To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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2SK3418

Silicon N Channel MOS FET
High Speed Power Switching

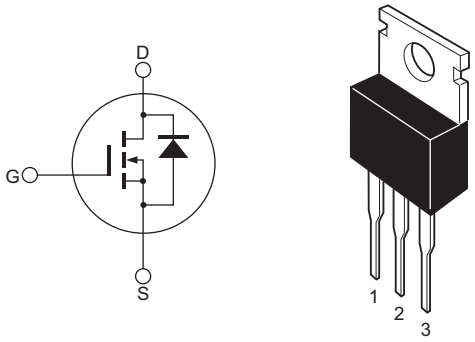
REJ03G0407-0200
(Previous ADE-208-941 (Z))
Rev.2.00
Sep.10.2004

Features

- Low on-resistance
  $R_{DS(on)}$ = 4.3 mΩ typ.
- Capable of 4 V gate drive
- High speed switching

Outline

TO-220AB



1. Gate
2. Drain (Flange)
3. Source

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	85	A
Drain peak current	I_D (pulse)[Note1]	340	A
Body-drain diode reverse drain current	I_{DR}	85	A
Avalanche current	I_{AP}[Note3]	60	A
Avalanche energy	E_{AR}[Note3]	308	mJ
Channel dissipation	Pch[Note2]	110	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	– 55 to +150	°C

Notes: 1. PW ≤ 10µs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C, Rg ≥ 50 Ω

Electrical Characteristics

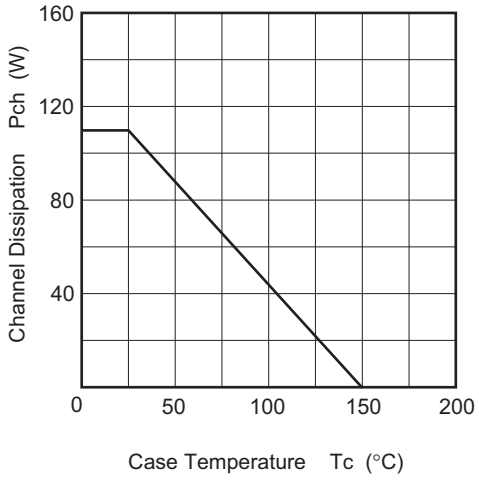
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 60 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±20 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA[Note1]
Forward transfer admittance	$\|y_{fs}\|$	55	90	—	S	I_D = 45 A, V_{DS} = 10 V[Note1]
Static drain to source on state resistance	$R_{DS(on)}$	—	4.3	5.5	mΩ	I_D = 45 A, V_{GS}= 10 V[Note1]
	$R_{DS(on)}$	—	6.0	9.0	mΩ	I_D = 45 A, V_{GS}=4 V[Note1]
Input capacitance	Ciss	—	9770	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	1340	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	470	—	pF	f = 1 MHz
Total gate charge	Qg	—	180	—	nC	V_{DD} = 50 V
Gate to source charge	Qgs	—	32	—	nC	V_{GS} = 10 V
Gate to drain charge	Qgd	—	36	—	nC	I_D = 85 A
Turn-on delay time	$t_{d(on)}$	—	53	—	ns	V_{GS} = 10 V
Rise time	t_r	—	320	—	ns	I_D= 45 A
Turn-off delay time	$t_{d(off)}$	—	700	—	ns	R_L = 0.67 Ω
Fall time	t_f	—	380	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.0	—	V	I_F = 85 A, V_{GS} = 0
Body-drain diode reverse recovery time	t_{rr}	—	70	—	ns	I_F = 85 A, V_{GS} = 0 diF / dt = 50 A / µs

