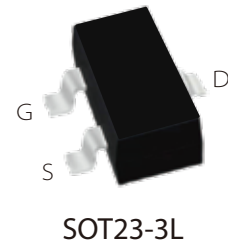


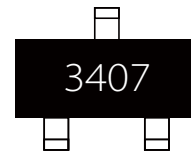
FEATURES

- | High Density Cell Design For Low $R_{DS(On)}$
- | Voltage Controlled Small Signal Switch
- | Rugged and Reliable
- | High Saturation Current Capability
- | Lead free product is acquired

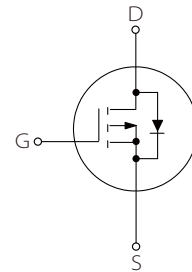


APPLICATION

- | Direct logic-level interface: TTL/CMOS
- | Drivers: relays, solenoids, lamps
- | hammers, display, memories, etc.
- | Battery operated systems
- | Solid-state relays



Marking



Schematic Symbol

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	≥ -30	V
Drain Current (Notes1)	$I_D(V_{GS} = -10\text{ V})$	≤ -4.3	A
	$I_D(T_a=100^{\circ}\text{C}, V_{GS} = -10\text{ V})$	≤ -2.7	A
Pulsed Drain Current (Notes1) (Notes2)	$I_{DM}(V_{GS} = -10\text{ V})$	≤ -17.2	A
Gate-Source Voltage	V_{GS}	$\leq \pm 12$	V
Total Power Dissipation	P_{tot}	≤ 1.4	W
Diode Forward Current	I_S	≤ -4.3	A
Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$
Thermal Resistance- Junction to Ambient (Notes1)	$R_{\theta JA}$	≤ 90	$^{\circ}\text{C}/\text{W}$

Notes: (1) Surface Mounted on 1 in² pad area, $t \leq 10$ sec
 (2) Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

ELECTRICAL CHARACTERISTICS(T_a = 25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250μA	-30			V
Drain Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =85°C			-30	μA
Gate Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _{DS} =250μA	-1.0	-1.5	-2.4	V
On-State Resistance ^(Notes1)	R _{DS(on)}	V _{GS} =-10V, I _{DS} =-4A		41	50	mΩ
		V _{GS} =-4.5V, I _{DS} =-3A		47	60	
		V _{GS} =-2.5V, I _{DS} =-2A		60	85	
Diode Characteristics						
Diode Forward Voltage ^(Notes1)	V _{SD}	V _{GS} =0V, I _{SD} =-4A		-0.8	-1.3	V
Reverse Recovery Time	t _{rr}	I _{SD} = - 4 A, di _{SD} /dt = 100 A/μs		30		ns
Reverse Recovery Charge	Q _{rr}	I _{SD} = - 4 A, di _{SD} /dt = 100 A/μs		2.7		nC
Dynamic Characteristics^(Notes2)						
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, F=1.0MHz		750		pF
Output Capacitance	C _{oss}			70		
Reverse Transfer Capacitance	C _{rss}			60		
Turn-On Delay Time	t _{d(on)}	V _{DS} =-15V, R _L =3.75Ω V _{GEN} =-10V, R _G =6Ω, I _{DS} = - 4 A		5.8		ns
Turn-On Rise Time	t _r			22		
Turn-Off Delay Time	t _{d(off)}			172		
Turn-Off Fall Time	t _f			69		
Gate Charge Characteristics^(Notes2)						
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-15V, I _{DS} =-4A		17		nC
Gate Source Charge	Q _{gs}			2.8		
Gate Drain Charge	Q _{gd}			2		

Notes: (1)Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%
 (2)Guaranteed by design, not subject to production testing

