DESCRIPTION

The MX4606 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device may be used to form a level shifted high side switch, and for a host of other application.

GENERAL FEATURES

N-Channel

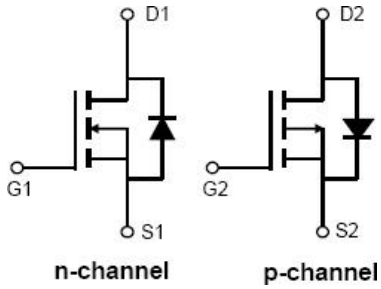
- V_{DS}=30V, I_D=6A
  $R_{DS(ON)}$(Typ.)=20mΩ @ V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=29mΩ @ V_{GS}=4.5V

P-Channel

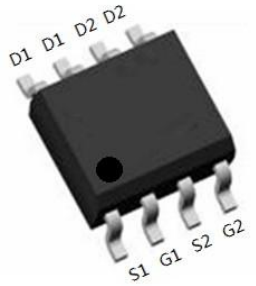
- V_{DS}=-30V, I_D=-5A
  $R_{DS(ON)}$(Typ.)=38mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$(Typ.)=58mΩ @ V_{GS}=-4.5V

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PINOUT



Schematic diagram



SOP-8 top view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MX4606	-55°C to 150°C	SOP-8	2500

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage (V_{GS}=0V)	V_{DS}	30	-30	V
Gate-Source Voltage (V_{DS}=0V)	V_{GS}	±20	±20	V
Drain Current-Continuous	I_D	6	-5	A
Pulsed Drain Current(Note1)	I_{DM}	30	-30	A
Maximum Power Dissipation(T_C=25°C)	P_D	2.5	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

N-CHANNEL ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
On/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}=30V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6A	-	20	30	mΩ
		V_{GS}=4.5V, I_D=6A	-	29	42	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=6A	3	7	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1.0MHz	-	580	-	pF
Output Capacitance	C_{oss}		-	96	-	pF
Reverse Transfer Capacitance	C_{rss}		-	72	-	pF
Total Gate Charge	Q_g	V_{DS}=10V, I_D=6A, V_{GS}=10V	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	4.5	-	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, I_D=6A, V_{GS}=10V, R_L=15Ω, R_G=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	27	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Drain-Source Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}		-	-	6	A
Diode Forward Voltage(Note1)	V_{SD}	V_{GS}=0V, I_S=6A	-	0.89	1.2	V

