

Digital transistors (built-in resistor)

DTC663EU / DTC663EK

●Features

In addition to the features of regular digital transistors.

- 1) Low saturation voltage, typically

$V_{O(on)} = 40\text{mV}$ at $I_O/I_C = 50\text{mA} / 2.5\text{mA}$, makes these transistors ideal for muting circuits.

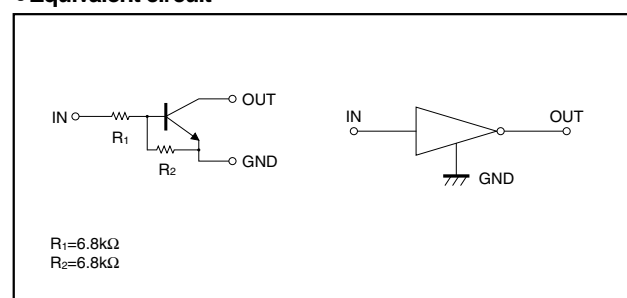
- 2) These transistors can be used at high current levels,
 $I_C = 600\text{mA}$.

●Structure

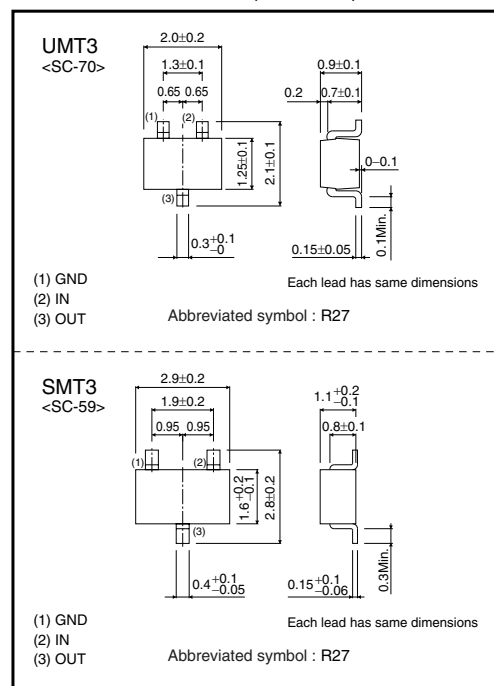
NPN digital transistor

(Built-in resistor type)

●Equivalent circuit



●External dimensions (Unit : mm)



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	20	V
Input voltage	V_{IN}	-20 to 20	V
Collector current	I_C	600	mA
Collector power dissipation	P_C	200	mW
Junction temperature	T_J	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	V	$V_{CC}=5V / I_O=100\mu A$
	$V_{I(on)}$	2.0	—	—	V	$V_O=0.3V / I_O=10mA$
Output voltage	$V_{O(on)}$	—	—	150	mV	$I_O=50mA / I_I=2.5mA$
Input current	I_I	—	—	0.9	mA	$V_I=5V$
Output current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC}=20V / V_I=0V$
DC current transfer ratio	G_I	250	—	550	—	$V_O=5V, I_O=50mA$
Input resistance	R_I	4.76	6.8	8.84	k Ω	—
Resistance ratio	R_2/R_1	0.8	1.0	1.2	—	—
Transition frequency	f_T	—	150	—	MHz	$V_{CE}=10V, I_E=-50mA, f=100MHz$ *
Output "ON" resistance	R_{on}	—	0.9	—	Ω	$V_I=5V, R_L=1k\Omega, f=1MHz$

*Transition frequency of the device.

●Packaging specifications and hFE

Type	Package	UMT3	SMT3
	Packaging type	Taping	Taping
	Code	T106	T146
	Basic ordering unit (pieces)	3000	3000
DTC663EU		○	—
DTC663EK		—	○

●Electrical characteristic curves

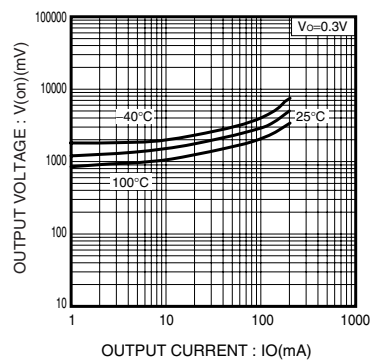


Fig.1 Input Voltage vs. Output Current(On characteristics)

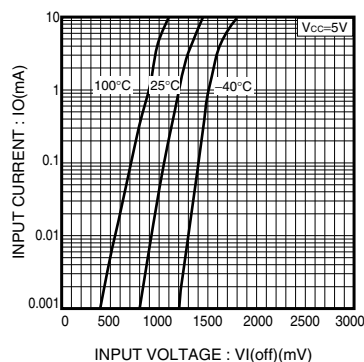


Fig.2 Output Current vs. Input Voltage(Off characteristics)

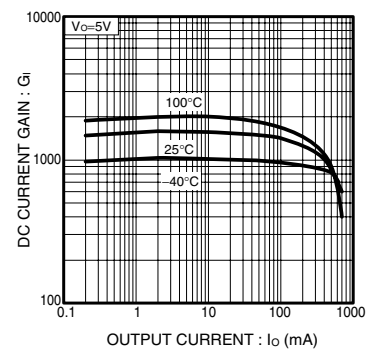


Fig.3 DC Current Gain vs. Output Current

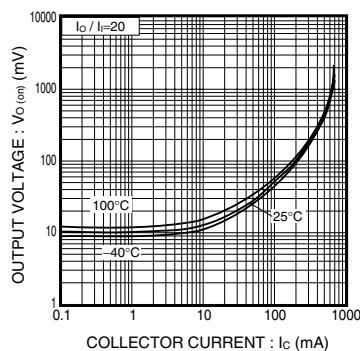


Fig.4 Output Voltage vs. Output Current

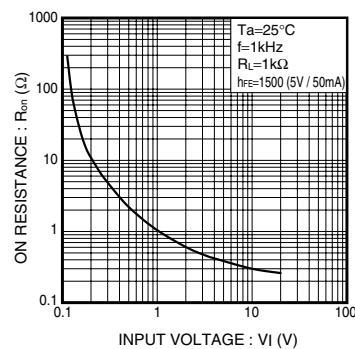
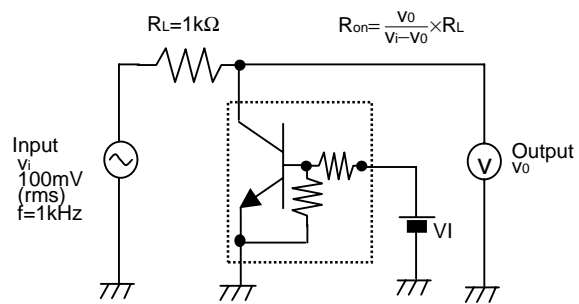


Fig.5 "ON" resistance vs. Input Voltage

Transistors

● R_{on} measurement circuitFig.6 Output "ON" resistance (R_{on}) measurement circuit

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