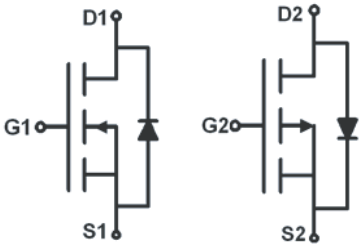
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM3075S8

N and P-Channel Enhancement Mode Power MOSFET

Description

The RM3075S8 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge . The SOP-8 package is universally preferred for all commercial industrial surface mount applications and suited for high and low side switches for inverter ; high and low side switches for generic Half-Bridge, low voltage applications such as DC/DC converters.

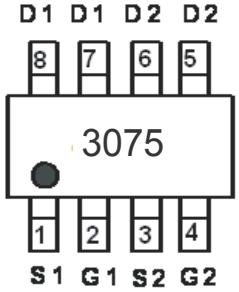


N-channel P-channel

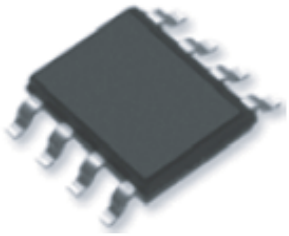
General Features

- **N-Channel**
  V_{DS} = 30V,I_D =6.8A
  $R_{DS(ON)}$ < 40mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$ < 27mΩ@ V_{GS}=10V
- **P-Channel**
  V_{DS} = -30V,I_D = -4.6A
  $R_{DS(ON)}$ < 103mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$ < 64mΩ @ V_{GS}=-10V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Schematic diagram



Marking and pin assignment



SOP-8 top view

Application

- DC/DC converters
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3075	RM3075S8	SOP-8	8830mm	12mm	2500 units

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A=25℃	I_D	6.8	-4.6	A
	T_A=70℃		5.4	-3.7	
Pulsed Drain Current (Note 1)		I_{DM}	34	-23	A
Maximum Power Dissipation	T_A=25℃	P_D	2.0	2.0	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note2)	$R_{\theta JA}$	N-Ch	62.5	℃/W
		P-Ch	62.5	

N-CH Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,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=10 μA	1.3	1.8	2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.8A	-	22	27	mΩ
		V_{GS}=4.5V, I_D=5.4A	-	33	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=15V,I_D=5.4A	8.2	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	398	-	PF
Output Capacitance	C_{oss}		-	82	-	PF
Reverse Transfer Capacitance	C_{rss}		-	36	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V,I_D=1A V_{GS}=4.5V,R_{GEN}=6.2Ω	-	5.1	-	nS
Turn-on Rise Time	t_r		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	4.9	-	nS
Turn-Off Fall Time	t_f		-	3.9	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=6.8A, V_{GS}=10V	-	6.8	14	nC
Gate-Source Charge	Q_{gs}		-	1.4	-	nC
Gate-Drain Charge	Q_{gd}		-	0.98	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=2.0A	-	-	1.2	V

P-CH Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,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=-10 μA	-1.3	-1.8	-2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.6A	-	51	64	mΩ
		V_{GS}=-4.5V, I_D=-3.7A	-	82	103	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-15V,I_D=-3.7A	4.1	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	383	-	
Output Capacitance	C_{oss}		-	104	-	
Reverse Transfer Capacitance	C_{rss}		-	64	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, ID=-1A, V_{GS}=-4.5V,R_{GEN}=6.8Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-4.6A V_{GS}=-10V	-	8.1	16	nC
Gate-Source Charge	Q_{gs}		-	1.3	-	nC
Gate-Drain Charge	Q_{gd}		-	2.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-2A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

RATING AND CHARACTERISTICS CURVES (RM3075S8)