PARAMETER CHARACTERISTIC CURVE

Figure 1: Power Capability

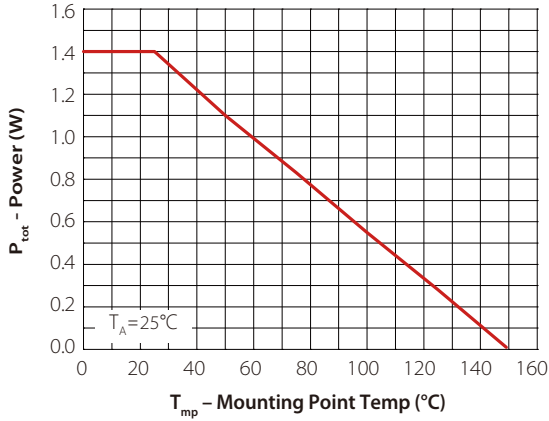


Figure 2: Current Capability

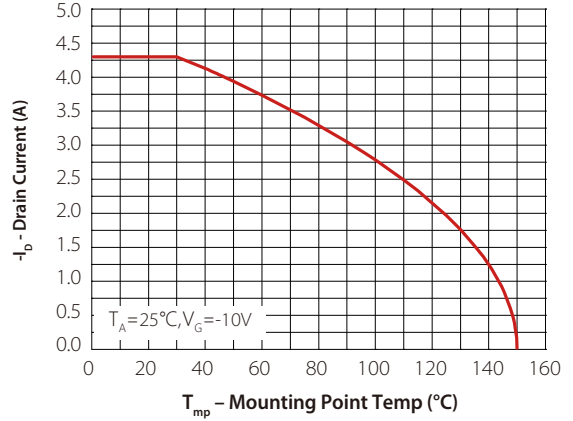


Figure 3: Safe Operation Area

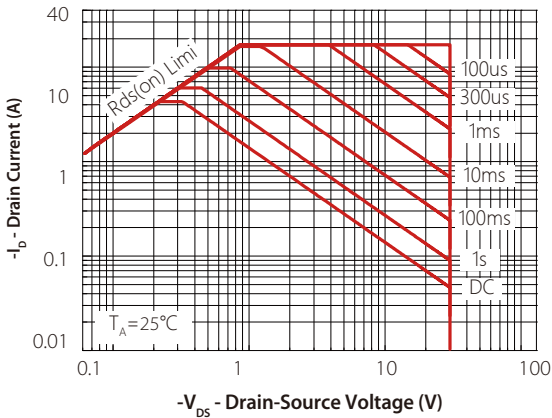


Figure 4: Transient Thermal Impedance

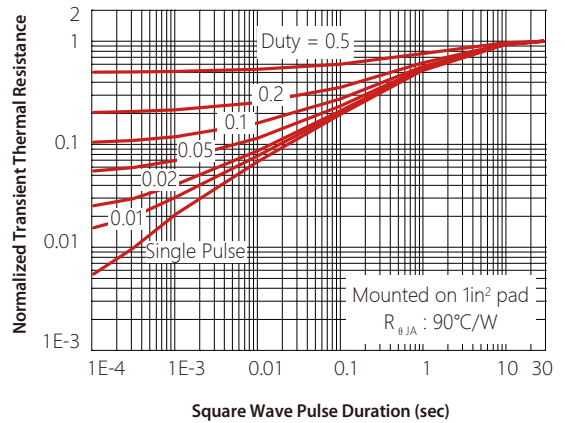


Figure 5: Output Characteristics

