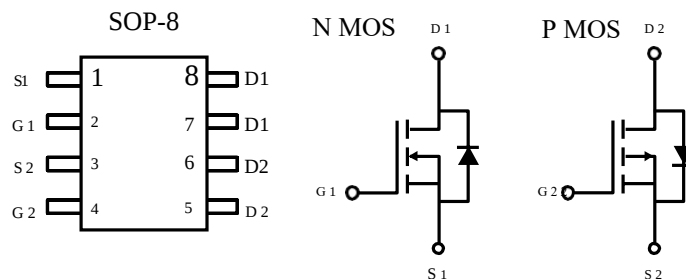


Complementary High Density Trench MOSFET

Features

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- Reliable and Rugged
- Green Device Available



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

Parameter	Symbol	N-Channel	P-Channel	Unit
	V _{DS}	100	-100	V
Gate-Source Voltage	V _{GS}	± 20	± 20	V
Continuous Drain Current, V _{GS} @ 10V ¹ @ T _A = 25 °C	I _D	3.0	-2.1	A
Continuous Drain Current, V _{GS} @ 10V ¹ @ T _A = 70°C	I _D	2.4	-1.7	A
Pulsed Drain Current ²	I _{DM}	10	-10	A
Single Pulse Avalanche Energy ³	E _{AS}	25	49	mJ
Avalanche Current	I _{AS}	10	-14	A
Maximum Power Dissipation ⁴	P _D	2.1	2.1	W
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	- 55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance Junction-ambient 1(t≤10S)	R _{θJA}	60	°C/W
Thermal Resistance Junction-ambient 1(Steady State)		100	°C/W
Thermal Resistance Junction-case ¹	R _{θJC}	36	°C/W

Note

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH,I_{AS}=10A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

N-Channel ELECTRICAL CHARACTERISTICS (TA= 25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V , I _D = 250uA	100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 80V , V _{GS} = 0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V , V _{DS} = 0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	1.2		2.7	V
Drain-Source On-State Resistance ²	R _{DS(on)}	V _{GS} = 10V , I _D = 2.5A		80	100	mΩ
		V _{GS} = 4.5V , I _D = 2.0A		90	125	mΩ
Gate Resistance	R _g	V _{DS} =0V , V _{GS} =0V , f=1MHz		3.5		Ω
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Source Current ^{1,5}	I _S	V _G =V _D =0V , Force Current			2	A
Diode Forward Voltage	V _{SD}	V _{GS} = 0V , I _S = 1.0A			1.2	V

DYNAMIC CHARACTERISTICS

Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V$ $f = 1.0MHz$		987		pF
Output Capacitance	C_{oss}			38		pF
Reverse Transfer Capacitance	C_{rss}			26		pF

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 30V,$ $V_{GEN} = 10V$ $I_D = 1A$ $R_{GEN} = 3.3 \Omega$		8		ns
Rise Time	t_r			12		ns
Turn-Off Delay Time	$t_{D(OFF)}$			20		ns
Fall Time	t_f			6		ns
Total Gate Charge	Q_g	$V_{DS} = 5048V$ $I_D = 2A, V_{GS} = 10V$		15		nC
Gate-Source Charge	Q_{gs}			3.2		nC
Gate-Drain Charge	Q_{gd}			2.6		nC

N-Channel ELECTRICAL CHARACTERISTICS (TA= 25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V , I _D = -250uA	-100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -80V , V _{GS} = 0V			-1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V , V _{DS} = 0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250uA	-1.2		-2.5	V
Drain-Source On-State Resistance ²	R _{DS(on)}	V _{GS} = -10V , I _D = -2A		180	220	mΩ
		V _{GS} = -4.5V , I _D = -1.6A		200	255	mΩ
Gate Resistance	R _g	V _{DS} =0V , V _{GS} =0V , f=1MHz		13		Ω
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Source Current ^{1,5}	I _S	V _G =V _D =0V , Force Current			-1.5	A
Diode Forward Voltage	V _{SD}	V _{GS} = 0V , I _S = -1.0A			-1.2	V

