

Achieving the industry's lowest Ron Qg along with high switching speed through the use of micro-cell structure and a newly developed design.

Low On-Resistance, High-Speed Switching MOSFET Series

■ Product Outline

2SK3628/2SK3559/2SK3665/2SK3637/2SK3652 are low On-resistance, high-speed switching MOSFETs ideal for PDP sustain drivers, inverters and power supplies for various equipment. Offering the lowest Ron Qg of its kind and improved switching speed, these products enhance equipment efficiency. This results in savings in labor and total cost reduction.

■ Features

- Low On-resistance: 29m (minimum) (45% lower than conventional Panasonic product)
- Low Ron Qg: 2.50nC (40% lower than conventional Panasonic product) -- industry's lowest
- High-speed switching

■ Applications

- PDP sustain drivers, inverters and power supply for various equipment

■ Specifications

Product	VDSS (V)	ID (A)	Pc (W)	Ron (typ) (mohm)	Qg (nC)	tr (n s)	tf (n s)	Package
2SK3628	230	20	100	65	45	40	45	TOP-3F
2SK3559	230	30	100	55	55	45	50	TOP-3F
2SK3665	200	30	200	50	55	45	50	TOP-3L
2SK3637	200	50	100	29	85	125	140	TOP-3E
2SK3652	230	50	100	29	105	140	145	TOP-3E

The products and specification are subject to change without any notice. Please ask for the latest Product Standards to guarantee the satisfaction of your product requirements.

Semiconductor Company, Matsushita Electric Industrial Co., Ltd.

2SK3628

N-channel enhancement mode MOSFET

High speed switching

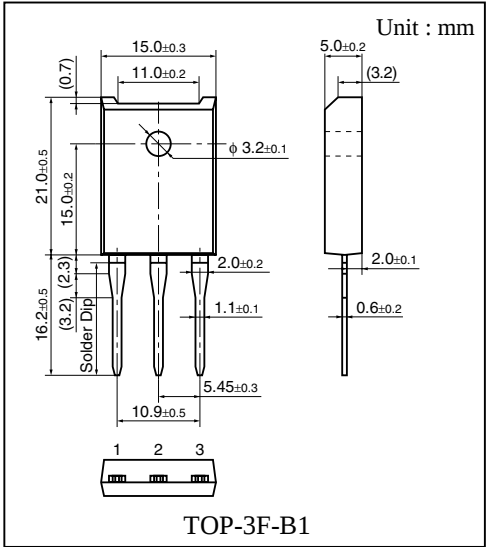
Absolute Maximum Ratings

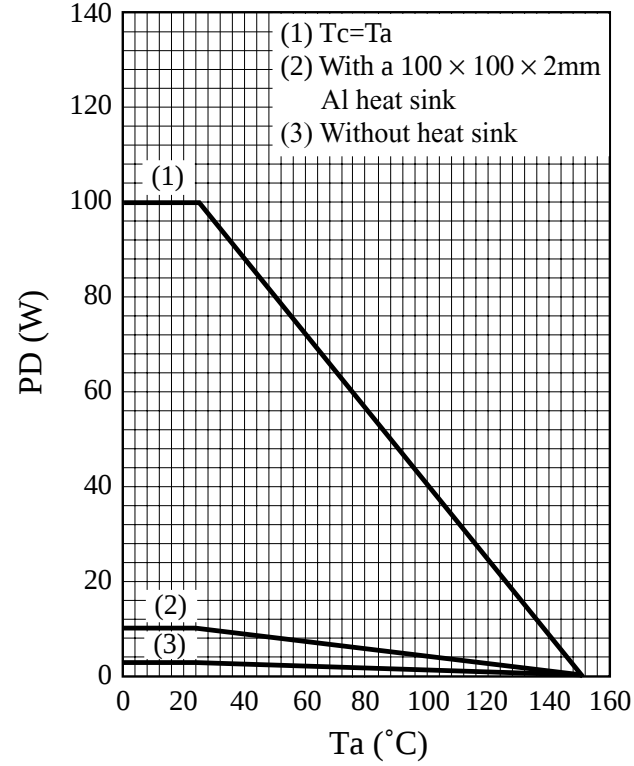
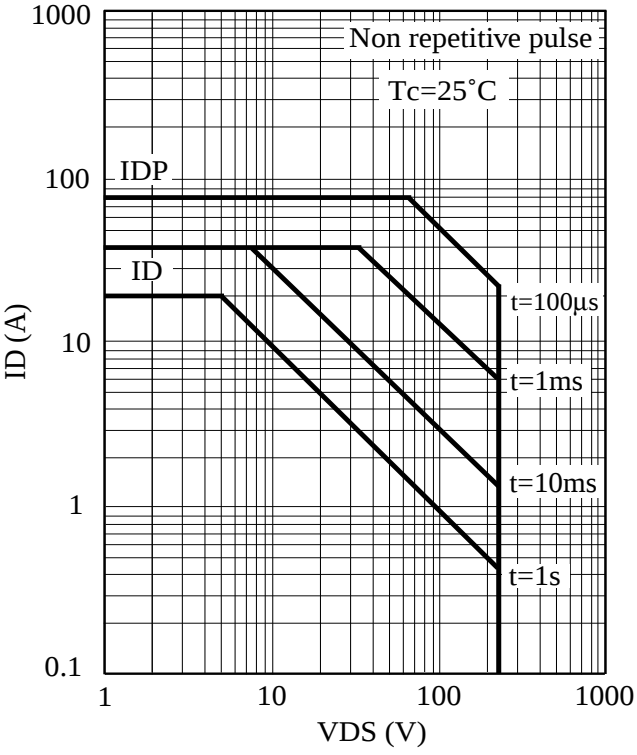
Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		VDSS	230	V
Gate-Source voltage		VGSS	± 30	V
Drain current	DC	ID	20	A
	Pulse	IDP	80	A
Avalanche energy capability *1		EAS	570	m J
Allowable power dissipation	Tc = 25 °C *2	PD	100	W
	Ta = 25 °C *3	PD	3	W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	-55 to +150	°C

