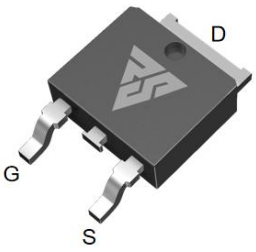
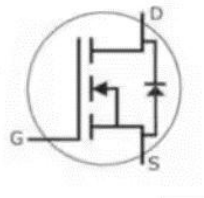
V_{DS}	$R_{DS(on)Typ}$	I_D@25℃
800V	190mΩ	14A





RoHS REACH HF

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.
RSM080190BD	TO-252	RSM080190BD	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	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	64	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		50				
C_{rss}	Reverse Transfer Capacitance		2.3				
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 17.5		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℃ T_j=175℃
t_r	Rise Time		11.6 10.5				T_j=25℃ T_j=175℃
$t_{d(off)}$	Turn-Off Delay Time		18.1 21.9				T_j=25℃ T_j=175℃
t_f	Fall Time		12.7 12.3				T_j=25℃ T_j=175℃
Eon	Turn−On Switching Loss		76.8 75.6		μJ		T_j=25℃ T_j=175℃
Eoff	Turn−Off Switching Loss		14.5 13.8				T_j=25℃ T_j=175℃
Etot	Total Switching Energy		91.3 89.4				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 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	2.35		℃/W	

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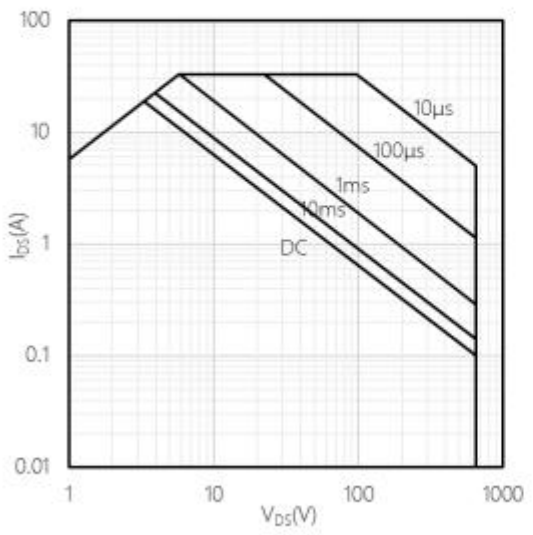
Typical Feature Curve

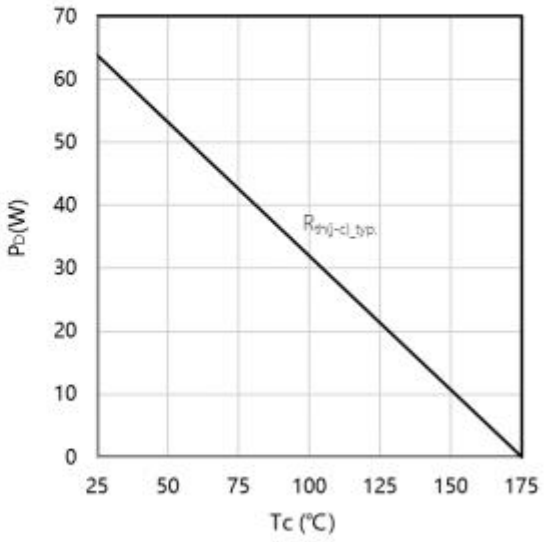
Safe operating area (SOA)

