

Transistor

Small switching (-20V, -1.5A)

QS5U27

●Features

- 1) The QS5U27 combines Pch Treueh MOSFET with a Schottky barrier diode in a single TSMT5 package.
- 2) Pch Treueh MOSFET have a low on-state resistance with a fast switching.
- 3) Pch Treueh MOSFET is neucted a low voltage drive (2.5V).
- 4) The independently connected Schottky barrier diode have a low forward voltage.

●Applications

load switch, DC/DC conversion

●Structure

- Silicon P-channel MOS FET
- Schottky Barrier DIODE

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS5U27		○

●Absolute maximum ratings (Ta=25°C)

<MOSFET>

Parameter	Symbol	Limits	Unit
Drain-source voltage	V _{DSS}	-20	V
Gate-source voltage	V _{GSS}	±12	V
Drain current	Continuous	I _D	±1.5 A
	Pulsed	I _{DP}	±6.0 A *1
Source current (Body diode)	Continuous	I _S	-0.75 A
	Pulsed	I _{SP}	-3.0 A *1
Channel temperature	T _{ch}	150	°C

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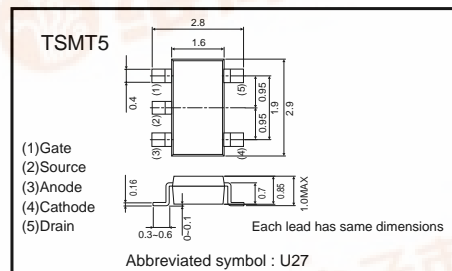
Parameter	Symbol	Limits	Unit
Repetitive peak reverse voltage	V _{RM}	25	V
Reverse voltage	V _R	20	V
Forward current	I _F	1.0	A
Forward current surge peak	I _{FSM}	3.0	A *2
Junction temperature	T _j	125	°C

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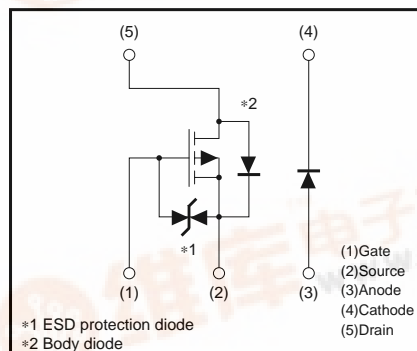
Parameter	Symbol	Limits	Unit
Total power disipation	P _D	1.0	W/ TOTAL *3
Range of strage temperature	T _{stg}	-40~+125	°C

*1 Pws<10µs, Duty cycles<1% *2 60Hz-1cyc. *3 Mounted on a ceramic board.

●External dimensions (Units : mm)



●Equivalent circuit



* A protection diode has been built in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when rated voltages are exceeded.

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●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±10	μA	$V_{GS}=\pm 12V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-20	-	-	V	$I_D=-1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	-1	μA	$V_{DS}=-20V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	-0.7	-	-2.0	V	$V_{DS}=-10V, I_D=-1mA$
Static drain-source on-state resistance	$R_{DS(on)}$	-	160	200	mΩ	$I_D=-1.5A, V_{GS}=-4.5V$
		-	180	240	mΩ	$I_D=-1.5A, V_{GS}=-4V^*$
		-	260	340	mΩ	$I_D=-0.75A, V_{GS}=-2.5V$
Forward transfer admittance	$ Y_{fs} $	1.0	-	-	S	$V_{DS}=-10V, I_D=-0.75A^*$
Input capacitance	C_{iss}	-	325	-	pF	$V_{DS}=-10V$
Output capacitance	C_{oss}	-	60	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	40	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$	-	10	-	ns	$I_D=-0.75A^*$
Rise time	t_r	-	10	-	ns	$V_{DD}=-15V^*$
Turn-off delay time	$t_{d(off)}$	-	35	-	ns	$V_{GS}=-4.5V^*$
Fall time	t_f	-	10	-	ns	$R_L=20\Omega$
Total gate charge	Q_g	-	4.2	-	nC	$V_{DD}=-15V$
Gate-source charge	Q_{gs}	-	1.0	-	nC	$V_{GS}=-4.5V$
Gate-drain charge	Q_{gd}	-	1.1	-	nC	$I_D=-1.5A$

* Pulsed

●Body diode (Source-drain)

<MOSFET>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}	-	-	-1.2	V	$I_S=-0.75A, V_{GS}=0V$

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Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_F	-	-	0.45	V	$I_F=1.0A$
Reverse leakage	I_R	-	-	200	μA	$V_R=20V$

●Electrical characteristic curves

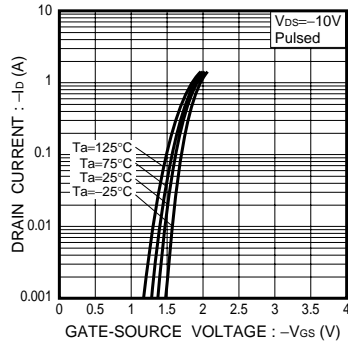


Fig.1 Typical Transfer Characteristics

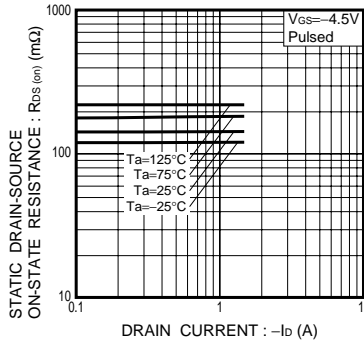


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current (I)

