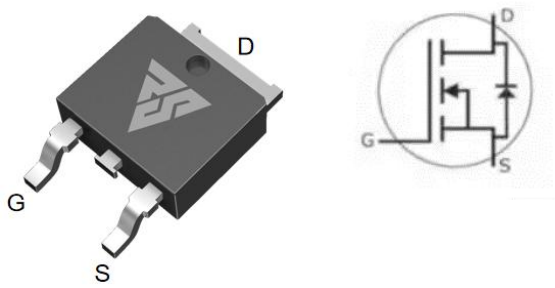
V_{DS}	$R_{DS(on)Typ}$	I_D@25℃
800V	160mΩ	15.4A





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.
RSM080160BD	TO-252	RSM080160BD	Tape&reel	2500 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	15.4 10.9	A	T_C =25℃ T_C =100℃
I_{DM}	Pulsed Drain Current	24.5	A	T_C =25℃
E_{AS}	Single Pulse Avalanche Energy L=0.5mH,I_{AS}=9.5A,V_{DD}=50V,V_{GS}=15 V	23	mJ	
P_D	Power Dissipation	52	W	T_C =25℃
T_J, T_{stg}	Operating Junction and StorageTemperature	-55 to + 175	℃	

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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			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		220	280	mΩ	V_{GS}=15V, I_D =8A	
			160	220		V_{GS}=18V, I_D =8A	
C_{iss}	Input Capacitance		289		pF	V_{GS}=0V, V_{DS}=400V f=1MHz,T_j=25℃	
C_{oss}	Output Capacitance		23				
C_{rss}	Reverse Transfer Capacitance		2.1				
gfs	Transconductance		5.7		S	V_{DS}=20V,I_D=8A	
R_G	Internal Gate Resistance		26		Ω	f=1MHz,V_{AC}=25mV	
Q_g	Total Gate Charge		12.5		nC	V_{DS}=400V V_{GS}=0/+15V I_D=5A	
Q_{gs}	Gate to Source Charge		4.5				
Q_{gd}	Gate to Drain Charge		1.5				
$t_{d(on)}$	Turn-On Delay Time		20.4 18.6		ns	V_{DD}=400V V_{GS}=0/15V L=600μH I_D=8A $R_{G(on)}$=4.3Ω $R_{Goff)}$=4.3Ω	T_j=25℃ T_j=175℃
t_r	Rise Time		11.9 10.2				T_j=25℃ T_j=175℃
$t_{d(off)}$	Turn-Off Delay Time		17.2 20.5				T_j=25℃ T_j=175℃
t_f	Fall Time		11.7 11.8				T_j=25℃ T_j=175℃
E_{on}	Turn−On Switching Loss		79.2 77.4		μJ		T_j=25℃ T_j=175℃
E_{off}	Turn−Off Switching Loss		13.3 13.2				T_j=25℃ T_j=175℃
E_{tot}	Total Switching Energy		92.5 90.6				T_j=25℃ 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 Diode Forward Current	13.5 5.9		A	T_C= 25℃ T_C= 100℃	
t_{rr}	Reverse Recovery time	12.1 11.6		ns	V_{GS}=0V,I_{SD}=8A V_{DS}=400V,T_j=25℃ di/dt=1.6KA/us	T_j=25℃ T_j=175℃
Q_{rr}	Reverse Recovery Charge	35.8 39.1		nC		T_j=25℃ T_j=175℃
I_{rrm}	Peak Reverse Recovery Current	5.3 5.8		A		T_j=25℃ T_j=175℃
E_{rr}	Reverse Recovery Energy	0.33 0.48		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	2.88		℃/W	