$R_{th(j-c)}$ =2.82 °C/W, Single Pulse, T_{VJ} = 25℃



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

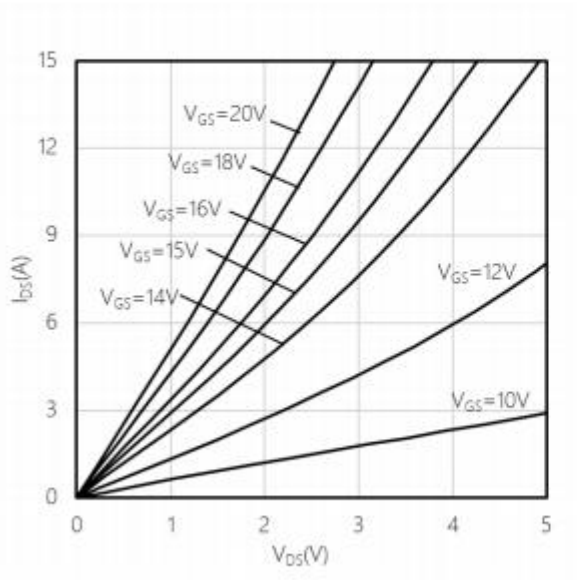
$P_D = f(T_C)$



Typical output characteristic, V_{GS} as parameter

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

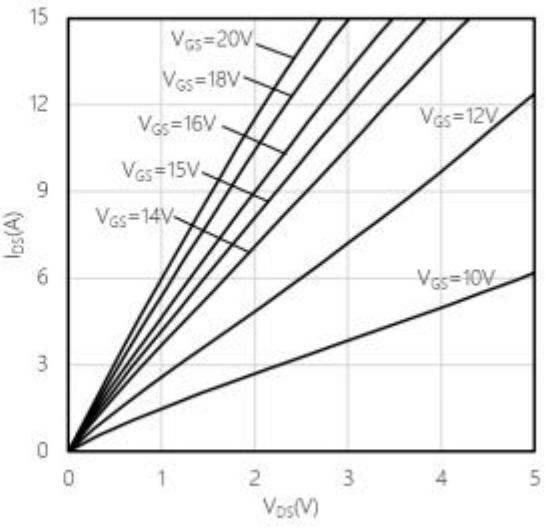
T_{VJ} = -55 ℃



Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = 25 ℃



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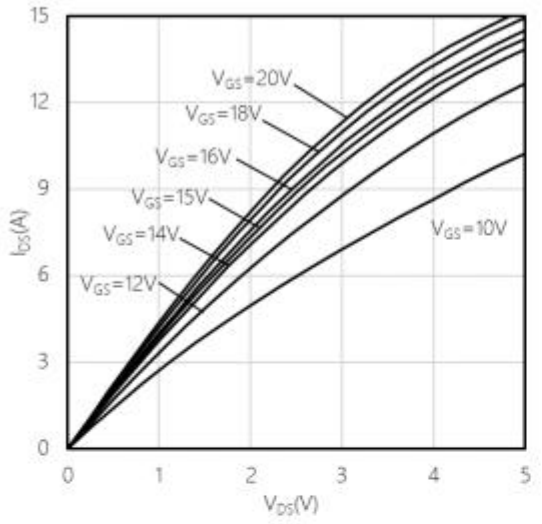
Typical output characteristic, V_{GS} as parameter

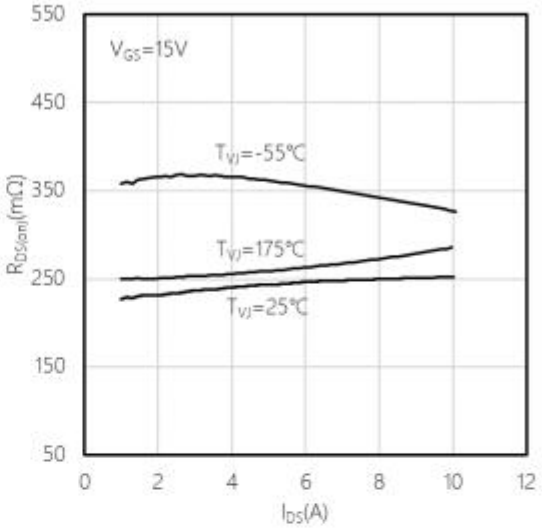
$I_{DS} = f(V_{DS})$

$T_{VJ} = 175℃$



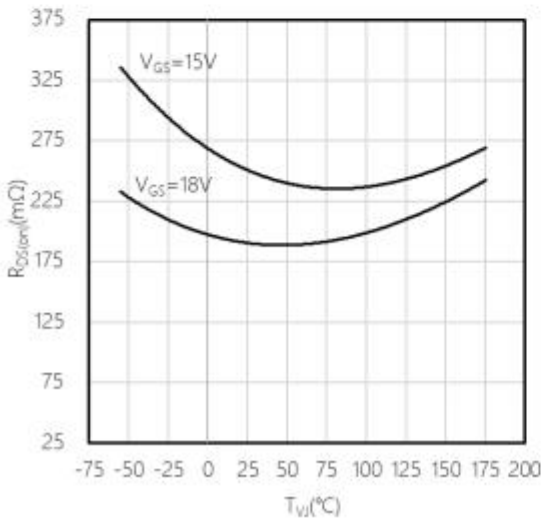
Typical on-state resistance as a function of drain current