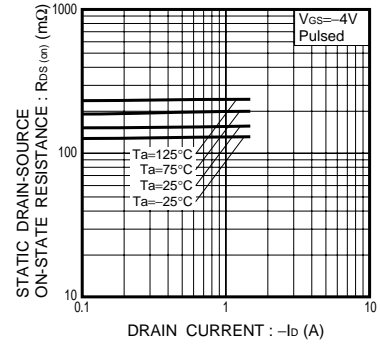


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current (II)

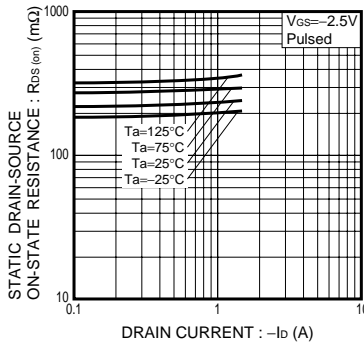


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (III)

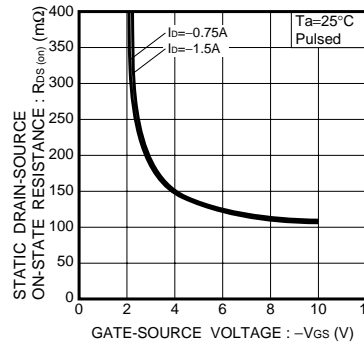


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

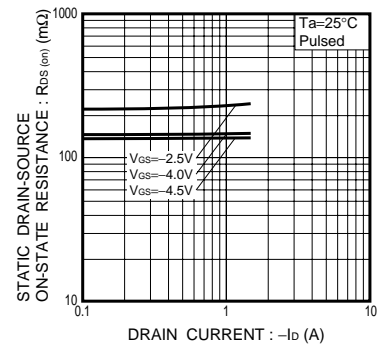


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (IV)

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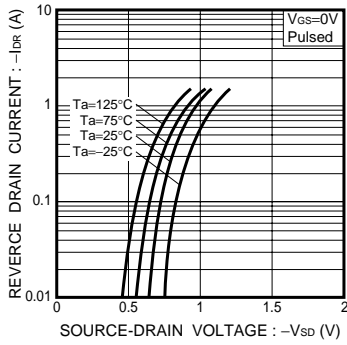


Fig.7 Reverse Drain Current vs. Source-Drain Current

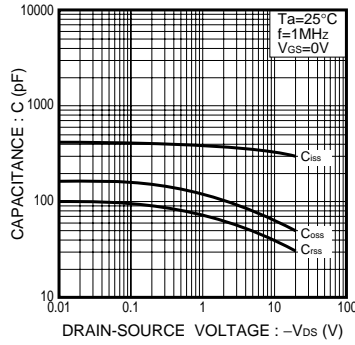


Fig.8 Typical Capacitance vs. Drain-Source Voltage

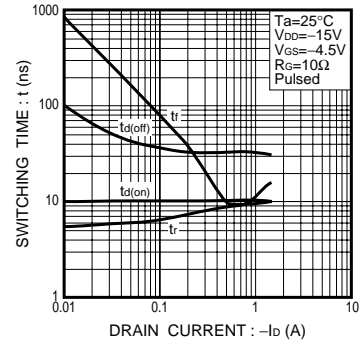


Fig.9 Switching Characteristics

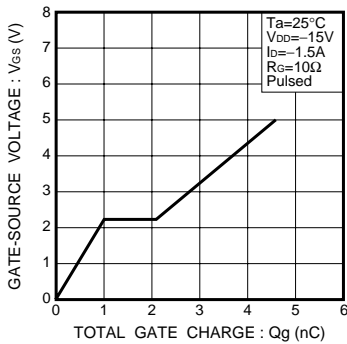


Fig.10 Dynamic Input Characteristics

●Measurement circuits

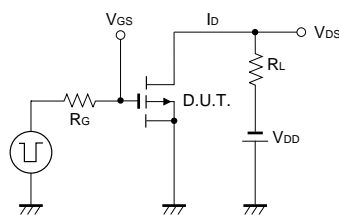


Fig.11 Switching Time Measurement Circuit

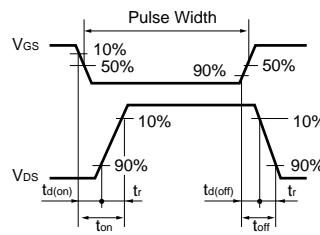


Fig.12 Switching Waveforms

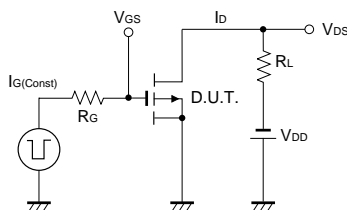


Fig.13 Gate Charge Measurement Circuit

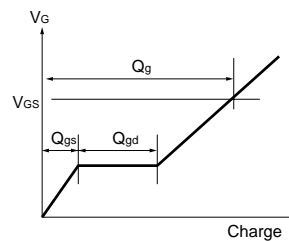


Fig.14 Gate Charge Waveforms

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