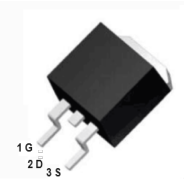
40 V N-Channel MOSFET

Features

- Optimized technology for DC / DC converters
- Excellent gate charge x R(on) product (FOM)
- Very low on-resistance RDS (on)
- V_{DS}(V) =40V
- I_D =120A (V_{GS}= 10V)
- $R_{DS(ON)}$ <1.5mΩ (V_{GS} =10V)



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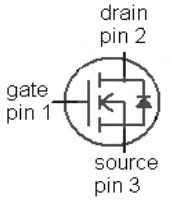


MOSFET Maximum Ratings T_j = 25°C unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	120	A
		V_{GS}=10 V, T_C=100 °C	120	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	400	
Avalanche current, single pulse[3]	I_{AS}	T_C=25 °C	100	
Avalanche energy, single pulse	E_{AS}	I_D=100 A, R_{GS}=25 Ω	865	mJ
Gate source voltage	V_{GS}		±20	V

MOSFET Maximum Ratings T ≠ 25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
Power dissipation	P_{tot}	T_C=25 °C		250		W
Operating and storage temperature	T_j, T_{stg}			-55 ... 175		°C
IEC climatic category; DIN IEC 68-1				55/175/56		
Parameter	**Symbol**	**Conditions**	**Value**			**Unit**
			min.	**typ.**	**max.**	
Thermal resistance, junction - case	R_{thJC}				0.6	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint			62	
		6 cm² cooling area[4)]			40	
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	40			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=200 µA	2		4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=40 V, V_{GS}=0 V, T_j=25 °C		0.1	2	µA
		V_{DS}=40 V, V_{GS}=0 V, T_j=125 °C		20	200	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V		10	100	nA
Drain-source on-state resistance [5)]	$R_{DS(on)}$	V_{GS}=10 V, I_D=100 A		1.2	1.5	mΩ
Gate resistance	R_G			1.5		Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=100 A	120	230		S

Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer , 70 um thick) copper area for drainconnection . PCB is vertical in still air.

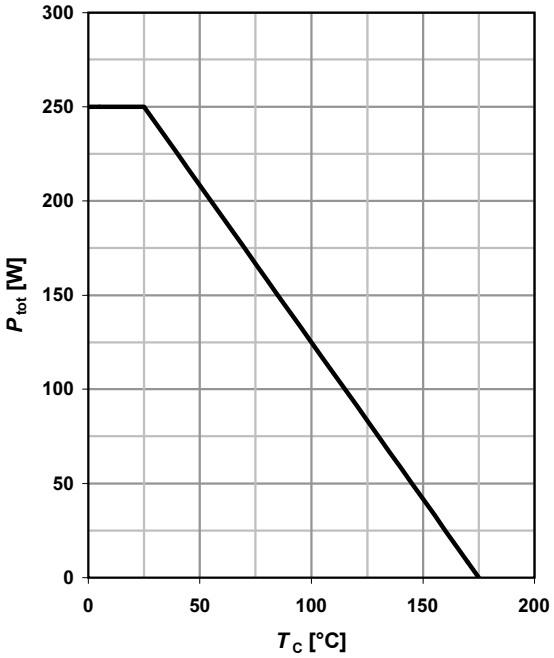
Measured from drain tab to source pin

Dynamic characteristics

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=20 V, f=1 MHz		15000	20000	pF
Output capacitance	C_{oss}			4000	5300	
Reverse transfer capacitance	C_{rss}			160		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20 V, V_{GS}=10 V, I_D=30 A, R_G=1.6 Ω		40		ns
Rise time	t_r			10		
Turn-off delay time	$t_{d(off)}$			64		
Fall time	t_f			13		
Gate to source charge	Q_{gs}	V_{DD}=20 V, I_D=100 A, V_{GS}=0 to 10 V		76		nC
Gate charge at threshold	$Q_{g(th)}$			46		
Gate to drain charge	Q_{gd}			23		
Switching charge	Q_{sw}			75		
Gate charge total	Q_g			188	250	
Gate plateau voltage	$V_{plateau}$			5.0		V
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 10 V		177		nC
Output charge	Q_{oss}	V_{DD}=20 V, V_{GS}=0 V		147		
Diode continuous forward current	I_S	T_C=25 °C			120	A
Diode pulse current	$I_{S,pulse}$				400	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=100 A, T_j=25 °C		0.88	1.2	V
Reverse recovery charge	Q_{rr}	V_R=15 V, I_F=I_S, di_F/dt =400 A/µs		141		nC

