

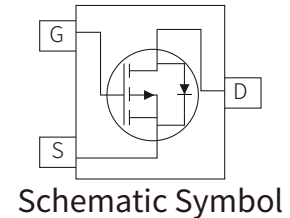
FEATURES

- | Low $R_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- | Excellent ON resistance for higher DC current :
- | $R_{DS(ON)} < 45m\Omega @ V_{GS} = -10V$ (Type:40m Ω)
- | $V_{DS} = -40V, I_D = -8A$
- | Supper high density cell design
- | High performance trench technology
- | High Power and current handing capability
- | Surface Mount Package



APPLICATION

- | Load/Power Switching for portable device
- | Charging device
- | Power supply converters circuit



APPROVALS

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

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

Parameter	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	-40	V
Continuous Drain Current $T_c=25^{\circ}C$	I_D	-8	A
Pulsed Drain Current	I_{DM}	-32	A
Gate Source Voltage	V_{GS}	± 20	V
Power Dissipation $T_c=25^{\circ}C$	P_D	10	W
Junction-to-Ambient Thermal Resistance ^a	$R_{\theta JA}$	166	$^{\circ}C/W$
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^{\circ}C$

^a Surface mounted on FR-5 Board using 1 square inch pad size, 1oz copper

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _{DS} =-250μA	-40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1		-3	V
Drain Cut-Off Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V			-1	μA
Gate Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±0.1	μA
Drain Source ON Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-4A		40	45	mΩ
		V _{GS} =-4.5V, I _D =-2.5A		56	65	mΩ
Forward Trans conductance	gFS	V _{DS} =-15V, I _D =-4A		10		S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} =-20V, V _{GS} =-10V, I _D =-4A		13.6		nC
Gate-Source Charge	Q _{gs}			2.5		nC
Gate-Drain Charge	Q _{gd}			3.3		nC
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-20V, f=1.0MHz		595		pF
Output capacitance	C _{oss}			86		pF
Reverse transfer capacitance	C _{rss}			65		pF
Turn-on Delay Time	t _{d(on)}	V _{DS} =-20V, V _{GS} =-4.5V I _D =-4A, R _G =1Ω R _L =8Ω		40		ns
Turn-on Rise Time	t _r			27		ns
Turn-Off Delay Time	t _{d(off)}			18		ns
Turn-Off Fall Time	t _f			10		ns
Gate Resistance	Rg	f=1.0MHz		4.5		Ω
Drain Source Body Diode Characteristics						
Continuous Source Current	I _s				-8	A
Source Drain Diode Forward Voltage	V _{SD}	I _s =-2.5A, V _{GS} =0V		-0.8	-1.2	V

Notes:

- 1.Pulse Test:Pulse Width≤300μs,Duty Cycle≤2%.
- 2.Dynamic parameters cannot be verified