*1 : Guarantee of single pulse avalanche energy.
(L = 2.23mH, IL = 20A, VDD = 50V, 1pulse, Ta = 25 °C)
*2 : Tc = 25 °C
*3 : Ta = 25 °C (Without heat sink)

Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain Cutoff Current	IDSS	VDS = 184V, VGS = 0	—	—	100	μ A
Gate-source Leakage Current	IGSS	VGS = ± 30 V, VDS = 0	—	—	± 1	μ A
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0	230	—	—	V
Gate Threshold Voltage	Vth	VDS = 25 V, ID = 1 mA	1.7	—	3.7	V
Drain-source on Resistance	RDS (on)	VGS = 10 V, ID = 10 A	—	65	85	m Ω
Forward Transfer Admittance	Yfs	VDS = 25 V, ID = 10 A	7	14	—	S
Diode Forward Voltage	VDSF	IDR = 20 A, VGS = 0	—	—	-1.5	V
Input Capacitance	Ciss	VDS = 25 V, VGS = 0, f = 1MHz	—	2300	—	p F
Output Capacitance	Coss		—	330	—	p F
Reverse Transfer Capacitance	Crss		—	30	—	p F
Turn-on delay time	td (on)	VDD = 100V, ID = 15 A	—	35	—	n s
Rise time	tr		—	26	—	n s
Turn-off delay time	td (off)	RL = 6.7 Ω, VGS = 10 V	—	220	—	n s
Fall time	tf		—	36	—	n s





2SK3559

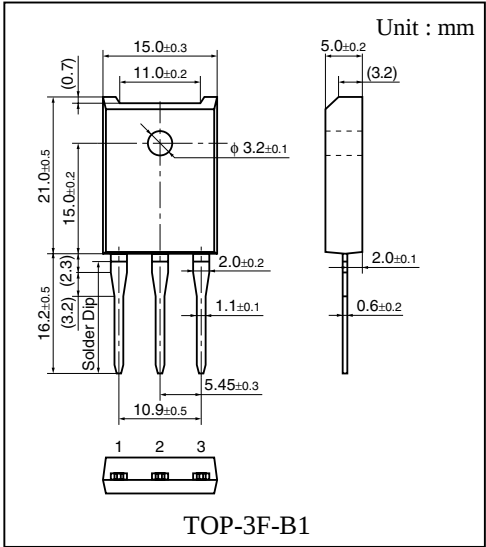
N-channel enhancement mode MOSFET

High speed switching

■ Absolute Maximum Ratings

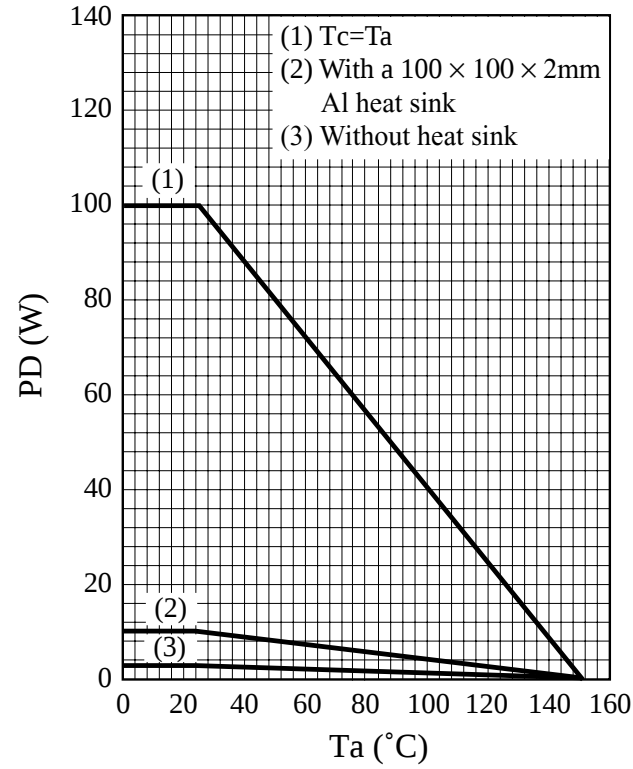
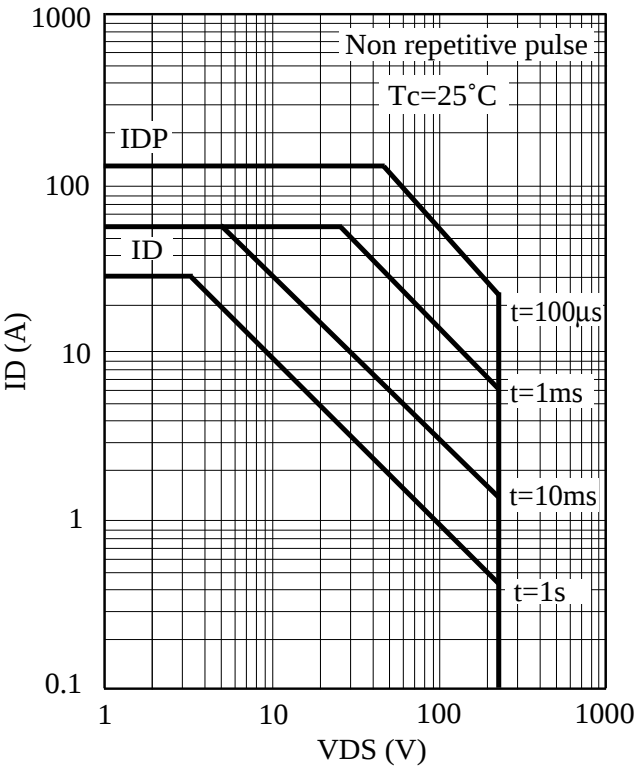
Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		VDSS	230	V
Gate-Source voltage		VGSS	± 30	V
Drain current	DC	ID	30	A
	Pulse	IDP	120	A
Allowable power dissipation	Tc = 25 °C *1	PD	100	W
	Ta = 25 °C *2	PD	3	W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	-55 to +150	°C

