

N/P Channel MOSFET ESD

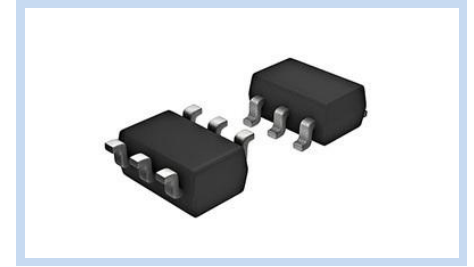
30V 0.57/0.44A 0.42W SOT-363

MFT3NPA57S363E

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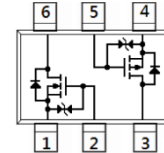
FEATURE

- $R_{DS(ON)} < 0.5\Omega / 0.9\Omega$ (N/P CH), $V_{GS}=4.5V$, $I_D=1A$
- $R_{DS(ON)} < 0.6\Omega / 1.1\Omega$ (N/P CH), $V_{GS}=2.5V$, $I_D=0.7A$
- $R_{DS(ON)} < 0.9\Omega / 13\Omega$ (N/P CH), $V_{GS}=1.8V$, $I_D=0.3A$
- Low Gate Charge
- ESD Protected 4KV HBM



MECHANICAL DATA

- Case: SOT-363, Molded Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026

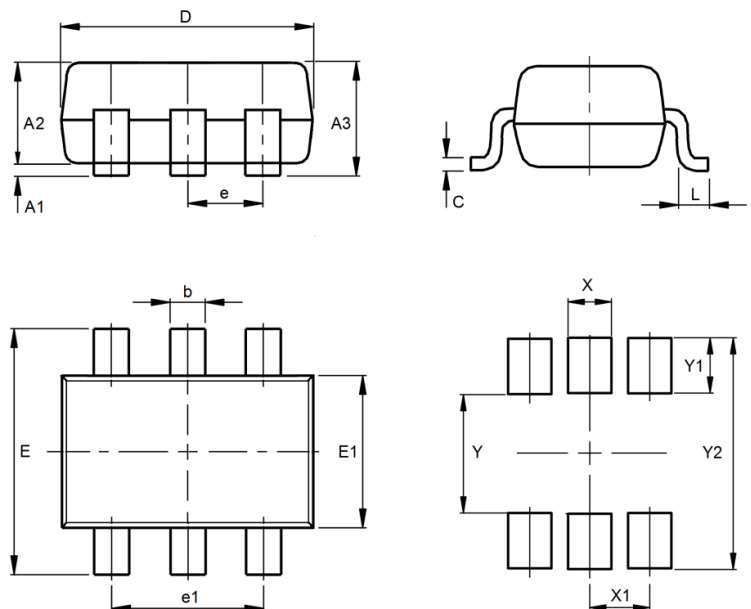


MAXIMUM RATINGS

Parameter		Symbol	N-CH	P-CH	Unit
Drain-Source Voltage		V _{DS}	30	-30	V
Gate-Source Voltage		V _{GS}	±8	±8	V
Drain Current – Continuous	V _{GS} =-4.5V, T _A = 25°C	I _D	0.57	-0.44	A
	V _{GS} =-4.5V, T _A = 70°C		0.46	-0.35	
Drain Current – Pulsed		I _{DM}	2.2	-1.8	A
Power Dissipation	T _A = 25°C	P _D	0.42		W
	T _A = 70°C		0.27		
Thermal Resistance Junction to Ambient		R _{θJA}	300		°C/W
Operating Junction and Storage Temperature		T _J , T _{STG}	-55 to 150		°C

DIMENSIONS

Item	Min (mm)	Max (mm)
A1	0.00	0.10
A2	0.90	1.00
A3	0.90	1.10
b	0.15	0.35
C	0.08	0.15
D	2.00	2.20
e	0.55	0.75
e1	1.20	1.40
E	2.15	2.45
E1	1.15	1.35
L	0.26	0.46
Y	1.14	
Y1	0.80	
Y2	2.74	
X	0.40	
X1	0.65	



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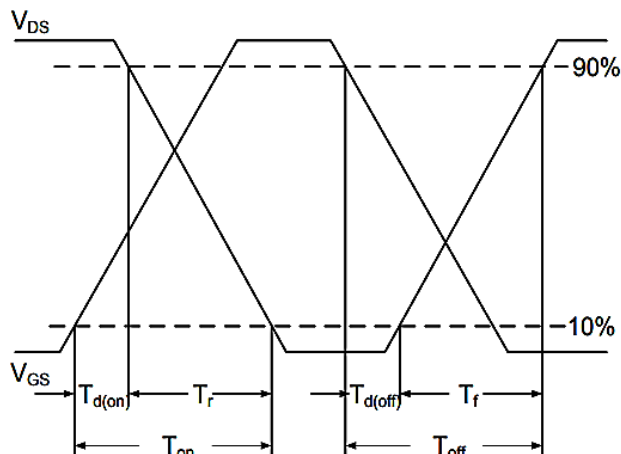
ELECTRICAL CHARACTERISTICS - N-CH

