

N- and P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

	V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
N-Channel	30	16 at V _{GS} = 10 V	8 ^a	10
		20 at V _{GS} = 4.5 V	8	
P-Channel	-30	29 at V _{GS} = -10 V	-8 ^a	21
		39 at V _{GS} = -4.5 V	-7.5	

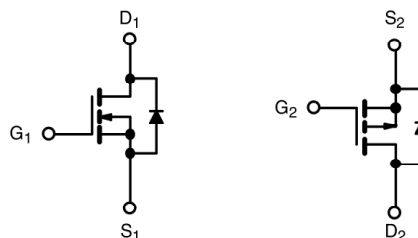
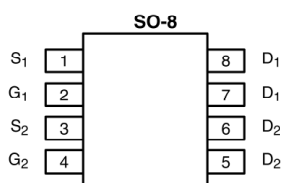
FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC


RoHS
 COMPLIANT

APPLICATIONS

- Motor Drive



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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	30	-30	V
Gate-Source Voltage	V _{GS}	±20	±20	
Continuous Drain Current (T _J = 150 °C)	I _D	8 ^e	-8 ^e	A
		6.8	-6.8	
		6.8 ^{b, c}	-6.6 ^{b, c}	
		5.4 ^{b, c}	-5.3 ^{b, c}	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	40	-40	
Source-Drain Current Diode Current	I _S	8	-8	A
		1.6 ^{b, c}	-1.6 ^{b, c}	
Pulsed Source-Drain Current	I _{SM}	40	-40	
Single Pulse Avalanche Current	I _{AS}	10	-20	
Single Pulse Avalanche Energy	E _{AS}	5	20	mJ
Maximum Power Dissipation	P _D	3.1	3.2	W
		2	2.1	
		2 ^{b, c}	2 ^{b, c}	
		1.28 ^{b, c}	1.28 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 175		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	N-Channel		P-Channel		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	50	62.5	47	62.5	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	30	40	29	38	

Notes:

 a. Based on T_C = 25 °C.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 s.

d. Maximum under steady state conditions is 120 °C/W (n-channel) and 110 °C/W (p-channel).

e. Package limited.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)								
Parameter	Symbol	Test Conditions		Min.	Typ. ^a	Max.	Unit	
Static								
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	N-Ch	30			V	
		V _{GS} = 0 V, I _D = - 250 μA	P-Ch	- 30				
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA	N-Ch		30		mV/°C	
		I _D = - 250 μA	P-Ch		- 24			
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J	I _D = 250 μA	N-Ch		- 4.1			
		I _D = - 250 μA	P-Ch		5			
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1		2.2	V	
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1.2		- 2.5		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	N-Ch			± 100	nA	
		V _{DS} = 0 V, V _{GS} = ± 20 V	P-Ch			± 100		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	N-Ch			1	μA	
		V _{DS} = - 30 V, V _{GS} = 0 V	P-Ch			- 1		
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			10		
		V _{DS} = - 24 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			- 10		
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	N-Ch	8			A	
		V _{DS} = - 5 V, V _{GS} = - 10 V	P-Ch	- 8				
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 6A	N-Ch		16	20	mΩ	
		V _{GS} = - 10 V, I _D = - 4.5 A	P-Ch		29	35		
		V _{GS} = 4.5 V, I _D = 5 A	N-Ch		20	26		
		V _{GS} = - 4.5 V, I _D = - 4 A	P-Ch		39	55		
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 6 A	N-Ch		27		S	
		V _{DS} = - 15 V, I _D = - 4.5 A	P-Ch		25			
Dynamic ^a								
Input Capacitance	C _{iss}	N-Channel V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz	N-Ch		435		pF	
			P-Ch		545			
Output Capacitance	C _{oss}	P-Channel V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz	N-Ch		70			
			P-Ch		80			
Reverse Transfer Capacitance	C _{rss}		N-Ch		61			
			P-Ch		55			
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 6 A	N-Ch		10		nC	
			P-Ch		21			
Gate-Source Charge	Q _{gs}	P-Channel V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 4.5 A	N-Ch		2			
			P-Ch		5			
Gate-Drain Charge	Q _{gd}		N-Ch		1			
			P-Ch		9			
Gate Resistance	R _g	f = 1 MHz	N-Ch		5		Ω	
			P-Ch		6			