*1 : Tc = 25 °C
*2 : Ta = 25 °C (Without heat sink)



■ Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain Cutoff Current	IDSS	VDS = 184V, VGS = 0	—	—	100	μ A
Gate-source Leakage Current	IGSS	VGS = ± 30 V, VDS = 0	—	—	± 1	μ A
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0	230	—	—	V
Gate Threshold Voltage	Vth	VDS = 25 V, ID = 1 mA	2	—	4	V
Drain-source on Resistance	RDS (on)	VGS = 10 V, ID = 15 A	—	55	74	m Ω
Forward Transfer Admittance	Yfs	VDS = 25 V, ID = 15 A	8	16	—	S
Diode Forward Voltage	VDSF	IDR = 30 A, VGS = 0	—	—	-1.5	V
Input Capacitance	Ciss	VDS = 25 V, VGS = 0, f = 1MHz	—	3170	—	p F
Output Capacitance	Coss		—	440	—	p F
Reverse Transfer Capacitance	Crss		—	35	—	p F
Turn-on delay time	td (on)	VDD = 100V, ID = 15 A	—	36	—	n s
Rise time	tr		—	25	—	n s
Turn-off delay time	td (off)	RL = 6.7 Ω, VGS = 10 V	—	217	—	n s
Fall time	tf		—	35	—	n s



2SK3665

N-channel enhancement mode MOSFET

High speed switching

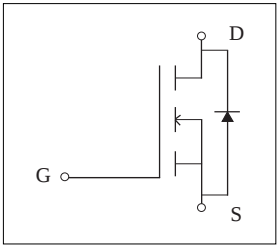
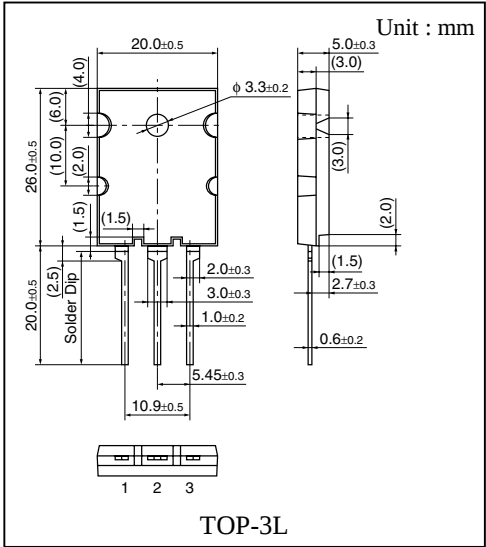
Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		VDSS	200	V
Gate-Source voltage		VGSS	± 30	V
Drain current	DC	ID	30	A
	Pulse	IDP	120	A
Avalanche energy capability *1		EAS	1800	m J
Allowable power dissipation	Tc = 25 °C *2	PD	180	W
	Ta = 25 °C *3	PD	3	W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	-55 to +150	°C

*1 : Guarantee of single pulse avalanche energy.
(L = 2mH, IL = 30A, VDD = 100V, 1pulse, Ta = 25 °C)
*2 : Tc = 25 °C
*3 : Ta = 25 °C (Without heat sink)

Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain Cutoff Current	IDSS	VDS = 160V, VGS = 0	—	—	100	μ A
Gate-source Leakage Current	IGSS	VGS = ± 30 V, VDS = 0	—	—	± 1	μ A
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0	200	—	—	V
Gate Threshold Voltage	Vth	VDS = 10 V, ID = 1 mA	1.5	—	3.5	V
Drain-source on Resistance	RDS (on)	VGS = 10 V, ID = 15 A	—	50	68	m Ω
Forward Transfer Admittance	Yfs	VDS = 25 V, ID = 15 A	8	16	—	S
Input Capacitance	Ciss	VDS = 25 V, VGS = 0, f = 1MHz	—	3170	—	p F
Output Capacitance	Coss		—	440	—	p F
Reverse Transfer Capacitance	Crss		—	35	—	p F
Turn-on delay time	td (on)	VDD = 100V, ID = 15 A	—	36	—	n s
Rise time	tr		—	42	—	n s
Turn-off delay time	td (off)	RL = 6.7 Ω, VGS = 10 V	—	230	—	n s
Fall time	tf		—	50	—	n s