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	30	--	--	V
Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 8V, V_{DS}=0V$	I_{GSS}	--	--	± 10	μA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=0.2A$	$R_{DS(ON)}$	--	500	700	m Ω
	$V_{GS}=2.5V, I_D=0.2A$		--	600	900	
	$V_{GS}=1.8V, I_D=10mA$		--	900	2000	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	0.4	--	1.2	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=20V, I_D=0.2A$ $V_{GS}=4.5V$	Q_g	--	0.9	--	nC
Gate-Source Charge		Q_{gs}	--	0.2	--	
Gate-Drain Charge		Q_{gd}	--	0.2	--	
Turn-On Delay Time	$V_{DS}=15V, I_D=0.2A$ $V_{GS}=4.5V$ $R_G=6\Omega$	$T_{d(on)}$	--	5.3	--	ns
Rise Time		T_r	--	16	--	
Turn-Off Delay Time		$T_{d(off)}$	--	20	--	
Fall Time		T_f	--	18	--	
Input Capacitance	$V_{DS}=15V, V_{GS}=0V$ $F=1MHz$	C_{iss}	--	31	--	pF
Output Capacitance		C_{oss}	--	11	--	
Reverse Transfer Capacitance		C_{rss}	--	8	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	--	I_S	--	0.35	--	A
Diode Forward Voltage	$V_{GS}=0V, I_S=0.2A$	V_{SD}	--	0.85	1.2	V

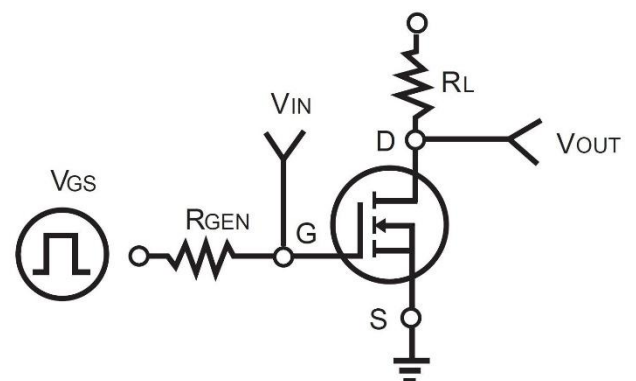
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.
4. $T_J=25^\circ C$, unless otherwise noted.

Switching Time Waveform



Switching Test Circuit



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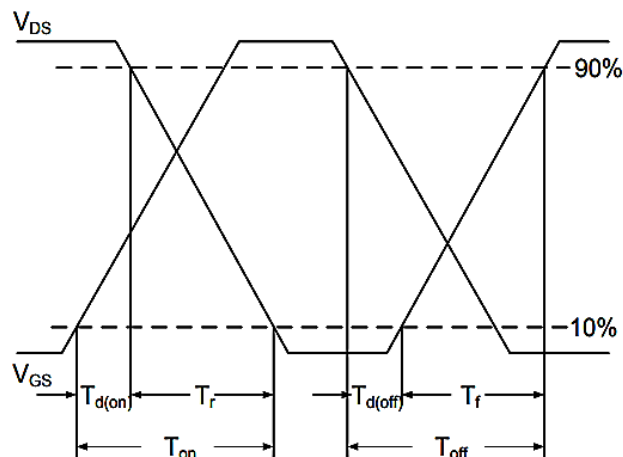
ELECTRICAL CHARACTERISTICS - P-CH

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-30	--	--	V
Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V$	I_{DSS}	--	--	-1	μA
Gate-Source Leakage Current	$V_{GS}=\pm 8V, V_{DS}=0V$	I_{GSS}	--	--	± 10	μA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-0.2A$	$R_{DS(ON)}$	--	0.9	1.3	Ω
	$V_{GS}=-2.5V, I_D=-0.2A$		--	1.1	1.7	
	$V_{GS}=-1.8V, I_D=-10mA$		--	1.3	2.7	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-0.4	--	-1.2	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-20V, I_D=-0.4A$ $V_{GS}=-4.5V$	Q_g	--	1	--	nC
Gate-Source Charge		Q_{gs}	--	0.2	--	
Gate-Drain Charge		Q_{gd}	--	0.2	--	
Turn-On Delay Time	$V_{DD}=-15V, I_D=-0.4A$ $V_{GS}=-4.5V, R_G=6\Omega$	$T_{d(on)}$	--	13	--	ns
Rise Time		T_r	--	21	--	
Turn-Off Delay Time		$T_{d(off)}$	--	44	--	
Fall Time		T_f	--	29	--	
Input Capacitance	$V_{DS}=-15V, V_{GS}=0V,$ $f=1MHz$	C_{iss}	--	46	--	pF
Output Capacitance		C_{oss}	--	13	--	
Reverse Transfer Capacitance		C_{rss}	--	10	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	--	I_S	--	-0.35	--	A
Diode Forward Voltage	$V_{GS}=0V, I_S=-0.2A$	V_{SD}	--	-0.85	-1.2	V

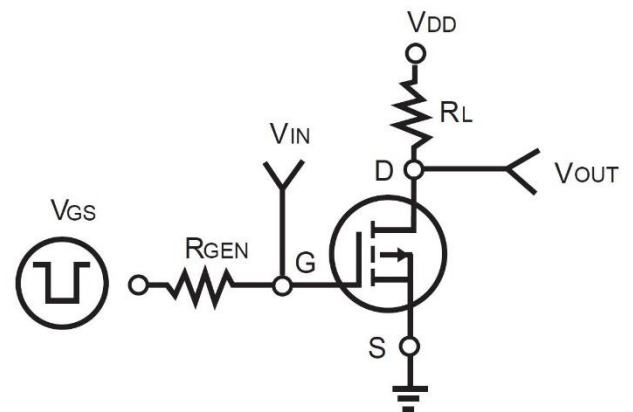
Note:

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4. $T_J=25^\circ C$, unless otherwise noted.