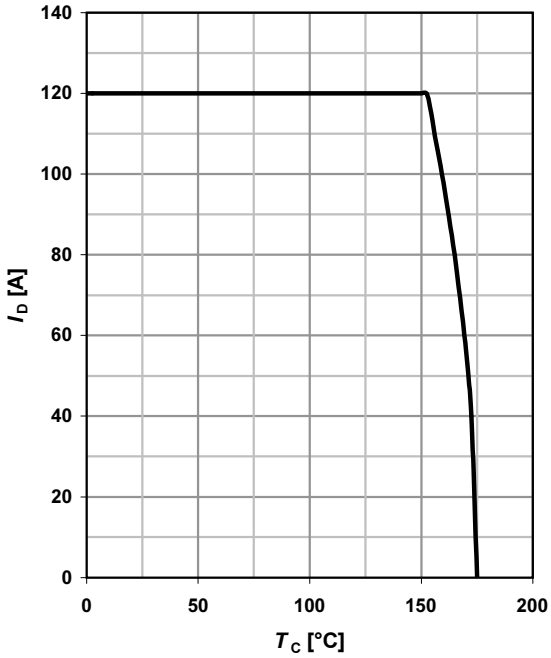
1 Power dissipation

P_{tot}=f(T_C)



2 Drain current

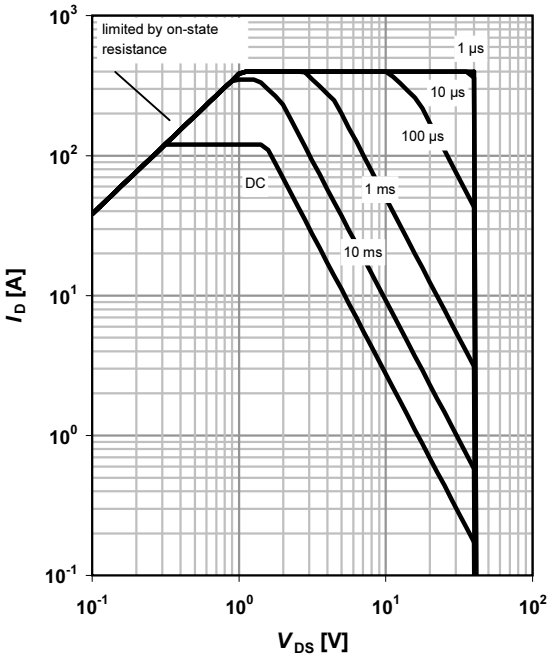
I_D=f(T_C); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

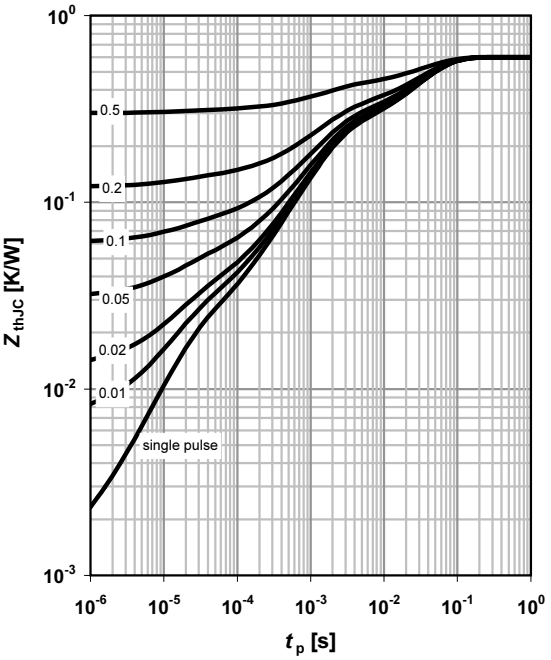
parameter: t_p



4 Max. transient thermal impedance

Z_{thJC}=f(t_p)