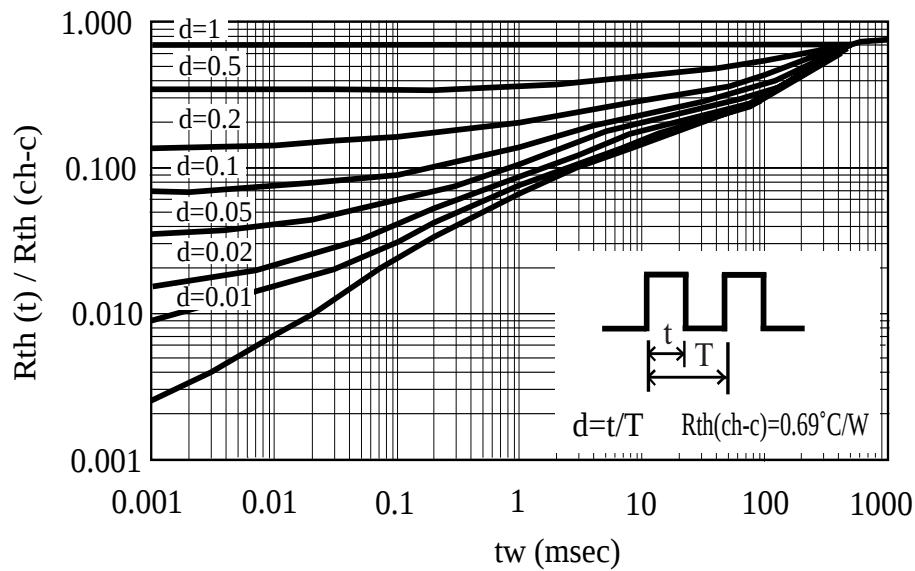
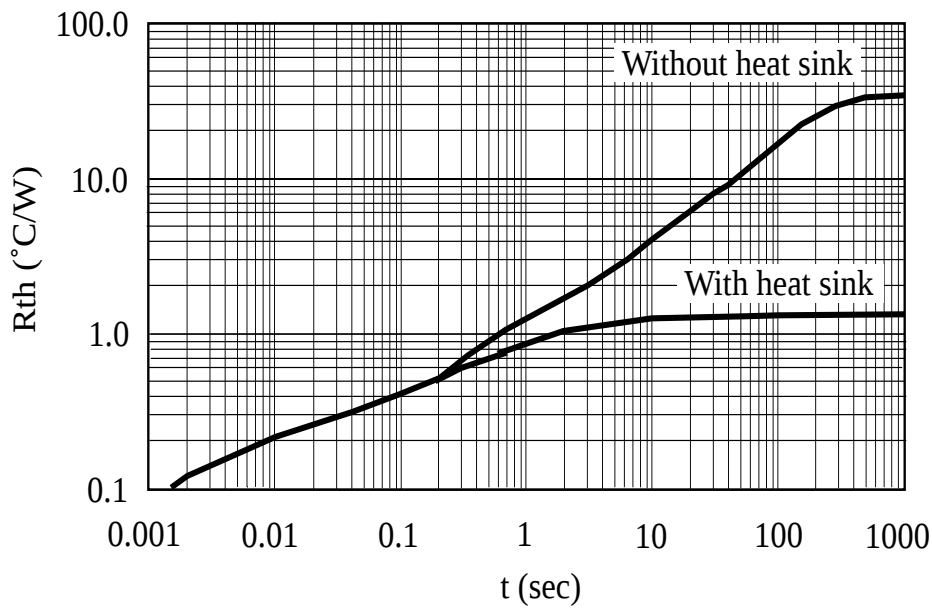
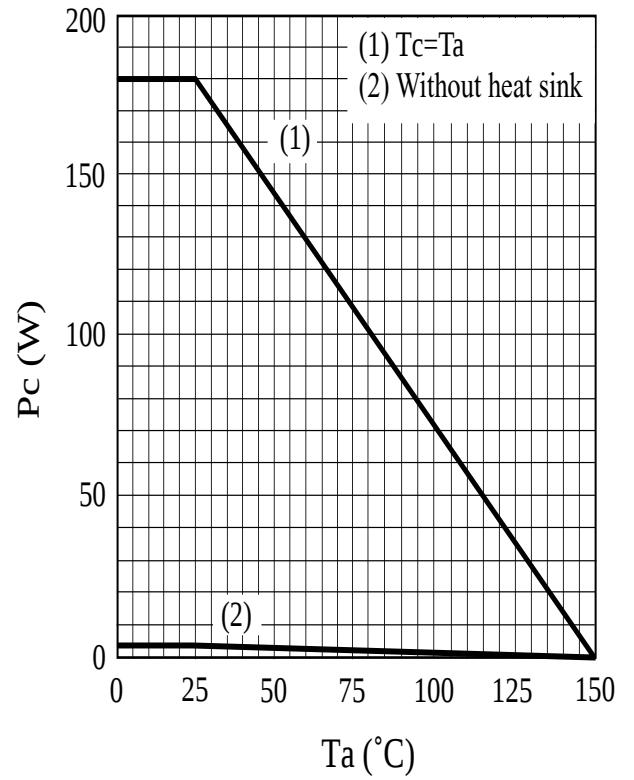
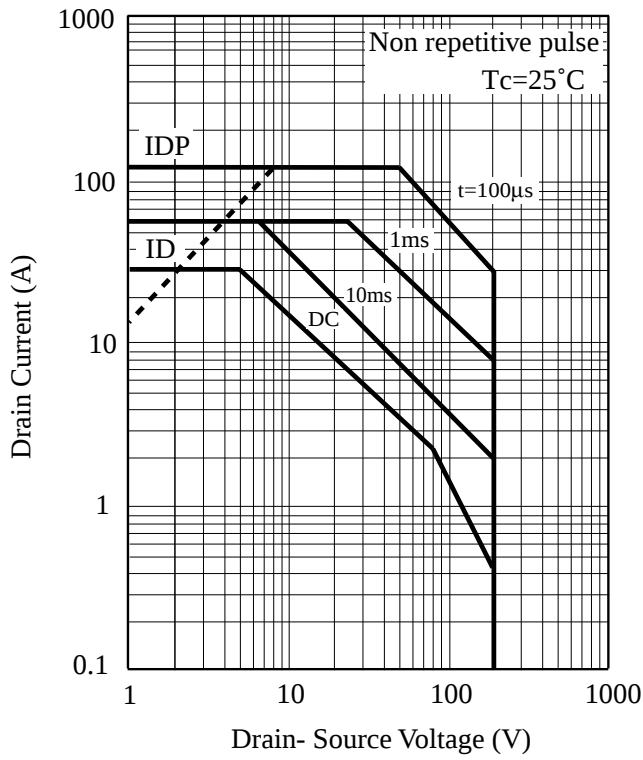


