ext)}$ = 9.1 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V



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

E = f(I_{DS})

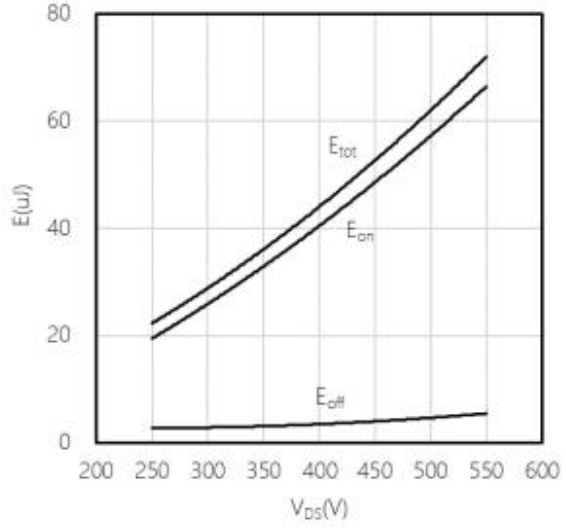
V_{GS} = 0/15 V, $R_{G(ext)}$ = 9.1 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V



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, $R_{G(ext)}$ = 9.1 Ω, T_{VJ} = 25 °C, I_{DS} = 4.5 A

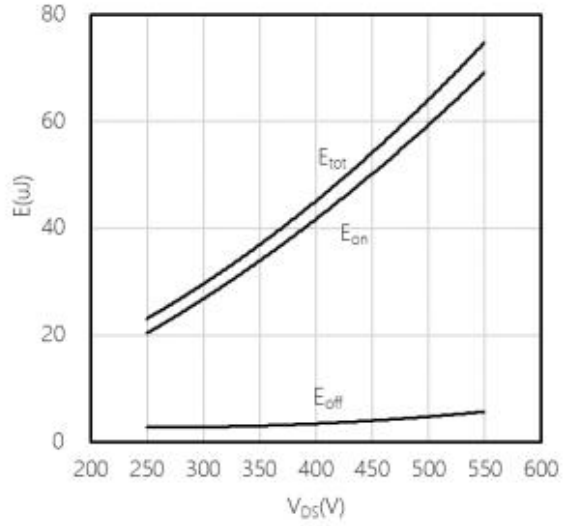


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Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(V_{DS})

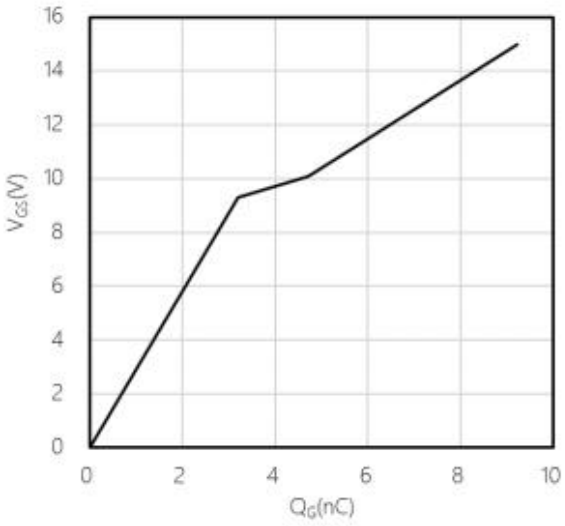
V_{GS} = 0/15 V, $R_{G(ext)}$ = 9.1 Ω, T_{VJ} = 175 ℃, I_{DS} = 4.5 A



Typical gate charge

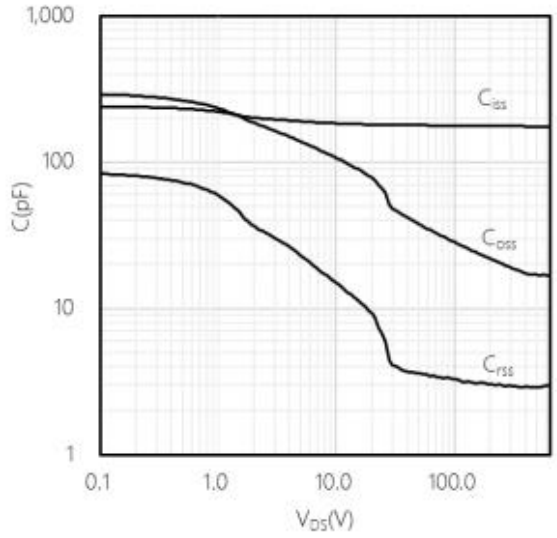
V_{GS} =f(Q_G), I_{DS} = 4.5A, V_{DS} = 400V

