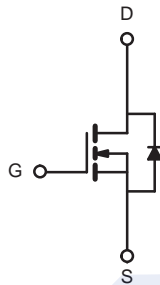
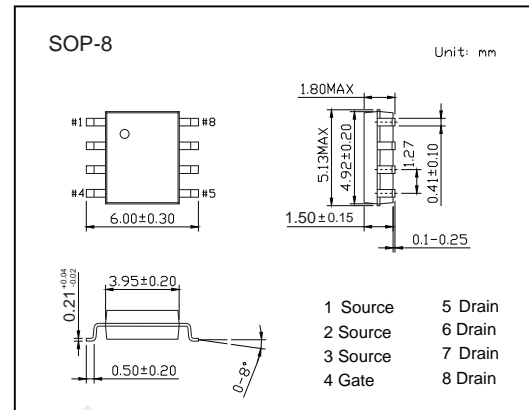


## N-Channel MOSFET

## 2KK5117

## ■ Features

- $V_{DS} = 30\text{ V}$
- $I_D$  (at  $V_{GS}=10\text{V}$ ) = 20 A
- $R_{DS(ON)}$  (at  $V_{GS} = 10\text{ V}$ ) < 5.3 m $\Omega$
- $R_{DS(ON)}$  (at  $V_{GS} = 4.5\text{ V}$ ) < 9 m $\Omega$
- 100% EAS Guaranteed
- Super Low Gate Charge
- Excellent CdV/dt effect decline

■ Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current (Note 1)	$I_D$	$T_A = 25^\circ\text{C}$	A
		$T_A = 70^\circ\text{C}$	
Pulsed Drain Current (Note 2)	$I_{DM}$	65	A
Avalanche Current	$I_{AS}$	46	
Avalanche Energy (Note 3)	EAS	105.8	mJ
Thermal Resistance, Junction- to-Ambient (Note 1)	$R_{\theta JA}$	85	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction- to-Case (Note 1)	$R_{\theta JL}$	25	
Power Dissipation (Note 4)	$P_D$	1.5	W
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to 150	

Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is  $V_{DD}=25\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.1\text{mH}$ ,  $I_{AS}=46\text{A}$
4. The power dissipation is limited by  $150^\circ\text{C}$  junction temperature.

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■ Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0V	30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55°C			5	
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Gate to Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0		2.0	V
Static Drain-Source On-Resistance (Note 2)	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 12 A			5.3	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A			9	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 12 A		47		S
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 15 V, f = 1 MHz		2295		pF
Output Capacitance	C <sub>oss</sub>			267		
Reverse Transfer Capacitance	C <sub>rss</sub>			210		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz		1.7		Ω
<b>Switching Characteristics</b>						
Total Gate Charge (4.5V)	Q <sub>g</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 15 V, I <sub>D</sub> = 10 A		21		nC
Gate Source Charge	Q <sub>gs</sub>			7		
Gate Drain Charge	Q <sub>gd</sub>			6.9		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 10 A, R <sub>G</sub> = 3.3 Ω, V <sub>GS</sub> = 10 V		9.6		ns
Turn-On Rise Time	t <sub>r</sub>			8.6		
Turn-Off Delay Time	t <sub>d(off)</sub>			59		
Turn-Off Fall Time	t <sub>f</sub>			15.6		
<b>Drain-Source Diode Characteristics</b>						
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 10 A, di/dt = 100 A/μs		12		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			4.8		nC
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2.1 A			1.2	V

## ■ Marking

Marking	K5117 KA****
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# 2KK5117