PARAMETER CHARACTERISTIC CURVE

Fig 1: Output Characteristics

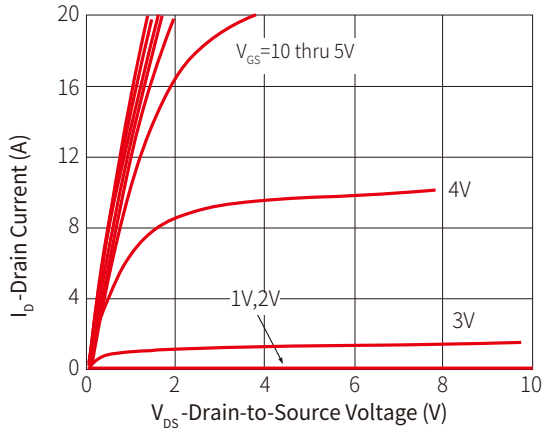


Figure 2: Transfer Characteristics

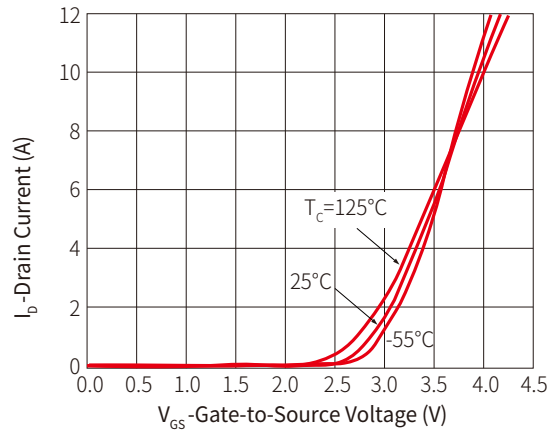


Figure 3: On-Resistance vs. Drain Current

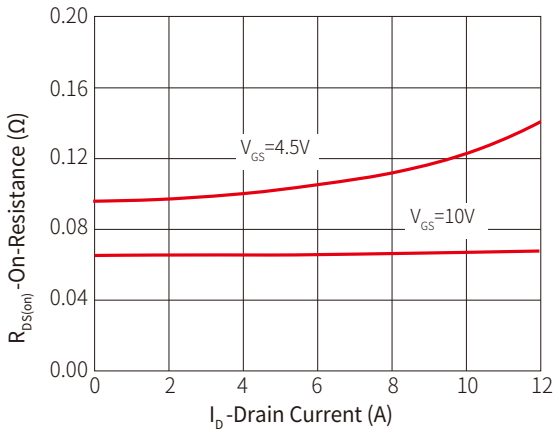


Figure 4: Capacitance

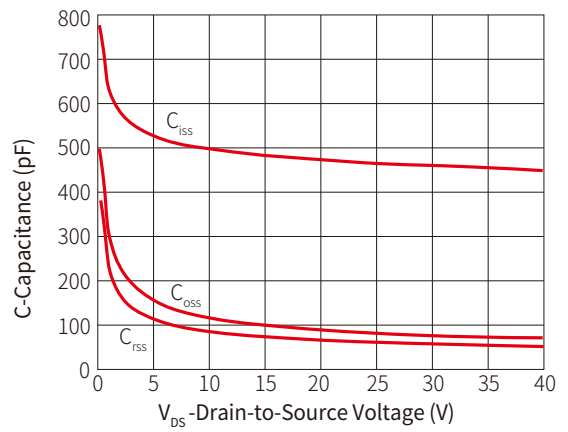


Figure 5: Gate Charge

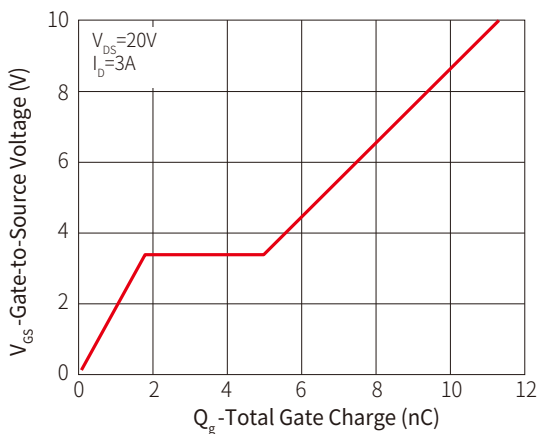


Figure 6: On-Resistance vs. Junction Temperature