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



Typical on-state resistance as a function of temperature

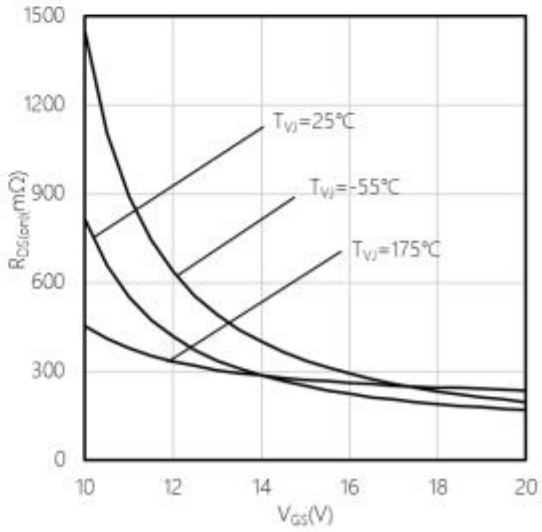
$R_{DS(on)} = f(T_{VJ})$, I_{DS} =8 A



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

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

I_{DS} =8 A



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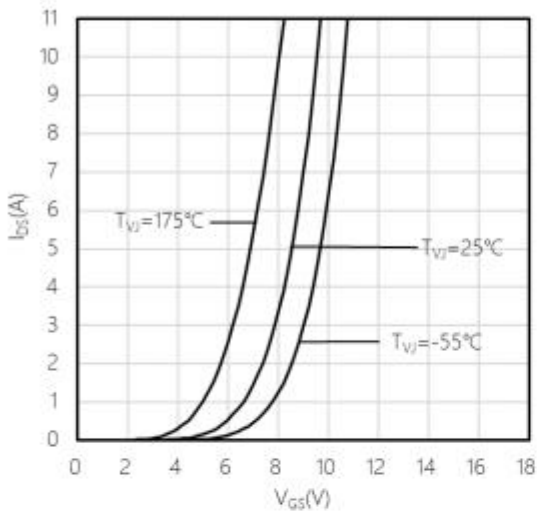
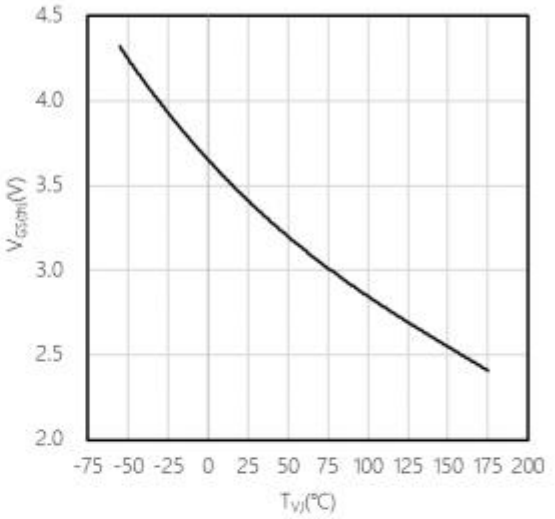
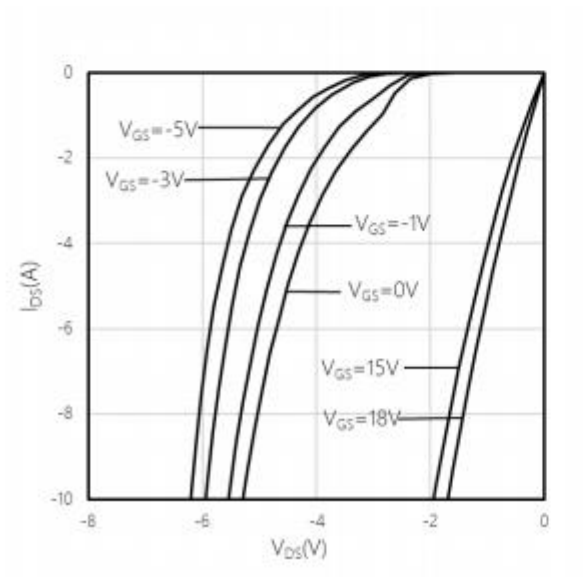
Typical transfer characteristic
$I_{DS} = f(V_{GS})$
V_{DS}= 20 V