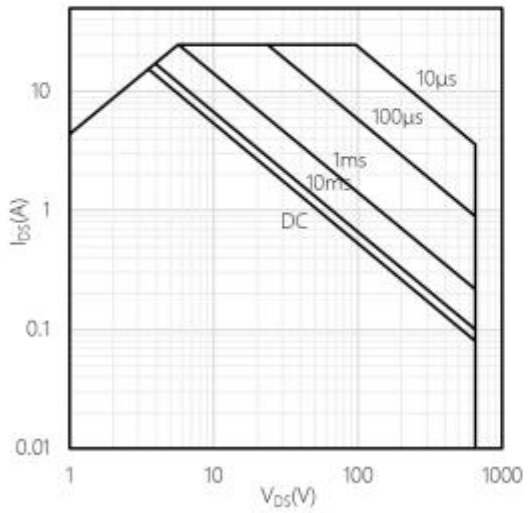
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Typical Feature Curve

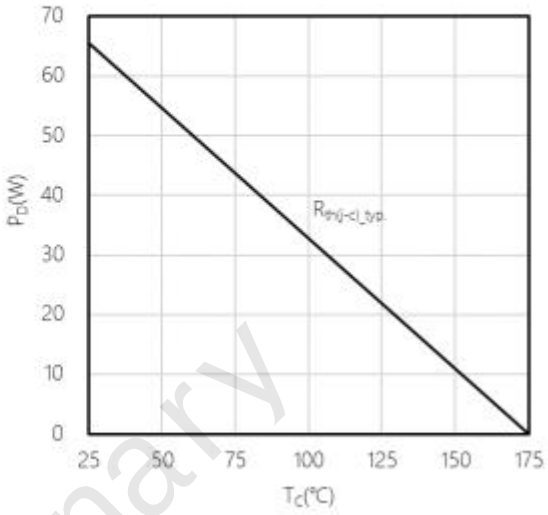
Safe operating area (SOA)