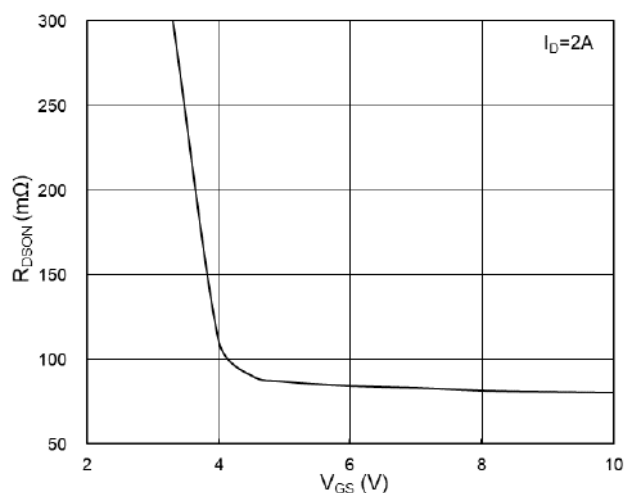
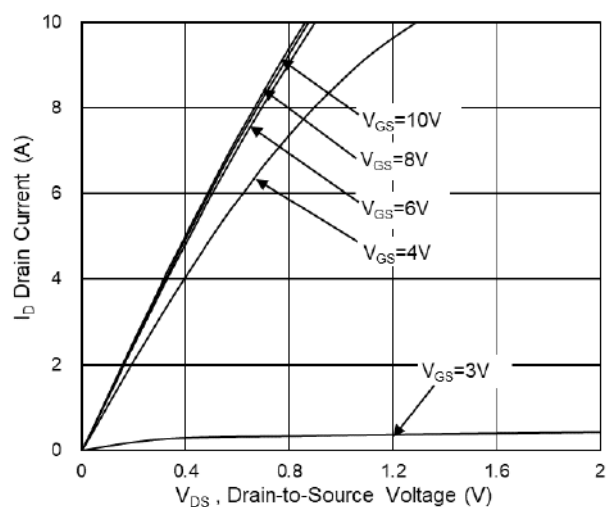
DYNAMIC CHARACTERISTICS

Input Capacitance	C_{iss}	$V_{DS} = -30V$, $V_{GS} = 0V$ $f = 1.0MHz$		1228		pF
Output Capacitance	C_{oss}			41		pF
Reverse Transfer Capacitance	C_{rss}			29		pF

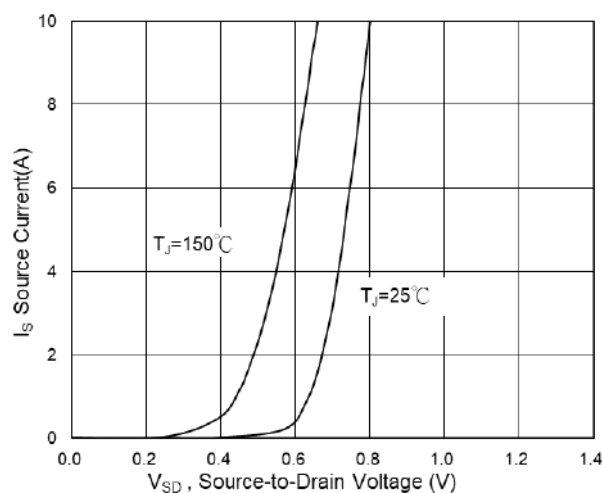
SWITCHING CHARACTERISTICS

Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = -30V$, $V_{GEN} = -10V$ $I_D = -1A$ $R_{GEN} = 3.3 \Omega$		9		ns
Rise Time	t_r			6		ns
Turn-Off Delay Time	$t_{D(OFF)}$			39		ns
Fall Time	t_f			33		ns
Total Gate Charge	Q_g	$V_{DS} = -50V$ $I_D = -2A$ $V_{GS} = -10V$		19		nC
Gate-Source Charge	Q_{gs}			3.4		nC
Gate-Drain Charge	Q_{gd}			2.9		nC