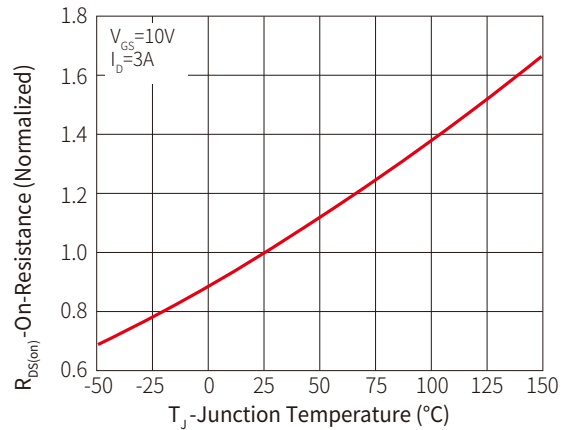


Figure 7: Source-Drain Diode Forward Voltage

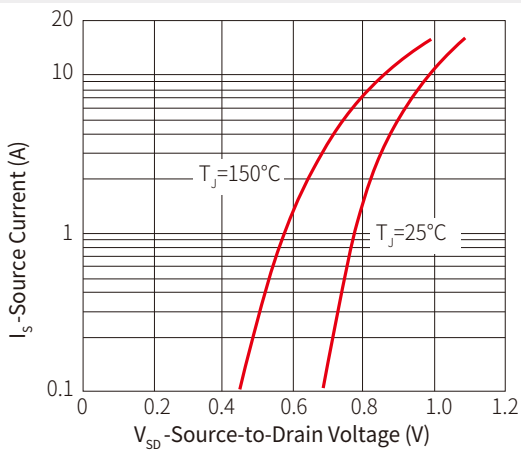


Figure 8: On-Resistance vs. Gate-to-Source Voltage

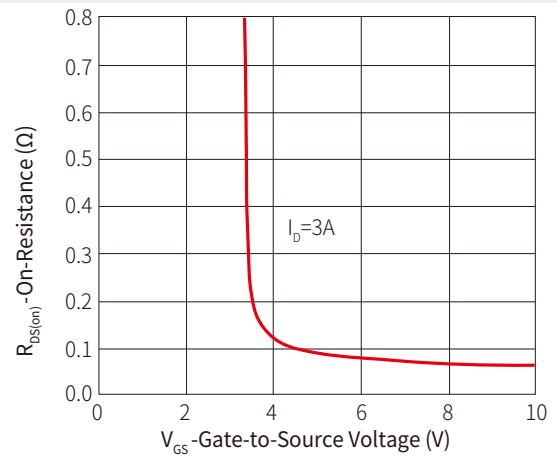


Figure 9: Threshold Voltage

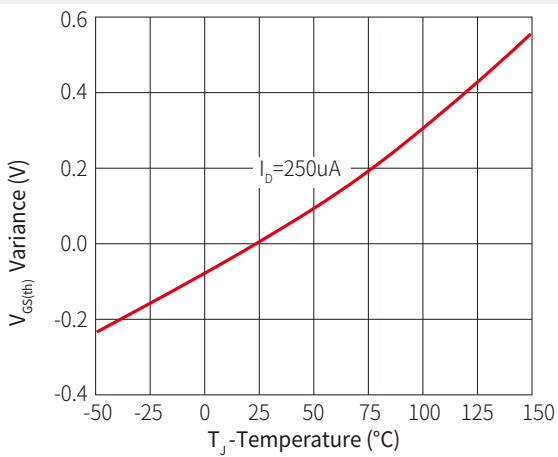


Figure 10: Single Pulse Power

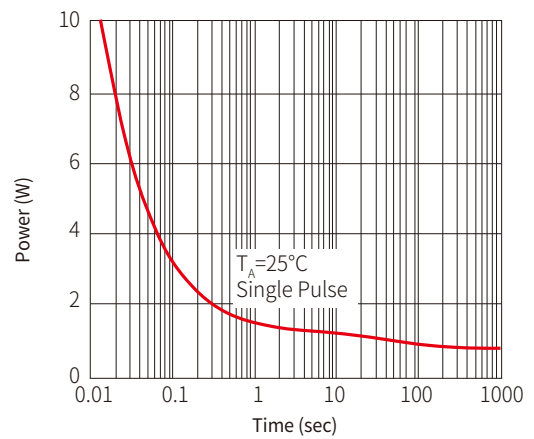


Figure 11: Safe Operating Area Junction-to-Case