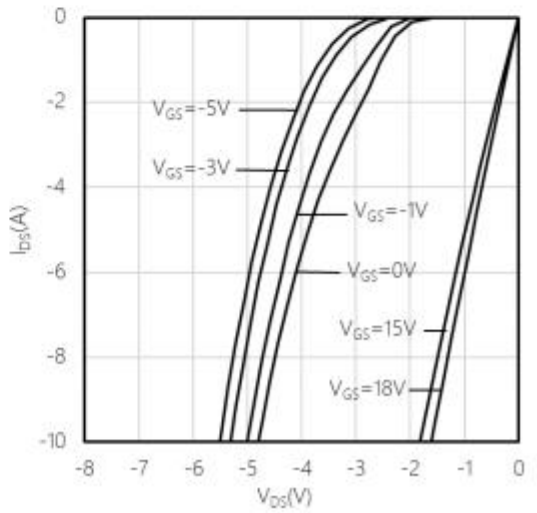
Typical gate-source threshold voltage as a function of junction temperature
$V_{GS(th)} = f(T_{VJ})$, I_{DS} = 3.5mA



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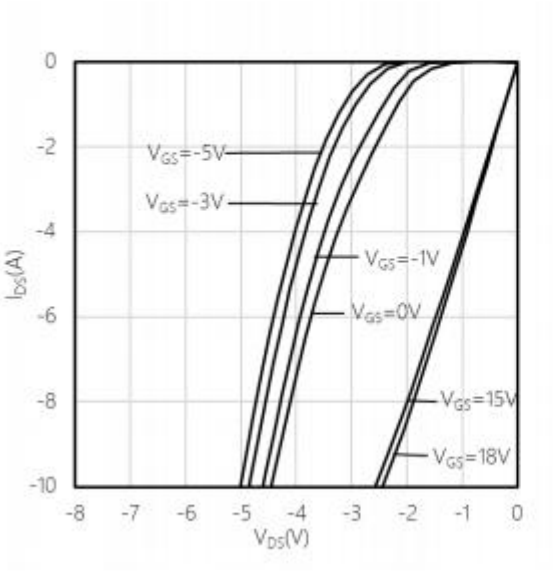
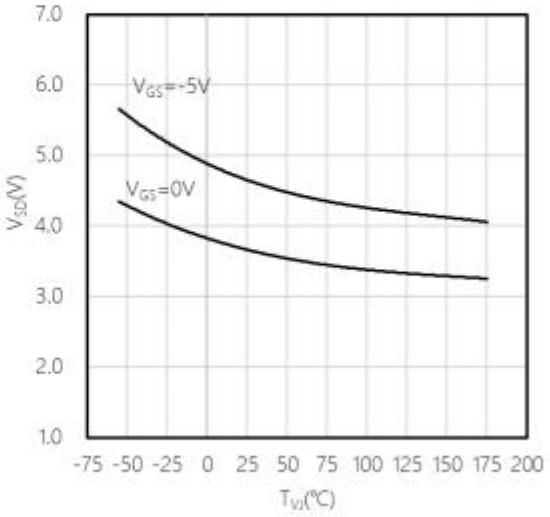
Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = 175 °C