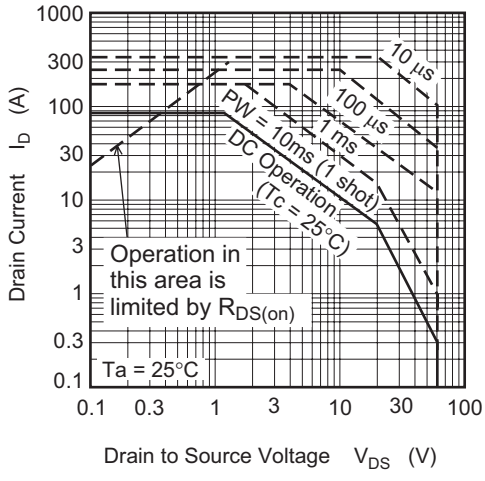
Note: 1. Pulse test

Main Characteristics

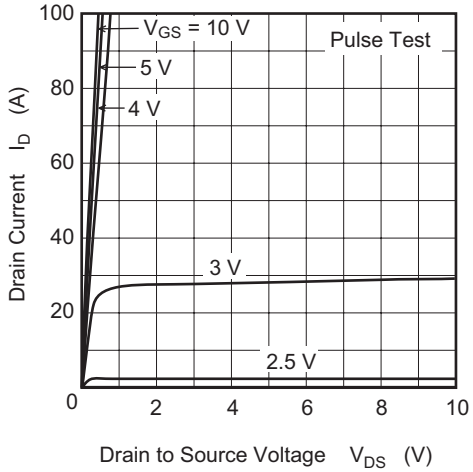
Power vs. Temperature Derating



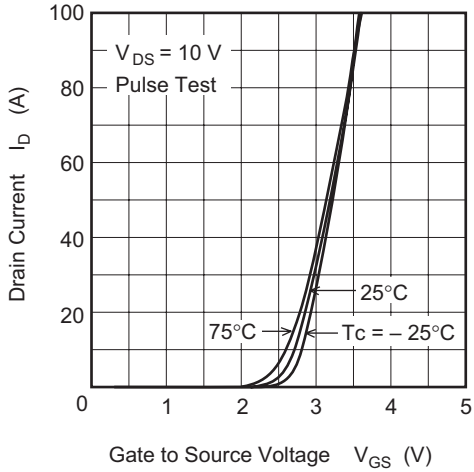
Maximum Safe Operation Area



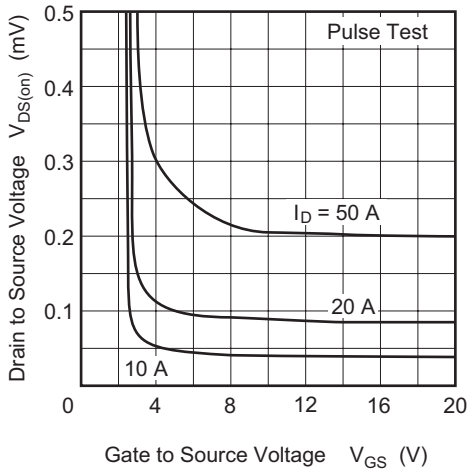
Typical Output Characteristics



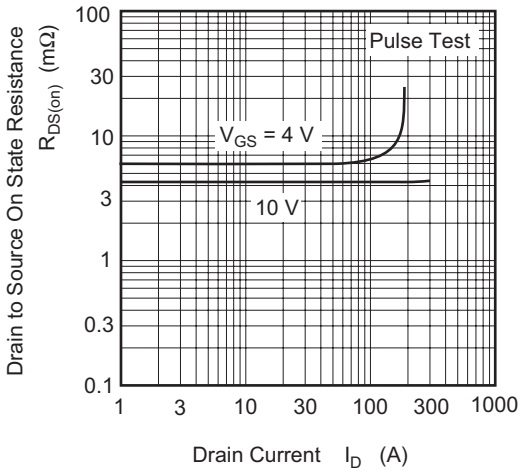
Typical Transfer Characteristics



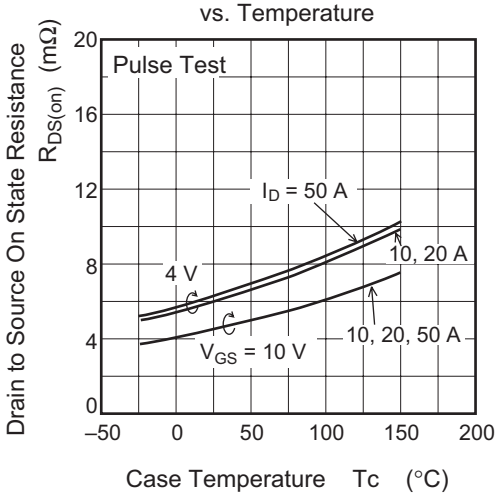
Drain to Source Saturation Voltage vs.
Gate to Source Voltage



