

# HAT2165H

Silicon N Channel Power MOS FET Power Switching

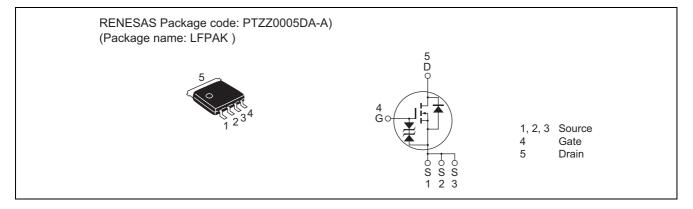
> REJ03G0004-0600 Rev.6.00 Sep 20, 2005

### Features

- High speed switching
- Capable of 7 V gate drive
- Low drive current
- High density mounting
- Low on-resistance

 $R_{DS(on)} = 2.5 \text{ m}\Omega \text{ typ.}$  (at  $V_{GS} = 10 \text{ V}$ )

### Outline



### **Absolute Maximum Ratings**

			$(Ta = 25^{\circ}C)$
Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	30	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	ID	55	A
Drain peak current	Note1 I <sub>D(pulse)</sub>	220	A
Body-drain diode reverse drain current	I <sub>DR</sub>	55	A
Avalanche current	I <sub>AP</sub> Note 2	30	A
Avalanche energy	E <sub>AR</sub> Note 2	90	mJ
Channel dissipation	Pch Note3	30	W
Channel to Case Thermal Resistance	θch-C	4.17	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. PW  $\leq$  10  $\mu$ s, duty cycle  $\leq$  1%