Typical reverse drain voltage as function of junction temperature

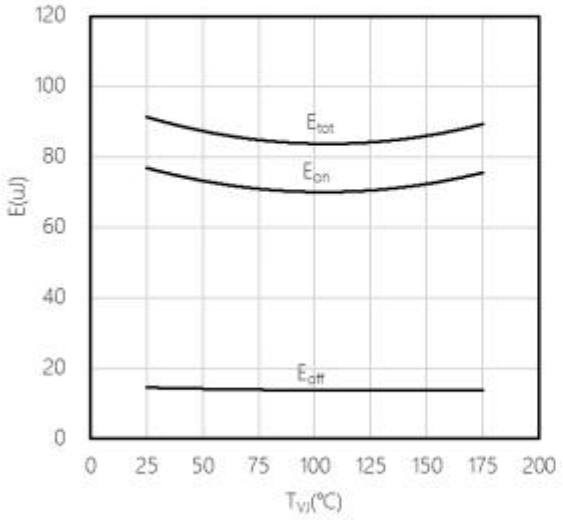
$V_{SD} = f(T_{VJ})$, I_{SD} = 4 A



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

$E = f(T_{VJ})$

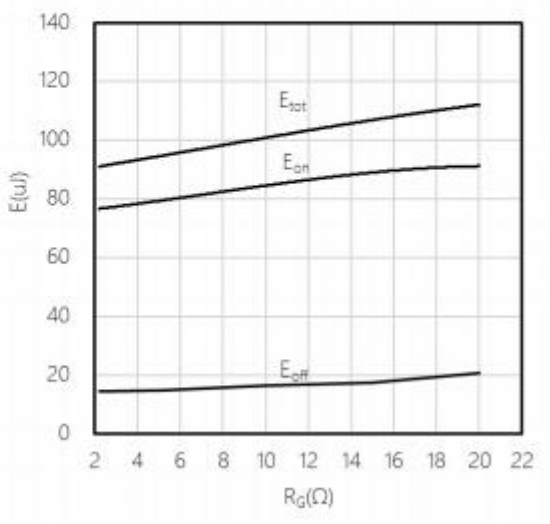
V_{DS} = 400 V, $R_{G(ext)}$ = 2.2 Ω, V_{GS} = 0V / 15 V, I_{DS} = 8 A



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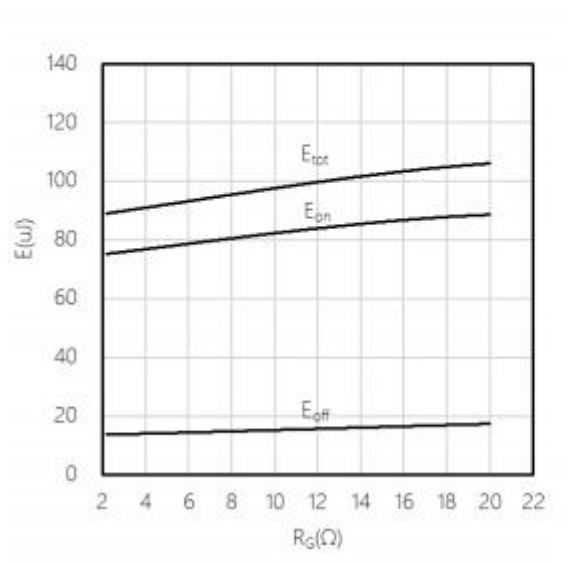
Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V

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

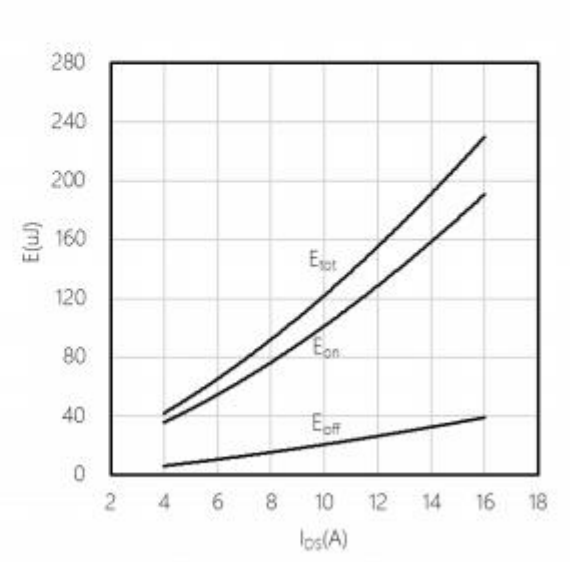
V_{GS} = 0/15 V, I_{DS} =8A, T_{VJ} = 175 °C, V_{DS} = 400 V



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

E = f(I_{DS})

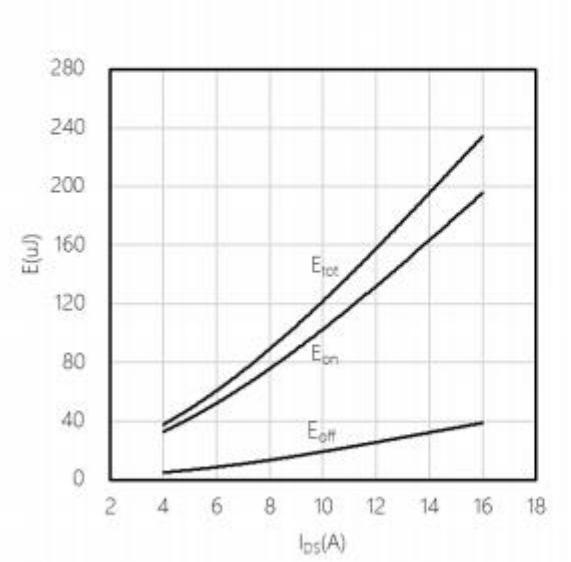
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V