Switching Time Waveform

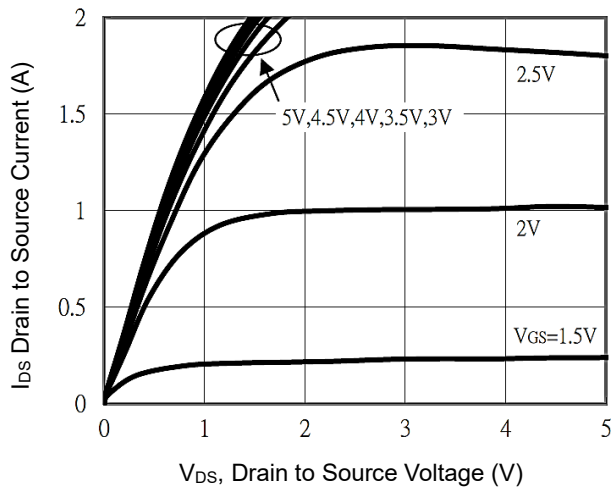


Switching Test Circuit

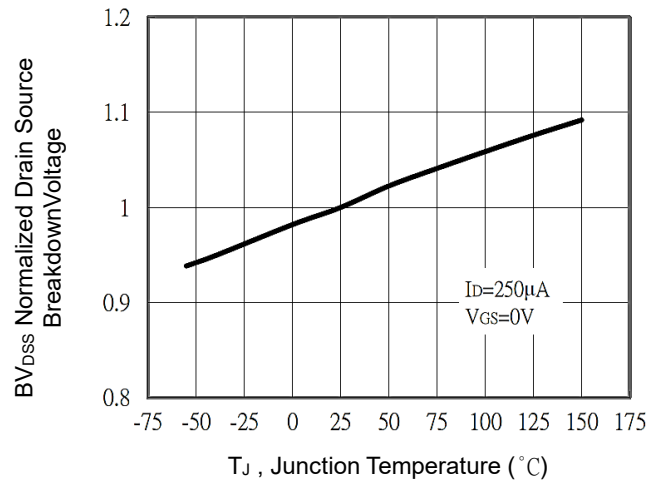


N-CH CHARACTERISTIC CURVES

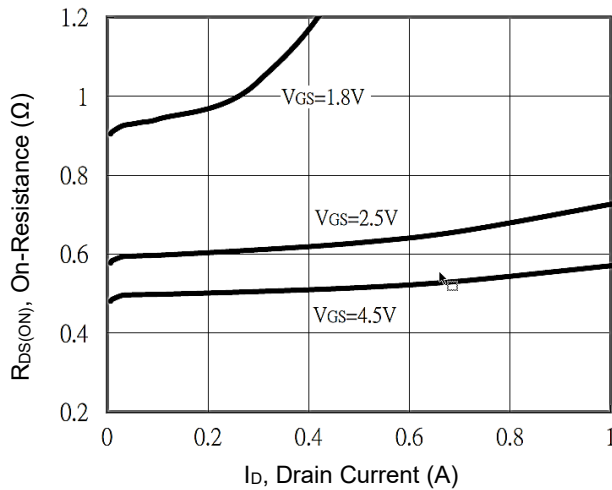
On-Region Characteristics



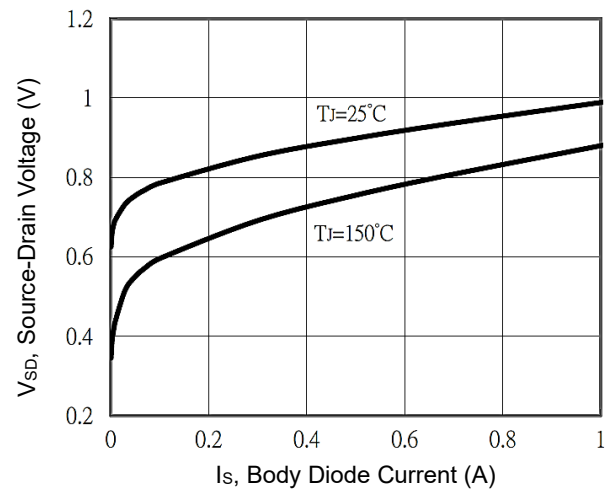
Breakdown Voltage vs T_J



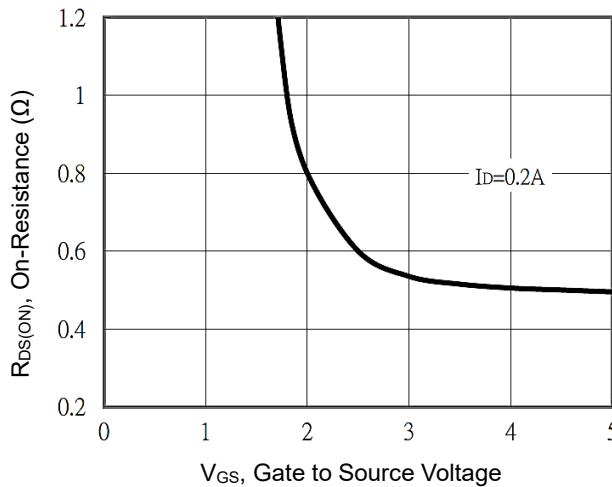
On-Resistance vs. Drain Current