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Dissipation

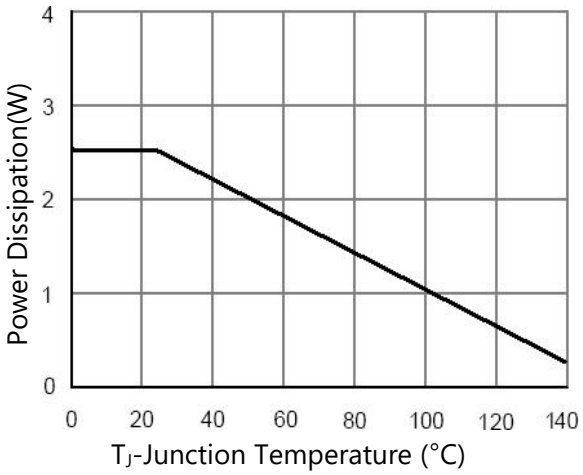


Figure 2. Drain Current

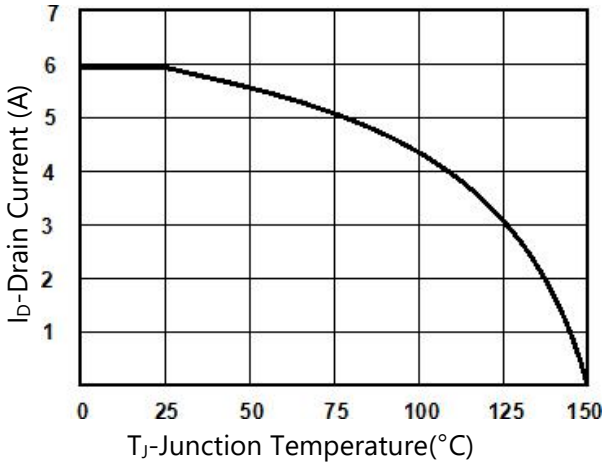


Figure 3. Output Characteristics

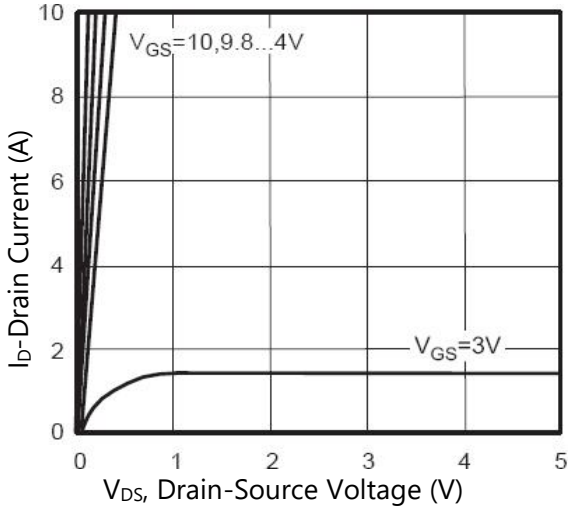


Figure 4. Transfer Characteristics

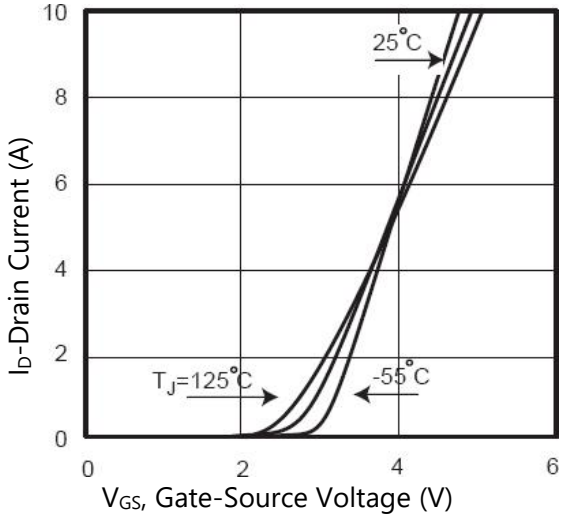


Figure 5. Capacitance

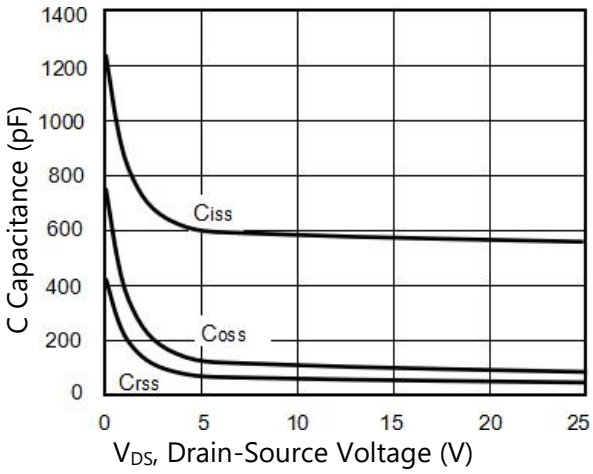
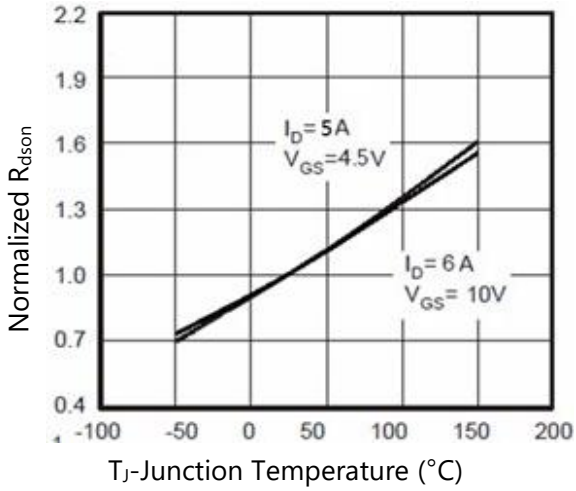
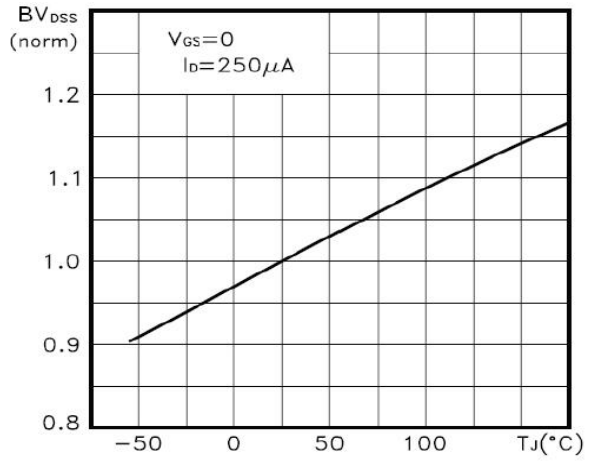