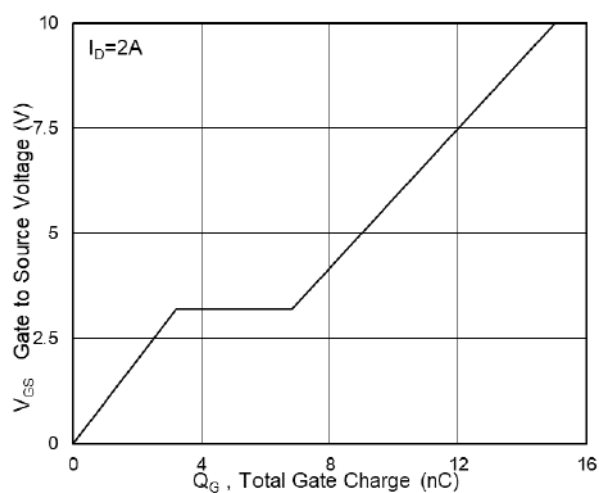
N-Channel Typical Characteristics



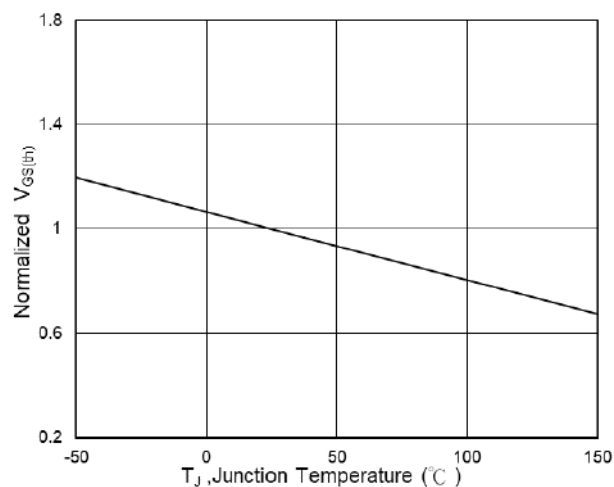
Typical Output Characteristics



On-Resistance vs G-S Voltage

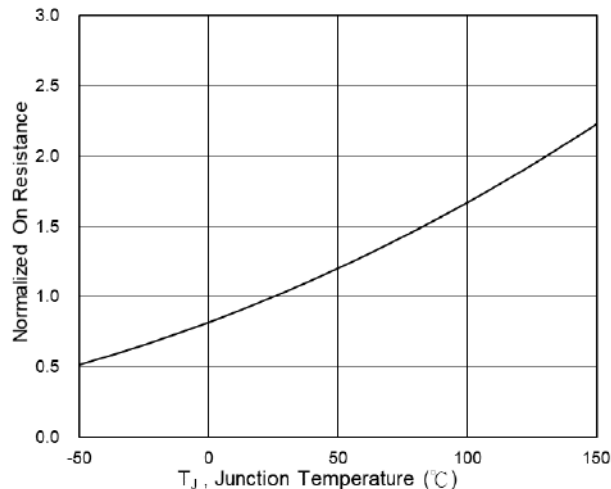


Source Drain Forward Characteristics

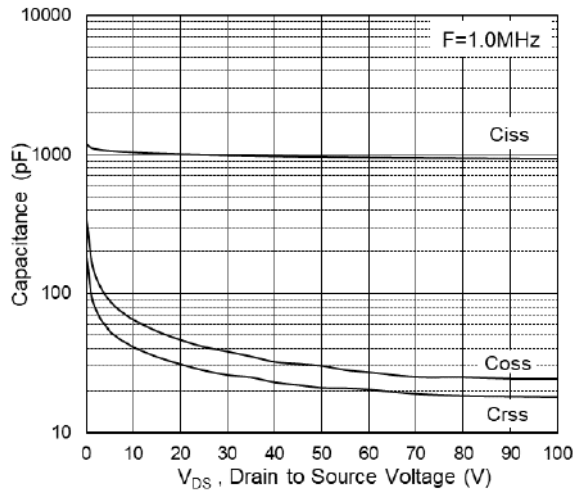