$R_{th(j-c)}$ =2.75 ℃/W, Single Pulse, T_{VJ} = 25℃



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

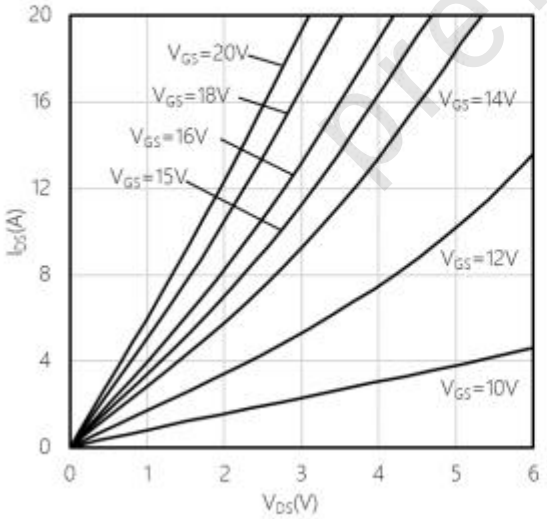
$P_D = f(T_C)$



Typical output characteristic, V_{GS} as parameter

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

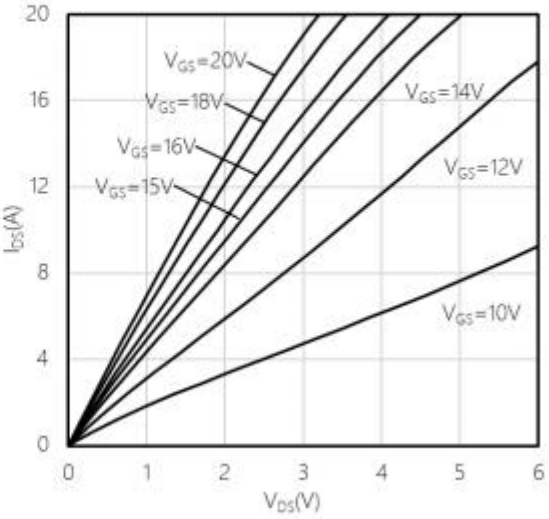
T_{VJ} = -55 ℃



Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = 25 ℃



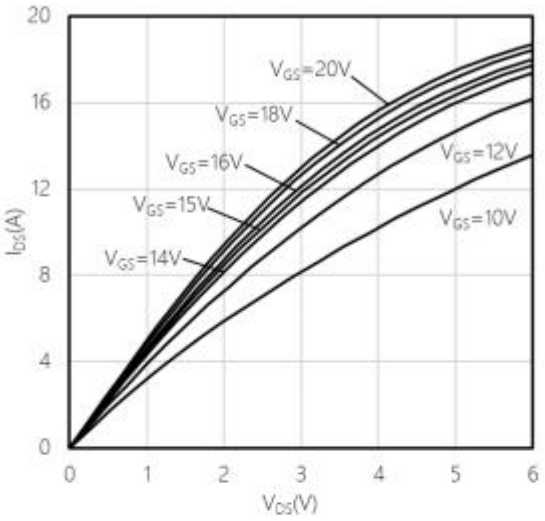
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Typical output characteristic, V_{GS} as parameter

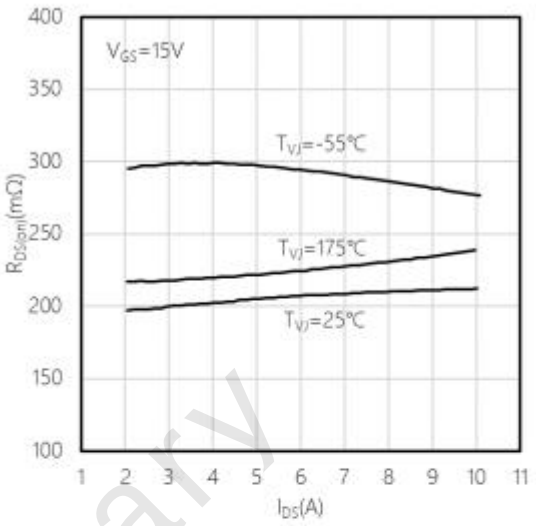
$I_{DS} = f(V_{DS})$

$T_{VJ} = 175℃$



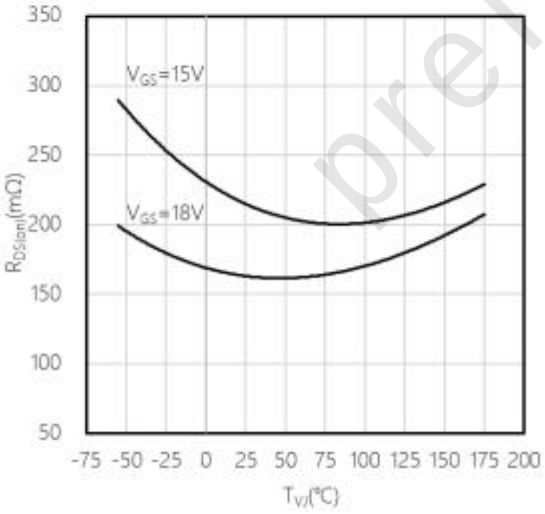
Typical on-state resistance as a function of drain current