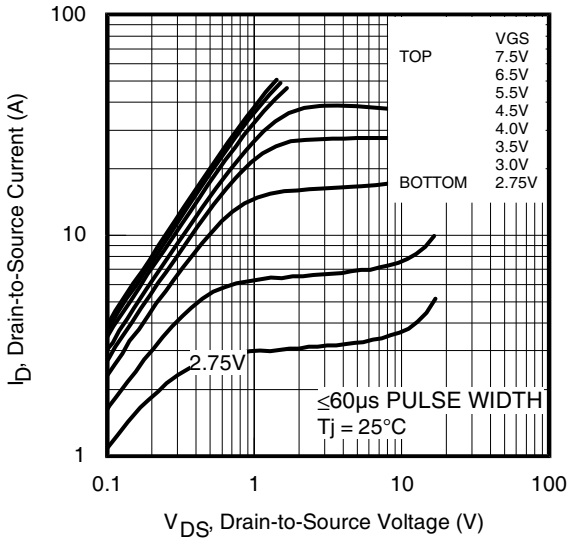


Fig 1. Typical Output Characteristics

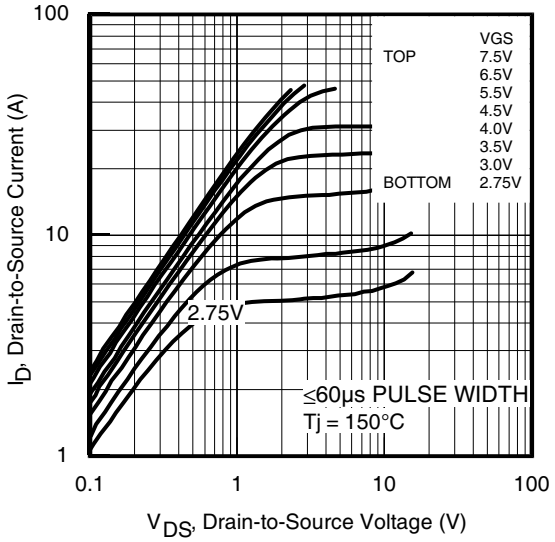


Fig 2. Typical Output Characteristics

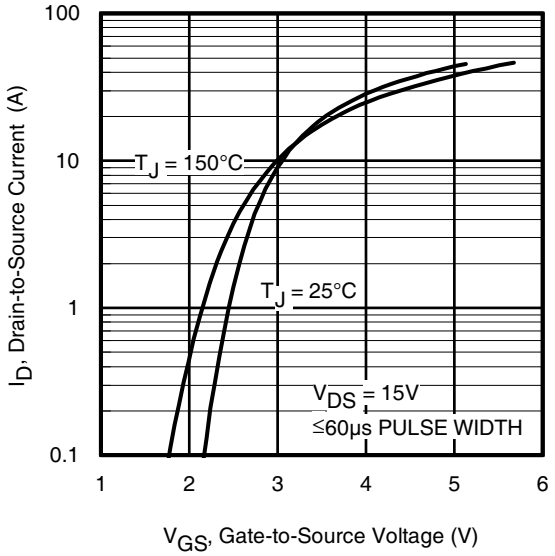


Fig 3. Typical Transfer Characteristics

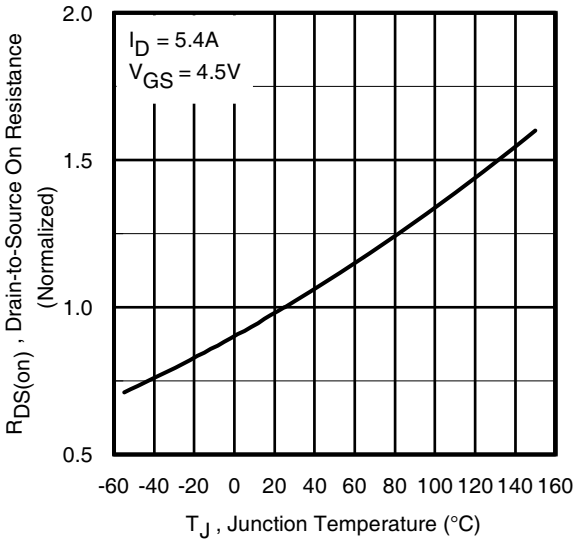


Fig 4. Normalized On-Resistance vs. Temperature

RATING AND CHARACTERISTICS CURVES (RM3075S8)

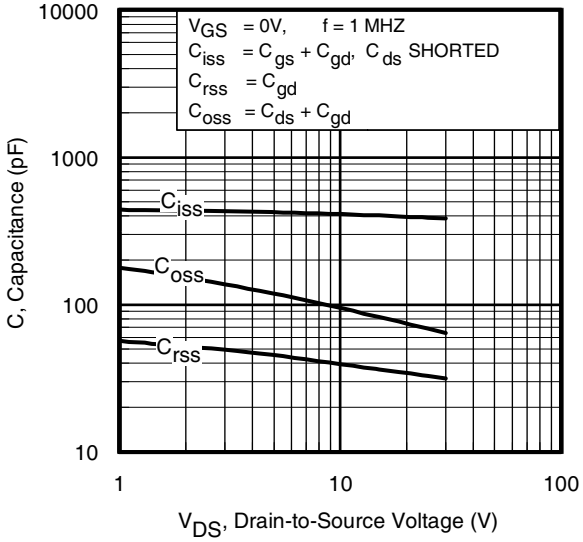


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

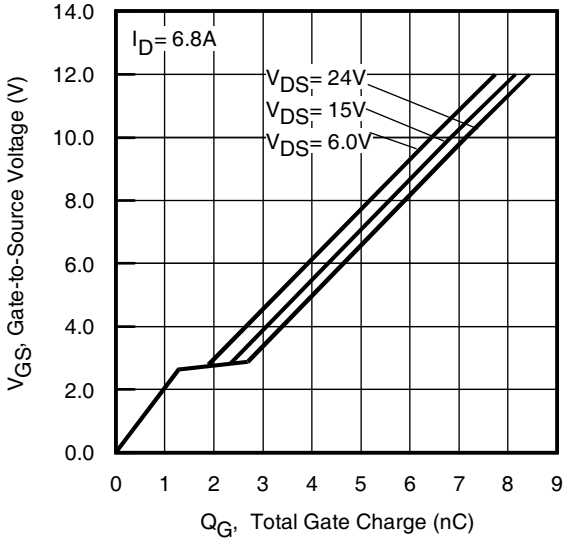


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

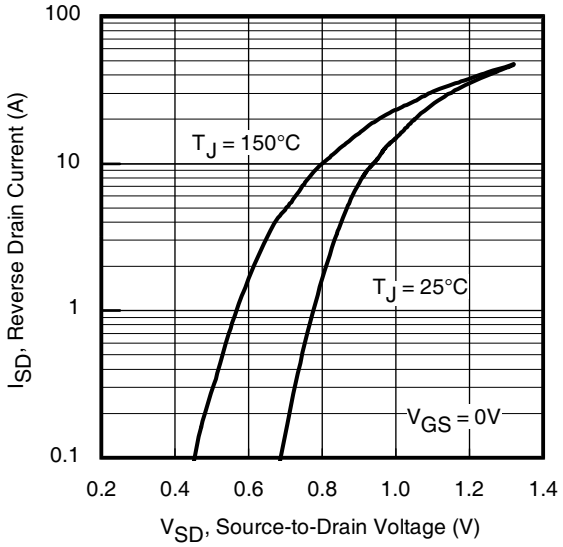


Fig 7. Typical Source-Drain Diode Forward Voltage

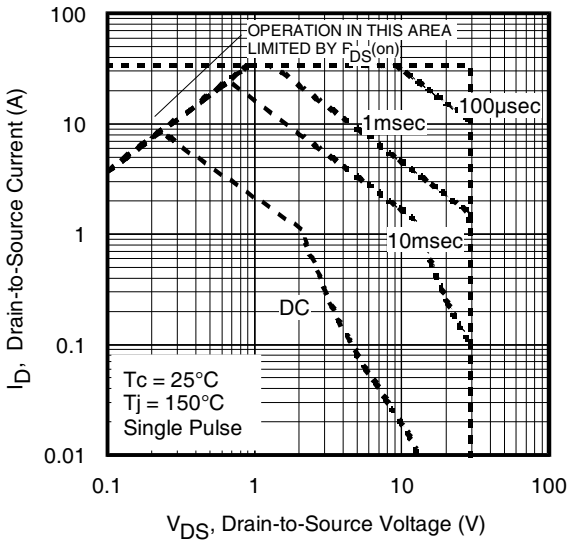


Fig 8. Maximum Safe Operating Area

RATING AND CHARACTERISTICS CURVES (RM3075S8)

