

Description

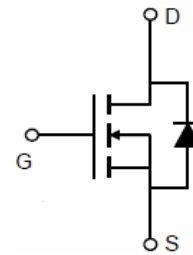
The RST6045G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

- $V_{DS} = 60V, I_D = 45A$
 $R_{DS(ON)} < 13m\Omega @ V_{GS}=10V$ (Typ:10m Ω)
 $R_{DS(ON)} < 17m\Omega @ V_{GS}=4.5V$ (Typ:13m Ω)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Application

- Power switching application
- Load switch



Schematic diagram



DFN5X6-8L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
RST6045G	RST6045G	DFN5X6-8L	Ø330mm	12mm	5000

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	45	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D (100^\circ C)$	32	A
Pulsed Drain Current	I_{DM}	140	A
Single pulse avalanche energy ^(Note 5)	E_{AS}	260	mJ
Maximum Power Dissipation	P_D	60	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.08	$^\circ C/W$
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Electrical Characteristics ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						

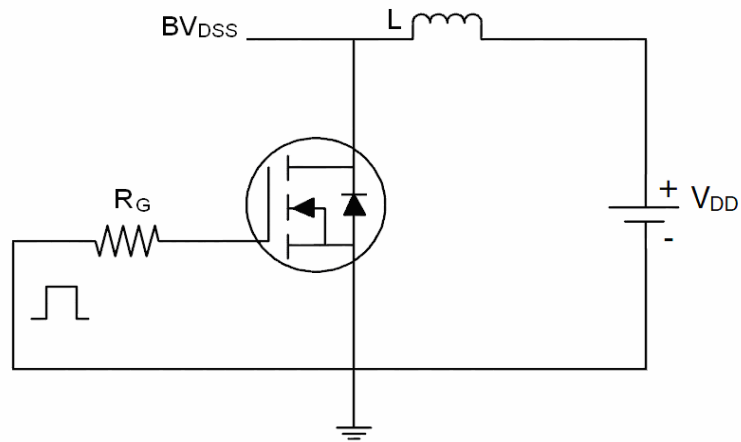
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	60		-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.2	1.8	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	10	13	mΩ
		V _{GS} =4.5V, I _D =20A	-	13	17	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =9A	25	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V, F=1.0MHz	-	2180	-	PF
Output Capacitance	C _{oss}		-	350	-	PF
Reverse Transfer Capacitance	C _{rss}		-	270	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =1Ω V _{GS} =10V,R _{GEN} =3Ω	-	8.5	-	nS
Turn-on Rise Time	t _r		-	6	-	nS
Turn-Off Delay Time	t _{d(off)}		-	30	-	nS
Turn-Off Fall Time	t _f		-	5	-	nS
Total Gate Charge	Q _g	V _{DS} =30V,I _D =20A, V _{GS} =10V	-	58	-	nC
Gate-Source Charge	Q _{gs}		-	8	-	nC
Gate-Drain Charge	Q _{gd}		-	17	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	45	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, IF=20A di/dt = 100A/μs ^(Note3)	-	30	-	nS
Reverse Recovery Charge	Q _{rr}		-	44	-	nC

Notes:

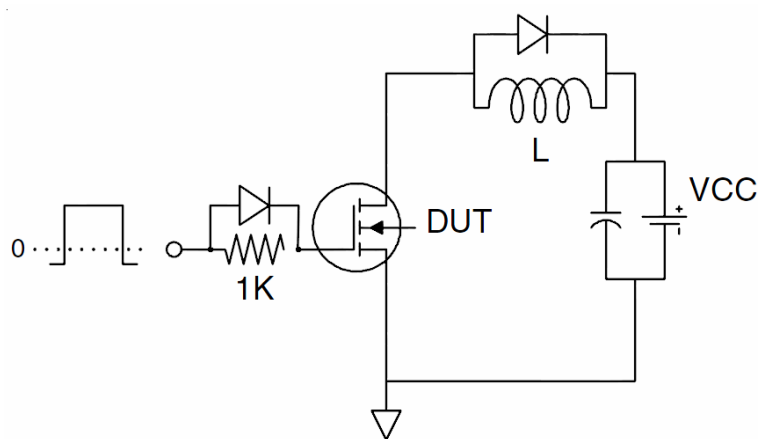
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $T_J=25^\circ C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