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



Typical on-state resistance as a function of temperature

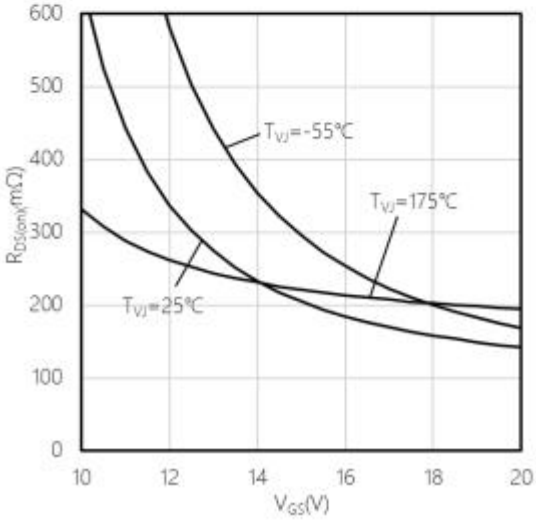
$R_{DS(on)} = f(T_{VJ})$, I_{DS} =8 A



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

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

I_{DS} =8 A



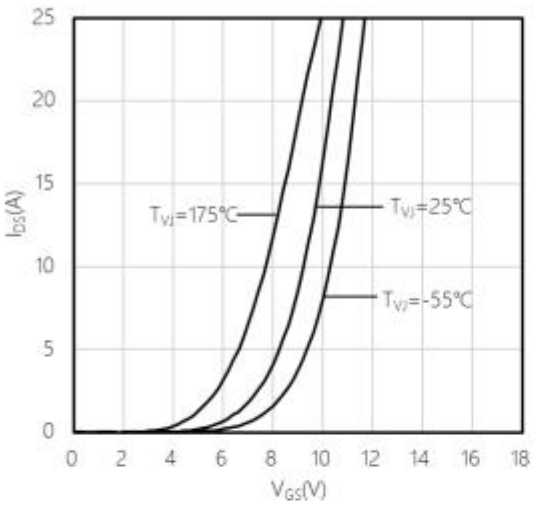
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Typical transfer characteristic

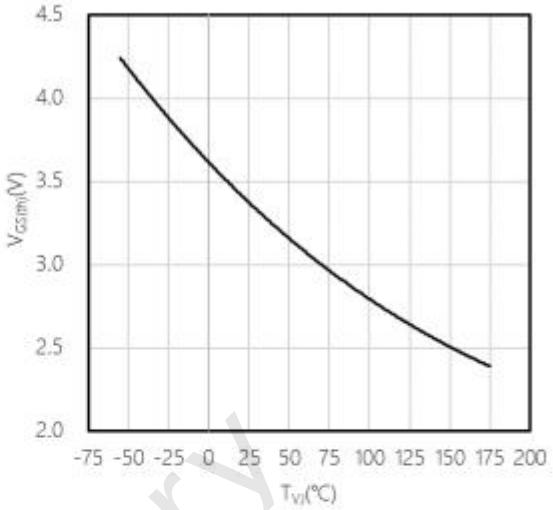
$I_{DS} = f(V_{GS})$

V_{DS}= 20 V



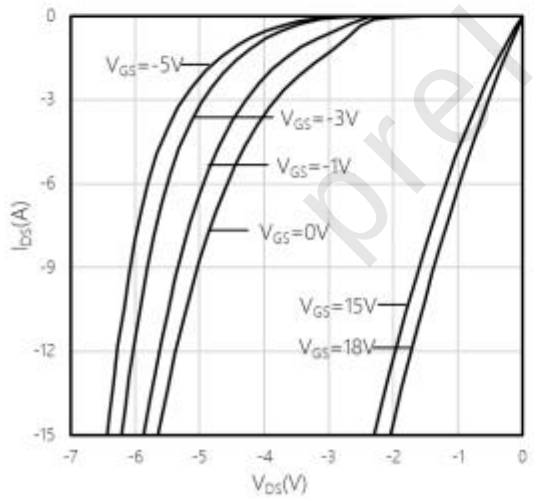
Typical gate-source threshold voltage as a function of junction temperature

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



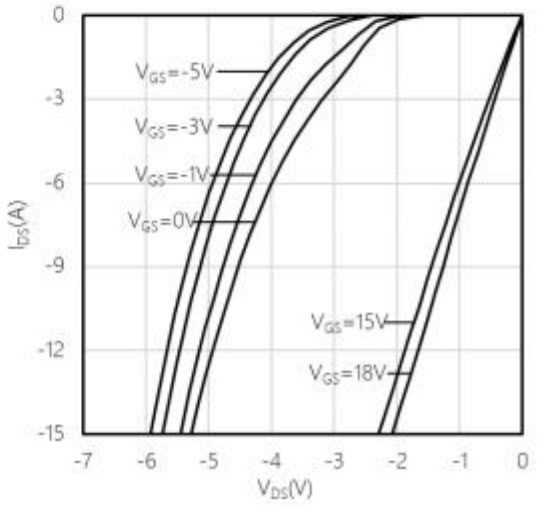
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = -55 ℃