■ Electrical Characteristics (Tc = 25 ± 3 °C)

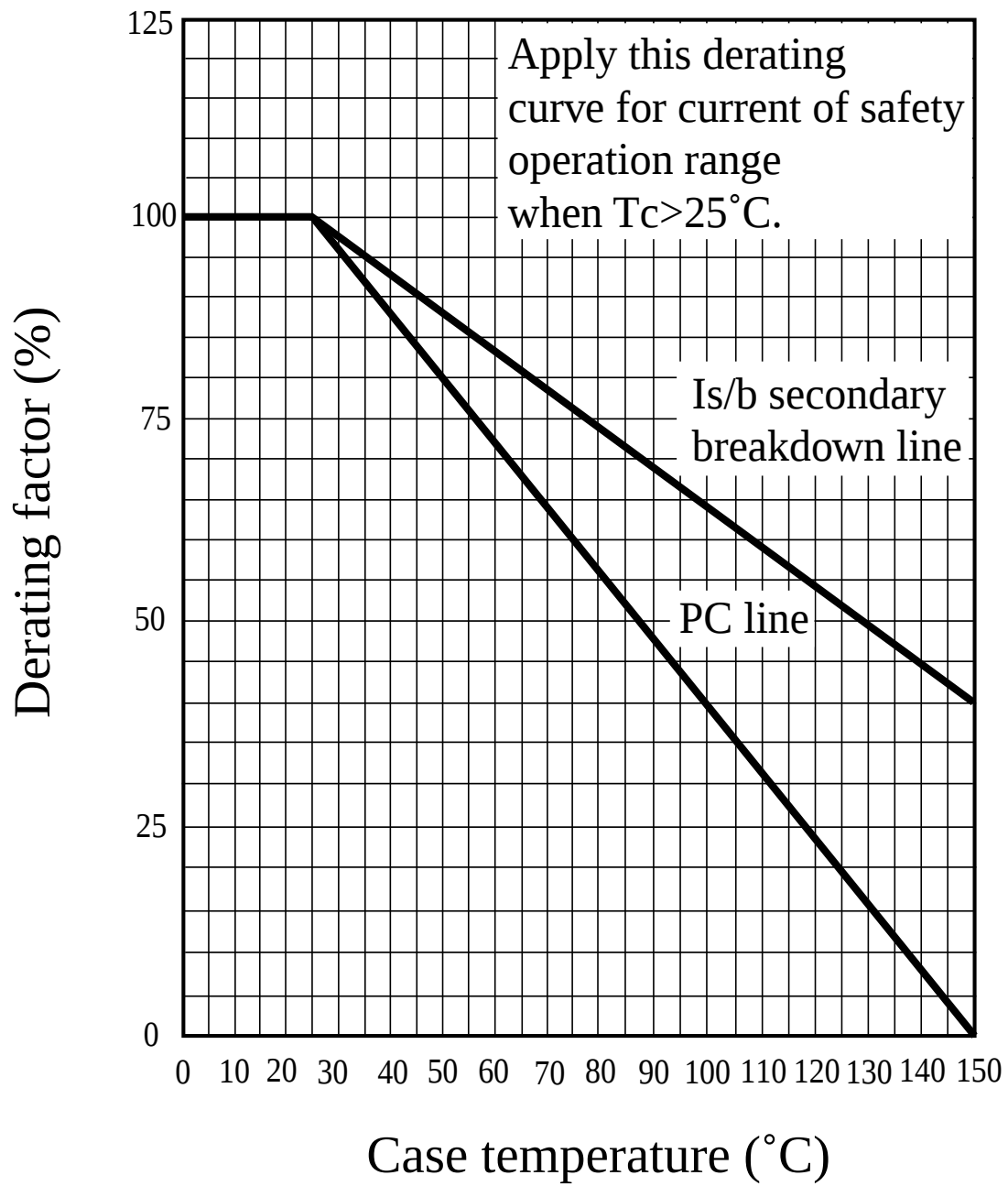
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode forward Voltage	VDSF	IDR = 30V, VGS = 0	–	–	-1.5	V
Reverse recovery Time	Trr	L = 230 μH, VDD = 100V IDR = 15 A, di/dt = 100A/μs	–	182	–	n s
Reverse recovery Charge	Qrr		–	819	–	n C
Total Gate Charge	Qg	VDD = 100 V, ID = 25 A VGS = 10 V	–	55	–	n C
Gate-Source Charge	Qgs		–	10	–	n C
Gate-Drain Charge	Qgd		–	16	–	n C