2. Value at Tch =  $25^{\circ}$ C, Rg  $\geq 50 \Omega$ 

3. Tc = 25°C



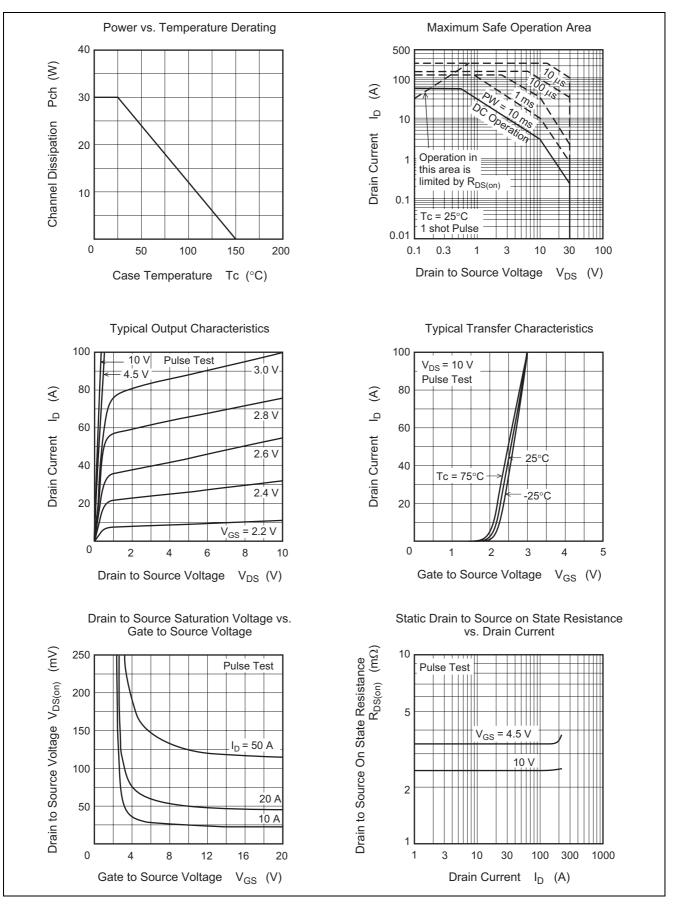
# **Electrical Characteristics**

Symbol					
Symbol	Min	Тур	Max	Unit	Test Conditions
V <sub>(BR)DSS</sub>	30	—	—	V	$I_{D} = 10 \text{ mA}, V_{GS} = 0$
V <sub>(BR)GSS</sub>	±20	—	—	V	$I_{G} = \pm 100 \ \mu A, \ V_{DS} = 0$
I <sub>GSS</sub>	_	—	±10	μA	$V_{GS} = \pm 16 \text{ V}, \text{ V}_{DS} = 0$
I <sub>DSS</sub>	_	—	1	μA	$V_{DS} = 30 V, V_{GS} = 0$
V <sub>GS(off)</sub>	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$
R <sub>DS(on)</sub>	_	2.5	3.3	mΩ	$I_D = 27.5 \text{ A}, V_{GS} = 10 \text{ V}^{Note4}$
R <sub>DS(on)</sub>	_	3.4	5.3	mΩ	$I_D = 27.5 \text{ A}, V_{GS} = 4.5 \text{ V}^{Note4}$
y <sub>fs</sub>	60	100	_	S	$I_D = 27.5 \text{ A}, V_{DS} = 10 \text{ V}^{Note4}$
Ciss	_	5180	_	pF	$V_{DS} = 10 V, V_{GS} = 0,$
Coss	_	1200	_	pF	f = 1 MHz
Crss	_	380		pF	
Rg		0.5		Ω	
Qg		33		nC	$V_{DD} = 10 \text{ V}, V_{GS} = 4.5 \text{ V},$ $I_D = 55 \text{ A}$
Qgs		15		nC	
Qgd		7.1		nC	
t <sub>d(on)</sub>		13		ns	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 27.5 \text{ A},$
tr		65		ns	$V_{\text{DD}} \cong 10 \text{ V}, \text{ R}_{\text{L}} = 0.36 \Omega,$ Rg = 4.7 $\Omega$
t <sub>d(off)</sub>		60		ns	
t <sub>f</sub>	_	9.5	—	ns	
$V_{DF}$	_	0.81	1.06	V	$IF = 55 A, V_{GS} = 0^{Note4}$
t <sub>rr</sub>	_	40		ns	IF = 55 A, V <sub>GS</sub> = 0
					di <sub>F</sub> / dt = 100 A/ μs
	V(BR)DSS           V(BR)GSS           IGSS           IDSS           VGS(off)           RDS(on)           Iyfs            Cisss           Coss           Crss           Rg           Qg           Qgd           td(on)           tr           td(off)           tf           VDF	V(BR)DSS         30           V(BR)GSS         ±20           IGSS            IDSS            VGS(off)         1.0           RDS(on)            RDS(on)            Iyfs         60           Ciss            Coss            Rg            Qg            Qgd            td(on)            tr            tf            VDF	V <sub>(BR)DSS</sub> 30         —           V <sub>(BR)GSS</sub> ±20         —           I <sub>GSS</sub> —         —           I <sub>DSS</sub> —         —           I <sub>DSS</sub> —         —           V <sub>GS(off)</sub> 1.0         —           V <sub>GS(off)</sub> 1.0         —           R <sub>DS(on)</sub> —         2.5           R <sub>DS(on)</sub> —         3.4            yfs          60         100           Ciss         —         5180           Coss         —         1200           Crss         —         380           Rg         —         0.5           Qg         —         33           Qgs         —         15           Qgd         —         13           t <sub>r</sub> —         65           t <sub>d(off)</sub> —         60           t <sub>f</sub> —         9.5           V <sub>DF</sub> —         0.81	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