turn-on pulse



Typical capacitance as a function of drain-source voltage

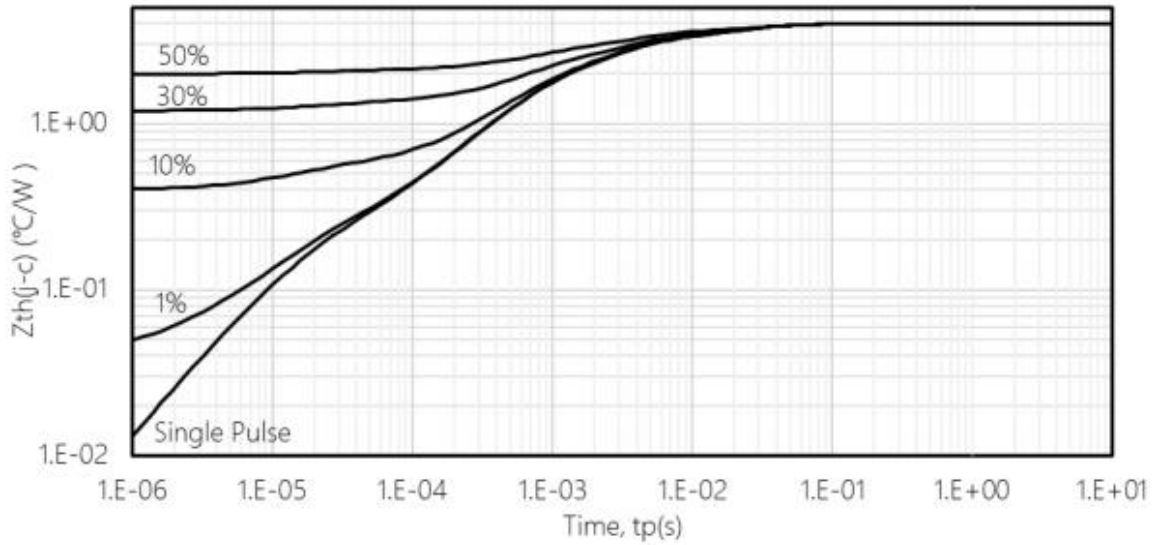
C = f(V_{DS}), V_{GS} = 0V, f = 1MHz



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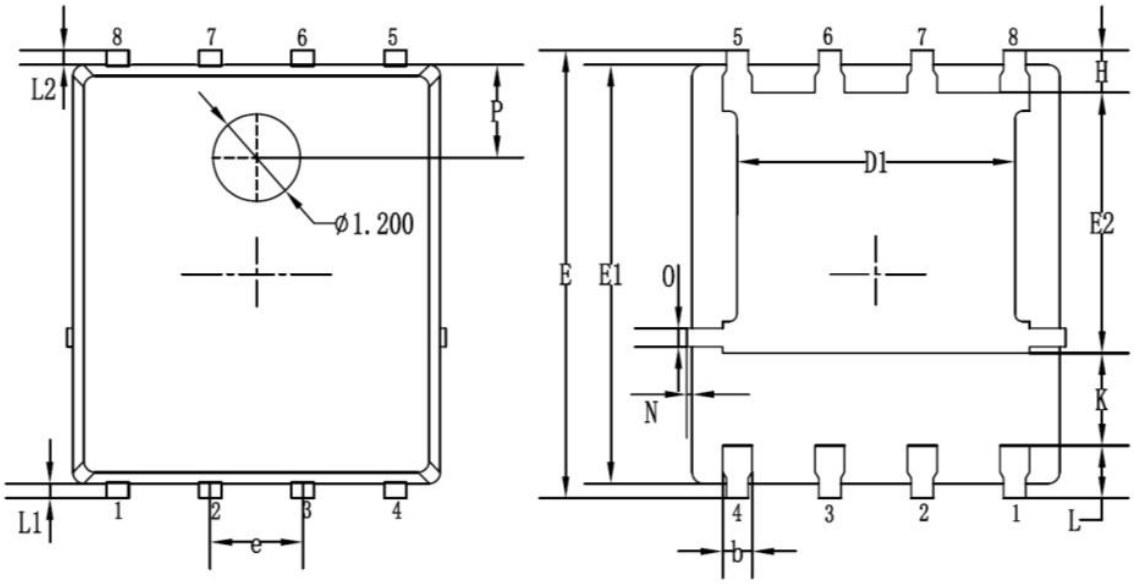
Transient thermal resistance (MOSFET)

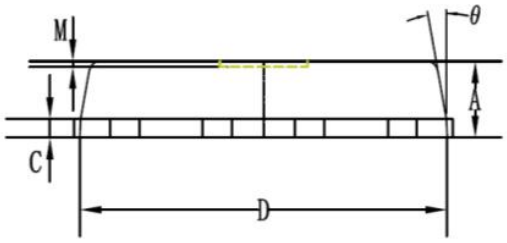
($Z_{th(j-c,max)}$ = f(t_p), Parameter D = t_p/T



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Package outline drawing(DFN5*6 Unit: mm)





Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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