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions		Min.	Typ. ^a	Max.	Unit
Dynamic ^a							
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 3.7 Ω I _D ≡ 6 A, V _{GEN} = 10 V, R _g = 1 Ω	N-Ch		5		ns
Rise Time	t _r		P-Ch		10		
			N-Ch		10		
Turn-Off Delay Time	t _{d(off)}		P-Ch		9		
		N-Ch		16			
Fall Time	t _f	P-Ch		50			
		N-Ch		7			
Turn-On Delay Time	t _{d(on)}	P-Channel V _{DD} = - 15 V, R _L = 2 Ω I _D ≡ - 4.5 A, V _{GEN} = - 10 V, R _g = 1 Ω	P-Ch		13		
			N-Ch		11		
			P-Ch		42		
			Rise Time	t _r	N-Ch		12
P-Ch		40					
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = - 15 V, R _L = 2 Ω I _D ≡ - 4 A, V _{GEN} = - 4.5 V, R _g = 1 Ω	N-Ch		17		
			P-Ch		40		
Fall Time	t _f	N-Ch		7			
		P-Ch		18			
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	N-Ch			2.6	A
			P-Ch			- 2.6	
Pulse Diode Forward Current ^a	I _{SM}		N-Ch			40	
			P-Ch			- 40	
Body Diode Voltage	V _{SD}	I _S = 6 A	N-Ch		0.81	1.2	V
		I _S = - 4.5 A	P-Ch		- 0.77	- 1.2	
Body Diode Reverse Recovery Time	t _{rr}	N-Channel I _F = 5 A, dI/dt = 100 A/μs, T _J = 25 °C	N-Ch		17		ns
			P-Ch		41		
Body Diode Reverse Recovery Charge	Q _{rr}		N-Ch		10		nC
			P-Ch		32		
Reverse Recovery Fall Time	t _a	P-Channel I _F = - 5 A, dI/dt = - 100 A/μs, T _J = 25 °C	N-Ch		10		ns
			P-Ch		15		
Reverse Recovery Rise Time	t _b		N-Ch		7		
			P-Ch		26		

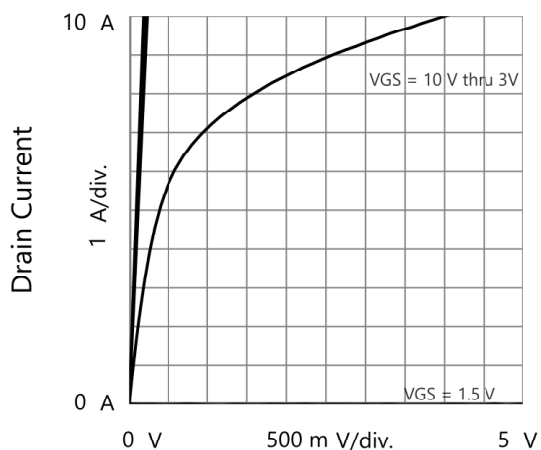
Notes:

a. Guaranteed by design, not subject to production testing.

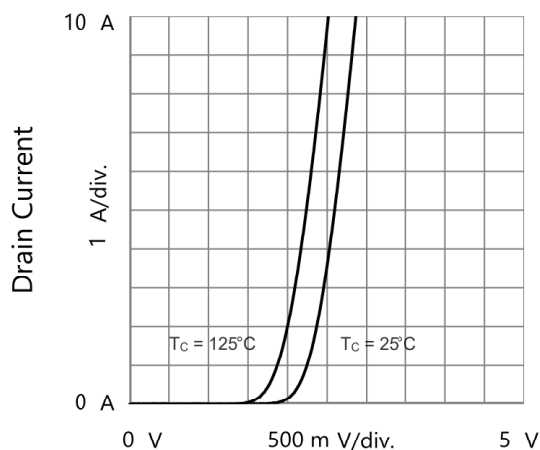
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