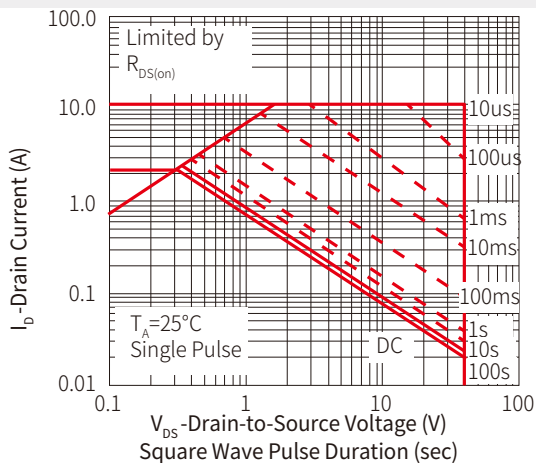


Figure 12: Normalized Thermal Transient Impedance Junction-to-Ambient

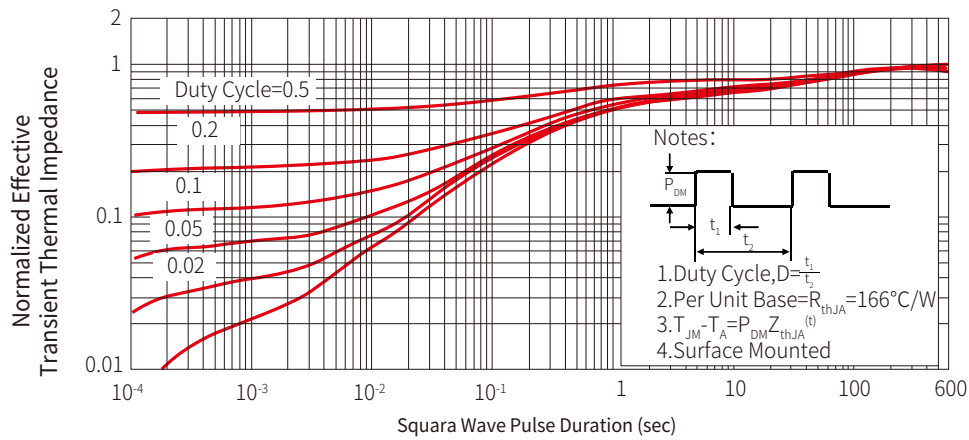


Figure 13: Gate Charge Test Circuit & Waveforms

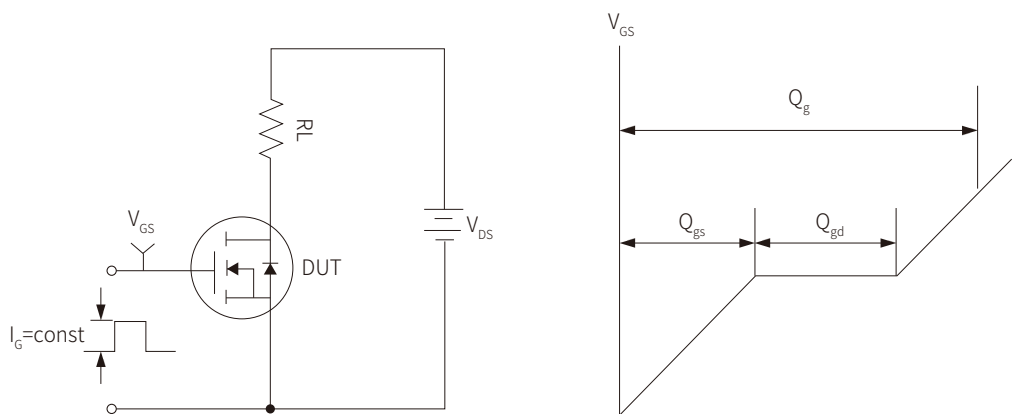


Figure 14: Switching Test Circuit & Waveforms

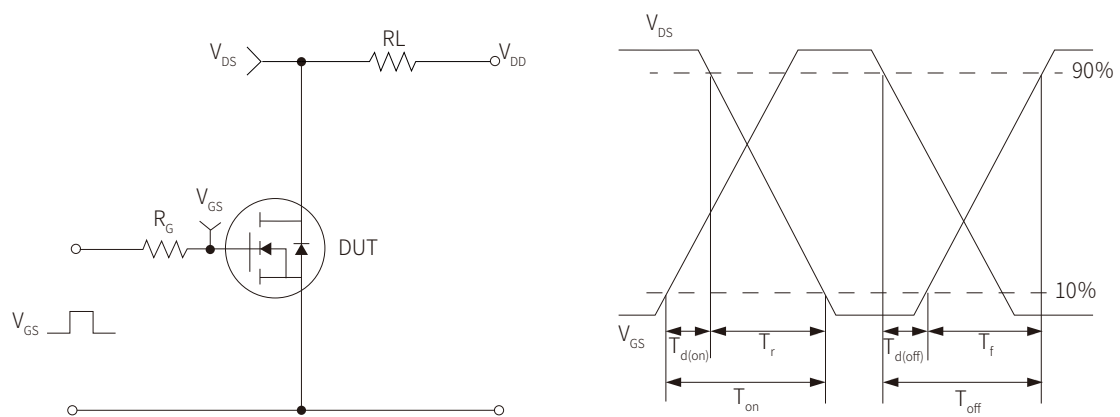
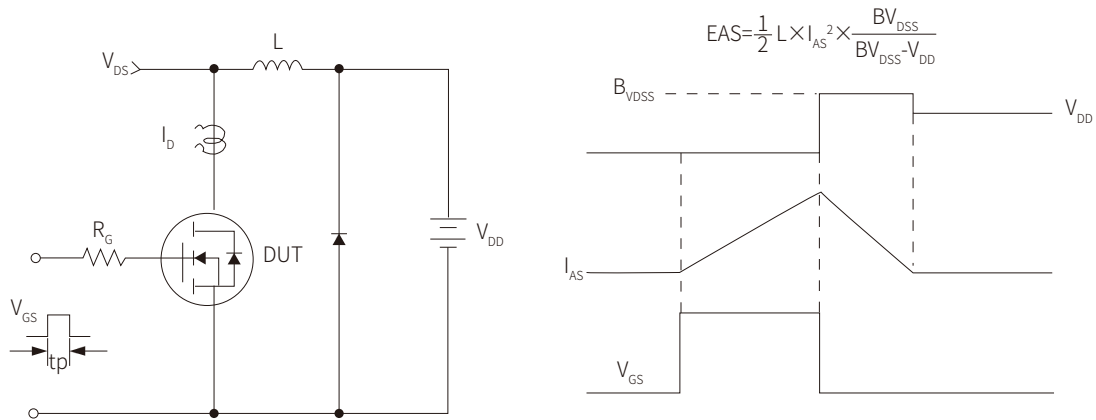
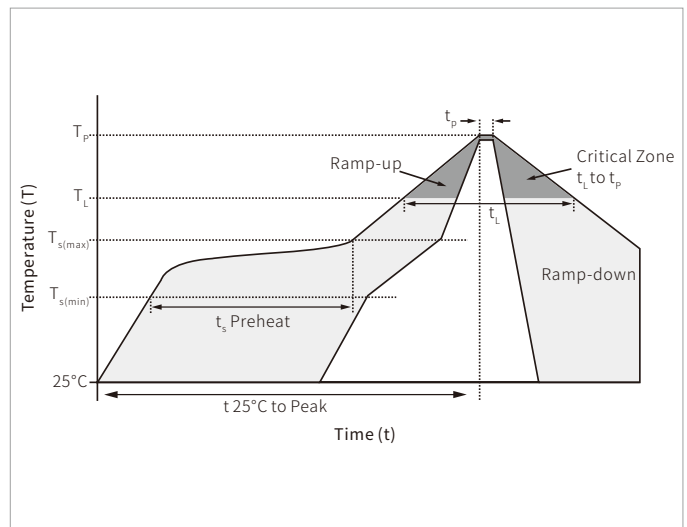


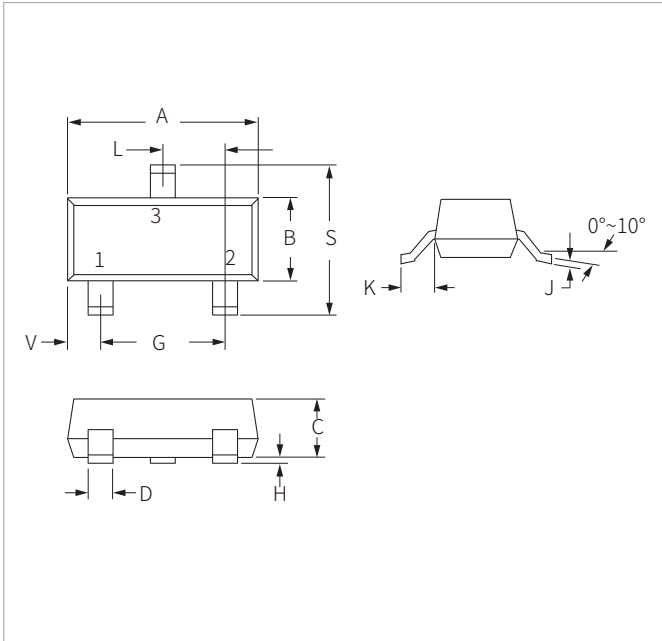
Figure 15: Unclamped Inductive Switching Test Circuit & Waveforms


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_s)	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_r)	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

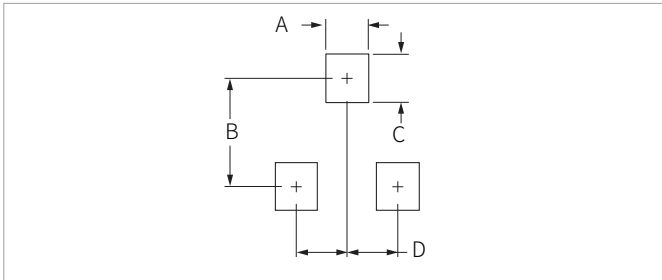


SOT23-3L PACKAGE INFORMATION



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
SPM4045L	SOT23-3L	3000PCS	7"

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