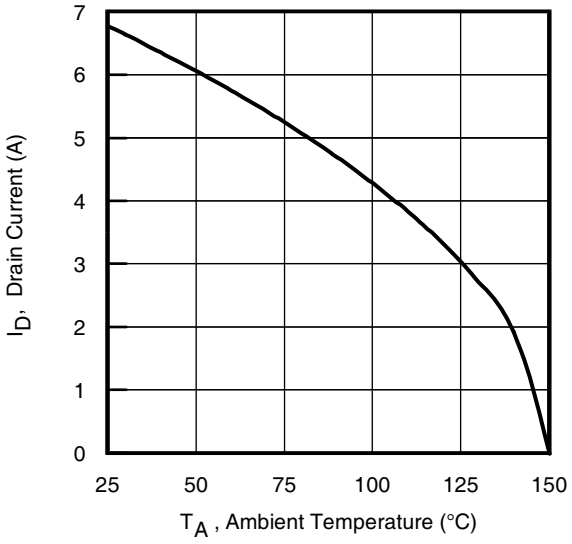


Fig 9. Maximum Drain Current vs. Ambient Temperature

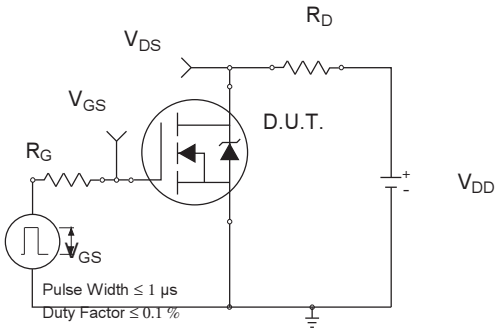


Fig 10a. Switching Time Test Circuit

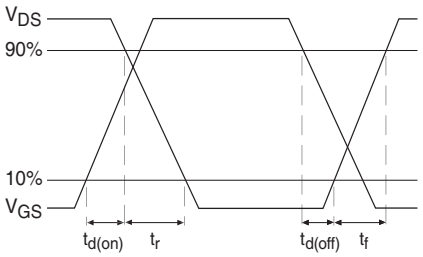


Fig 10b. Switching Time Waveforms

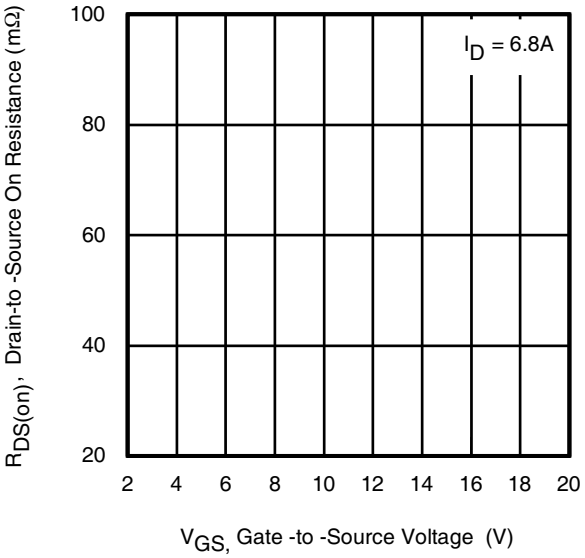


Fig 11. Typical On-Resistance vs. Gate Voltage

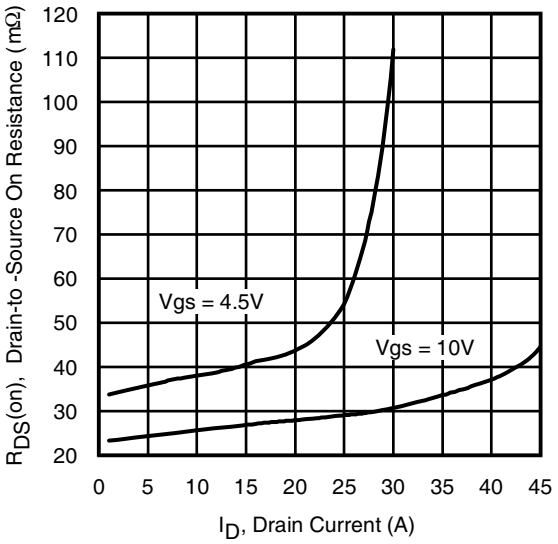


Fig 12. Typical On-Resistance vs. Drain Current

RATING AND CHARACTERISTICS CURVES (RM3075S8)