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



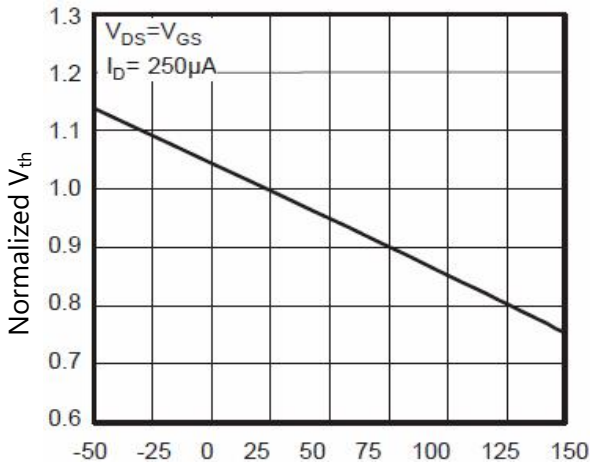
N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Max BV_{DSS} vs Junction Temperature



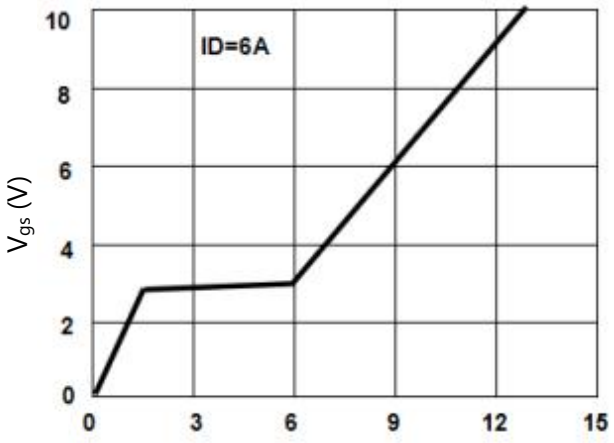
T_J-Junction Temperature (°C)

Figure 8. $V_{GS(th)}$ vs Junction Temperature



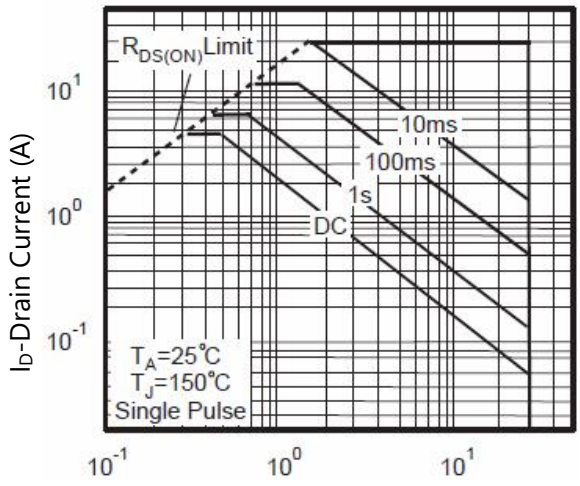
T_J-Junction Temperature (°C)