Test Circuit

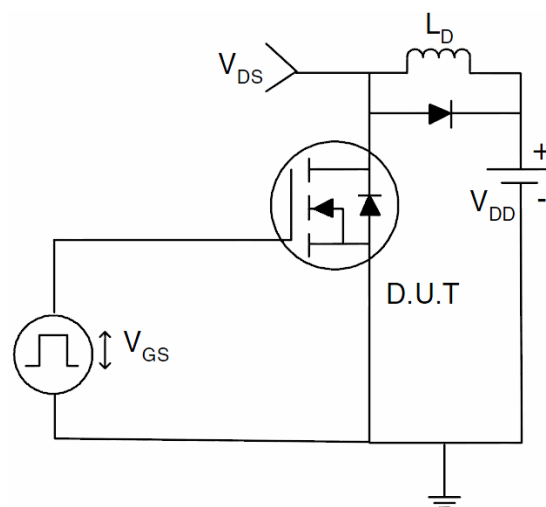
1) E_{AS} test Circuit

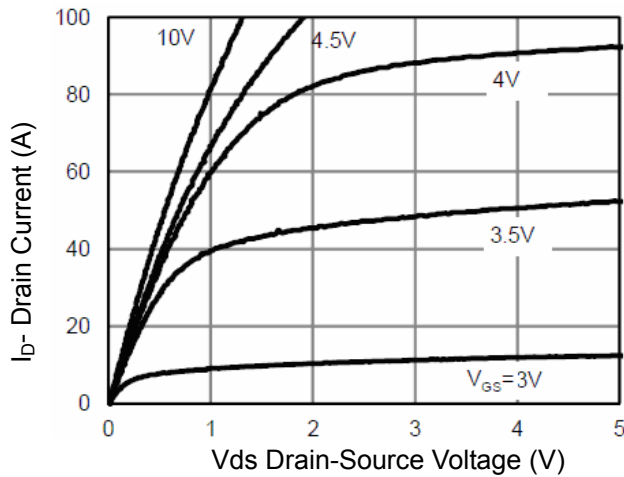
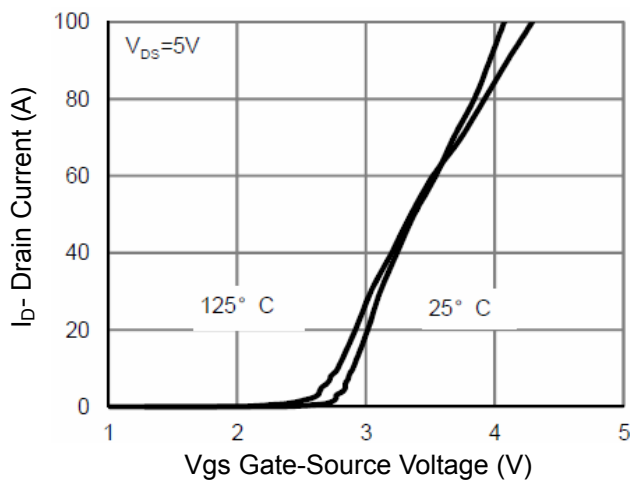