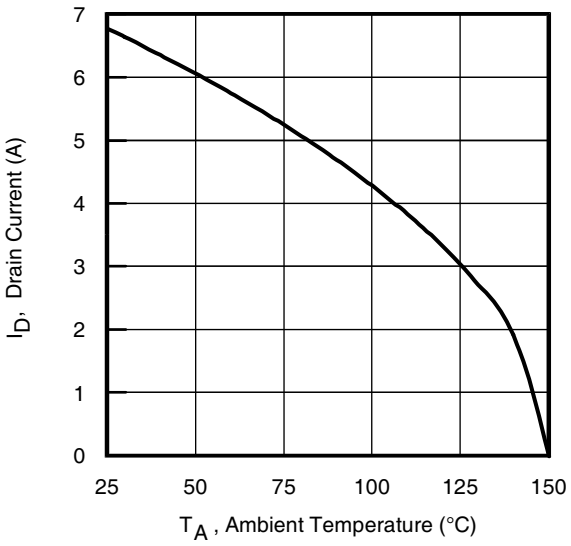


Fig 9. Maximum Drain Current vs. Ambient Temperature

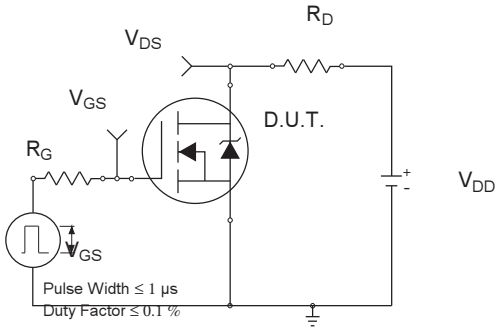


Fig 10a. Switching Time Test Circuit

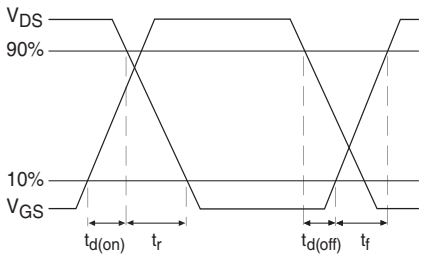


Fig 10b. Switching Time Waveforms

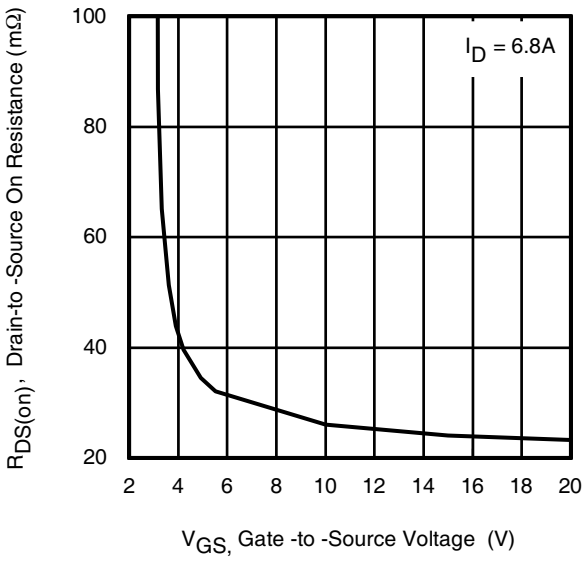


Fig 11. Typical On-Resistance vs. Gate Voltage

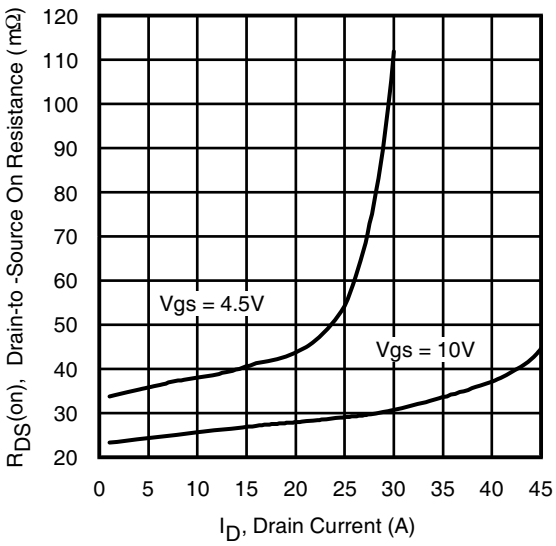


Fig 12. Typical On-Resistance vs. Drain Current

RATING AND CHARACTERISTICS CURVES (RM3075S8)

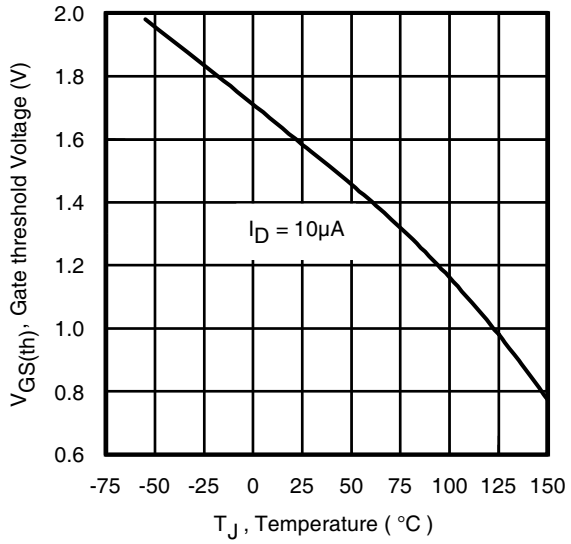


Fig 13. Threshold Voltage vs. Temperature

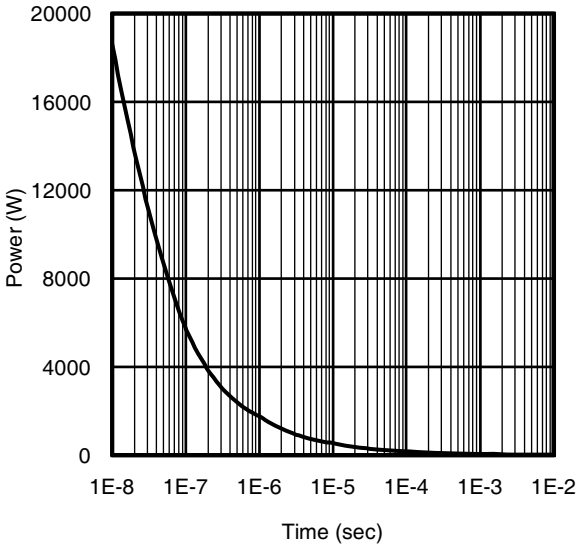


Fig 14. Typical Power vs. Time

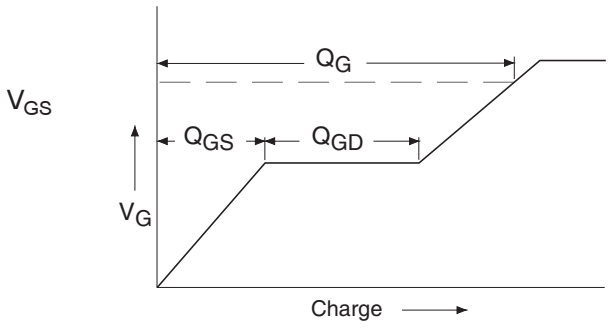


Fig 15a. Basic Gate Charge Waveform

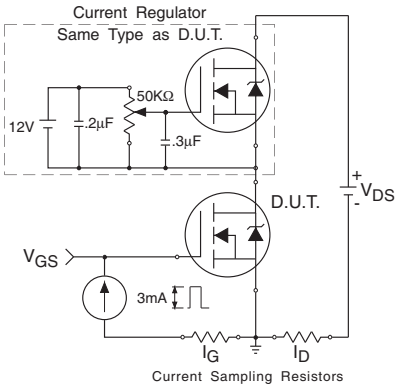


Fig 15b. Gate Charge Test Circuit

RATING AND CHARACTERISTICS CURVES (RM3075S8)