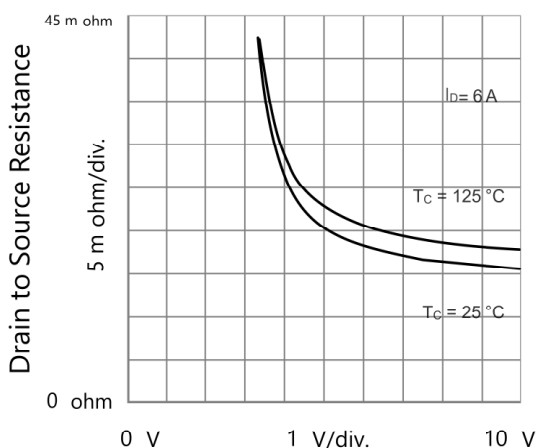
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



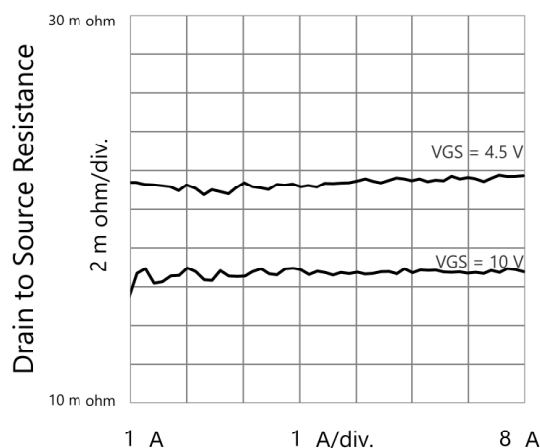
Drain to Source Voltage
Output Characteristics



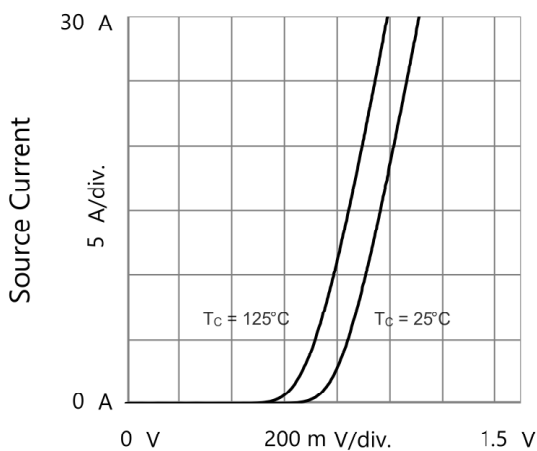
Gate to Source Voltage
Transfer Characteristics



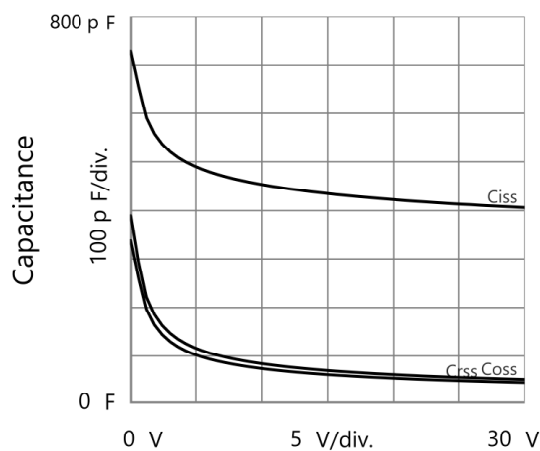
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