## Typical Characteristics

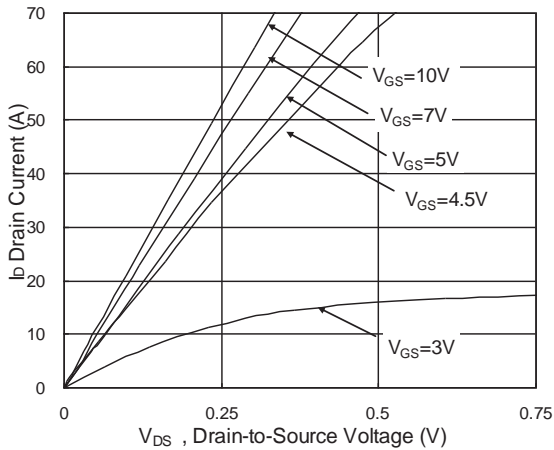


Fig.1 Typical Output Characteristics

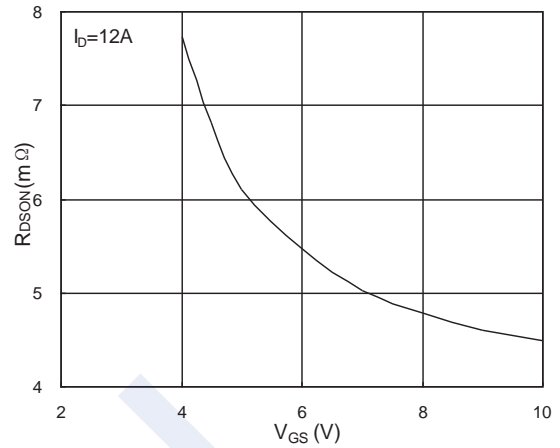


Fig.2 On-Resistance vs. Gate-Source

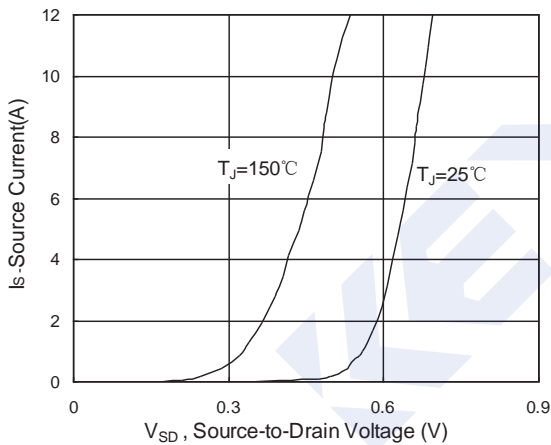


Fig.3 Forward Characteristics of Reverse

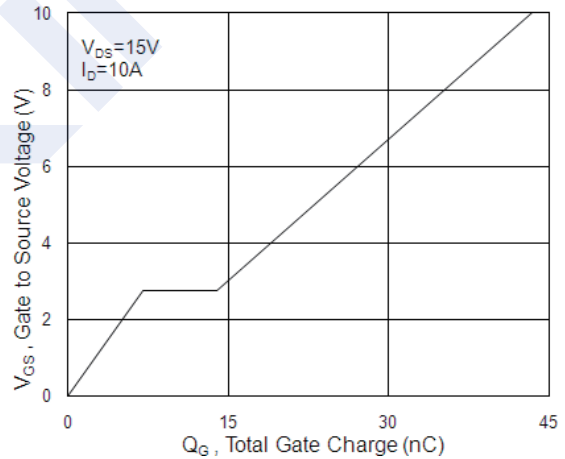


Fig.4 Gate-Charge Characteristics

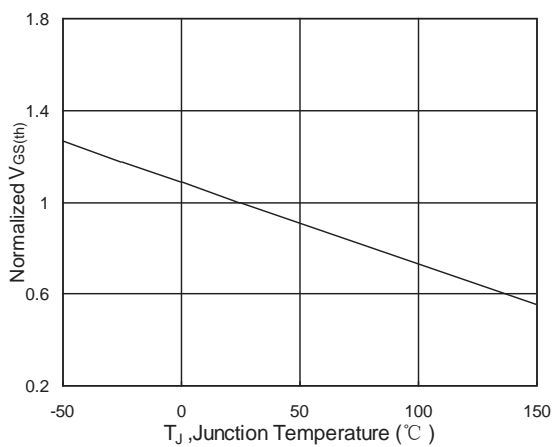


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

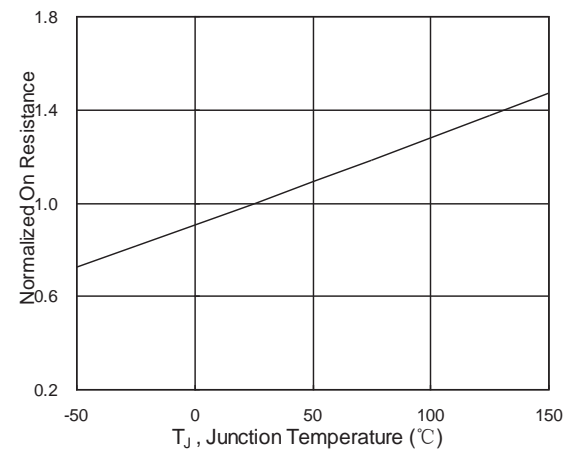