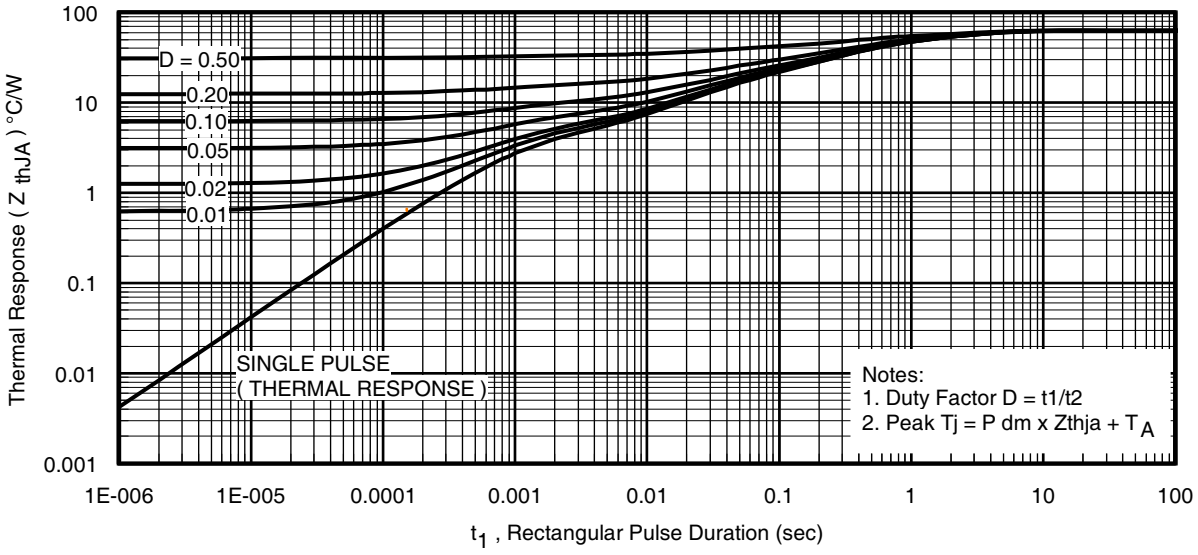


Fig 16. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

RATING AND CHARACTERISTICS CURVES (RM3075S8)