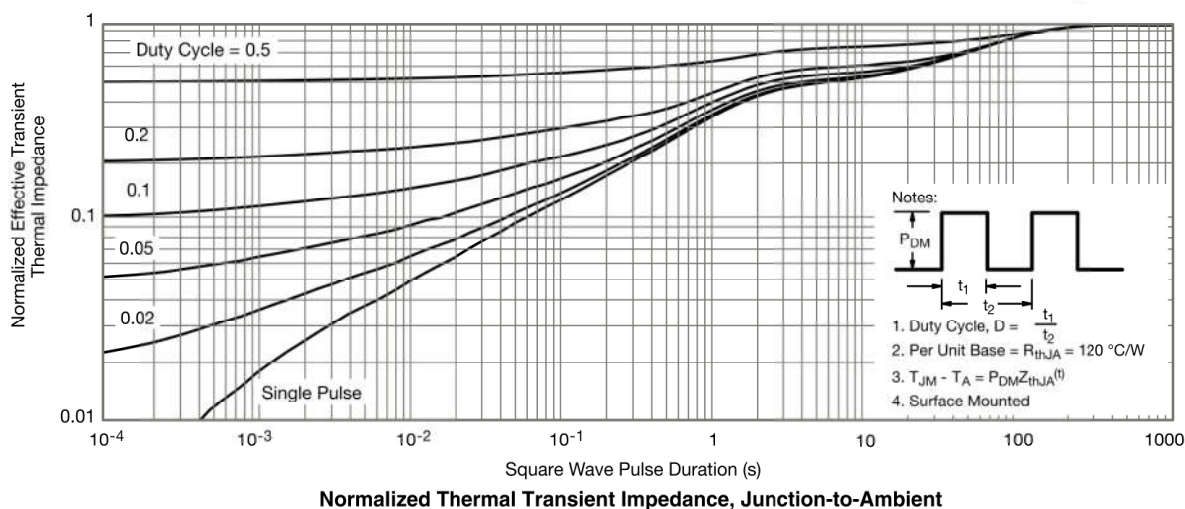
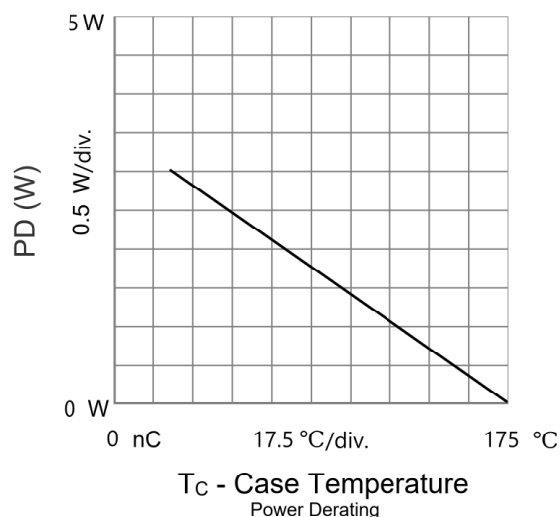
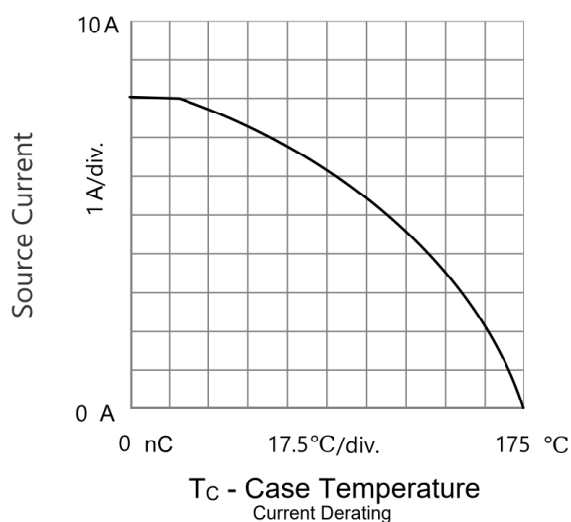