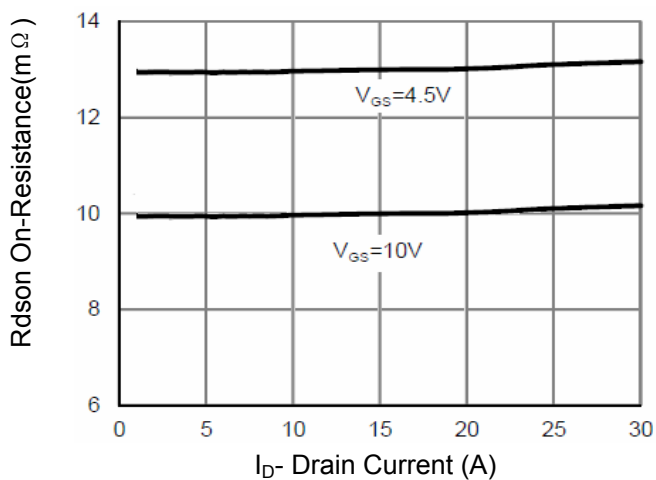
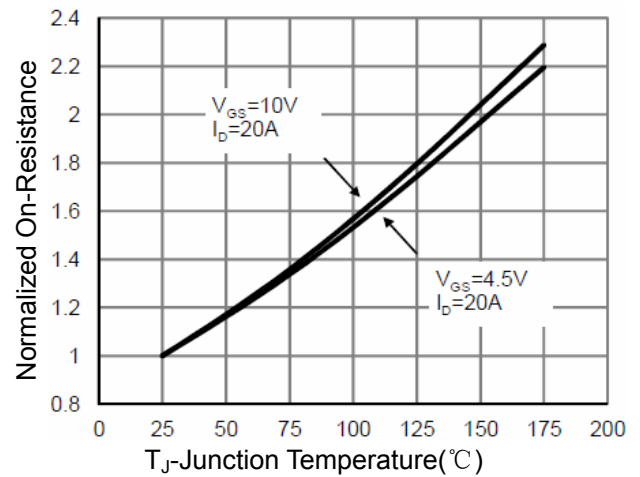
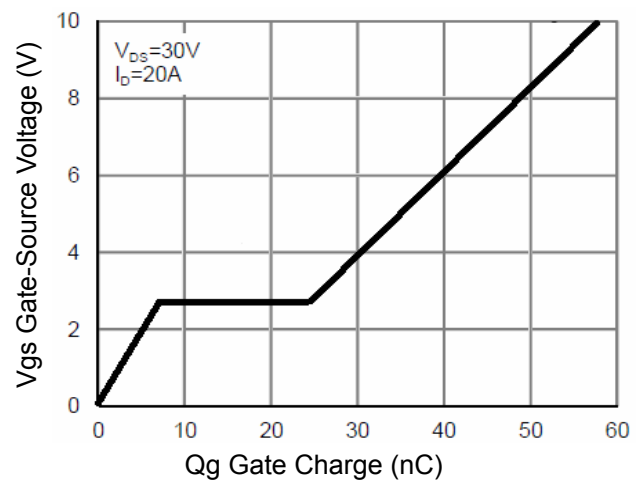
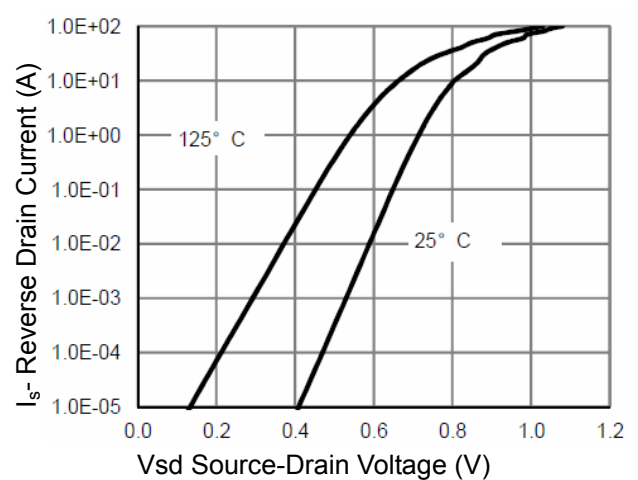