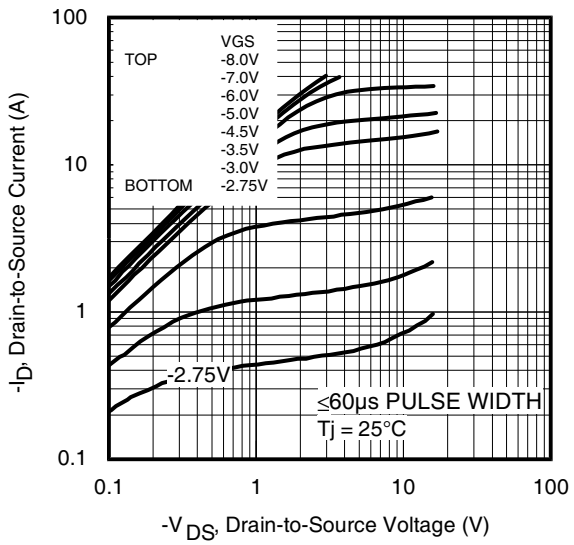


Fig 17. Typical Output Characteristics

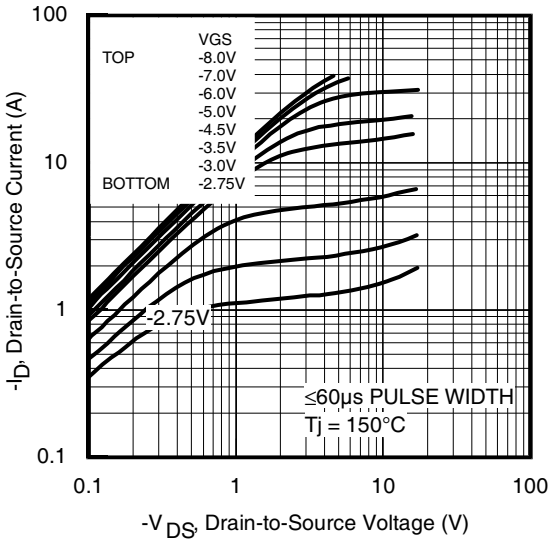


Fig 18. Typical Output Characteristics

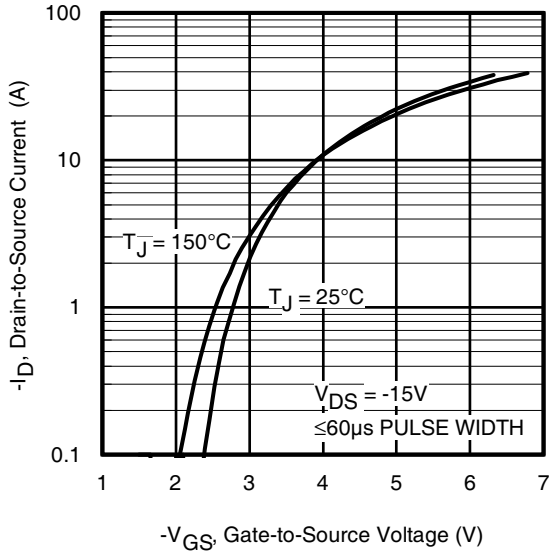


Fig 19. Typical Transfer Characteristics

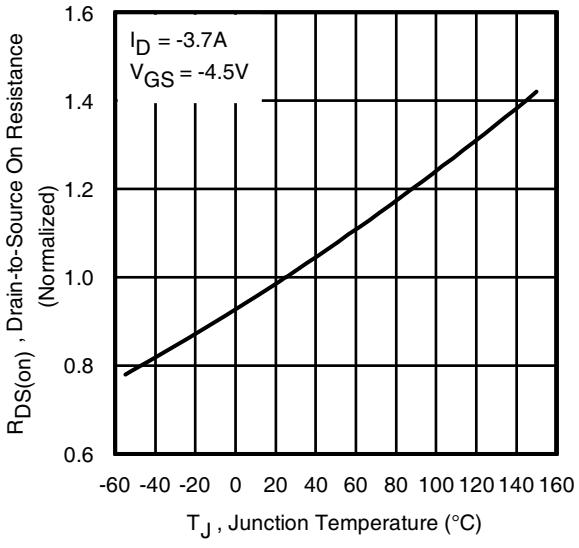


Fig 20. Normalized On-Resistance vs. Temperature

RATING AND CHARACTERISTICS CURVES (RM3075S8)

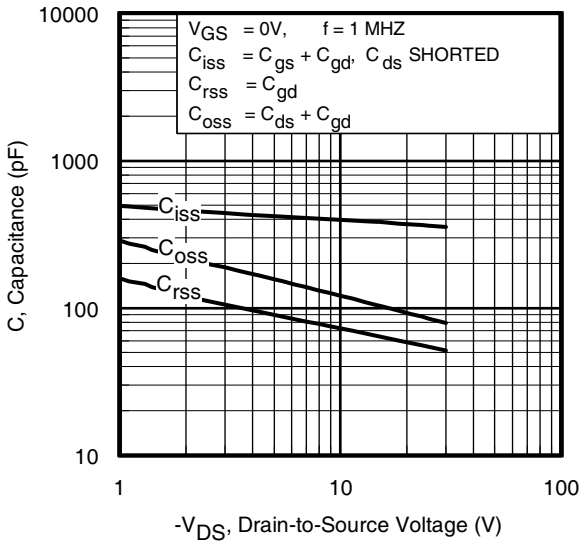


Fig 21. Typical Capacitance vs. Drain-to-Source Voltage

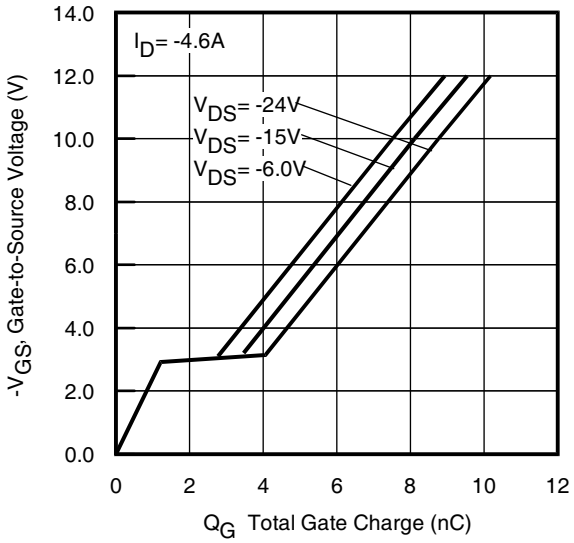


Fig 22. Typical Gate Charge vs. Gate-to-Source Voltage

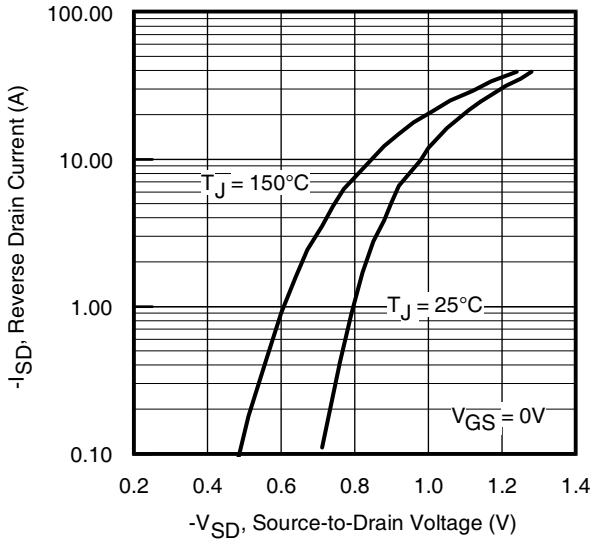


Fig 23. Typical Source-Drain Diode Forward Voltage

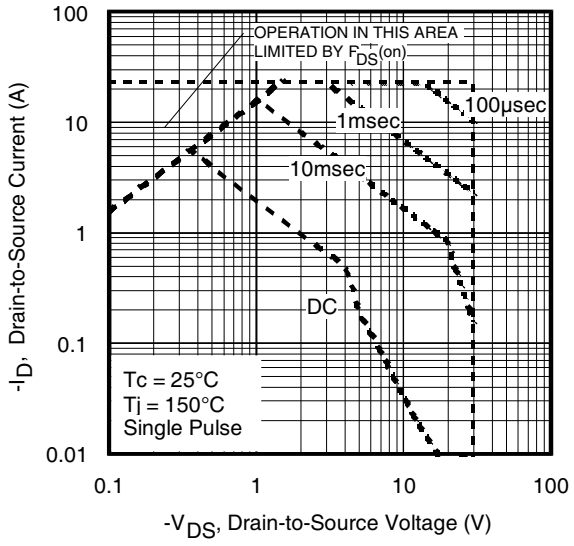


Fig 24. Maximum Safe Operating Area

RATING AND CHARACTERISTICS CURVES (RM3075S8)