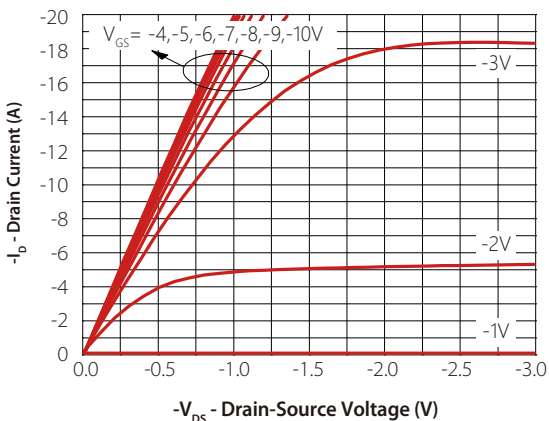


Figure 6: On Resistance

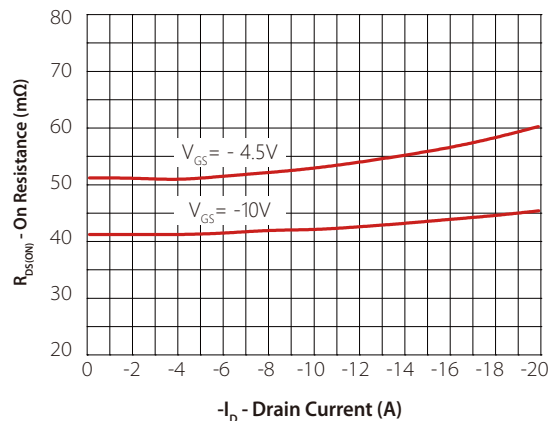
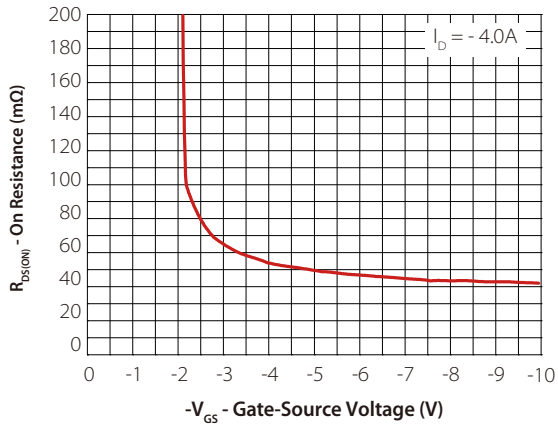
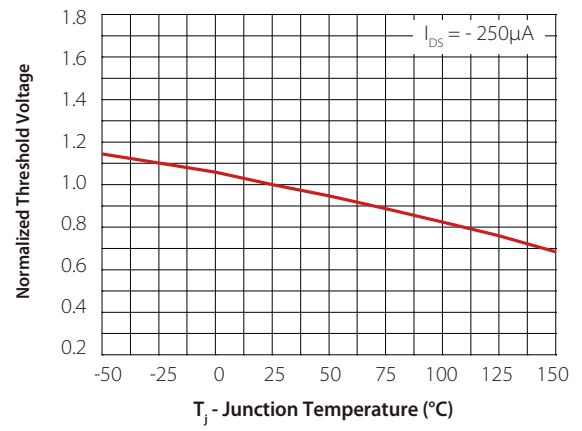
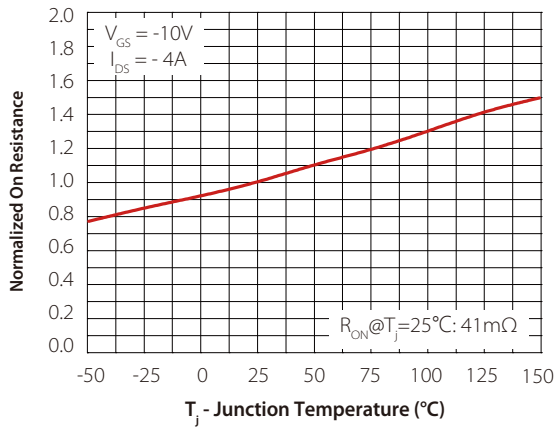
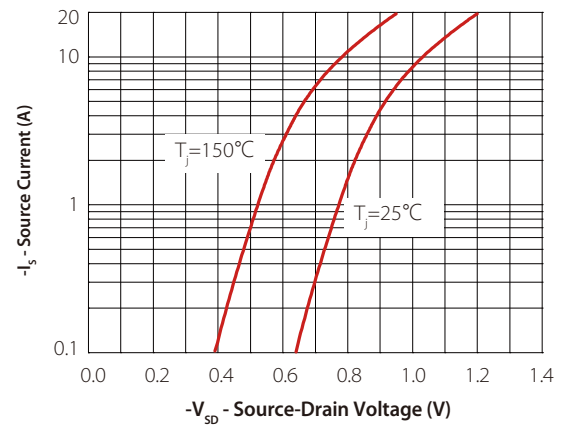
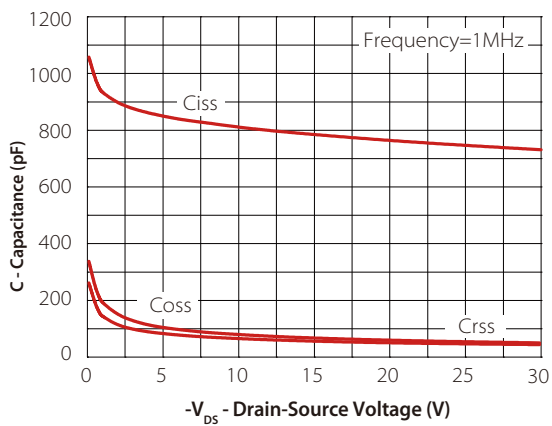
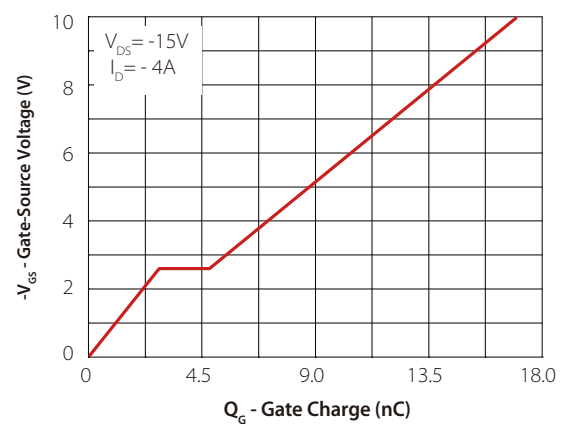
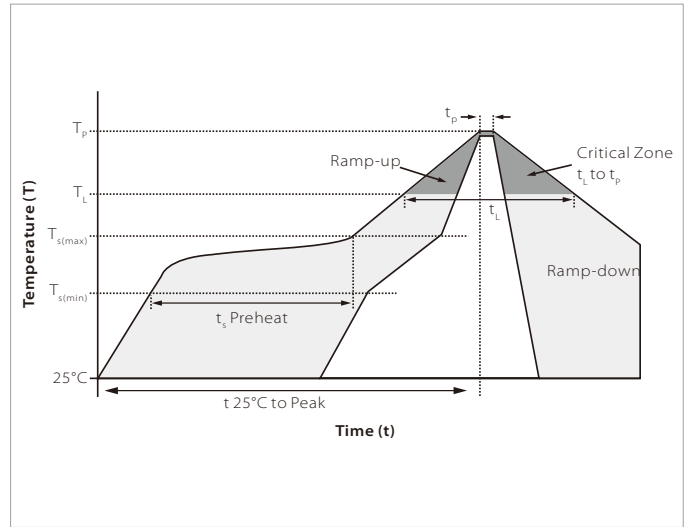