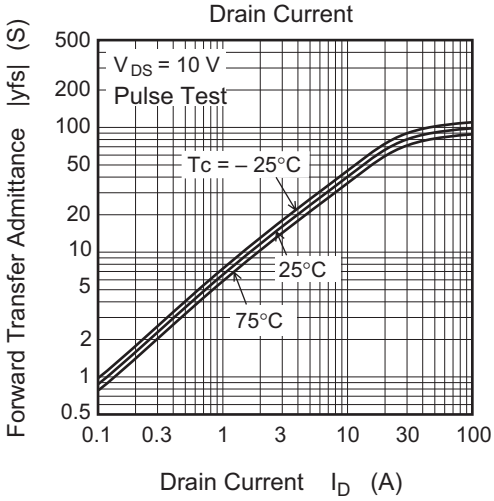
Static Drain to Source on State Resistance
vs. Drain Current



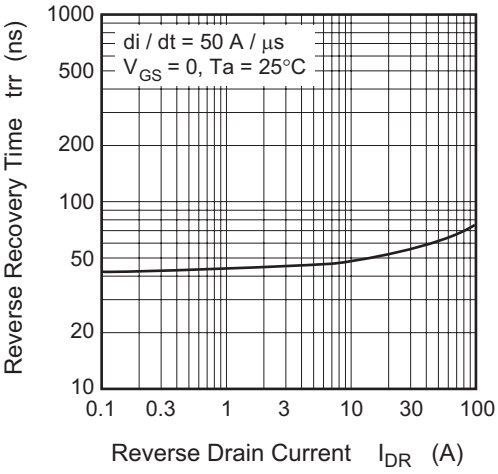
Static Drain to Source on State Resistance vs. Temperature



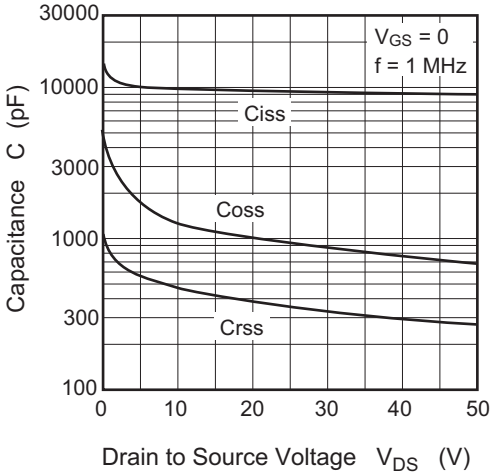
Forward Transfer Admittance vs. Drain Current



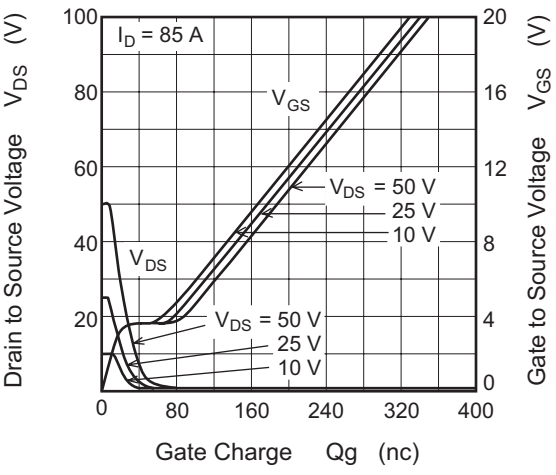
Body-Drain Diode Reverse Recovery Time



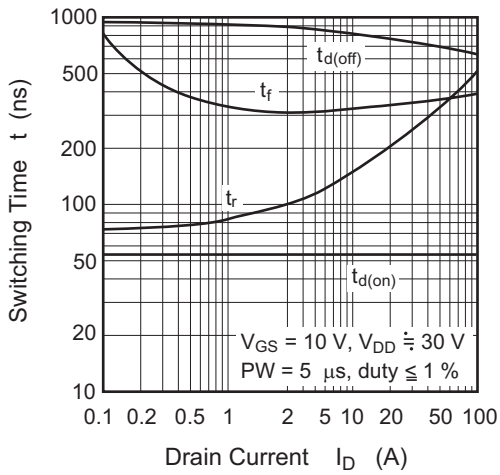
Typical Capacitance vs. Drain to Source Voltage