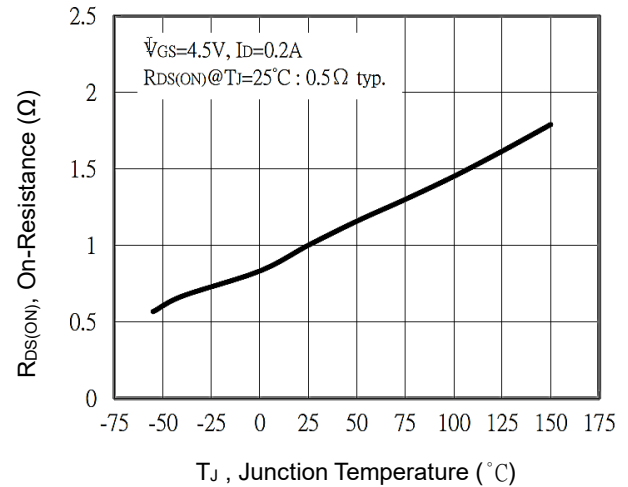
Body Diode vs Source-Drain Current



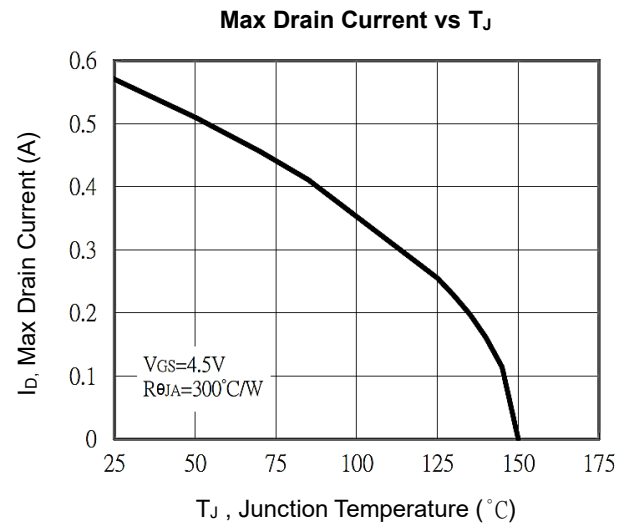
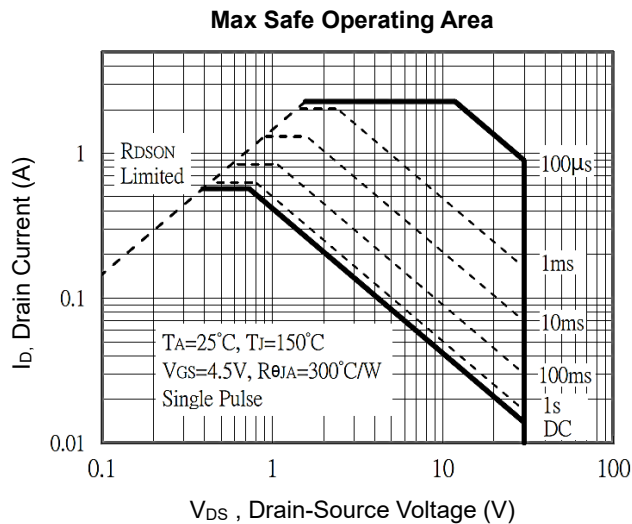
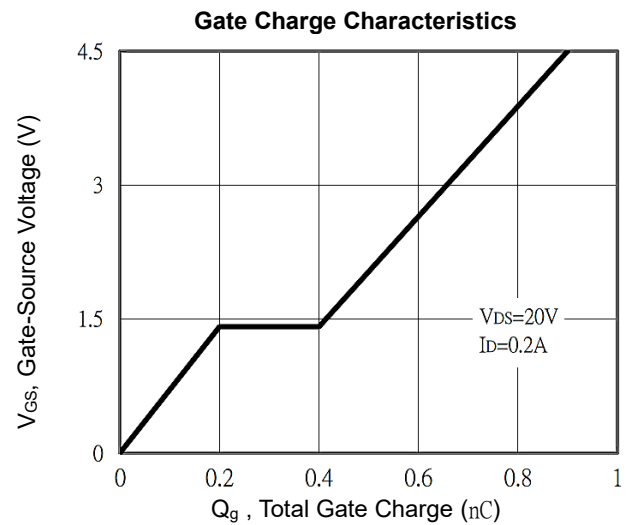
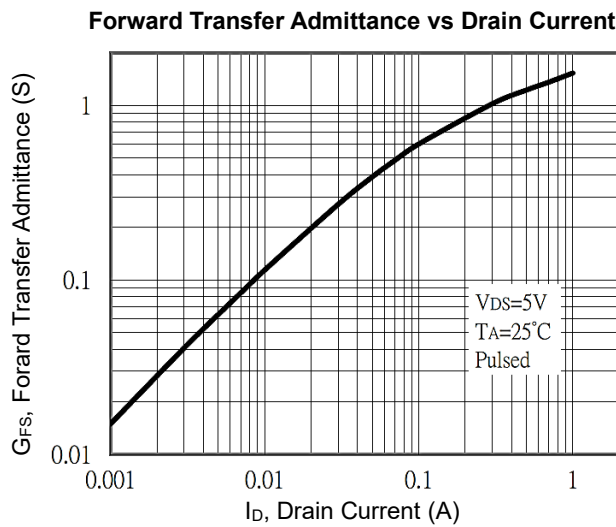
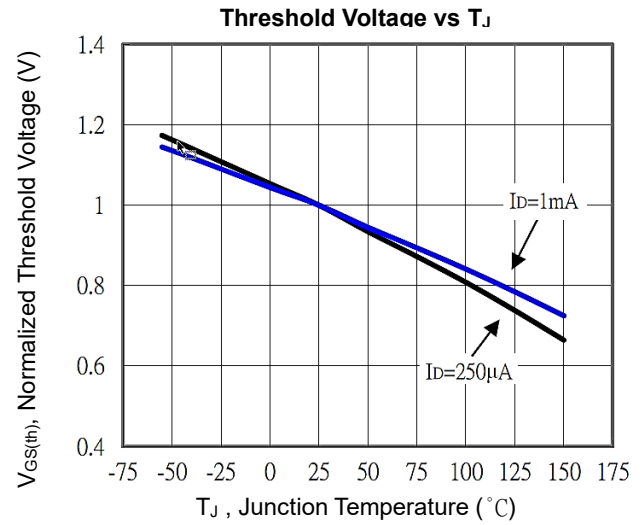
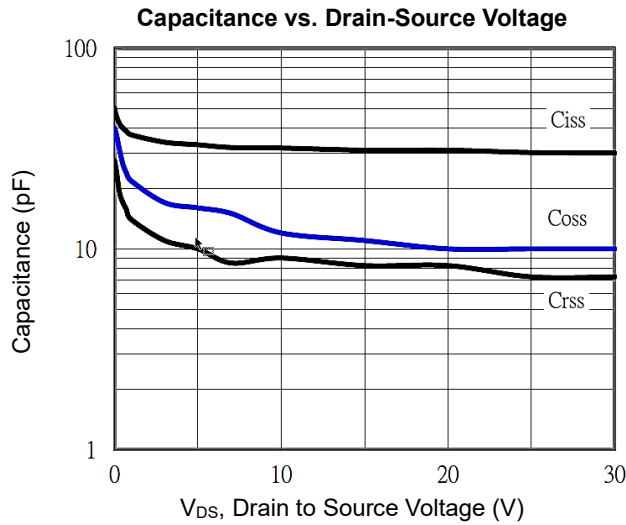
On-Resistance Variation with V_{GS}