Figure 9. Gate Charge Waveforms



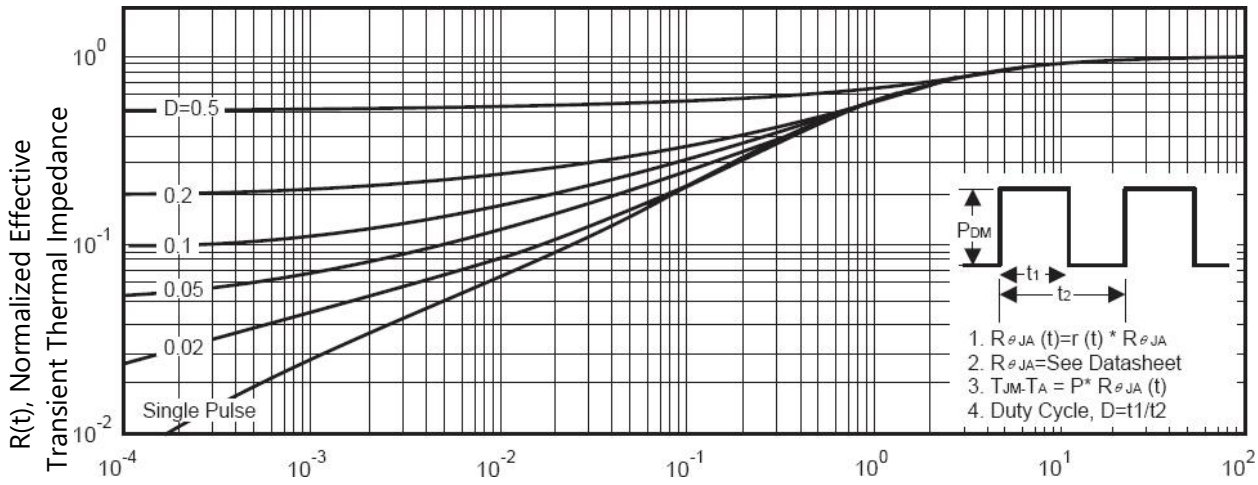
Qg (nC)

Figure 10. Maximum Safe Operating Area



V_{DS}, Drain-Source Voltage (V)

Figure11. Normalized Maximum Transient Thermal Impedance



Square Wave Pluse Duration(sec)

P-CHANNEL ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
On/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
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.6	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-5A	-	38	49	mΩ
		V_{GS}=-4.5V, I_D=-4A	-	58	90	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=6A	4	9	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	605	-	pF
Output Capacitance	C_{oss}		-	106	-	pF
Reverse Transfer Capacitance	C_{rss}		-	79	-	pF
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-5A, V_{GS}=-10V	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	1.2	-	nC
Gate-Drain Charge	Q_{gd}		-	4.5	-	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, I_D=-1A, V_{GS}=-10V, R_L=15Ω, R_G=2.5Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	7	-	nS
Drain-Source Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}		-	-	-5	A
Diode Forward Voltage(Note1)	V_{SD}	V_{GS}=0V, I_S=-1.7A	-	-	-1.2	V