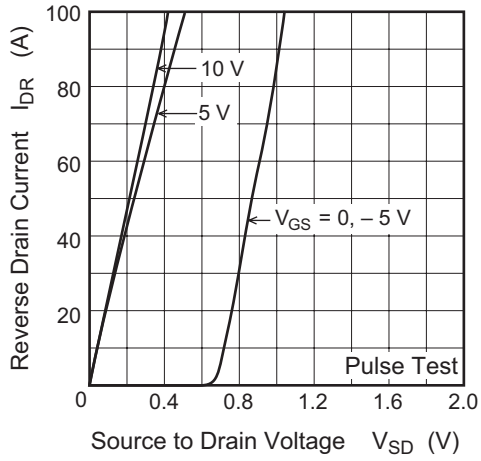
Dynamic Input Characteristics



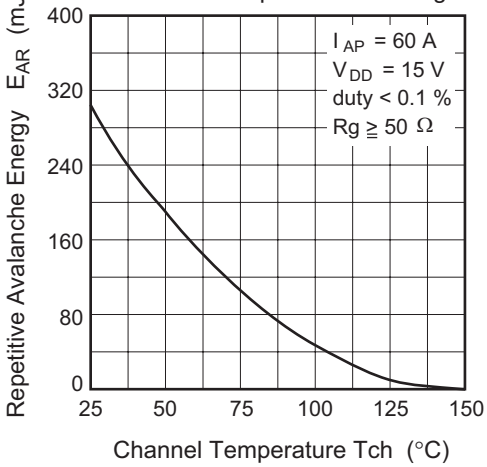
Switching Characteristics



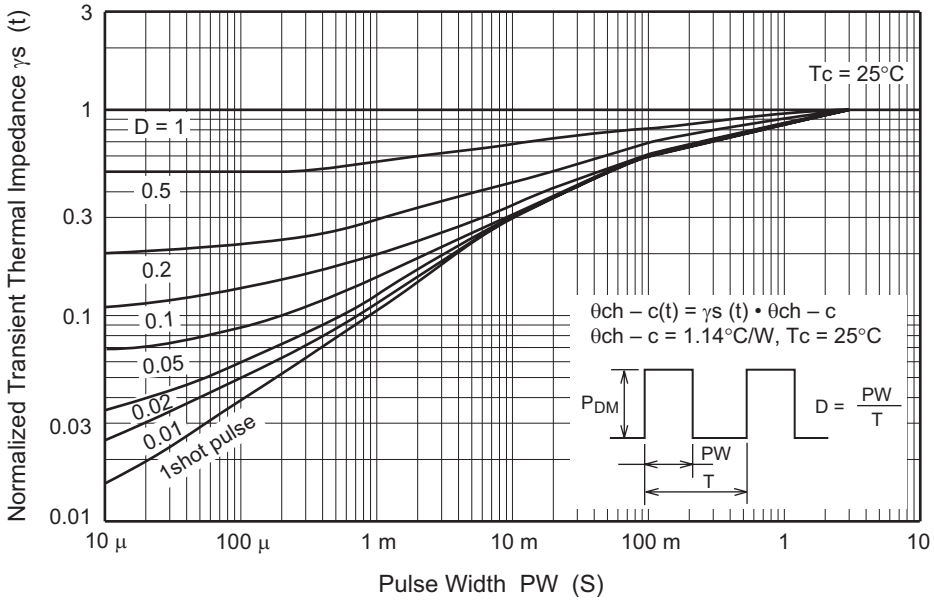
Reverse Drain Current vs. Source to Drain Voltage



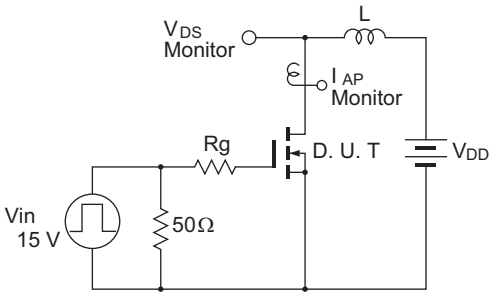
Maximum Avalanche Energy vs. Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