On-Resistance vs. T_J

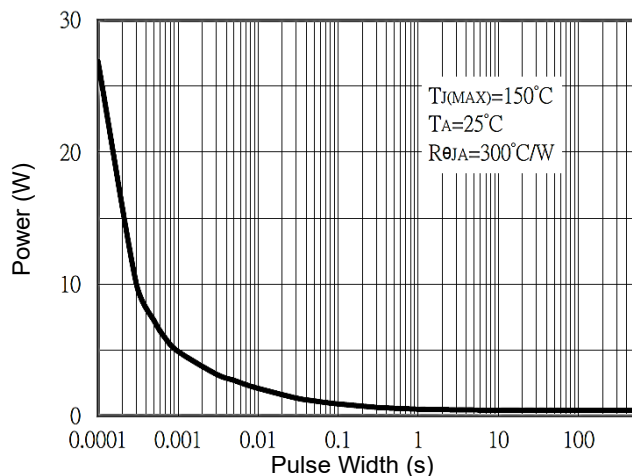


N-CH CHARACTERISTIC CURVES

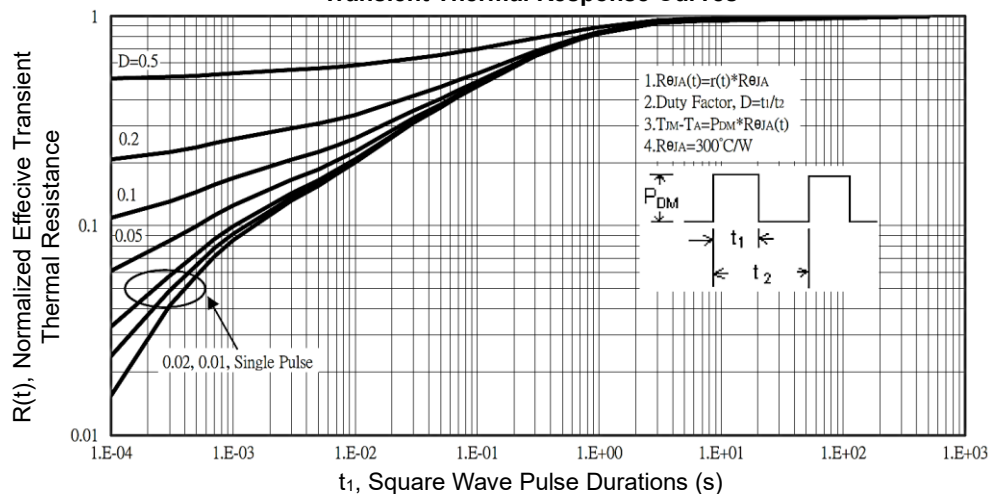


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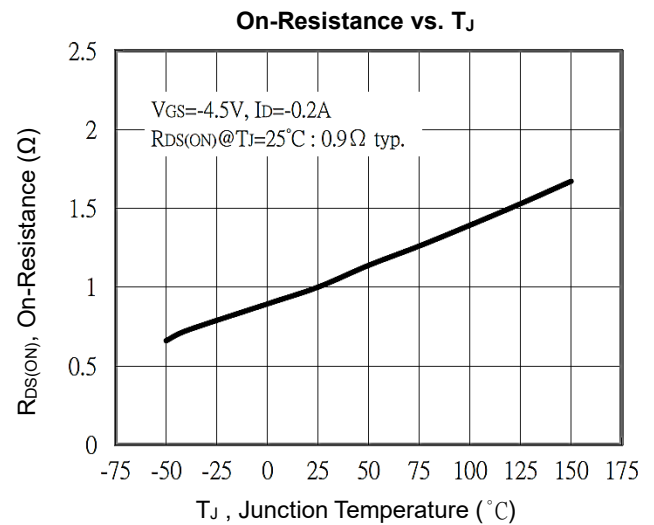
