

# RJK60S5DPE

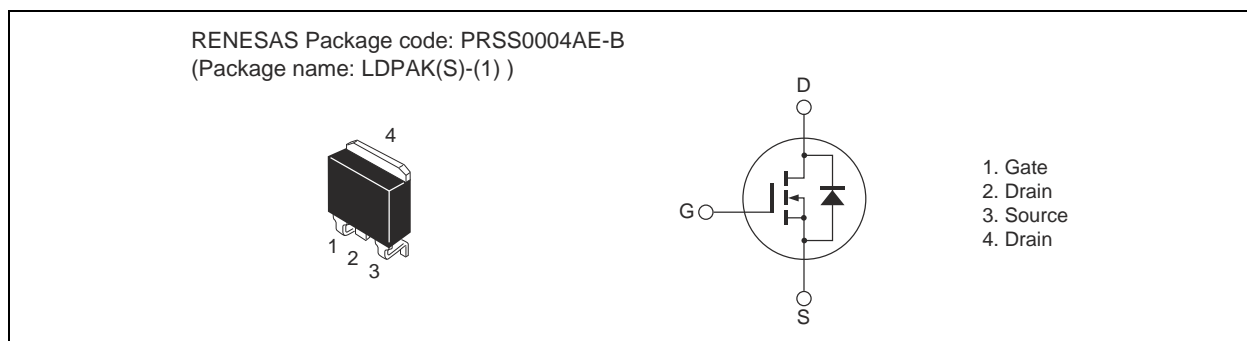
600V - 20A - SJ MOS FET  
High Speed Power Switching

R07DS0639EJ0100  
Rev.1.00  
Apr 23, 2012

## Features

- Superjunction MOSFET
- Low on-resistance  
 $R_{DS(on)} = 0.150 \Omega$  typ. (at  $I_D = 10 \text{ A}$ ,  $V_{GS} = 10 \text{ V}$ ,  $T_a = 25^\circ\text{C}$ )
- High speed switching  
 $t_f = 23 \text{ ns}$  typ. (at  $I_D = 10 \text{ A}$ ,  $V_{GS} = 10 \text{ V}$ ,  $R_L = 30 \Omega$ ,  $R_g = 10 \Omega$ ,  $T_a = 25^\circ\text{C}$ )

## Outline



## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	600	V
Gate to source voltage	$V_{GSS}$	+30, -20	V
Drain current	$T_c = 25^\circ\text{C}$	$I_D$ <sup>Note1</sup>	20
	$T_c = 100^\circ\text{C}$	$I_D$ <sup>Note1</sup>	12.6
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	40	A
Body-drain diode reverse drain current	$I_{DR}$ <sup>Note1</sup>	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note1</sup>	40	A
Avalanche current	$I_{AP}$ <sup>Note3</sup>	5	A
Avalanche energy	$E_{AR}$ <sup>Note3</sup>	1.36	mJ
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	125	W
Channel to case thermal impedance	$\theta_{ch-c}$	1.0	$^\circ\text{C}/\text{W}$
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

- Notes: 1. Limited by  $T_{ch}$  max.  
2. Value at  $T_c = 25^\circ\text{C}$   
3.  $ST_{ch} = 25^\circ\text{C}$ ,  $T_{ch} \leq 150^\circ\text{C}$