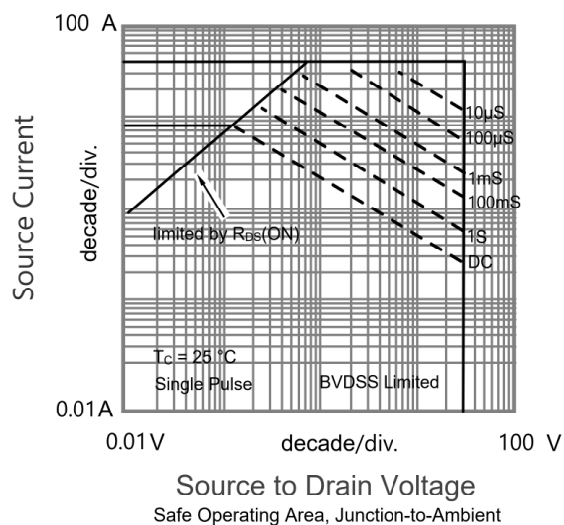
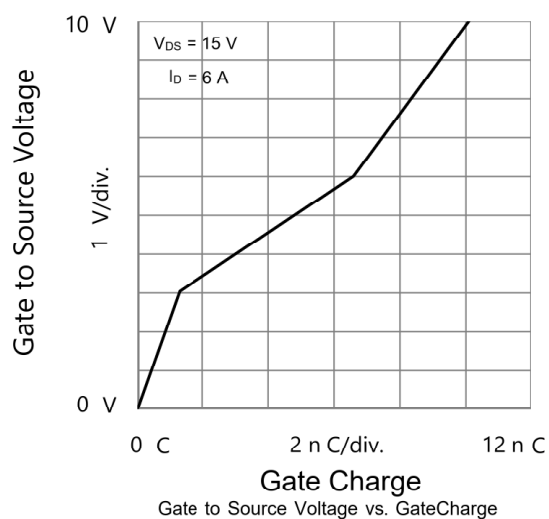