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Dissipation

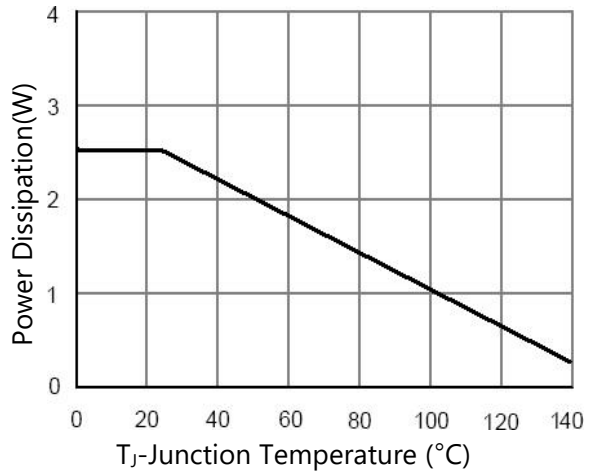


Figure 2. Drain Current

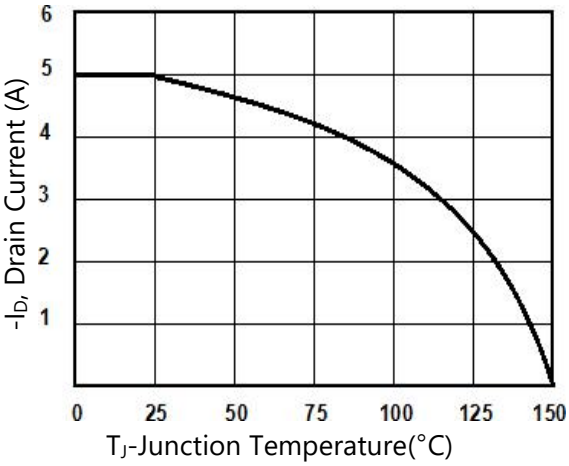


Figure 3. Output Characteristics

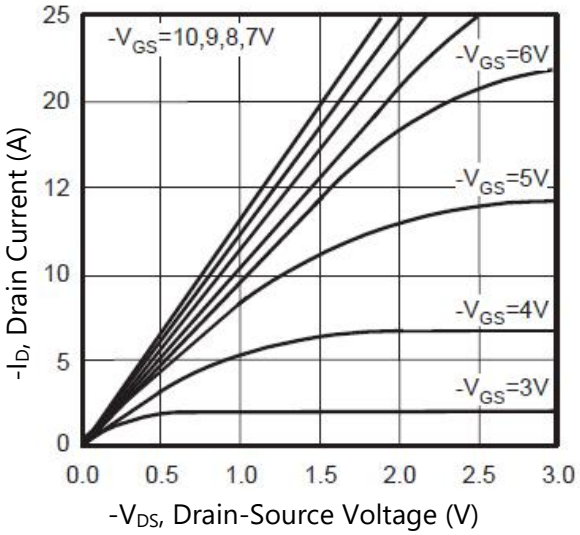


Figure 4. Transfer Characteristics

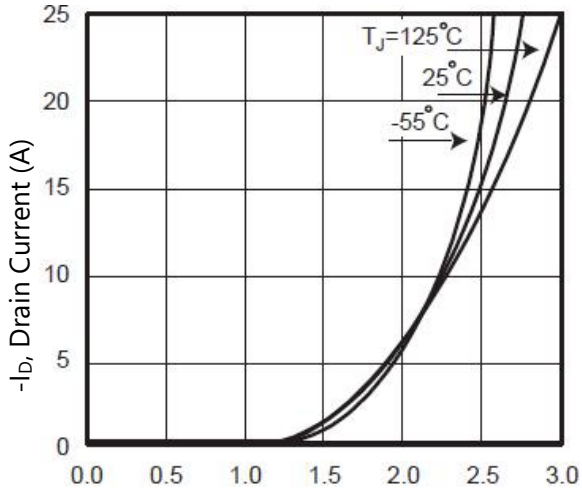


Figure 5. Capacitance

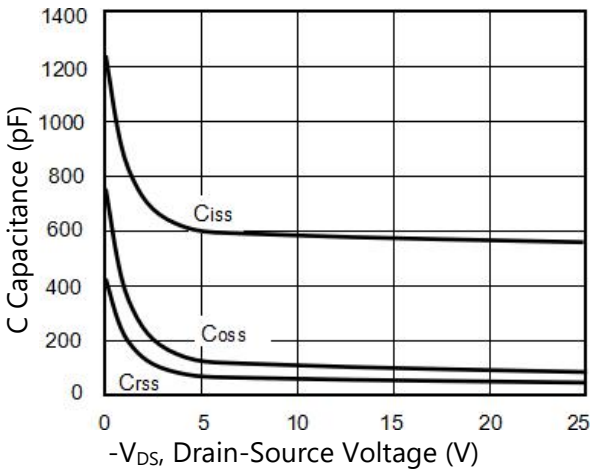
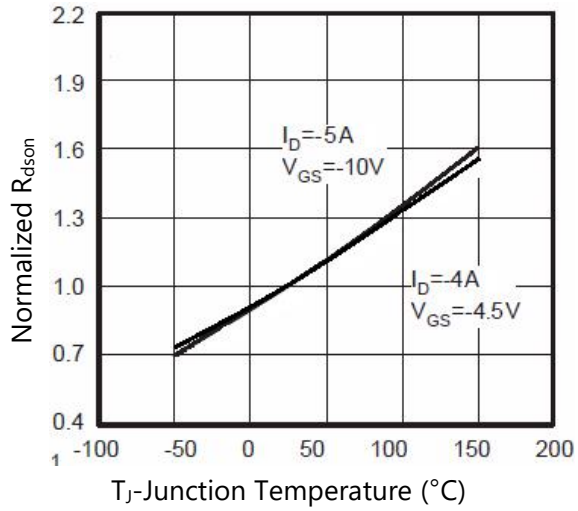
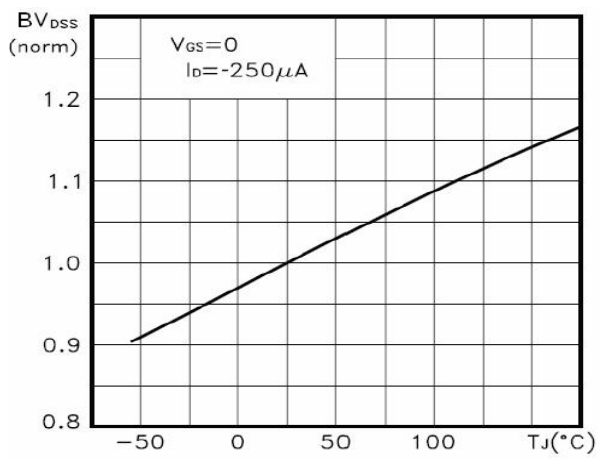