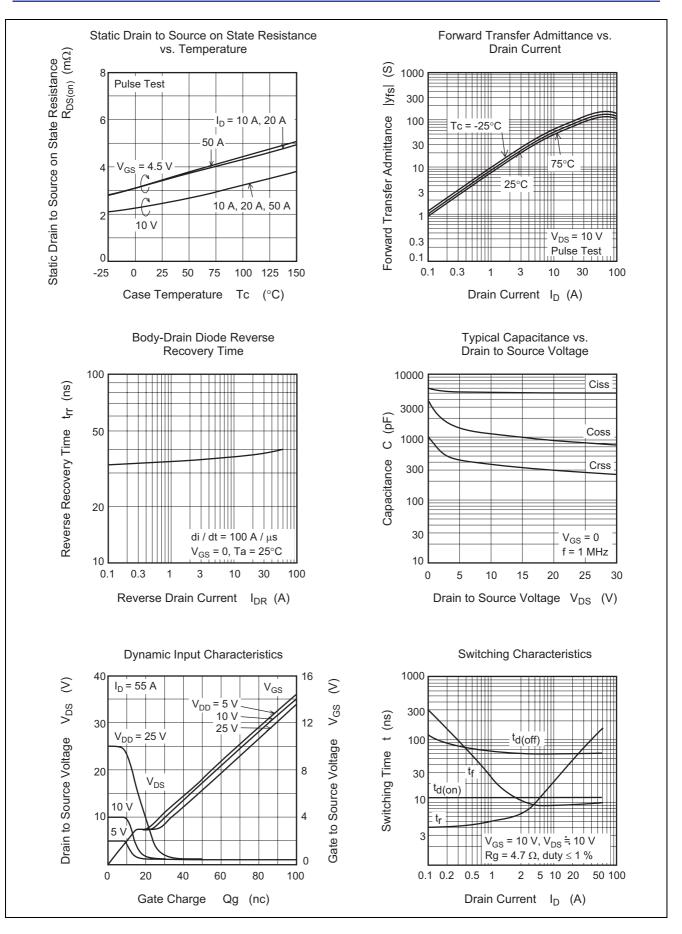
Notes: 4. Pulse test



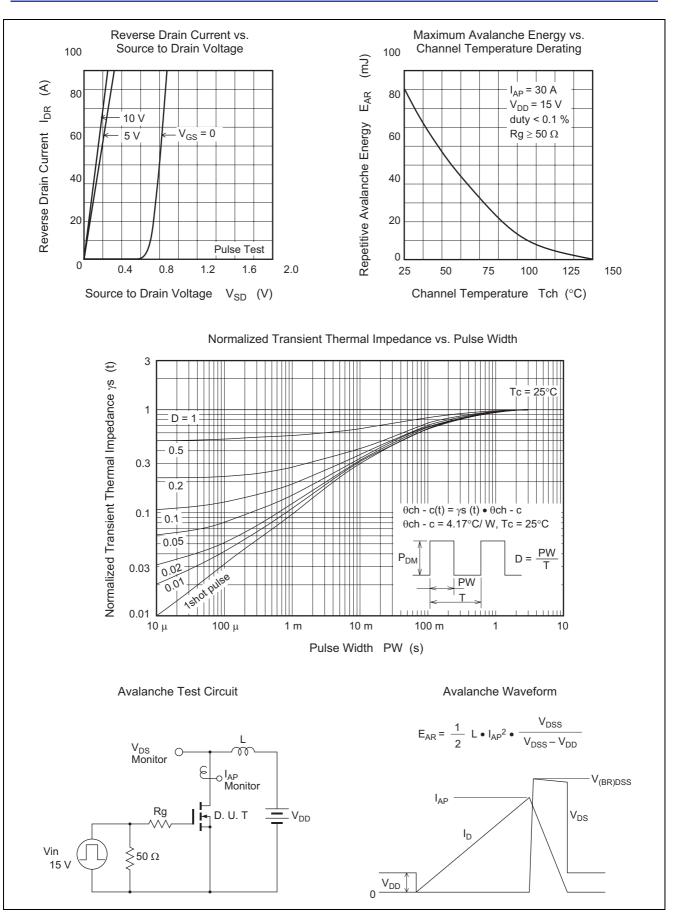
### **Main Characteristics**



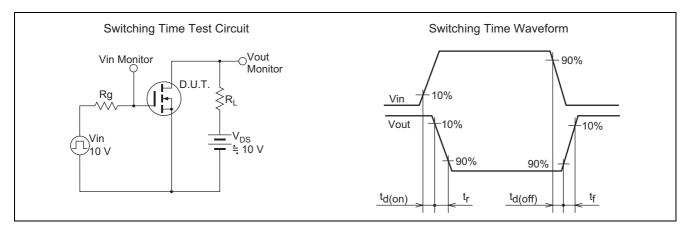






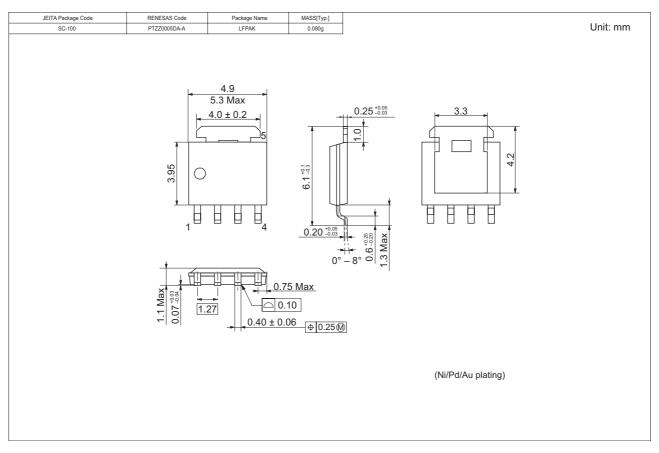








# **Package Dimensions**



## **Ordering Information**

Part Name	Quantity	Shipping Container
HAT2165H-EL-E	2500 pcs	Taping

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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