Source to Drain Voltage
Body Diode Forward Characteristics

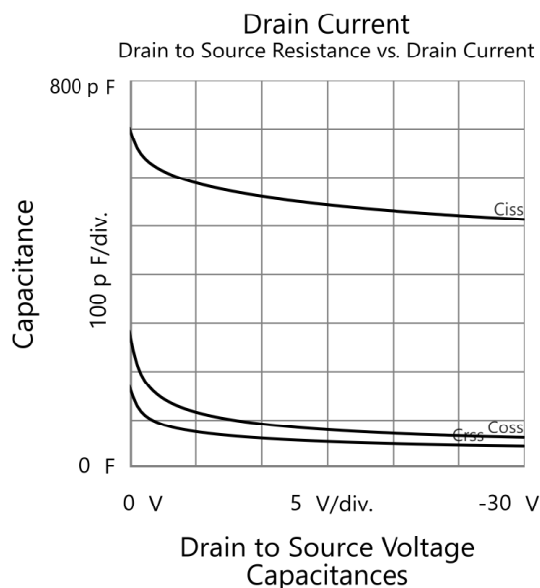
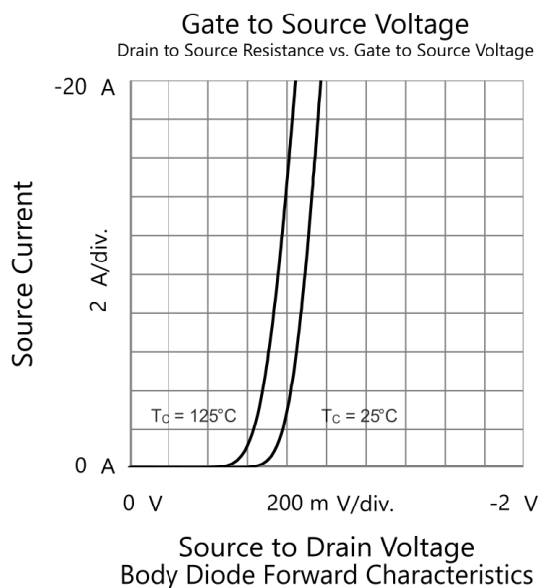
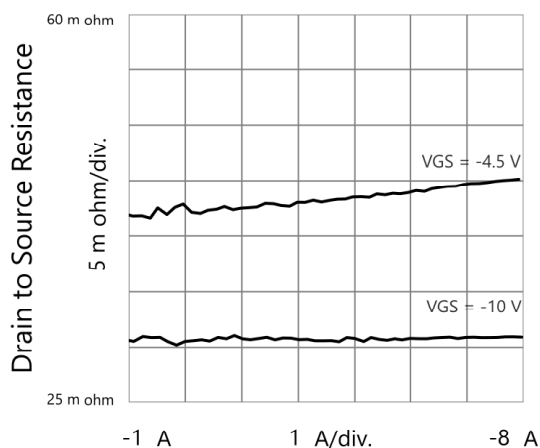
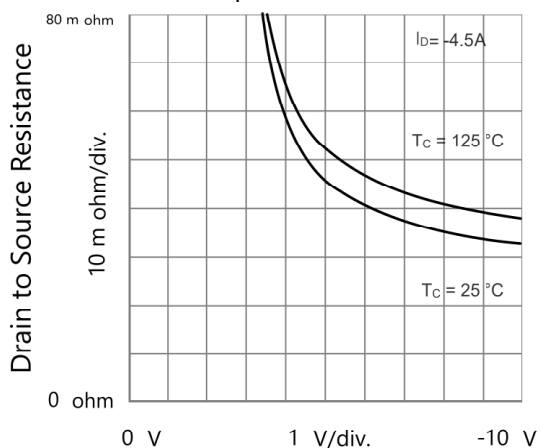
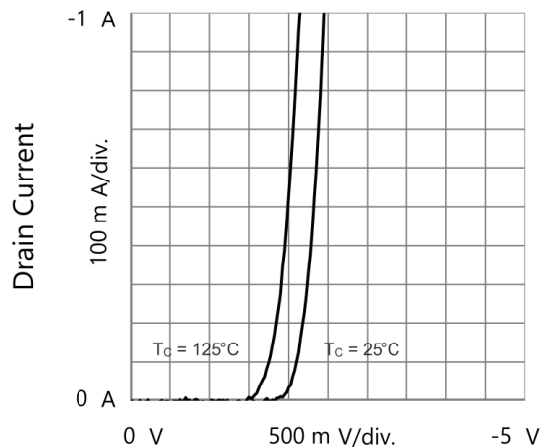
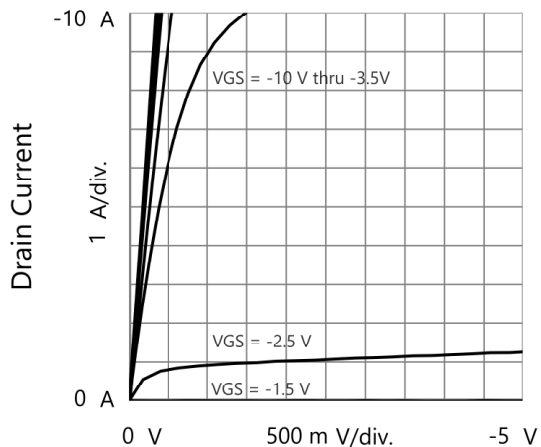