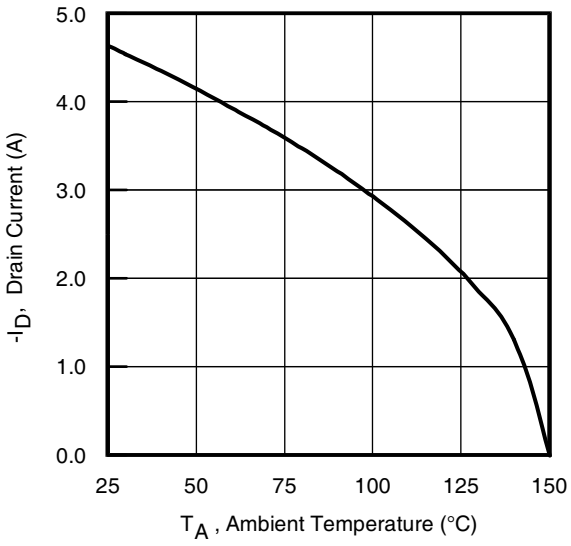


Fig 25. Maximum Drain Current vs. Ambient Temperature

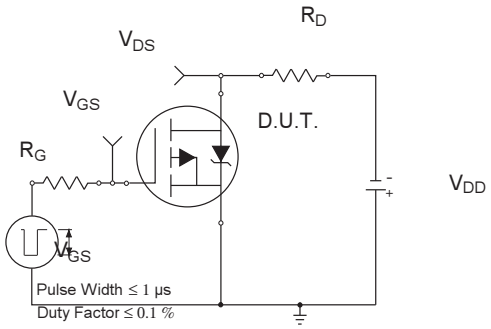


Fig 26a. Switching Time Test Circuit

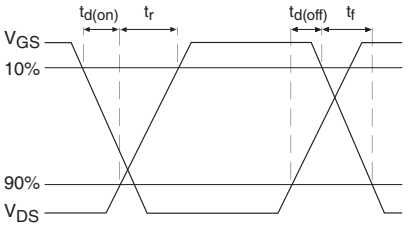


Fig 26b. Switching Time Waveforms

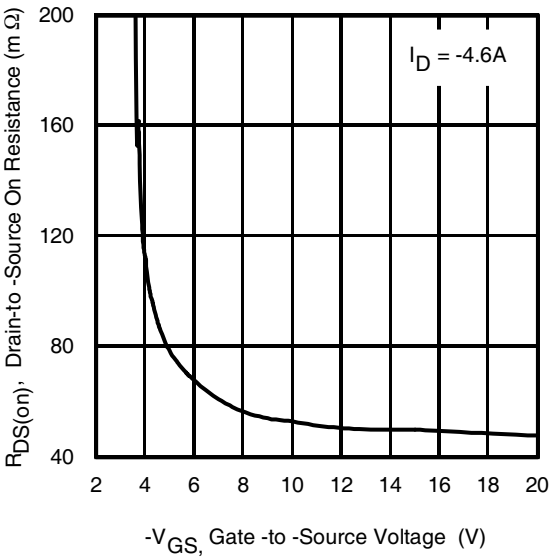


Fig 27. Typical On-Resistance vs. Gate Voltage

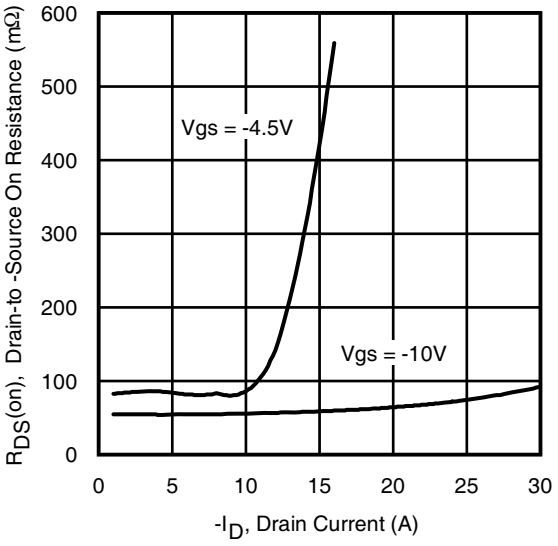


Fig 28. Typical On-Resistance vs. Drain Current

RATING AND CHARACTERISTICS CURVES (RM3075S8)