Normalized $V_{GS(th)}$ vs T_J

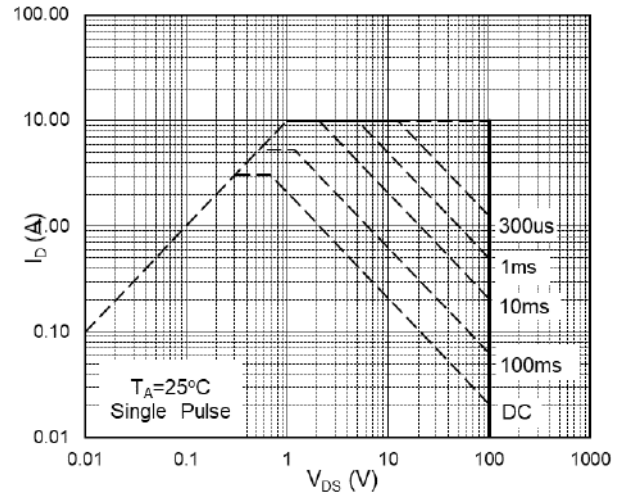
Gate-Charge Characteristics



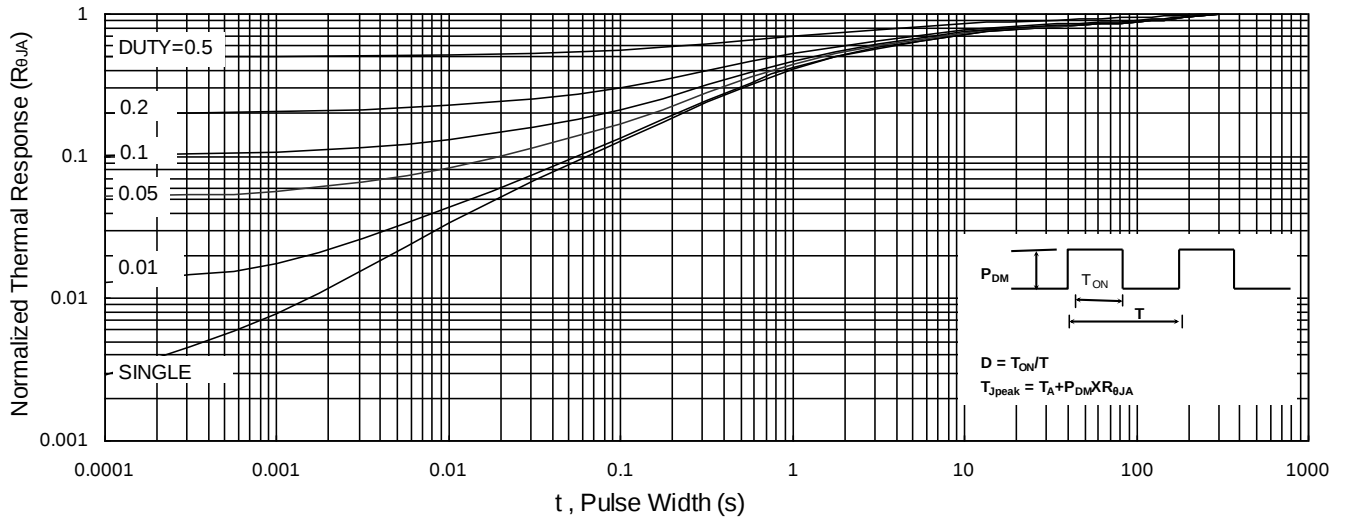
Normalized $R_{DS(on)}$ vs T_J



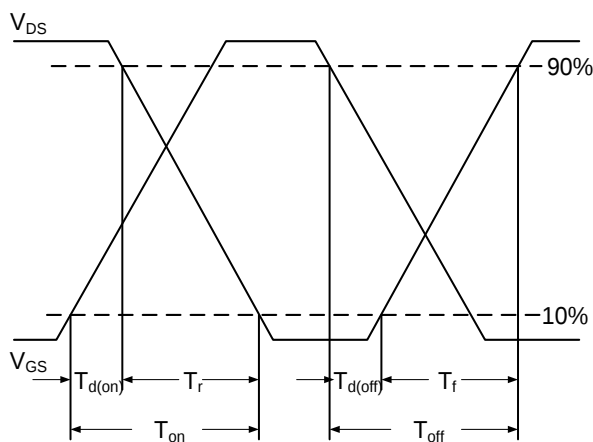
Capacitance



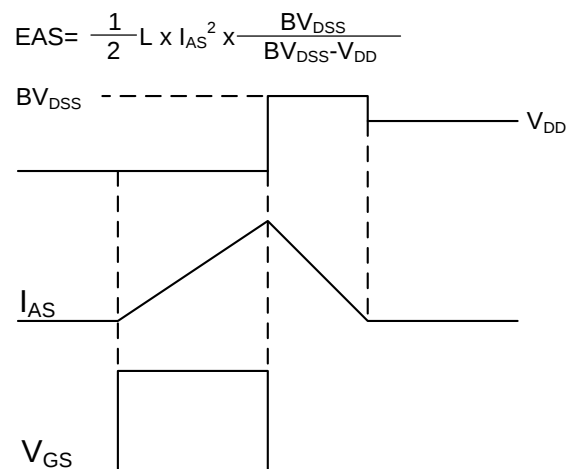
Safe Operating Area