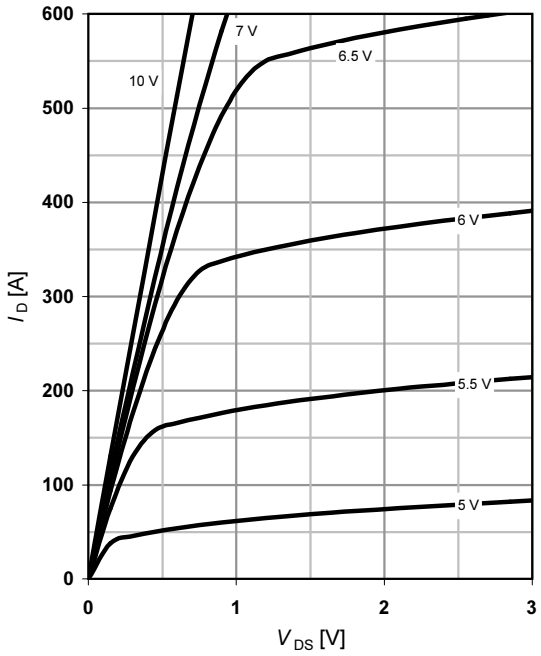
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

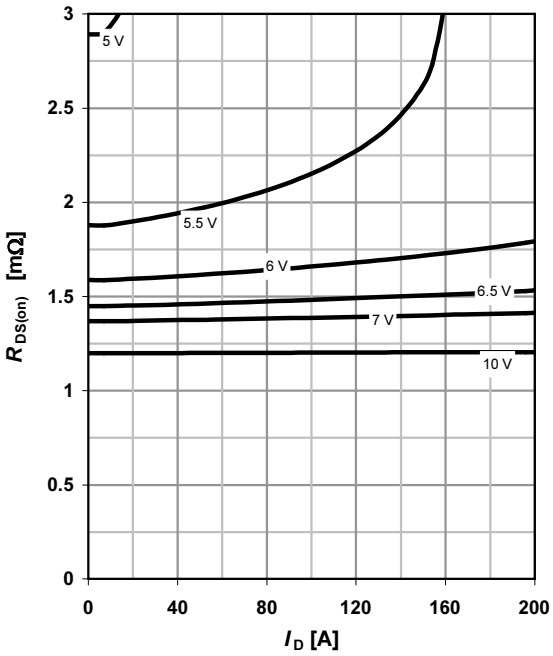
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

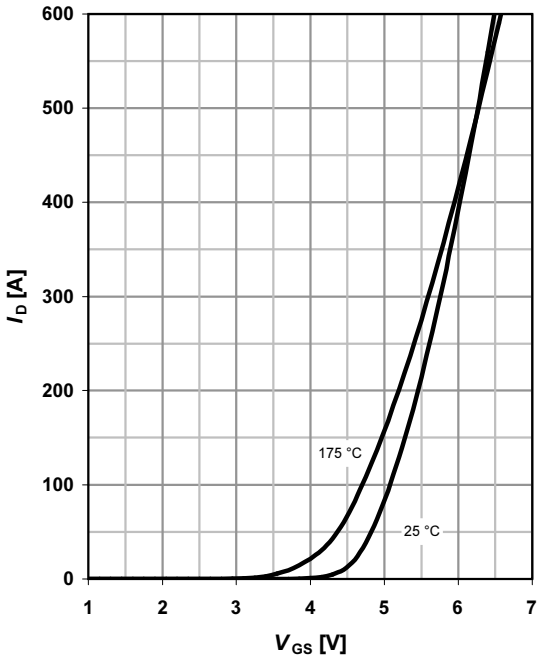
parameter: V_{GS}



7 Typ. transfer characteristics

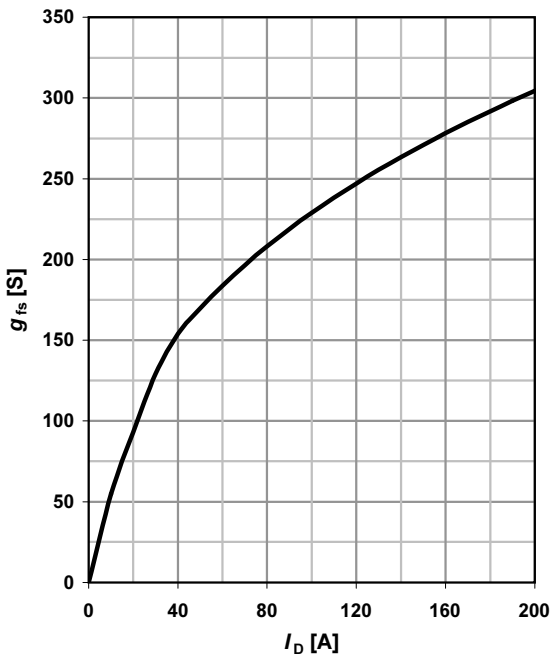
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