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

E = f(I_{DS})

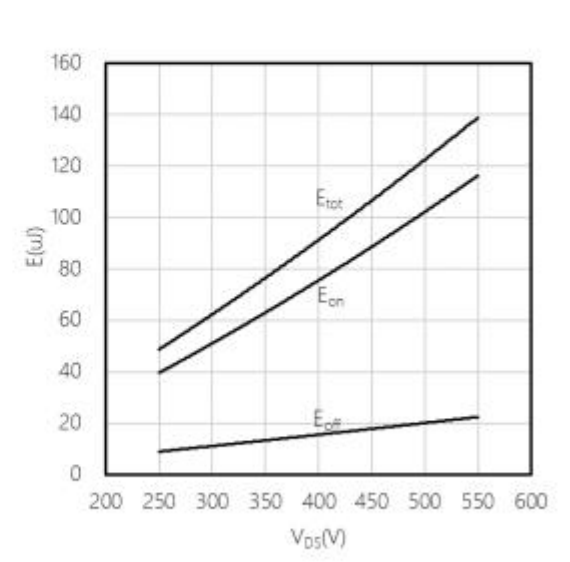
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V



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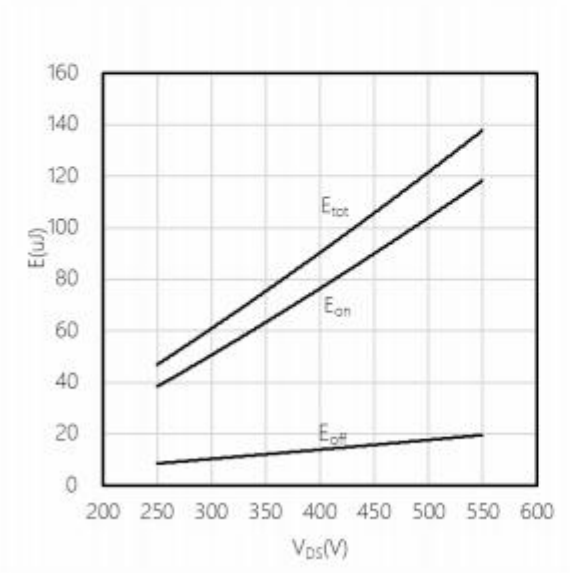
Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(V_{DS})

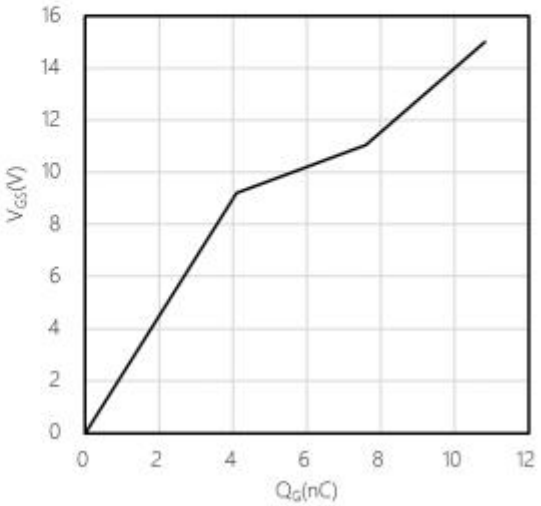
V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 175 °C, I_{DS} = 8 A



Typical gate charge

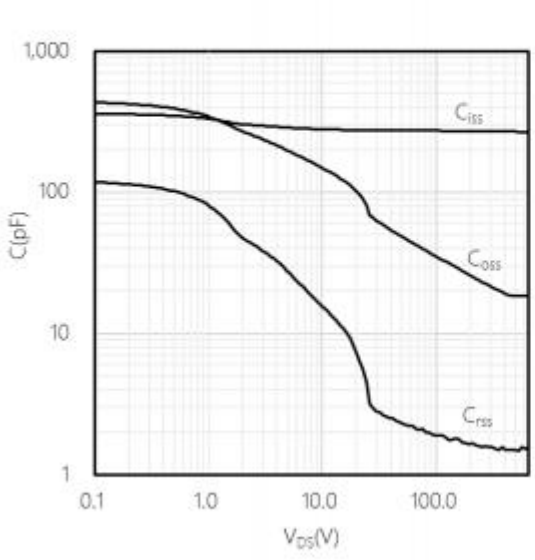
V_{GS} =f(Q_G), I_{DS} = 8A, V_{DS} = 400V