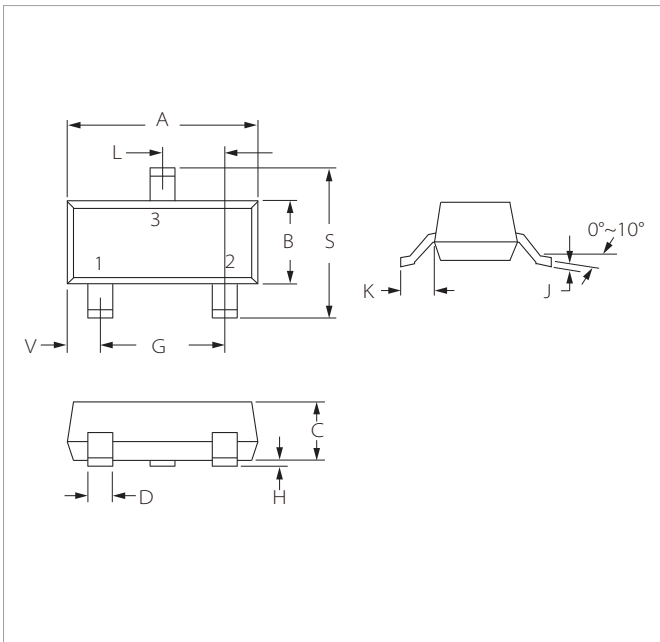
Figure 7: Transfer Characteristics

Figure 8: Normalized Threshold Voltage

Figure 9: Normalized On Resistance

Figure 10: Diode Forward Current

Figure 11: Capacitance

Figure 12: Gate Charge


SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (t_2)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_1)	60 – 150 seconds
Peak Temperature (T_p)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C

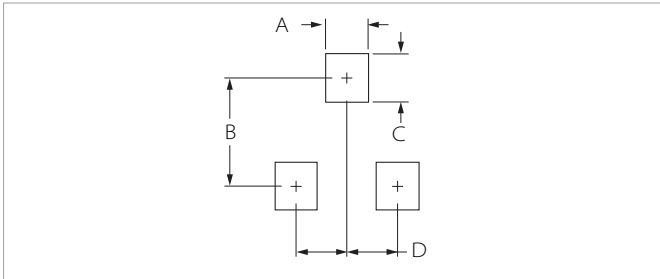


SOT23-3L PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.15	0.110	0.124
B	1.50	1.70	0.060	0.070
C	1.00	1.30	0.039	0.051
D	0.37	0.50	0.015	0.020
G	1.78	2.10	0.070	0.083
H	0.01	0.15	0.001	0.006
J	0.08	0.18	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.60	3.00	0.102	0.118
V	0.45	0.60	0.018	0.024

RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.70	1.00	0.028	0.039
B	2.30	2.50	0.090	0.098
C	0.70	1.00	0.028	0.039
D	0.80	1.10	0.032	0.043

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM23T3N03	SOT23-3L	3000PCS	7"

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