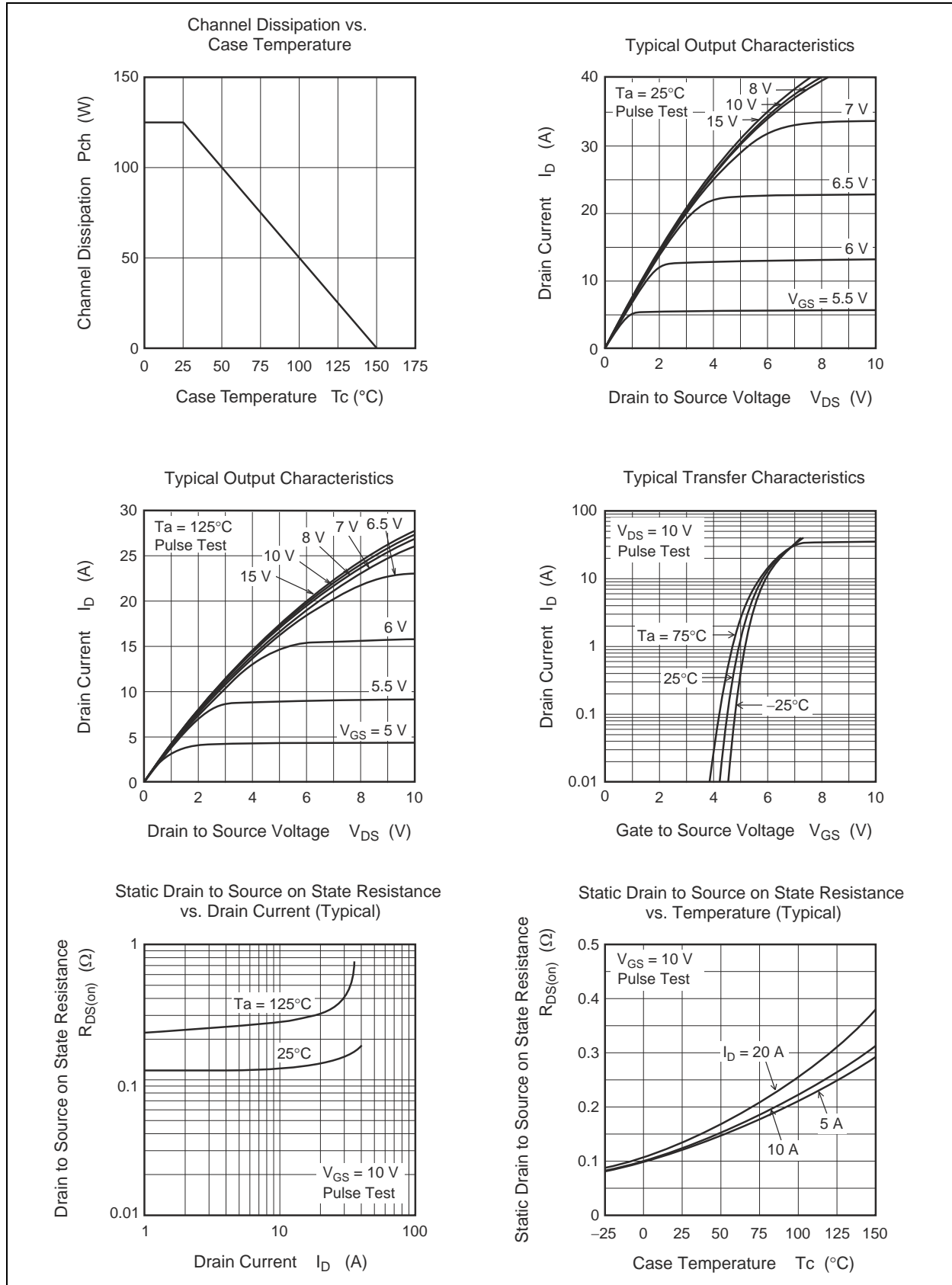
## Electrical Characteristics

(Ta = 25°C)