2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 2 Transfer Characteristics

Figure 3 Rdson- Drain Current

Figure 4 Rdson-Junction Temperature

Figure 5 Gate Charge

Figure 6 Source- Drain Diode Forward

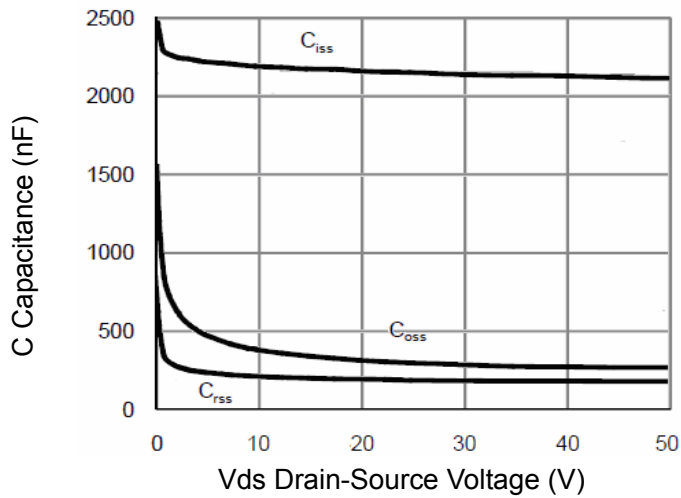


Figure 7 Capacitance vs Vds

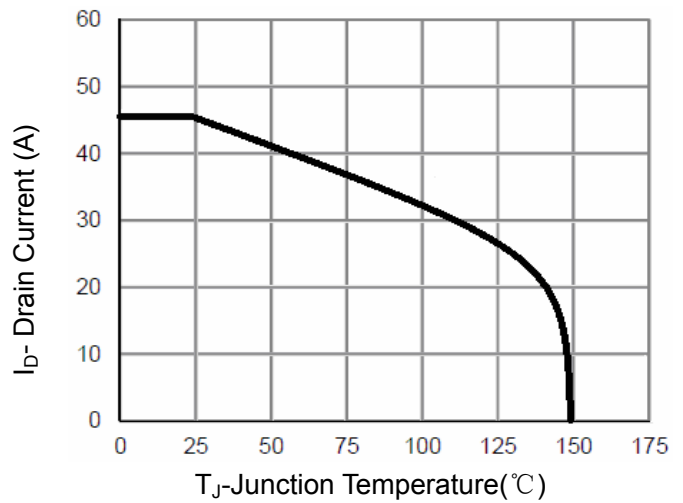


Figure 9 Current De-rating

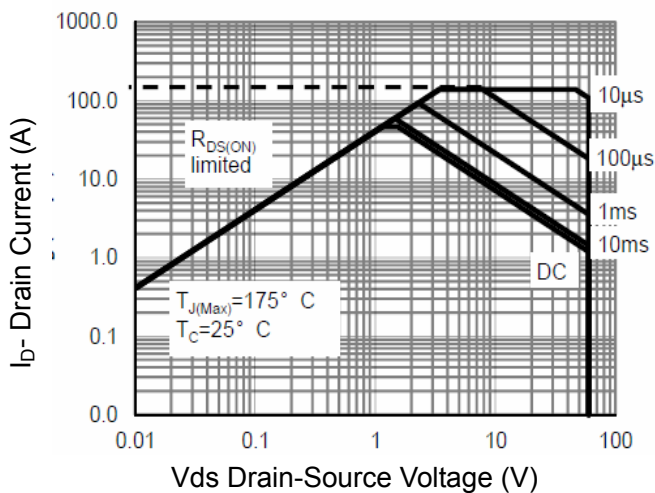


Figure 8 Safe Operation Area