Normalized Maximum Transient Thermal Impedance

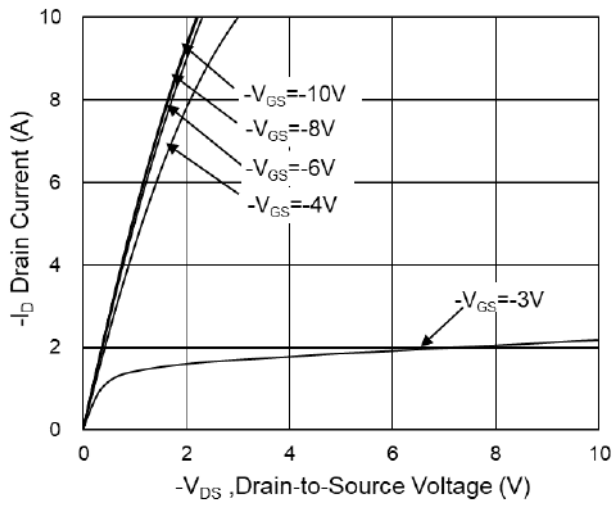


Switching Time Waveform

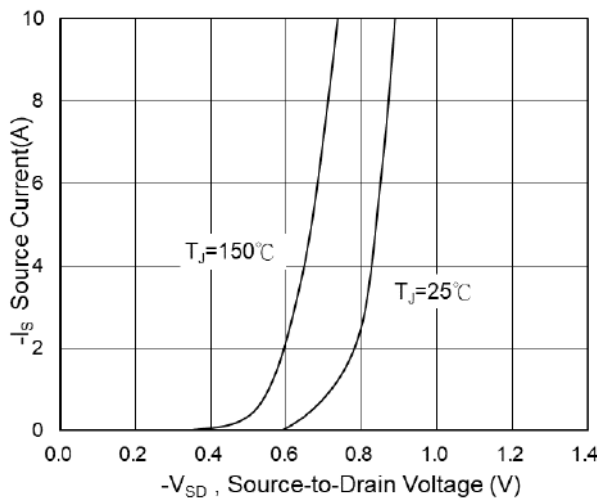


Unclamped Inductive Waveform

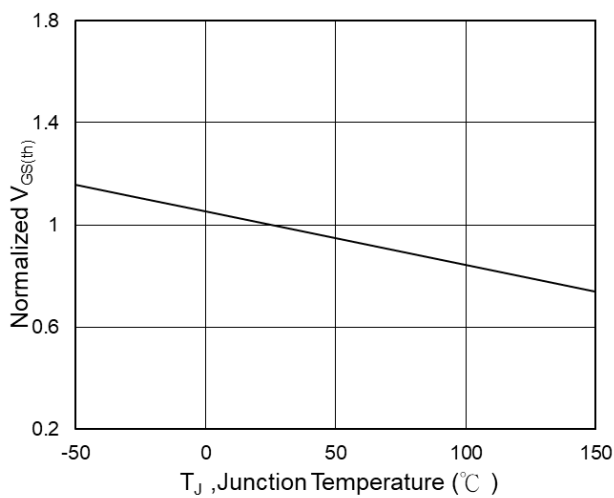
P Channel Typical Characteristics



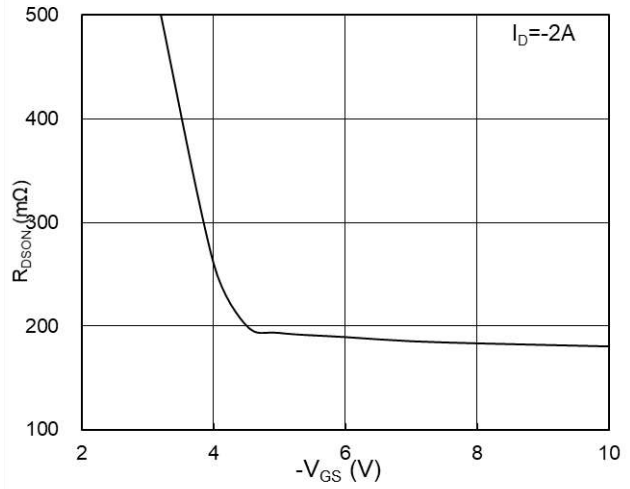