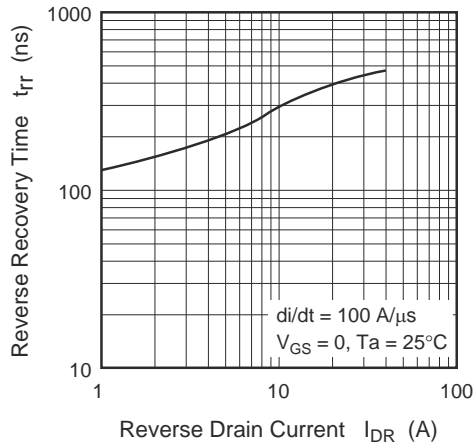
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 600 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = +30\text{V}$ , $-20 \text{ V}$ , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.150	0.178	$\Omega$	$I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	0.375	—	$\Omega$	Ta = 150°C $I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
Gate resistance	Rg	—	2.5	—	$\Omega$	f = 1 MHz $V_{DS} = 25 \text{ V}$ , $V_{GS} = 0$
Input capacitance	Ciss	—	1600	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	Coss	—	2160	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	8.2	—	pF	f = 100kHz
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 30 \Omega$ $R_g = 10 \Omega$ <sup>Note4</sup>
Rise time	$t_r$	—	25	—	ns	
Turn-off delay time	$t_{d(off)}$	—	49	—	ns	
Fall time	$t_f$	—	23	—	ns	
Total gate charge	Qg	—	27	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Qgs	—	10.5	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Qgd	—	8.5	—	nC	$I_D = 20 \text{ A}$ <sup>Note4</sup>
Body-drain diode forward voltage	$V_{DF}$	—	0.96	1.60	V	$I_F = 20 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	400	—	ns	$I_F = 20 \text{ A}$ $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ <sup>Note4</sup>
Body-drain diode reverse recovery current	$I_{rr}$	—	25	—	A	
Body-drain diode reverse recovery charge	$Q_{rr}$	—	5.6	—	$\mu\text{C}$	

Notes: 4. Pulse test

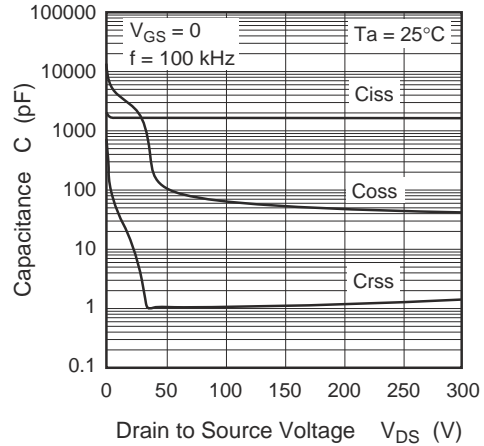
## Main Characteristics



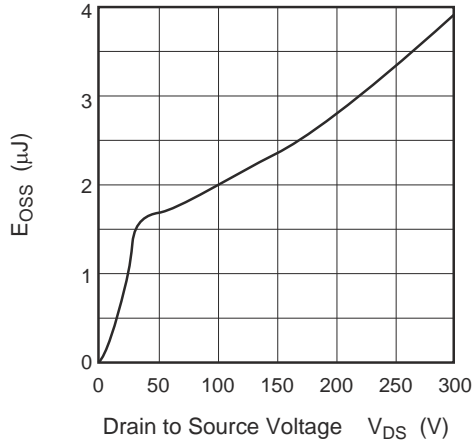
Body-Drain Diode Reverse Recovery Time (Typical)



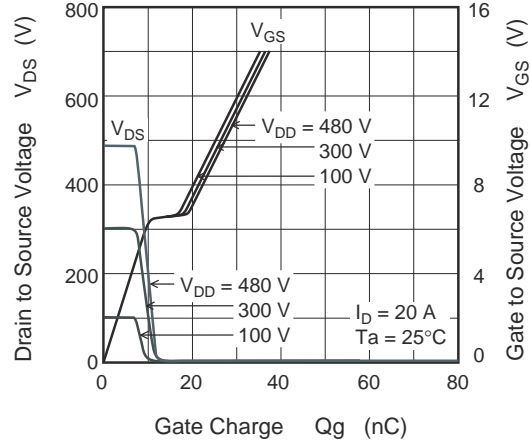
Typical Capacitance vs. Drain to Source Voltage



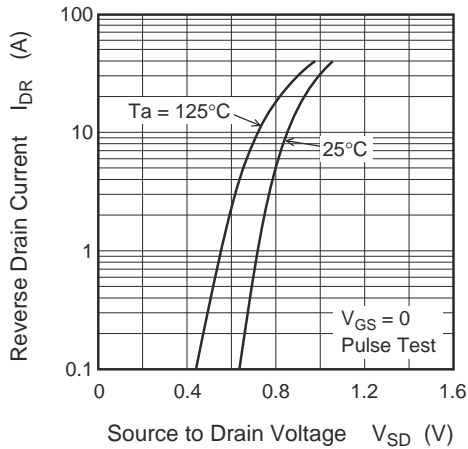
Coss Stored Energy (Typical)