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

$I_{DS} = f(V_{DS})$, T_{VJ} = 25 ℃

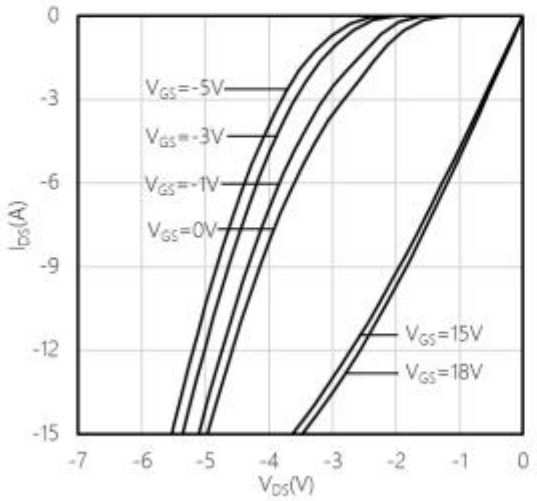


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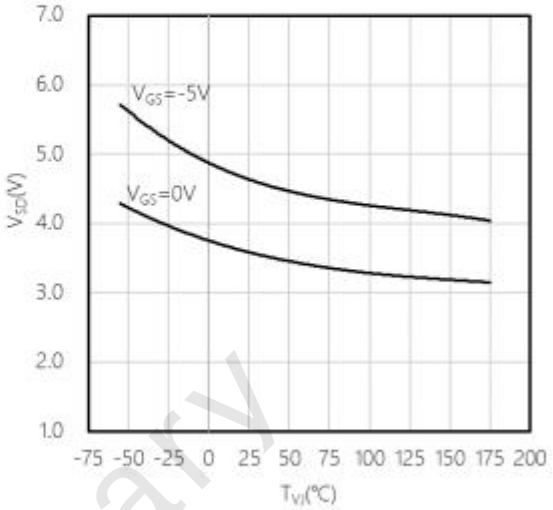
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = 175 °C



Typical reverse drain voltage as function of junction temperature

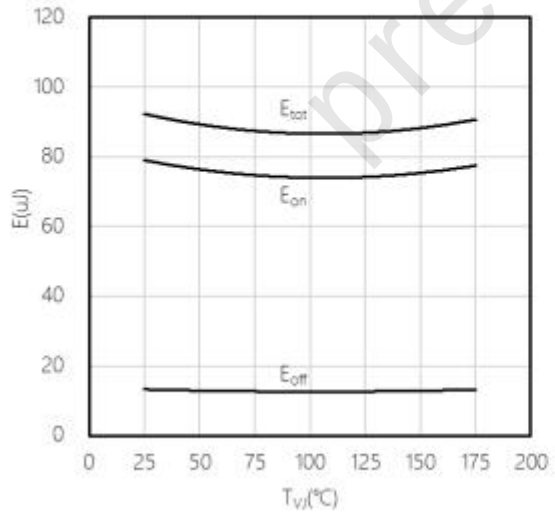
$V_{SD} = f(T_{VJ})$, I_{SD} = 4 A



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

$E = f(T_{VJ})$

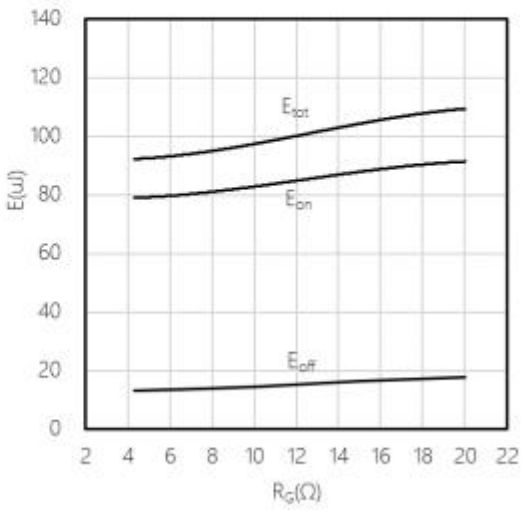
V_{DS} = 400 V, $R_{G(ext)}$ = 4.3 Ω, V_{GS} = 0/15 V, I_{DS} = 8 A