Typical Output Characteristics



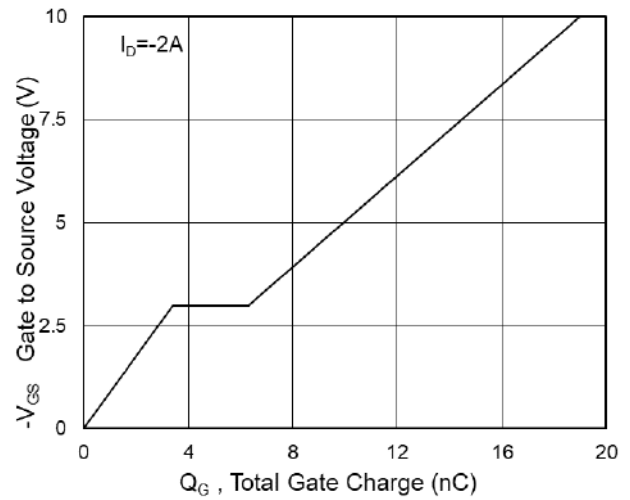
Source Drain Forward Characteristics



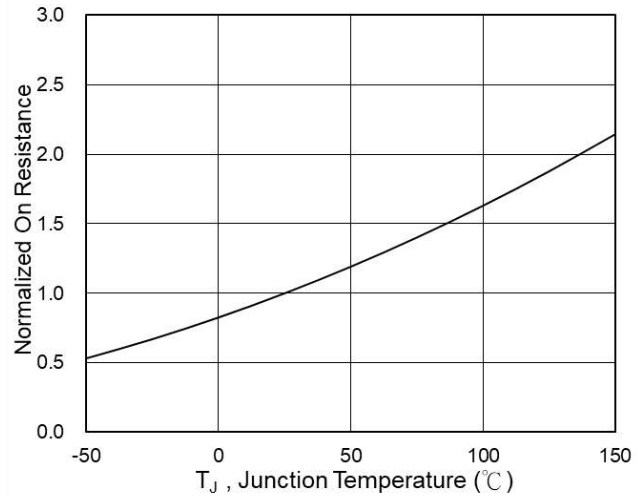
Normalized $V_{GS(th)}$ vs T_J



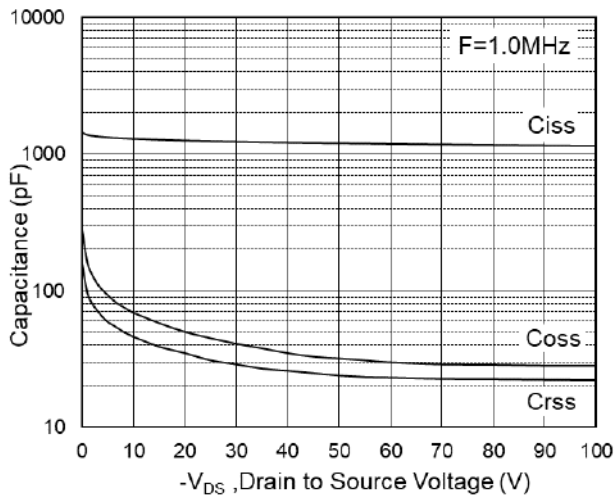
On-Resistance vs G-S Voltage



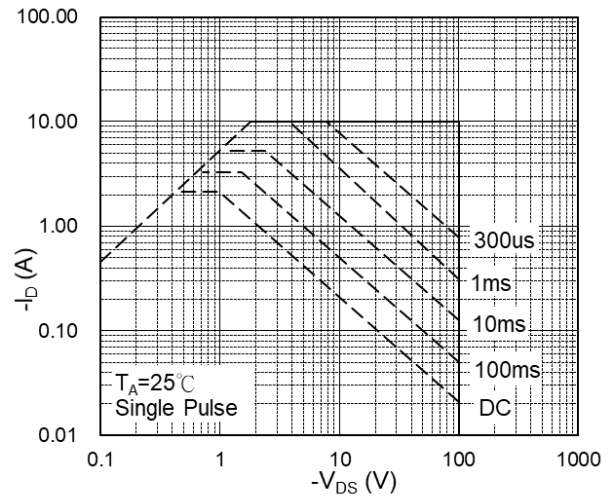
Gate-Charge Characteristics