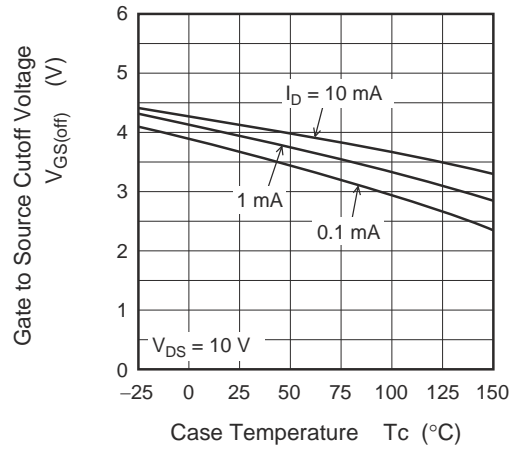
Dynamic Input Characteristics (Typical)



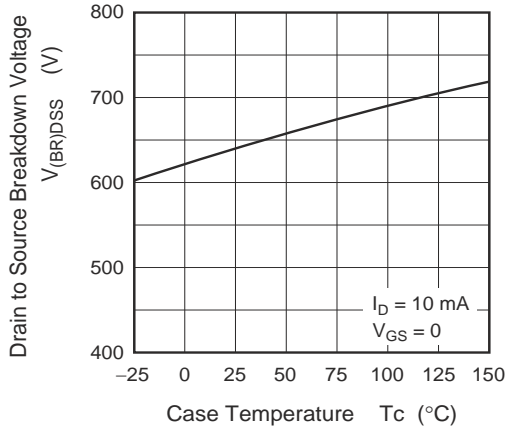
Reverse Drain Current vs. Source to Drain Voltage (Typical)



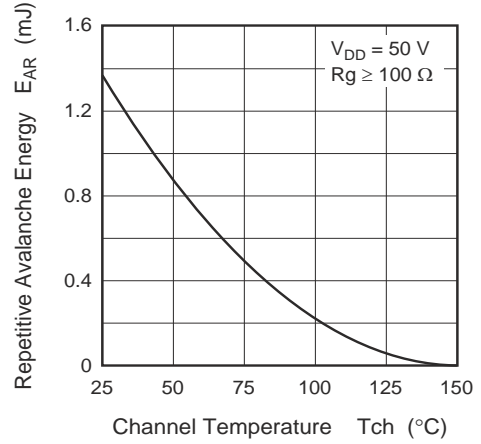
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



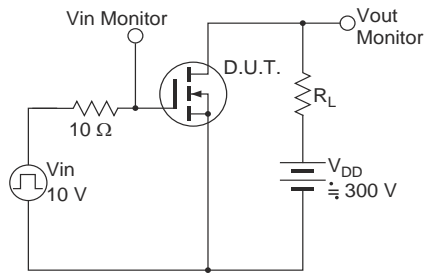
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



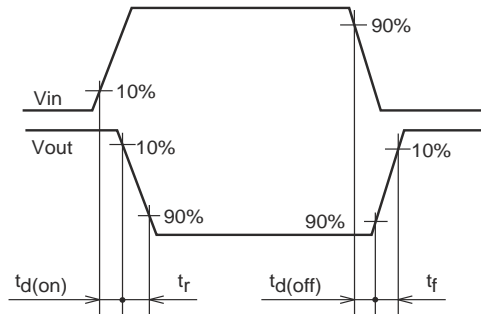
Maximum Avalanche Energy vs. Channel Temperature Derating