Drain to Source Voltage
Capacitances

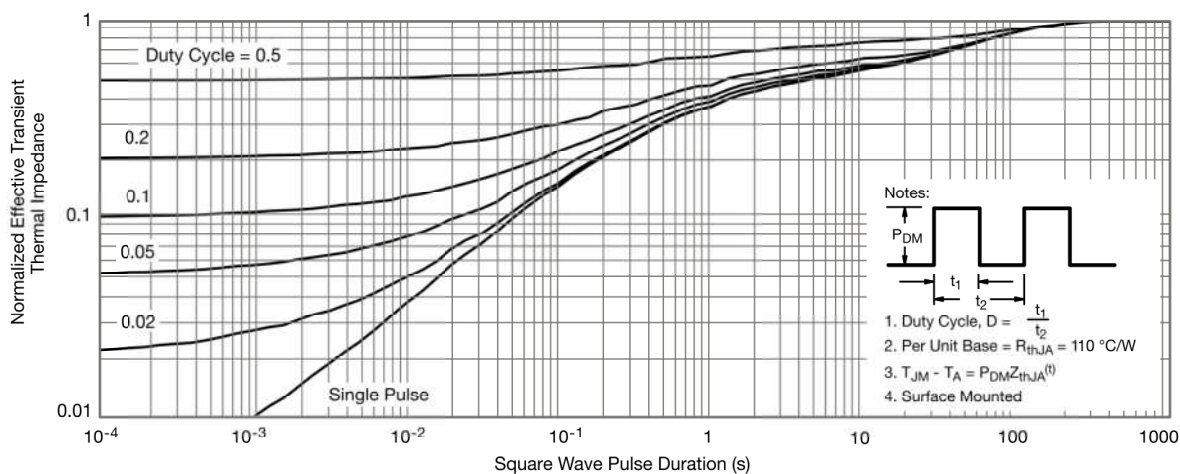
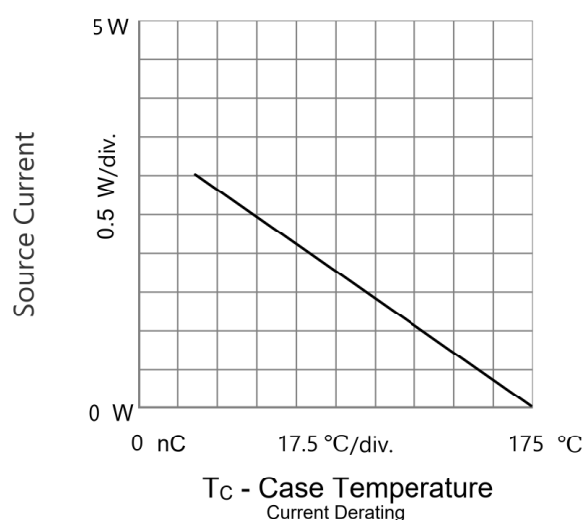
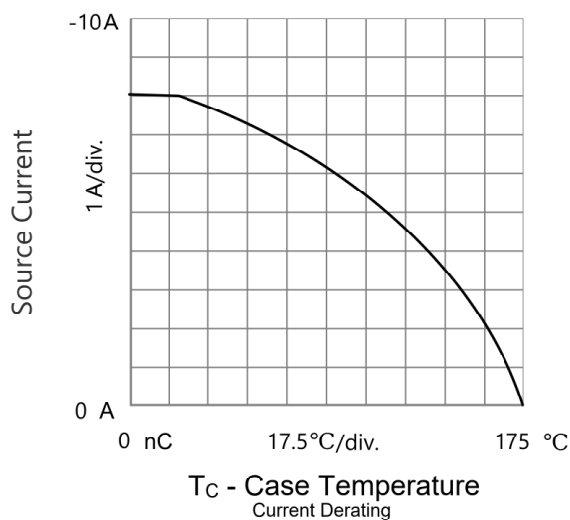
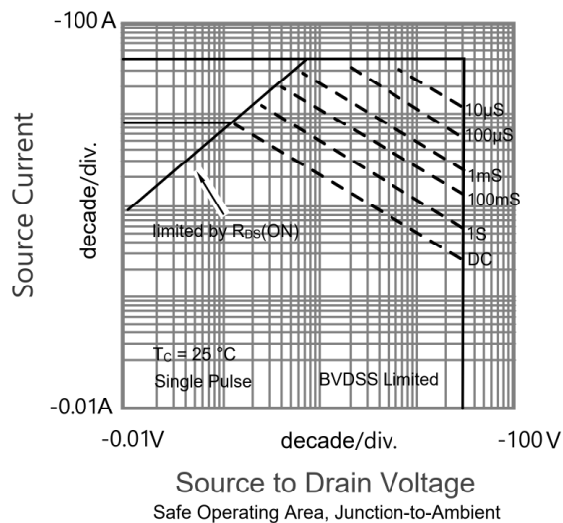
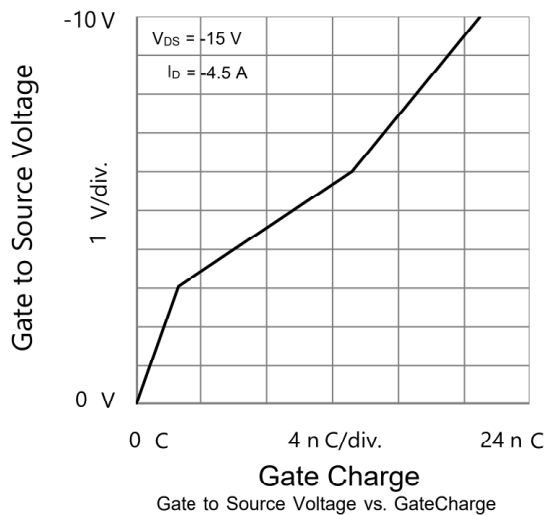
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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