parameter: T_j



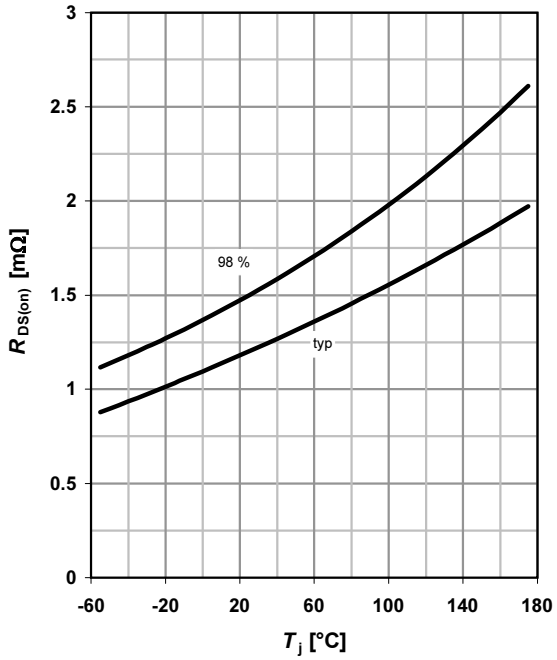
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



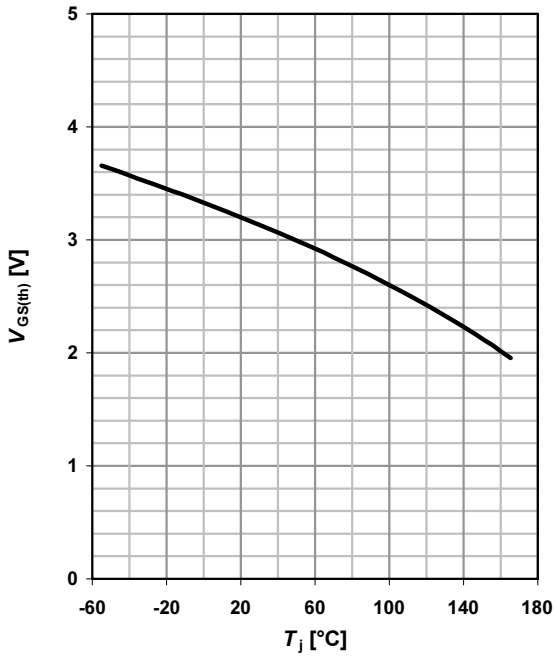
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=100 A; V_{GS}=10 V



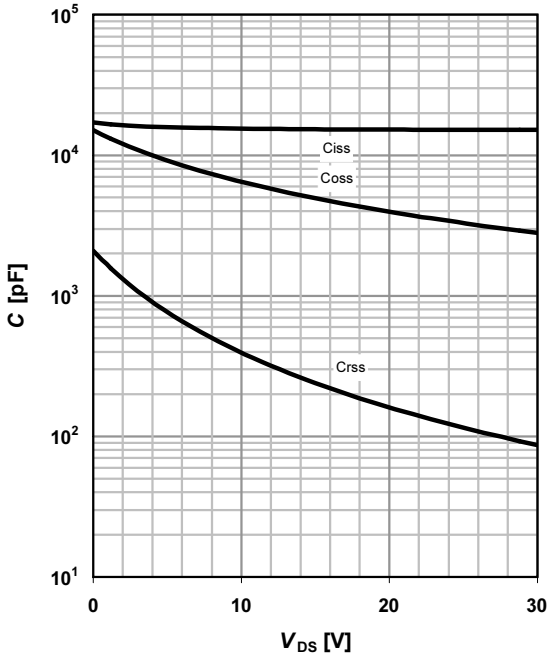
10 Typ. gate threshold voltage

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=1mA



11 Typ. capacitances

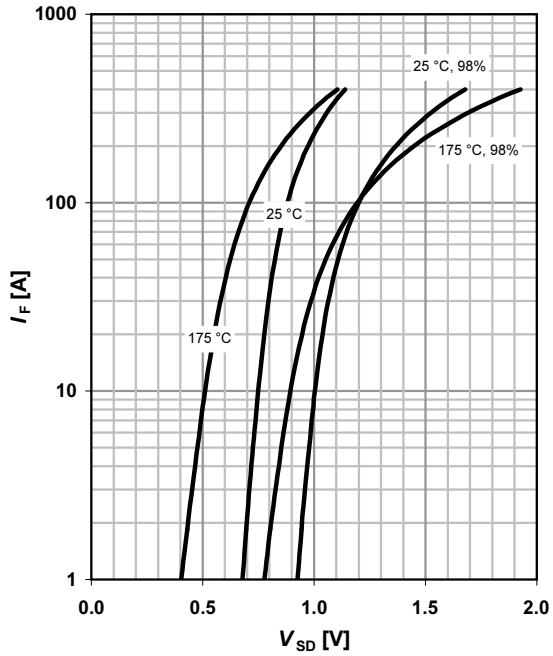
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