turn-on pulse



Typical capacitance as a function of drain-source voltage

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



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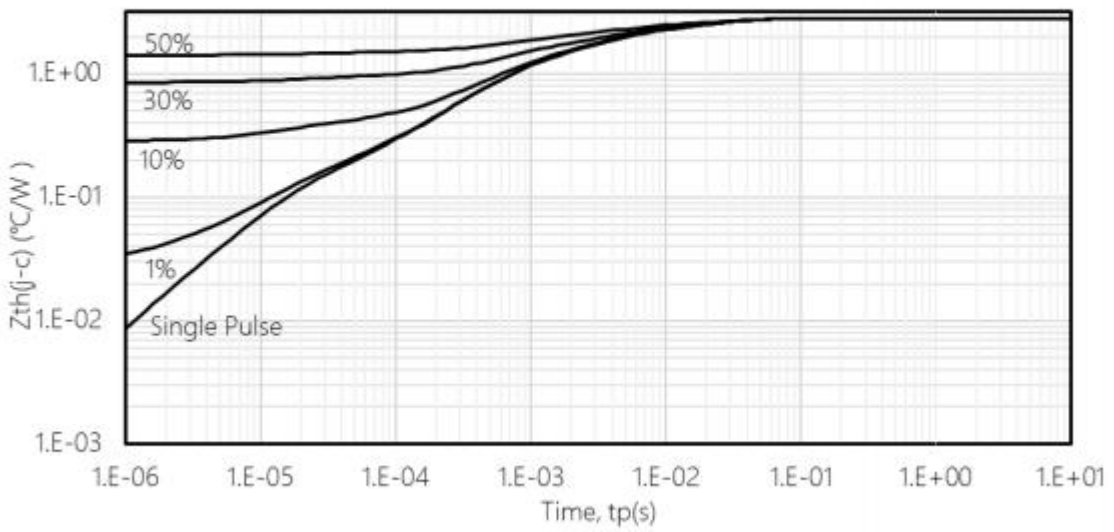
Transient thermal resistance (MOSFET)

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



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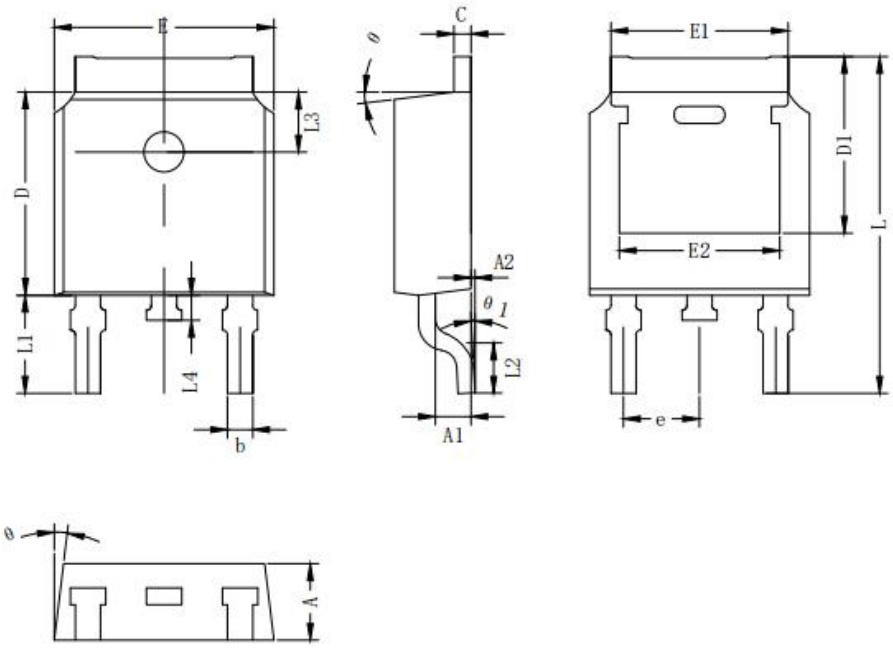
Package outline drawing(TO-252 Unit: mm)



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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c.whose failuer to when properly used in accordance with instructions for used provided in the laeling,can be reasonably expected to result in significant injury to the user.

2.A critical component is any component of a life support device or system whose failure to system whose failure to perform can be reasonably expected to cause the failure of the life support device or system,or to affect its safety or effectiveness.

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