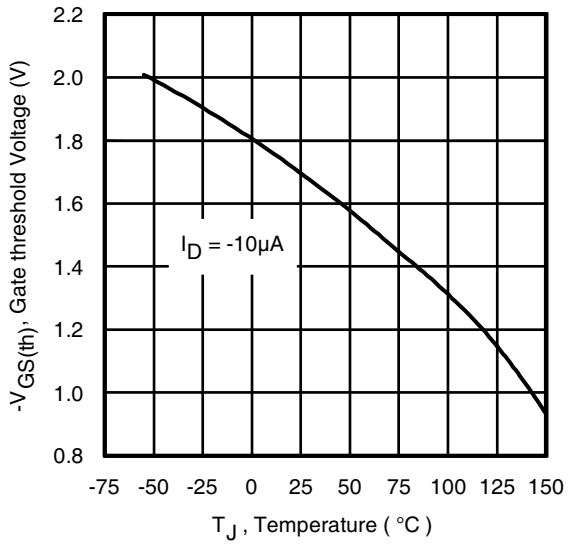


Fig 29. Threshold Voltage vs. Temperature

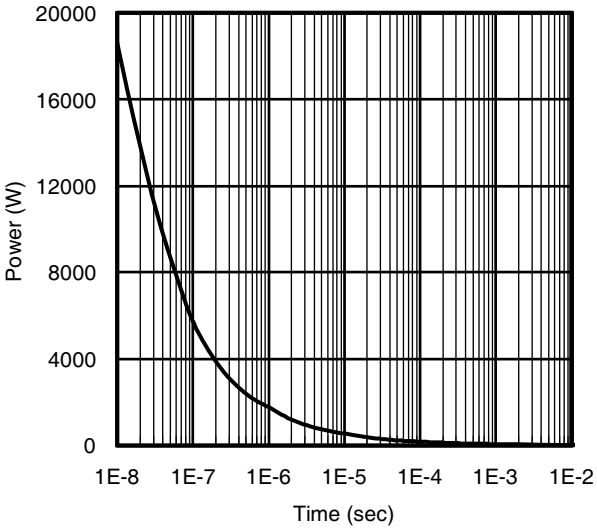


Fig 30. Typical Power vs. Time

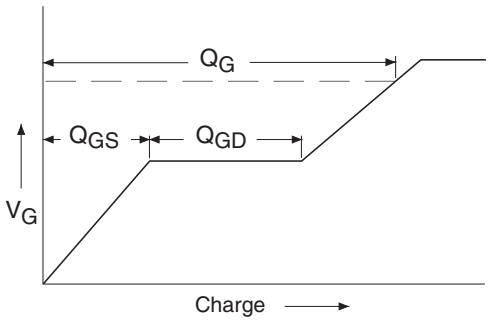


Fig 31a. Basic Gate Charge Waveform

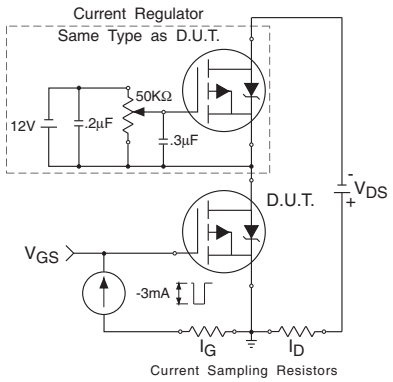
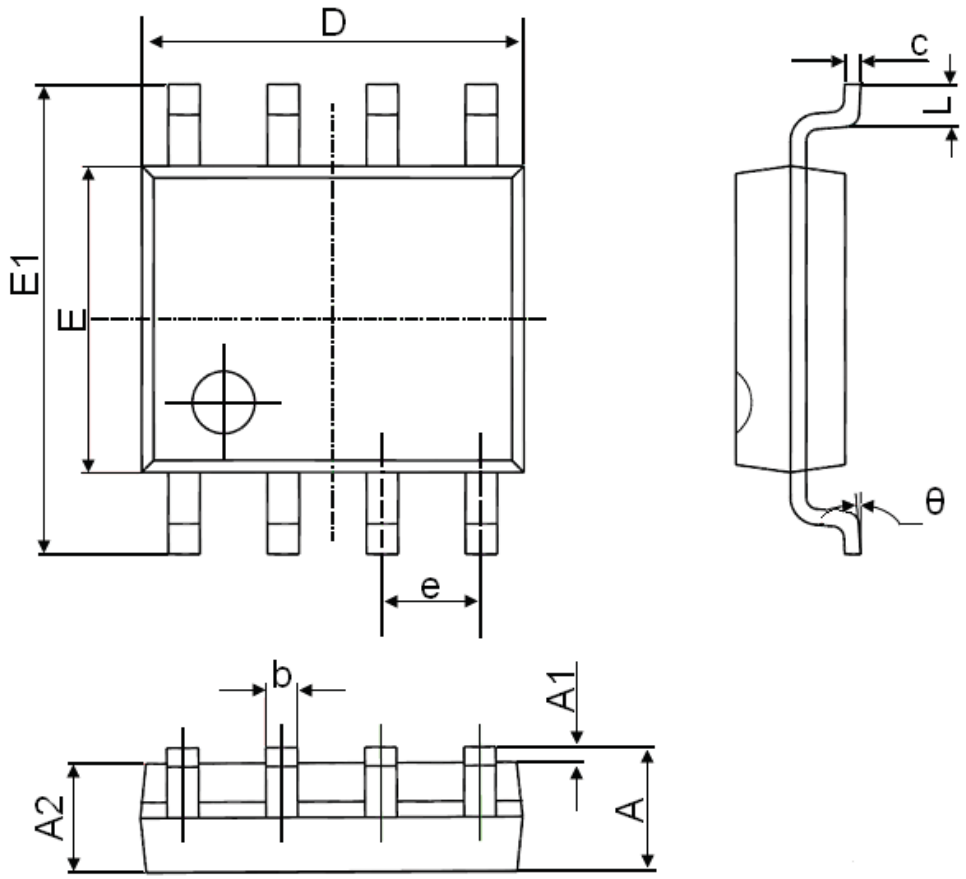


Fig 31b. Gate Charge Test Circuit

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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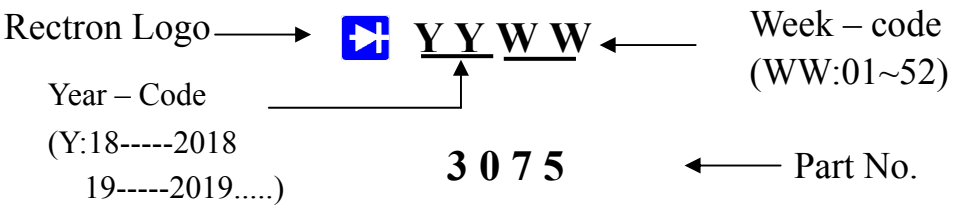
Marking on the body



Package	Tube (pcs/tube)	Tube (pcs/inner box)	Tube (pcs/cartoon)	Tape&Reel (pcs/reel)	Tape&Reel (pcs/inner box)	Tape&Reel (pcs/cartoon)
DFN	100	10,000	100,000	2,500	5,000	40,000
SOP-8	100	10,000	100,000	4,000	4,000	20,000
TSSOP-8	100	32,000	128,000	3,000	6,000	48,000
SOT-23-3L	——	——	——	3,000	30,000	120,000
SOT-23-6L	——	——	——	3,000	30,000	120,000
SOT-23(6R)	——	——	——	3,000	30,000	120,000
SOT-363	——	——	——	3,000	30,000	120,000
SOT-523	——	——	——	3,000	30,000	120,000
SOT223	——	——	——	2,500	2,500	20,000
TO-220	50	1,000	5,000	——	——	——
TO-220F	50	1,000	10,000	——	——	——
TO-247	30	300	1,200	——	——	——
TO-251	80	4,000	40,000	——	——	——
TO-251S(4R)	80	4,000	40,000	——	——	——
TO-252-2L(4R)	80	4,000	40,000	2,500	2,500	25,000
TO-263-2L	50	1,000	10,000	800	800	8,000
TO-3P	30	300	3,000	——	——	——
TO-92	——	——	——	1,000(袋装)	10,000	100,000

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