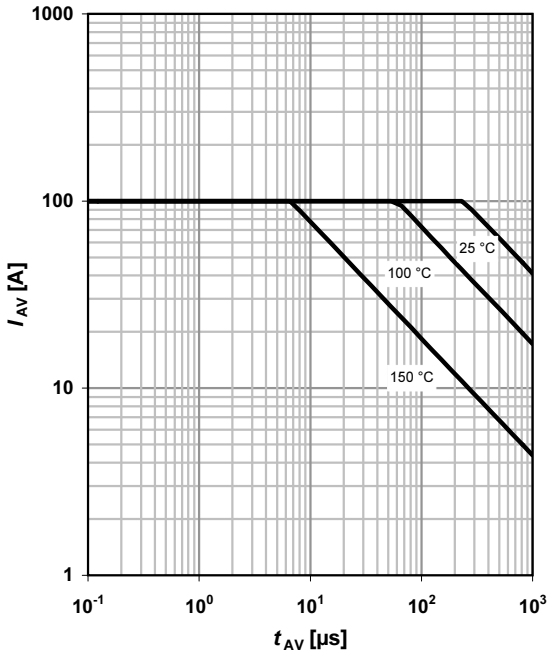
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

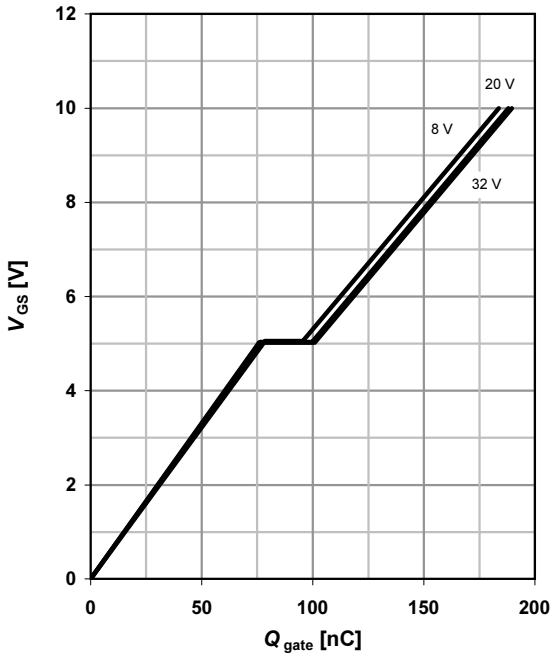
parameter: $T_{j(start)}$



14 Typ. gate charge

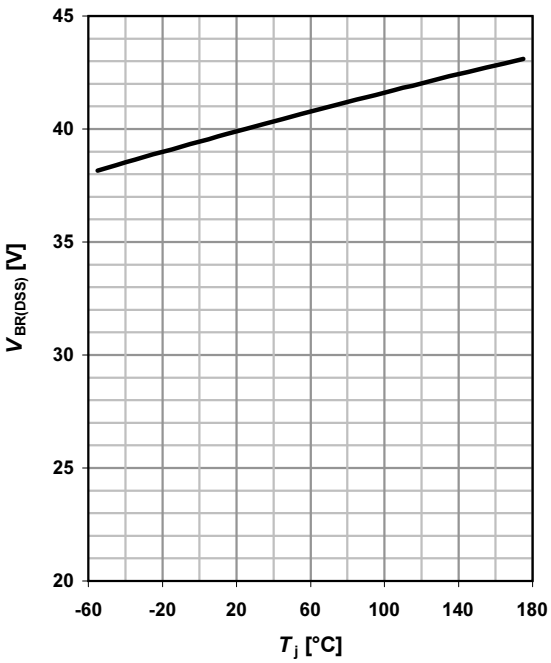
V_{GS}=f(Q_{gate}); I_D=100 A pulsed

parameter: V_{DD}

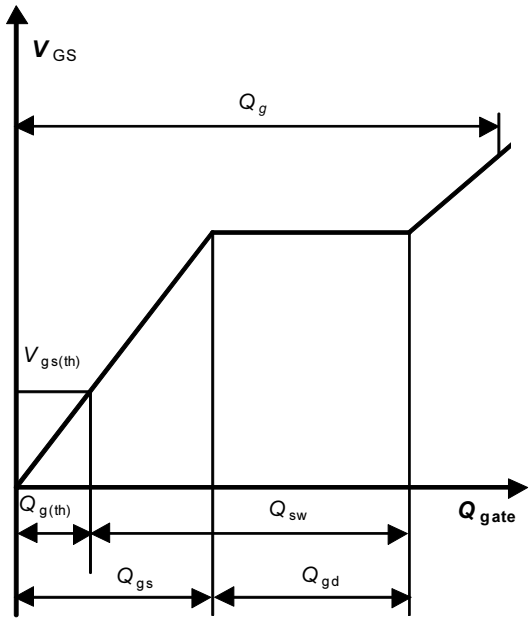


15 Drain-source breakdown voltage

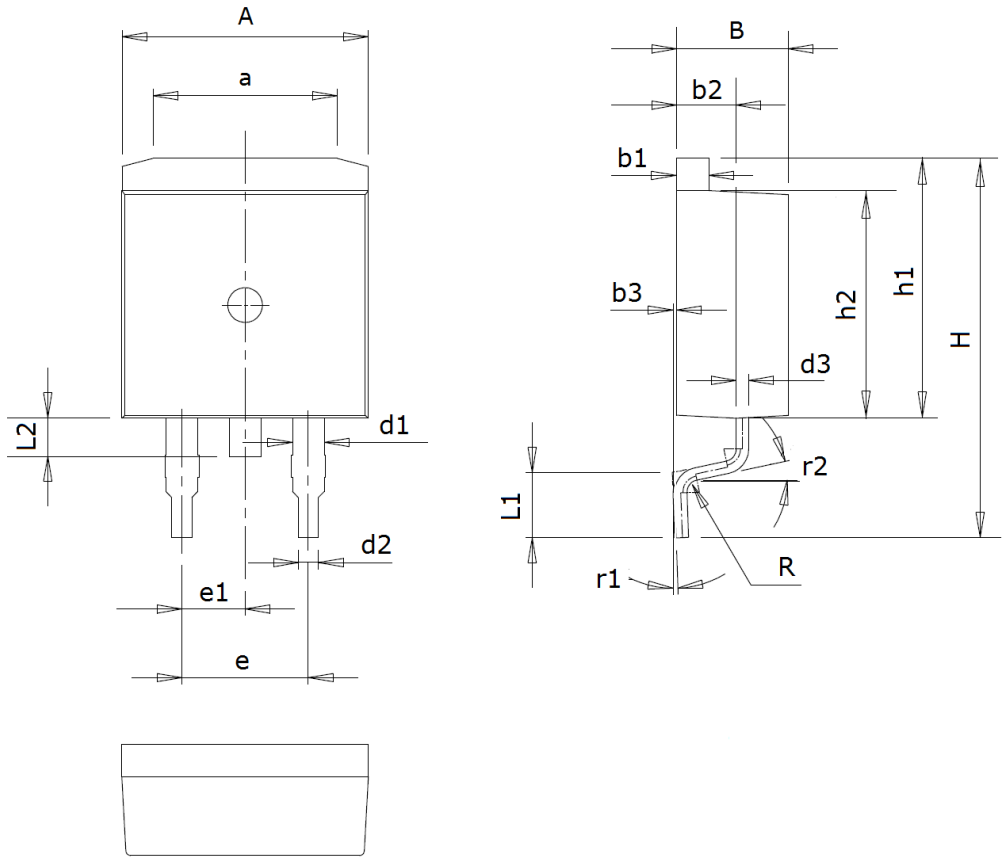
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms

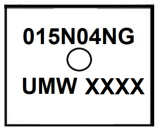


TO-263 Package Outline Drawing



Symbol	Dimensions （mm）	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	9.7～10.3	d2	0.7～0.9	L1	2.4~2.9
a	7.0～7.8	d3	0.4～0.6	L2	1.3~1.8
B	4.3～4.7	e	5.08（typ）	R	0.5(typ)
b1	1.25～1.35	e1	2.54（typ）	r1	0~8°
b2	2.2～2.6	H	14.8~15.6	r2	12°（typ）
b3	0～0.2	h1	10.2~10.7		
d1	1.2～1.4	h2	8.9~9.4		

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IPB015N04NG	TO-263	800	Tape and reel