■ Thermal characteristics

Thermal resistance (channel to case)	Rth (ch-c)		–	–	0.69	°C/W
Thermal resistance (channel to ambient)	Rth (ch-a)		–	–	41.6	°C/W



Derating curve for safety operation



2SK3637

N-channel enhancement mode MOSFET

High speed switching

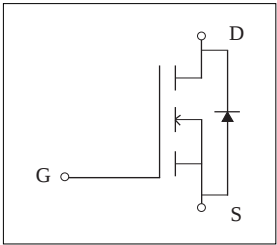
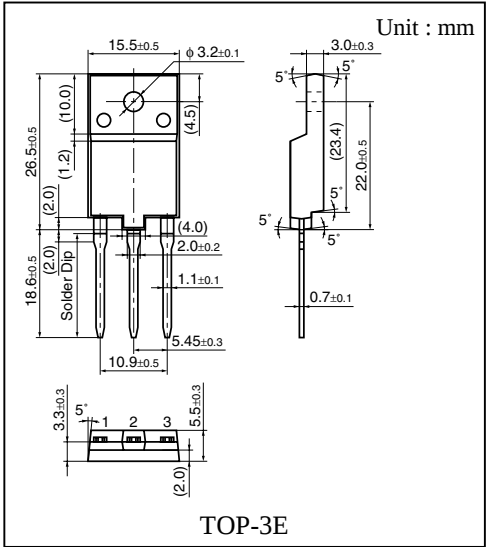
Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		VDSS	200	V
Gate-Source voltage		VGSS	± 30	V
Drain current	DC	ID	50	A
	Pulse	IDP	200	A
Avalanche energy capability *1		EAS	2000	m J
Allowable power dissipation	Tc = 25 °C *2	PD	100	W
	Ta = 25 °C *3	PD	3	W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	-55 to +150	°C

*1 : Guarantee of single pulse avalanche energy.
(L = 0.8mH, IL = 50A, VDD = 100V, 1pulse, Ta = 25 °C)
*2 : Tc = 25 °C
*3 : Ta = 25 °C (Without heat sink)

Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain Cutoff Current	IDSS	VDS = 160V, VGS = 0	—	—	100	μ A
Gate-source Leakage Current	IGSS	VGS = ± 30 V, VDS = 0	—	—	± 1	μ A
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0	200	—	—	V
Gate Threshold Voltage	Vth	VDS = 25 V, ID = 10 mA	2	—	4	V
Drain-source on Resistance	RDS (on)	VGS = 10 V, ID = 25 A	—	29	40	m Ω
Forward Transfer Admittance	Yfs	VDS = 25 V, ID = 25 A	15	30	—	S
Input Capacitance	Ciss	VDS = 25 V, VGS = 0, f = 1MHz	—	4550	—	p F
Output Capacitance	Coss		—	750	—	p F
Reverse Transfer Capacitance	Crss		—	75	—	p F
Turn-on delay time	td (on)	VDD = 100V, ID = 25 A RL = 4 Ω, VGS = 10 V	—	50	—	n s
Rise time	tr		—	125	—	n s
Turn-off delay time	td (off)		—	390	—	n s
Fall time	tf		—	140	—	n s