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

2KK5117

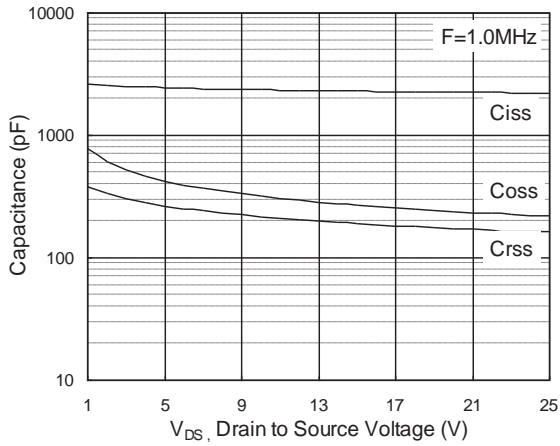


Fig.7 Capacitance

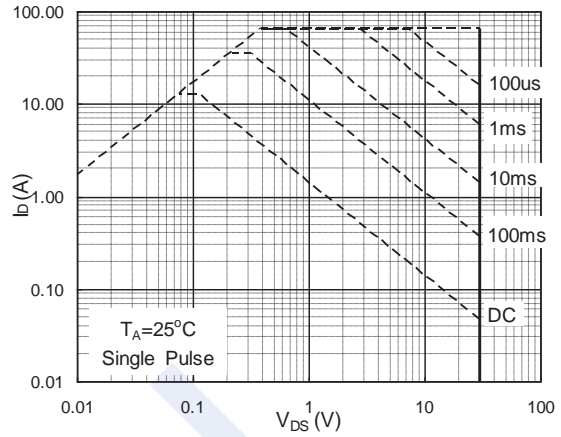


Fig.8 Safe Operating Area

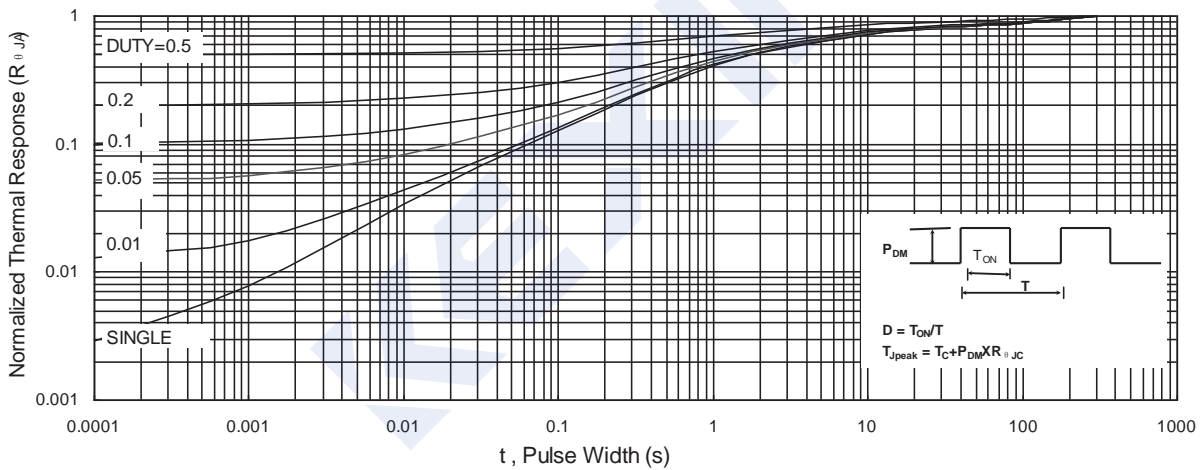


Fig.9 Normalized Maximum Transient Thermal Impedance

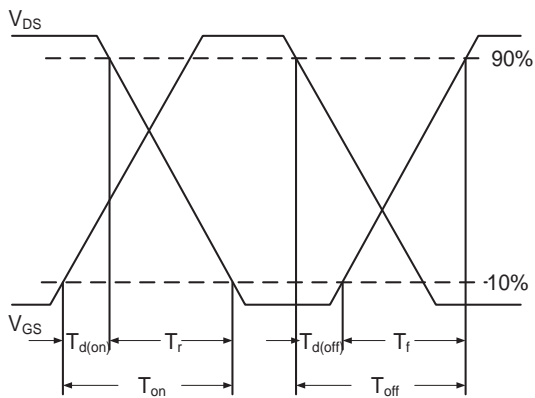


Fig.10 Switching Time Waveform

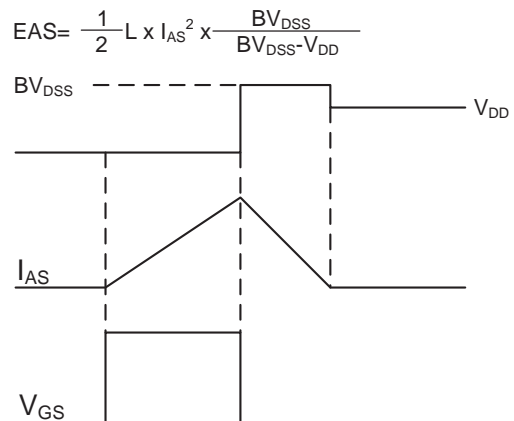


Fig.11 Unclamped Inductive Switching Waveform