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



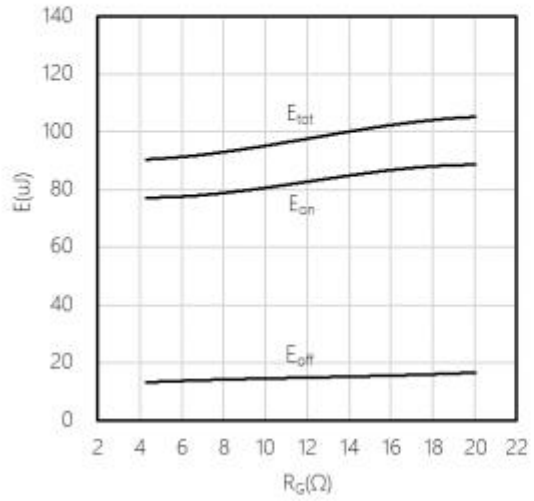
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Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V

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

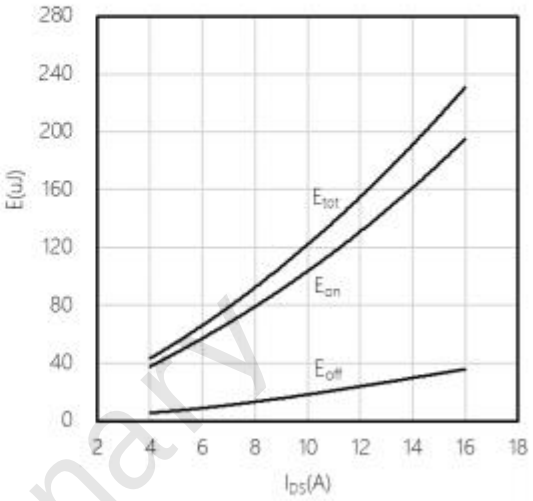
V_{GS} = 0/15 V, I_{DS} = 8 A, T_{VJ} = 175 °C, V_{DS} = 400 V



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

E = f(I_{DS})

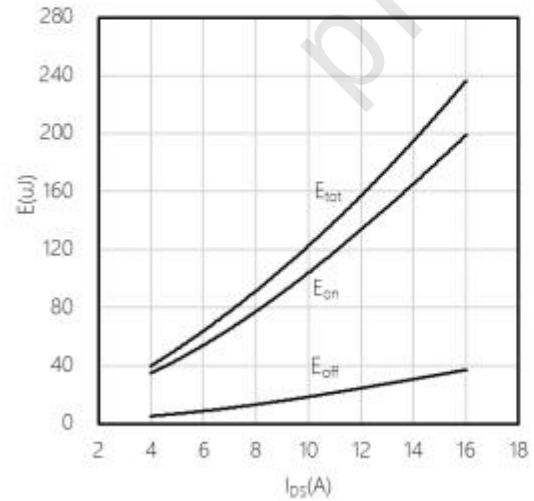
V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V



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

E = f(I_{DS})

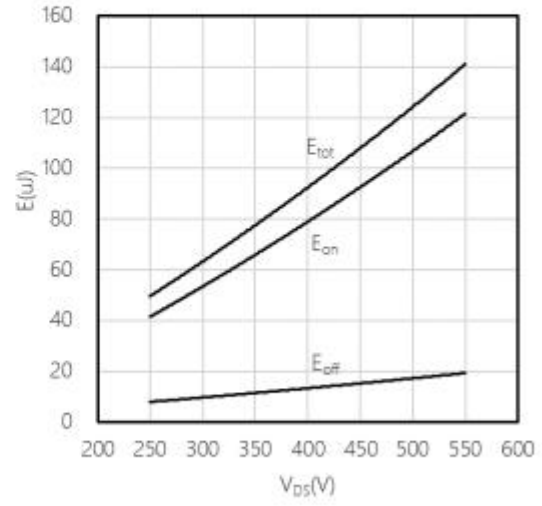
V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V