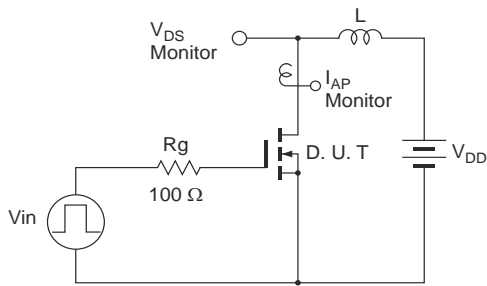
Switching Time Test Circuit



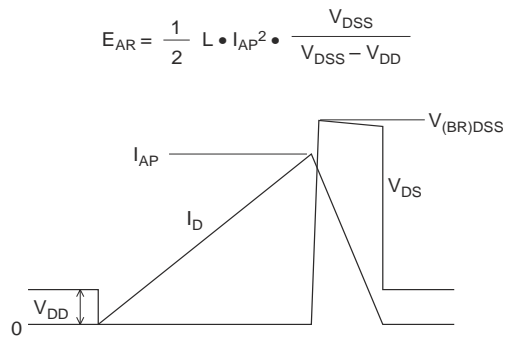
Waveform



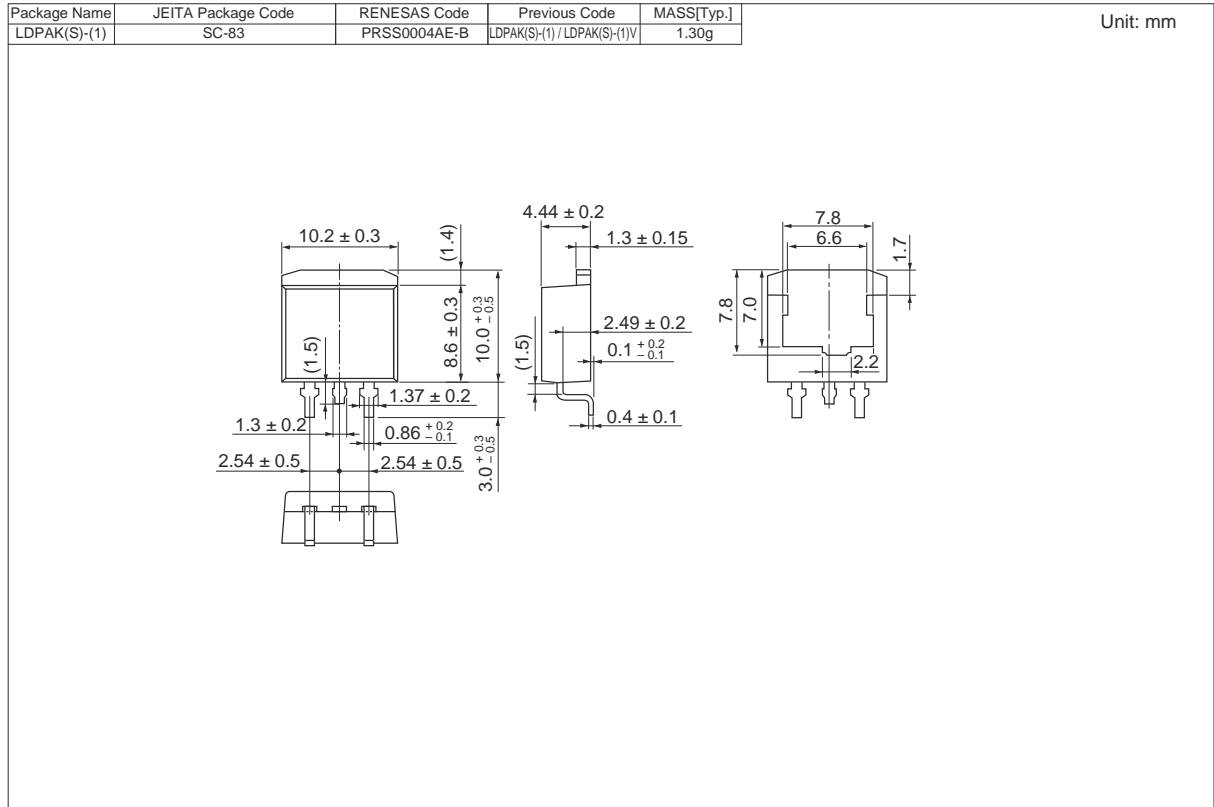
Avalanche Test Circuit



Avalanche Waveform



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S5DPE-00#J3	1000 pcs	Taping

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