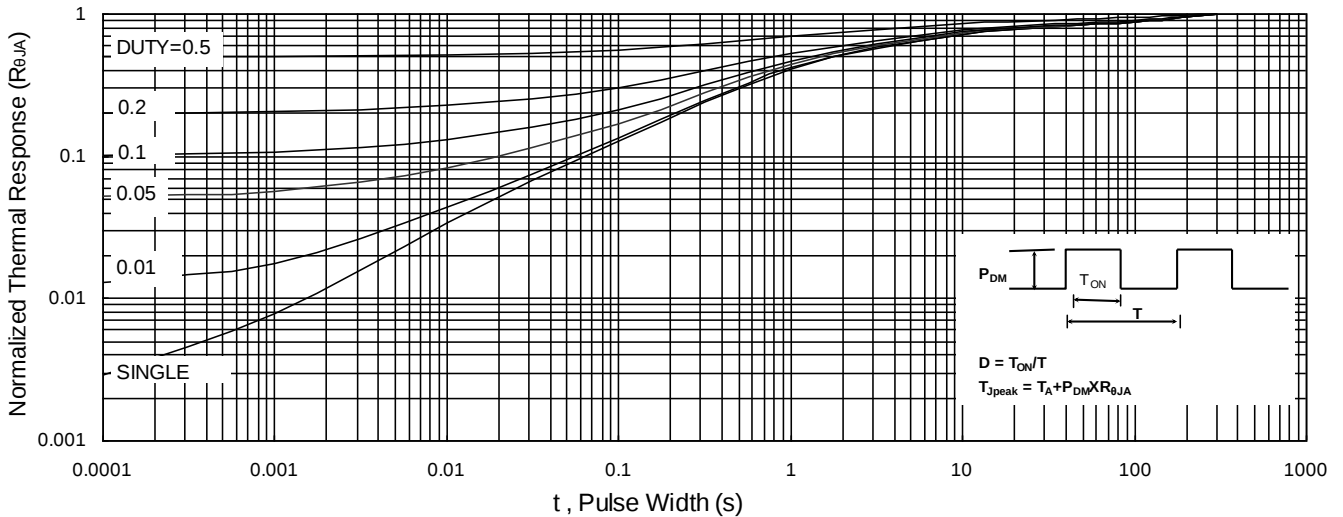
Normalized $R_{DS(on)}$ vs T_J



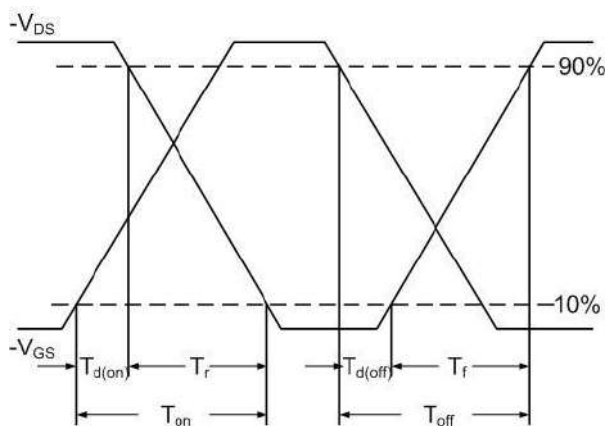
Capacitance



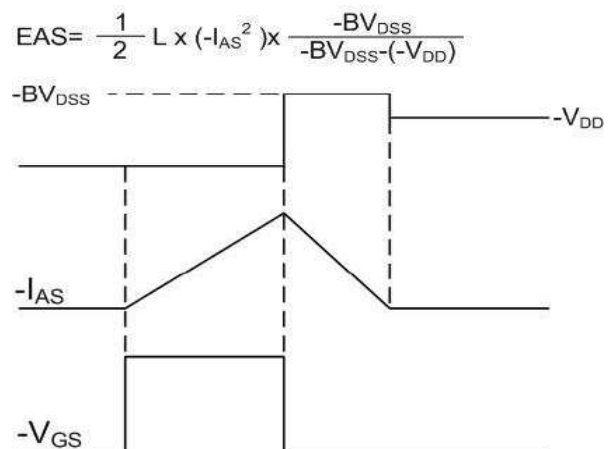
Safe Operating Area



Normalized Maximum Transient Thermal Impedance



Switching Time Waveform



Unclamped Inductive Waveform