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, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 25 °C, I_{DS} = 8 A



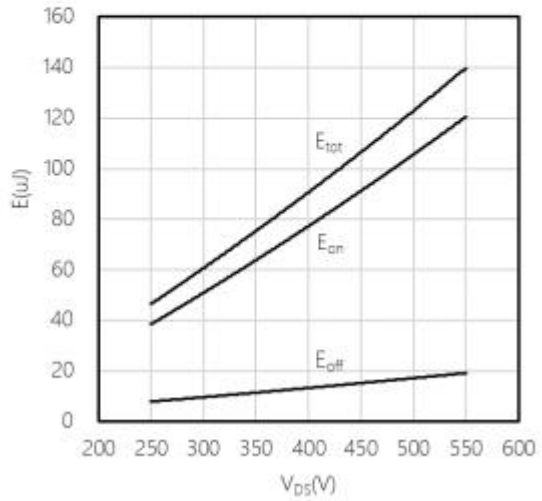
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Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(V_{DS})

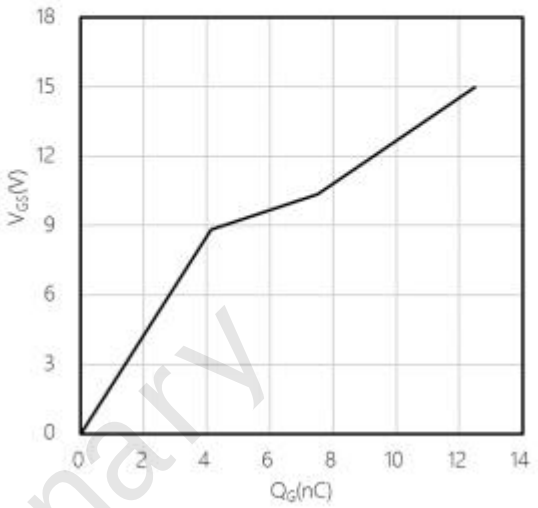
V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 175 °C, I_{DS} = 8 A



Typical gate charge

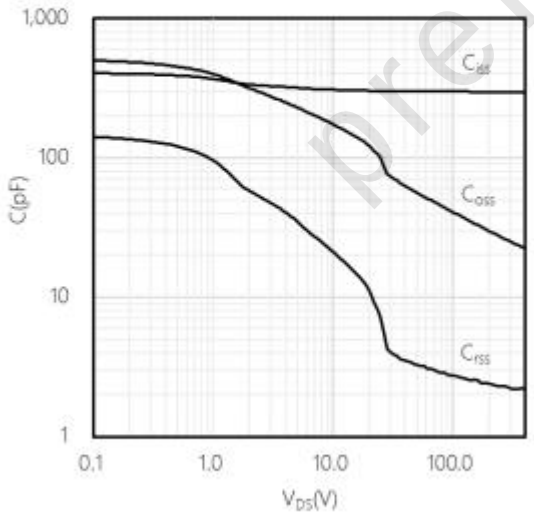
V_{GS} =f(Q_G), I_{DS} = 8 A, V_{DS} = 400V