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



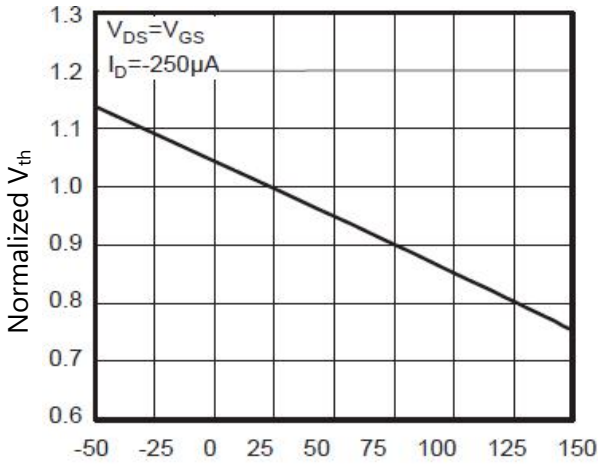
P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Max BV_{DSS} vs Junction Temperature



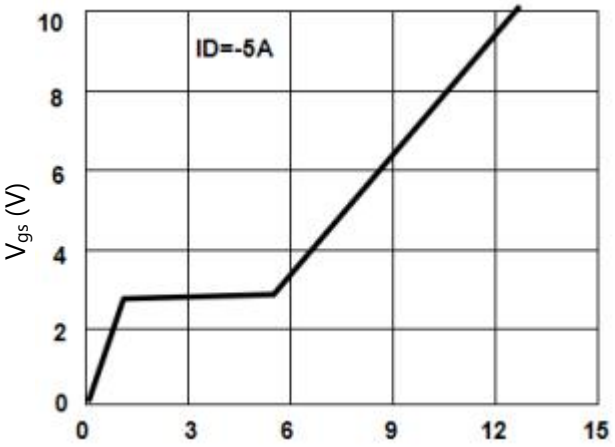
T_J-Junction Temperature (°C)

Figure 8. $V_{GS(th)}$ vs Junction Temperature



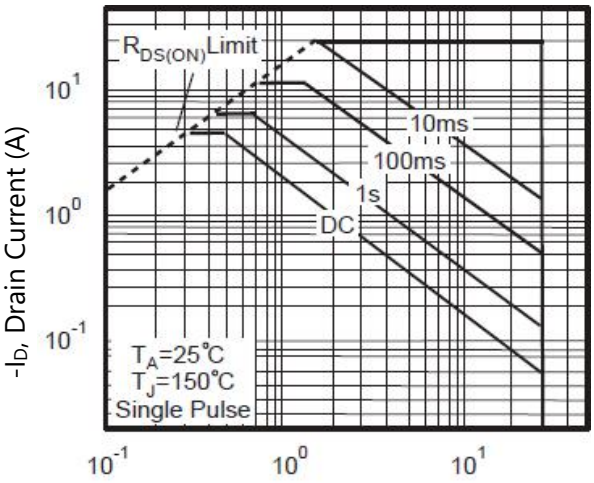
T_J-Junction Temperature (°C)