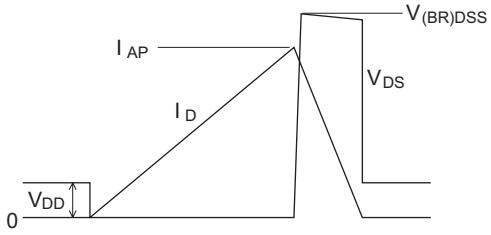


Avalanche Test Circuit

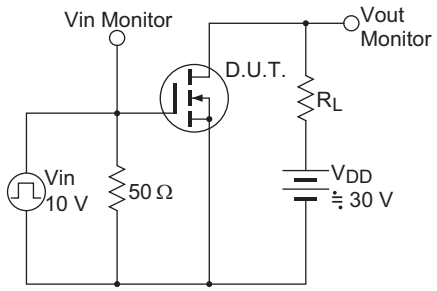


Avalanche Waveform

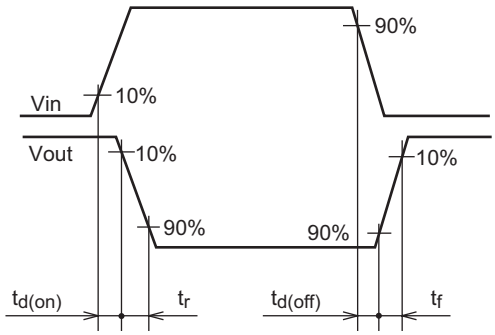
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

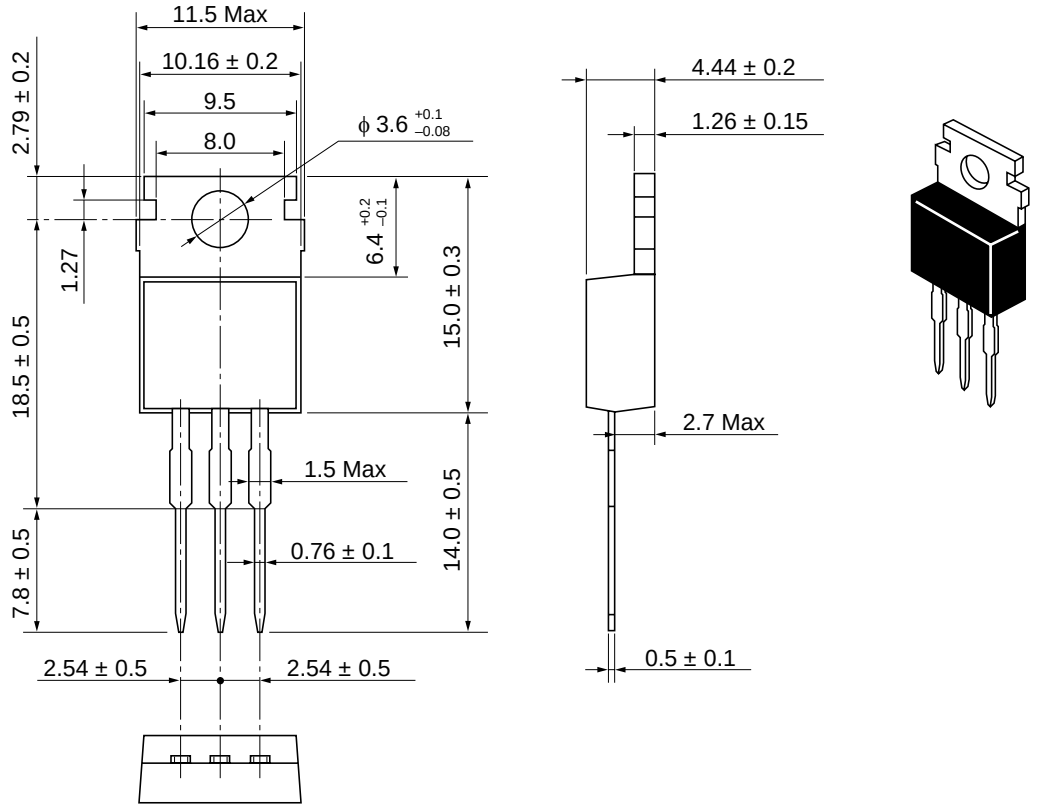


Waveform



Package Dimensions

As of January, 2003
Unit: mm



Package Code	TO-220AB
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.8 g

Ordering Information

Part Name	Quantity	Shipping Container
2SK3418-E	50 pcs	sack

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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