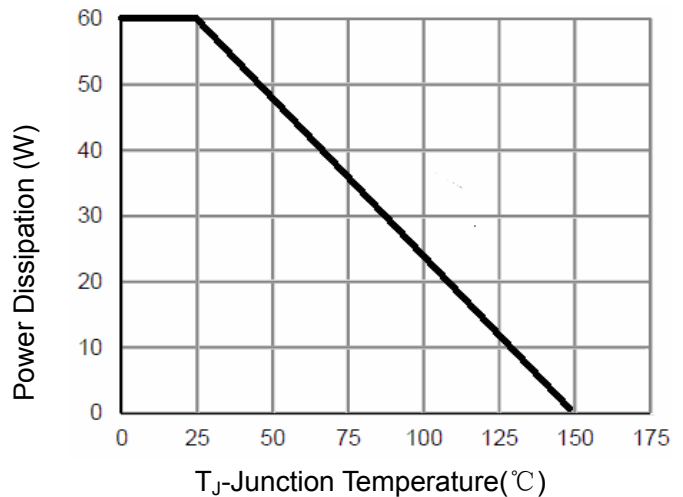


Figure 10 Power De-rating

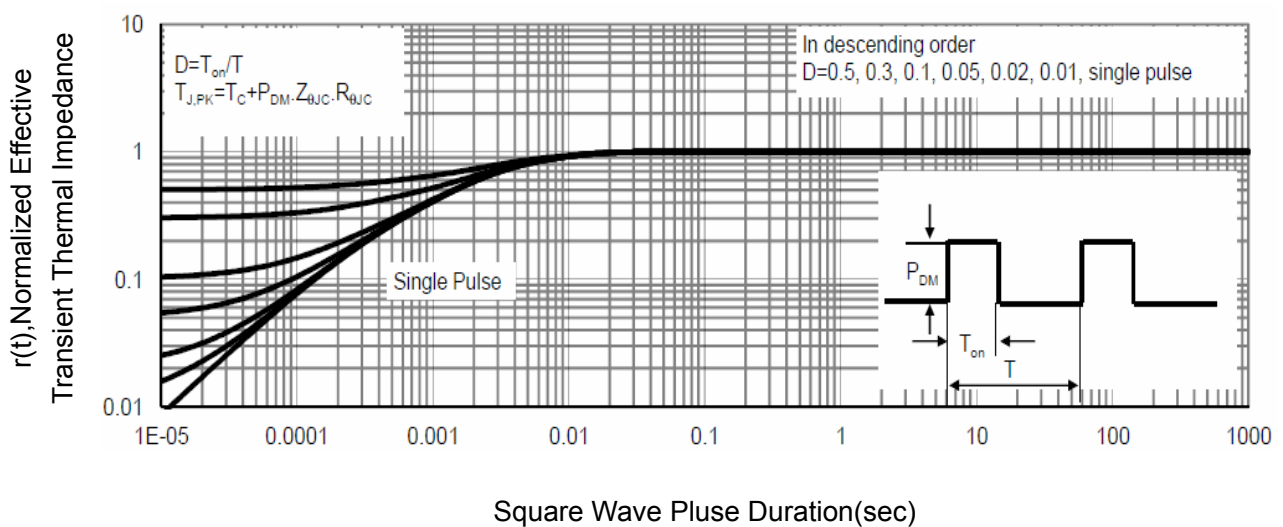
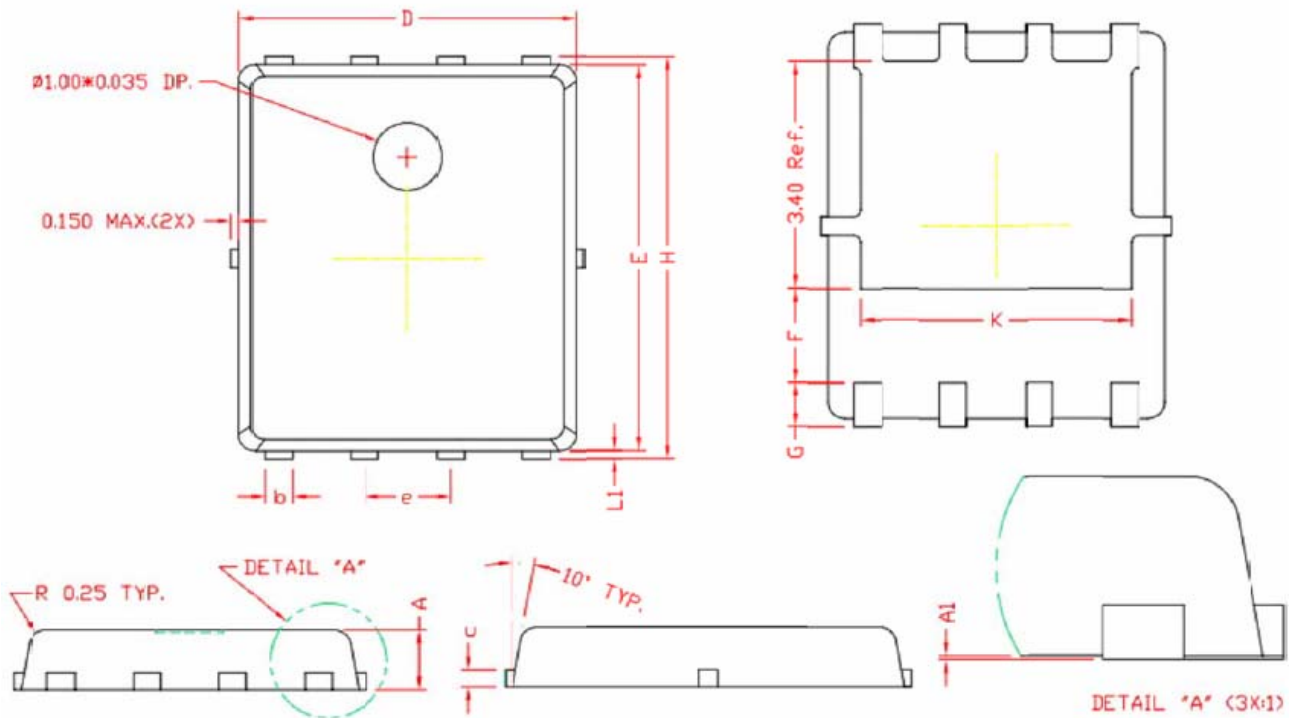


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information

COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c	0.254 REF.		
D	4.90	5.00	5.10
F	1.40 REF.		
E	5.70	5.80	5.90
e	1.27 BSC.		
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G	0.60 REF.		
K	4.00 REF.		