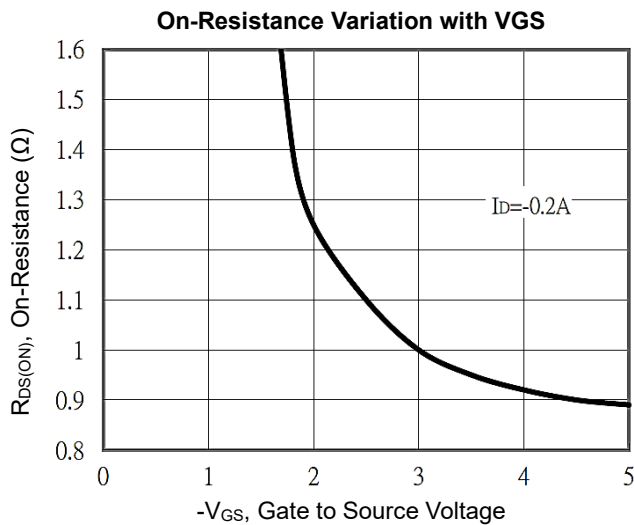
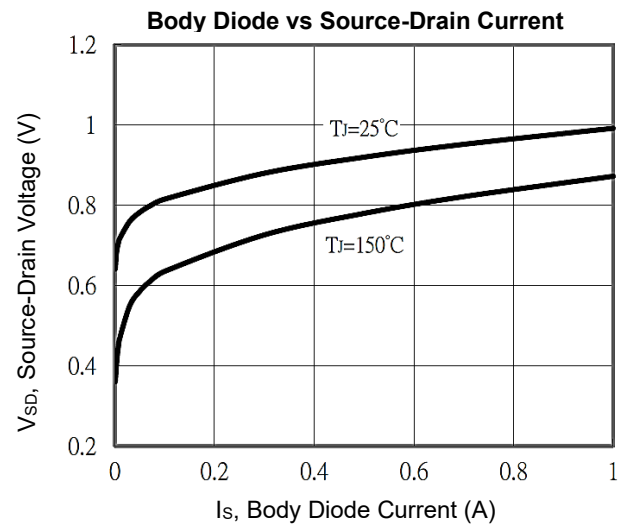
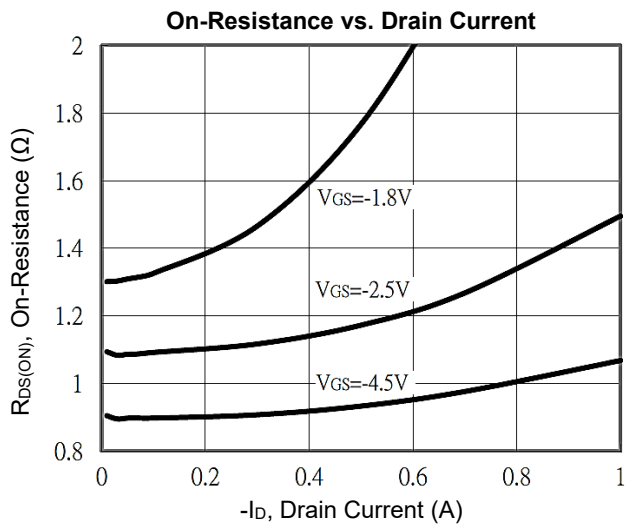
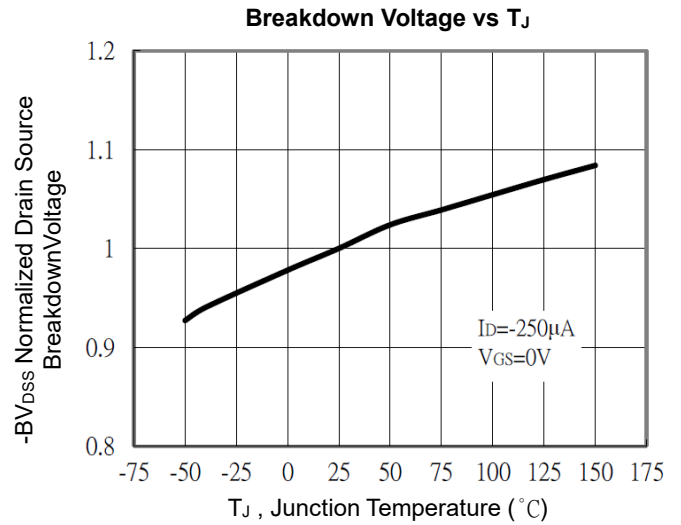
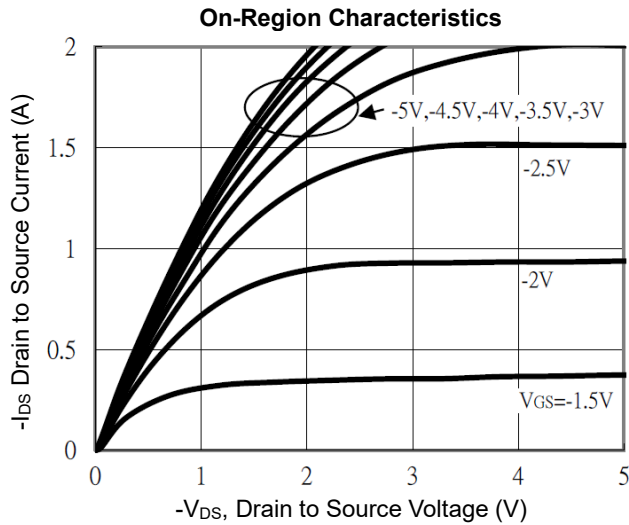
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves



P-CH CHARACTERISTIC CURVES



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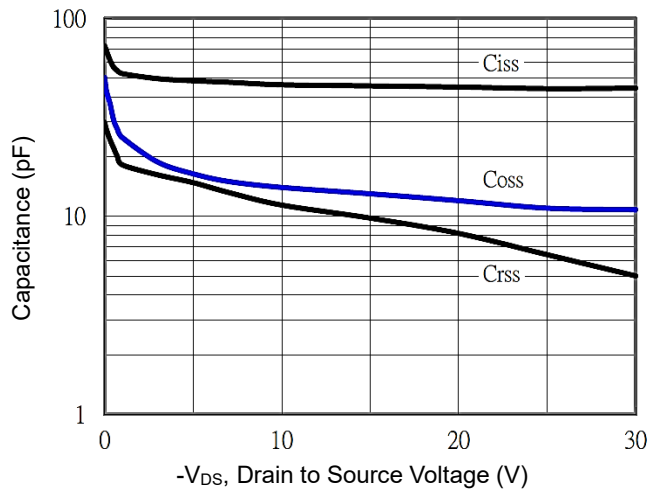
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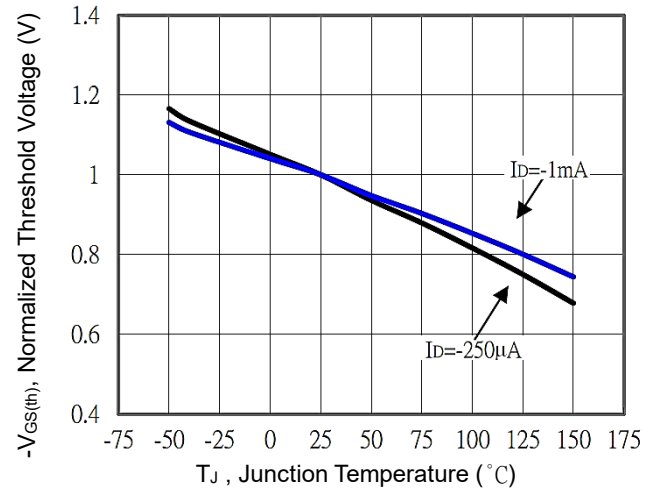
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P-CH CHARACTERISTIC CURVES