Figure 9. Gate Charge Waveforms



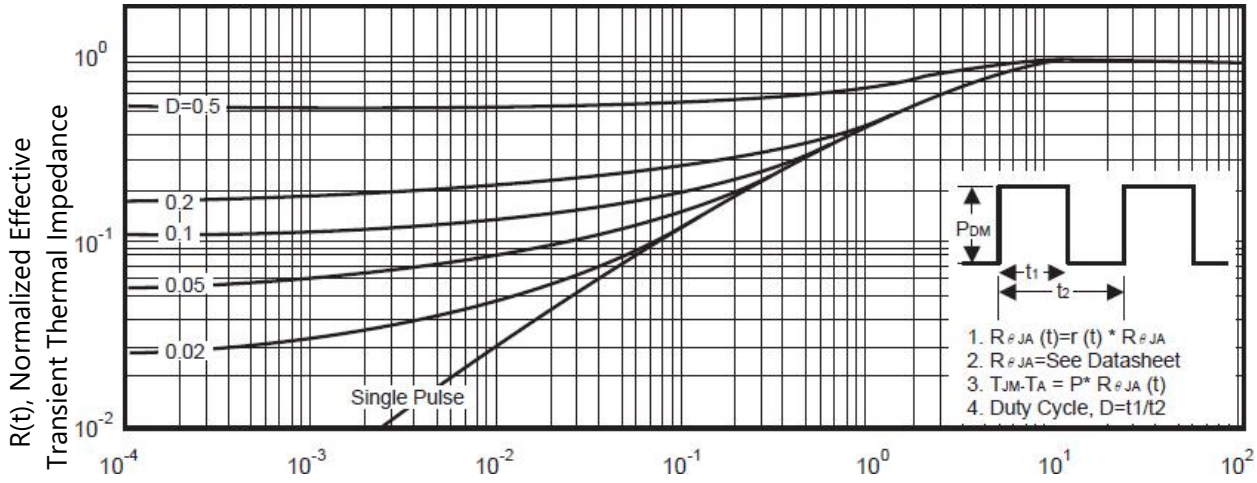
Qg (nC)

Figure 10. Maximum Safe Operating Area



$-V_{DS}$, Drain-Source Voltage (V)

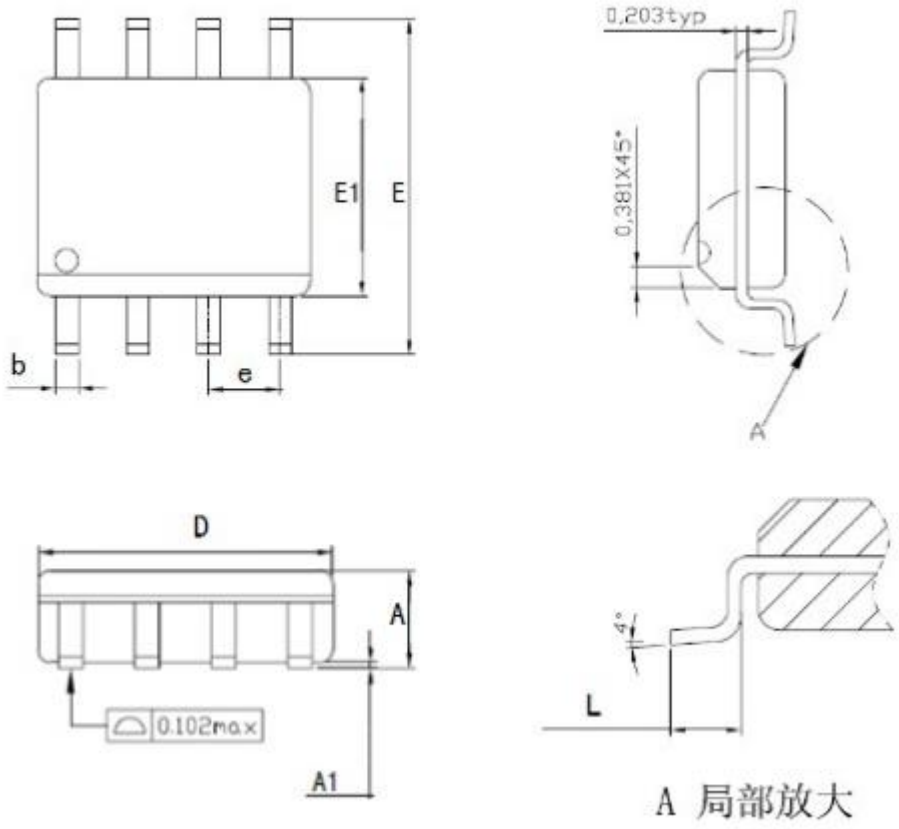
Figure11. Normalized Maximum Transient Thermal Impedance



Square Wave Pluse Duration(sec)

PACKAGE INFORMATION

SOP-8



Symbol	Dimensions InMillimeters		
	Min.	Typ.	Max.
A	1.35	1.55	1.75
A1	0.1	0.15	0.2
b	0.346	0.406	0.466
D	4.8	4.89	4.98
E	5.75	6.00	6.25
E1	3.81	3.90	3.99
e	1.27TYP.		
L	0.406	0.838	1.27