turn-on pulse



Typical capacitance as a function of drain-source voltage

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

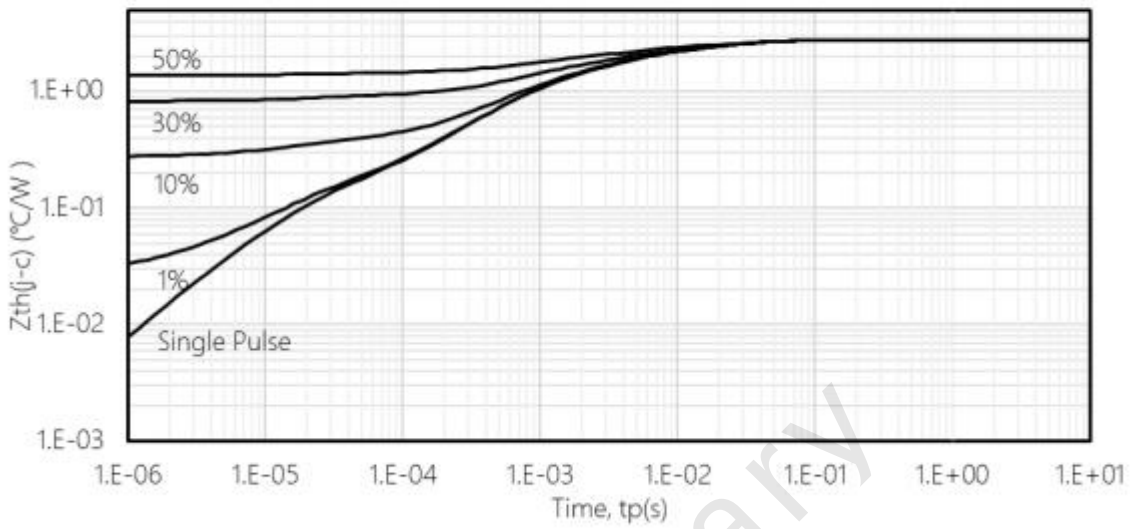


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Transient thermal resistance (MOSFET)

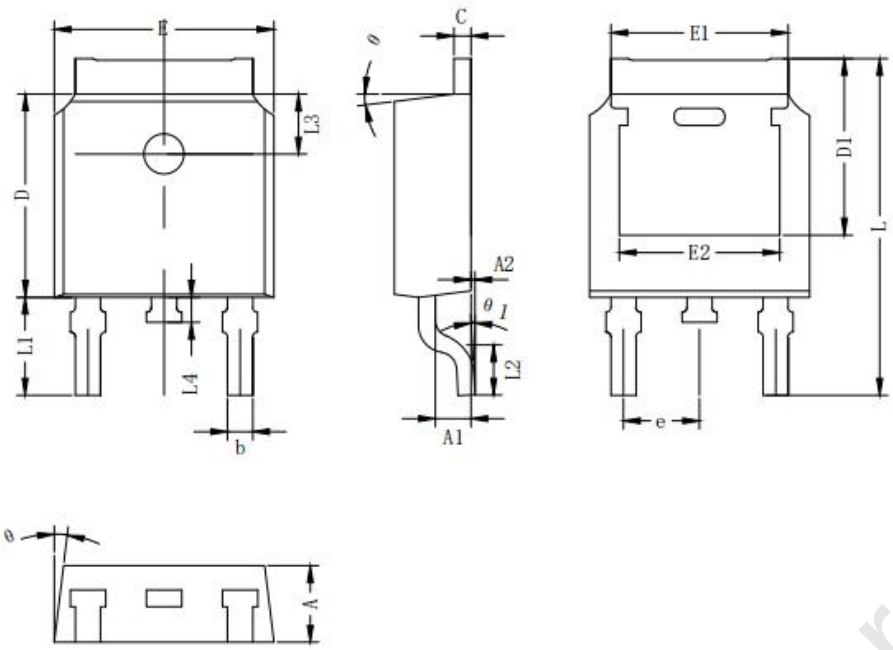
($Z_{th(j-c,max)}$ = f(t_p), Parameter D = t_p/T



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Package outline drawing(TO-252 Unit: mm)



SYMBOL	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0.97	1.07	1.17
A2	0.00	–	0.12
b	0.66	0.76	0.86
c	0.45	0.51	0.60
D	5.90	6.10	6.30
D1	5.10	5.30	5.45
E	6.40	6.60	6.80
E1	5.10	5.33	5.45
E2	4.63	4.83	5.03
L	9.90	10.10	10.30
L1	2.74	2.94	3.14
L2	1.40	1.50	1.70
L3	1.65	1.80	1.95
L4	0.60	0.80	1.00
e	2.286BSC		
θ	5°	7°	10°
θ1	0°	–	3°

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