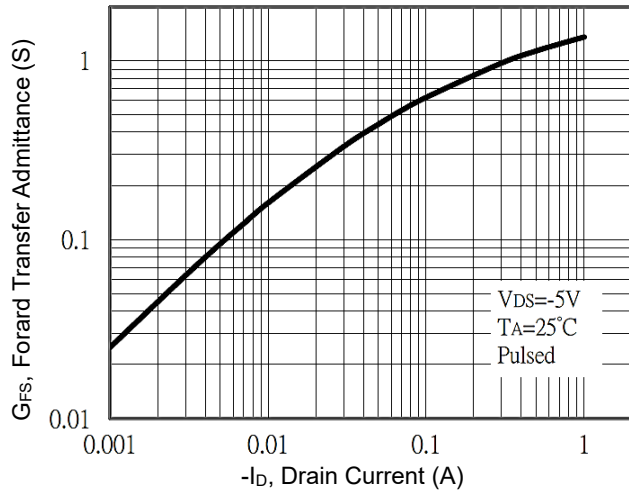
Capacitance vs. Drain-Source Voltage



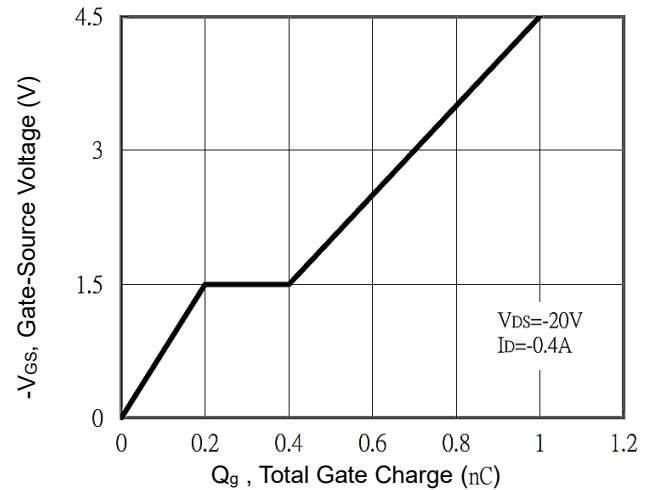
Threshold Voltage vs T_J



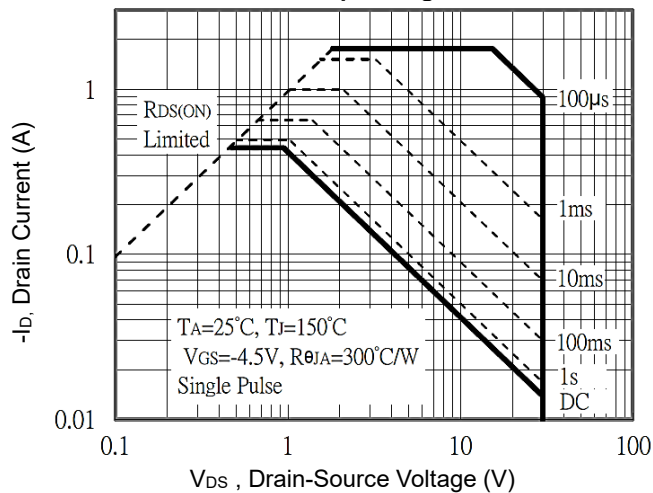
Forward Transfer Admittance vs Drain Current



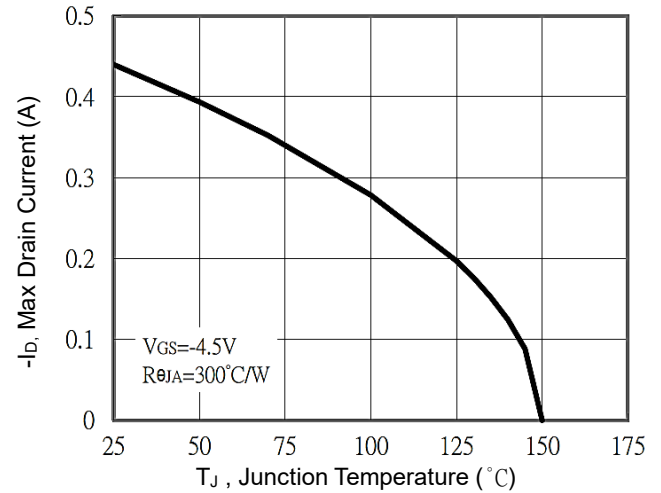
Gate Charge Characteristics



Max Safe Operating Area

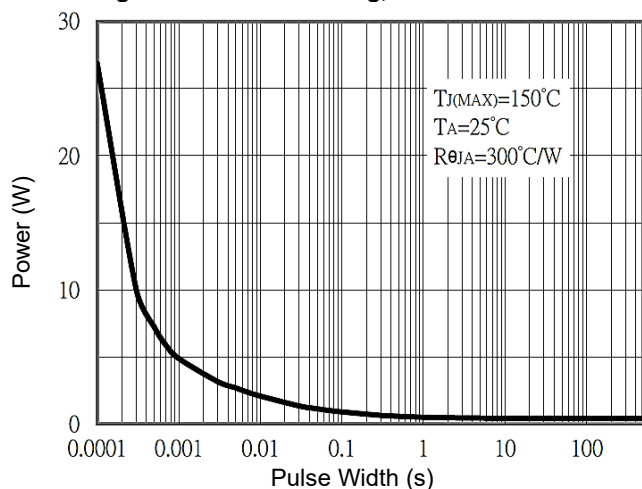


Max Drain Current vs T_J



P-CH CHARACTERISTIC CURVES

Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves