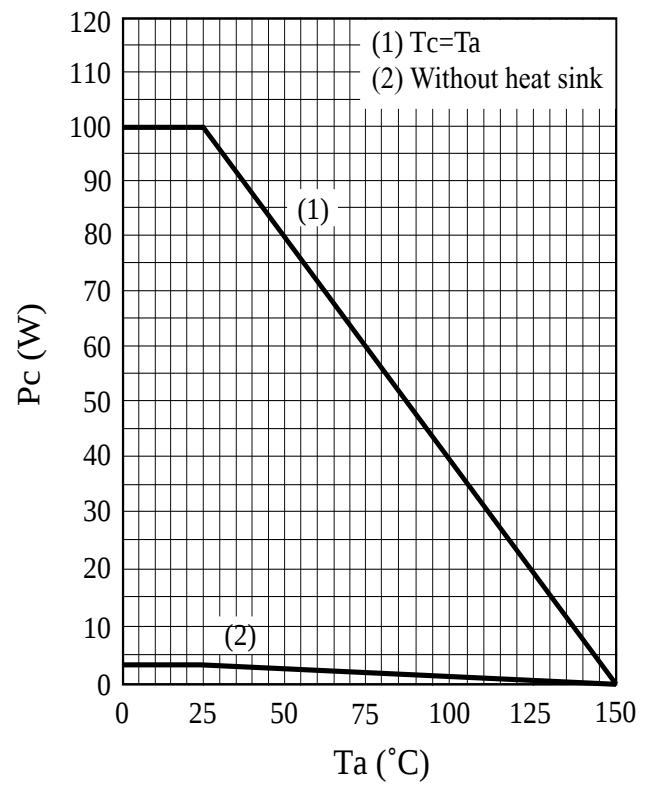
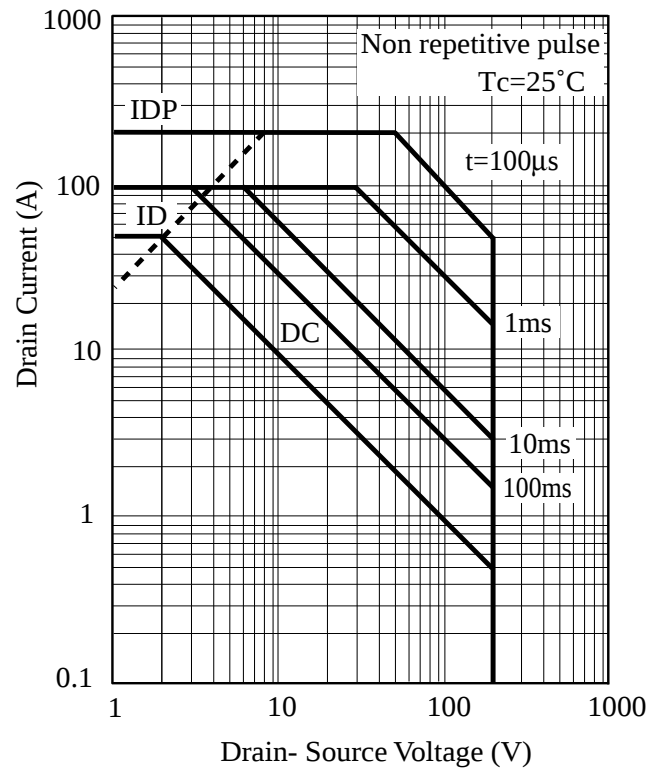


■ Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode forward Voltage	VDSF	IDR = 50V, VGS = 0	–	–	-1.5	V
Reverse recovery Time	Trr	L = 230 μH, VDD = 100V IDR = 25 A, di/dt = 100A/μs	–	210	–	n s
Reverse recovery Charge	Qrr		–	820	–	n C
Total Gate Charge	Qg	VDD = 100 V, ID = 25 A VGS = 10 V	–	85	–	n C
Gate-Source Charge	Qgs		–	30	–	n C
Gate-Drain Charge	Qgd		–	12	–	n C

■ Thermal characteristics

Thermal resistance (channel to case)	Rth (ch-c)		–	–	1.25	°C/W
Thermal resistance (channel to ambient)	Rth (ch-a)		–	–	41.6	°C/W



2SK3652

N-channel enhancement mode MOSFET

High speed switching

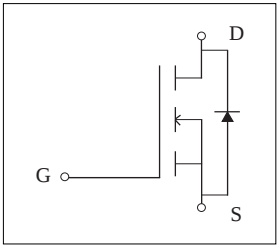
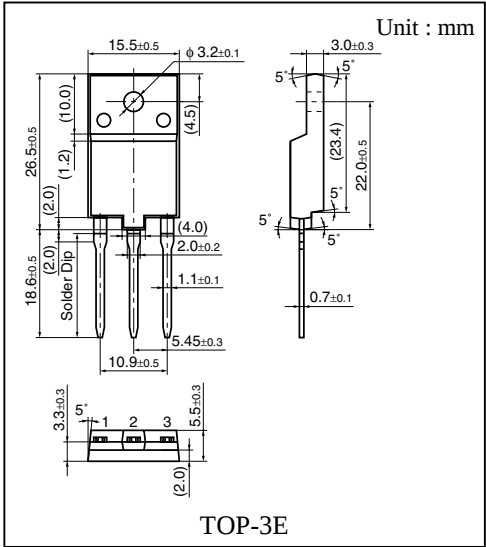
Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source breakdown voltage		VDSS	230	V
Gate-Source voltage		VGSS	± 30	V
Drain current	DC	ID	50	A
	Pulse	IDP	230	A
Avalanche energy capability *1		EAS	2200	m J
Allowable power dissipation	Tc = 25 °C *2	PD	100	W
	Ta = 25 °C *3	PD	3	W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	-55 to +150	°C

*1 : Guarantee of single pulse avalanche energy.
(L = 1mH, IL = 50A, VDD = 100V, 1pulse, Ta = 25 °C)
*2 : Tc = 25 °C
*3 : Ta = 25 °C (Without heat sink)

Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain Cutoff Current	IDSS	VDS = 184V, VGS = 0	—	—	100	μ A
Gate-source Leakage Current	IGSS	VGS = ± 30 V, VDS = 0	—	—	± 1	μ A
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0	230	—	—	V
Gate Threshold Voltage	Vth	VDS = 25 V, ID = 10 mA	2	—	4	V
Drain-source on Resistance	RDS (on)	VGS = 10 V, ID = 25 A	—	29	40	m Ω
Forward Transfer Admittance	Yfs	VDS = 25 V, ID = 25 A	17	35	—	S
Input Capacitance	Ciss	VDS = 25 V, VGS = 0, f = 1MHz	—	5950	—	p F
Output Capacitance	Coss		—	850	—	p F
Reverse Transfer Capacitance	Crss		—	80	—	p F
Turn-on delay time	td (on)	VDD = 100V, ID = 25 A RL = 4 Ω, VGS = 10 V	—	65	—	n s
Rise time	tr		—	140	—	n s
Turn-off delay time	td (off)		—	470	—	n s
Fall time	tf		—	145	—	n s

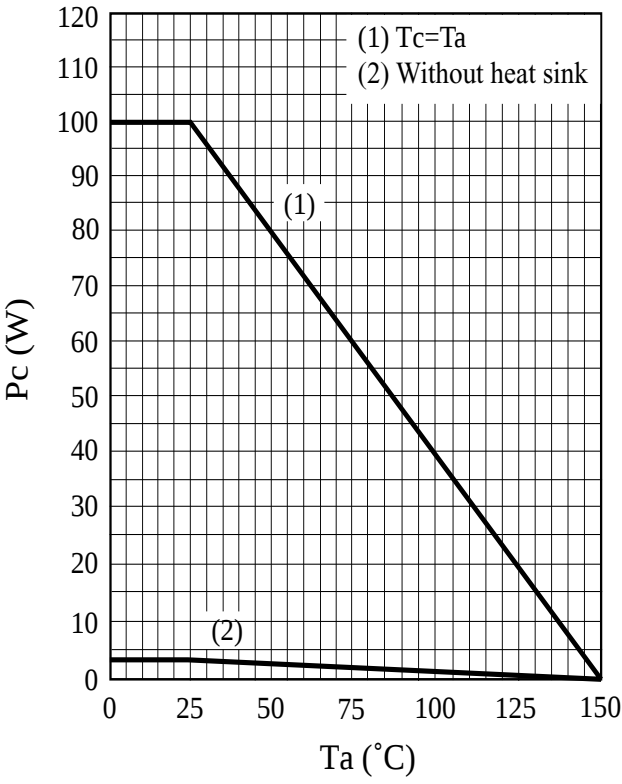
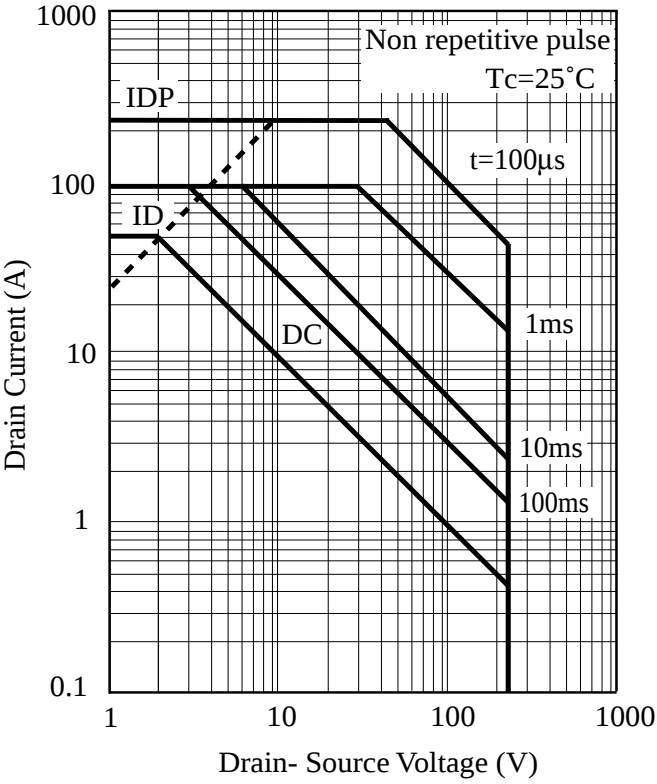


■ Electrical Characteristics (Tc = 25 ± 3 °C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode forward Voltage	VDSF	IDR = 50V, VGS = 0	–	–	-1.5	V
Reverse recovery Time	Trr	L = 230 μH, VDD = 100V IDR = 25 A, di/dt = 100A/μs	–	235	–	n s
Reverse recovery Charge	Qrr		–	1180	–	n C
Total Gate Charge	Qg	VDD = 100 V, ID = 25 A VGS = 10 V	–	105	–	n C
Gate-Source Charge	Qgs		–	40	–	n C
Gate-Drain Charge	Qgd		–	14	–	n C

■ Thermal characteristics

Thermal resistance (channel to case)	Rth (ch-c)		–	–	1.25	°C/W
Thermal resistance (channel to ambient)	Rth (ch-a)		–	–	41.6	°C/W



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