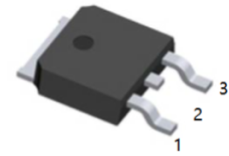


PRODUCT SUMMARY

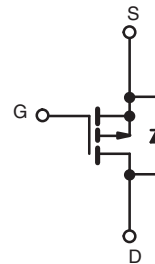
- $V_{DS} (V) = -40V$
- $R_{DS(ON)} < 17\ m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 29m\Omega$ ($V_{GS} = -4.5V$)



1.G 2.D 3.S
TO-252(DPAK) top view

FEATURES

- Package with low thermal resistance



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\ ^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	$T_C = 25\ ^\circ C^a$	-50
		$T_C = 125\ ^\circ C$	-39
Continuous Source Current (Diode Conduction) ^a	I_S	-50	A
Pulsed Drain Current ^b	I_{DM}	-200	
Single Pulse Avalanche Current	I_{AS}	L = 0.1 mH	-40
Single Pulse Avalanche Energy			E_{AS}
Maximum Power Dissipation ^b	P_D	$T_A = 25\ ^\circ C$	3
		$T_C = 25\ ^\circ C$	136
		$T_C = 125\ ^\circ C$	45
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^\circ C$

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R_{thJA}	50	$^\circ C/W$
Junction-to-Case (Drain)			

Notes

- Package limited.
- Pulse test; pulse width $\leq 300\ \mu s$, duty cycle $\leq 2\ \%$.
- When mounted on 1" square PCB (FR4 material).
- Parametric verification ongoing.

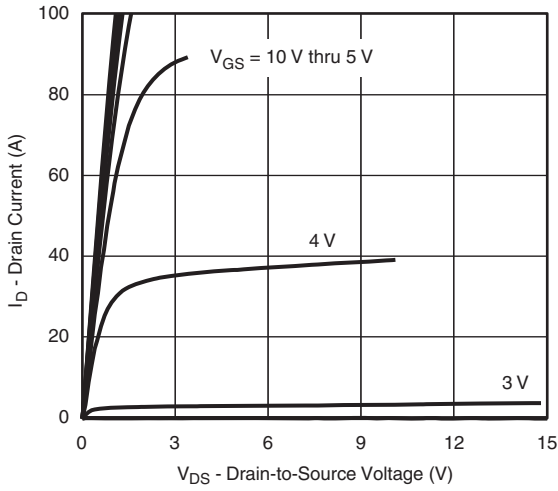
SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	-40			V	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-1.5		-2.5		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = -40\text{ V}$			-1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = -40\text{ V}$, $T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = -40\text{ V}$, $T_J = 175\text{ }^\circ\text{C}$			-150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = -10\text{ V}$	$V_{DS} \leq -5\text{ V}$	-50		A	
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -17\text{ A}$			17	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}$	$I_D = -14\text{ A}$			29	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}$, $I_D = -17\text{ A}$		61		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$		2872	3950	pF
Output Capacitance	C_{oss}			508	635		
Reverse Transfer Capacitance	C_{rss}			352	440		
Total Gate Charge ^c	Q_g	$V_{GS} = -10\text{ V}$	$V_{DS} = -30\text{ V}$, $I_D = -50\text{ A}$		60	80	nC
Gate-Source Charge ^c	Q_{gs}			5.7	8.6		
Gate-Drain Charge ^c	Q_{gd}			14.7	22		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.5	3	4.5	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -20\text{ V}$, $R_L = 0.4\text{ }\Omega$ $I_D \cong -50\text{ A}$, $V_{GEN} = -10\text{ V}$, $R_g = 1\text{ }\Omega$			10	15	ns
Rise Time ^c	t_r				12	18	
Turn-Off Delay Time ^c	$t_{d(off)}$				40	60	
Fall Time ^c	t_f				16	24	
Source-Drain Diode Ratings and Characteristics^b							
Pulsed Current ^a	I_{SM}				-200	A	
Forward Voltage	V_{SD}	$I_F = -50\text{ A}$, $V_{GS} = 0\text{ V}$			-1	-1.5	V

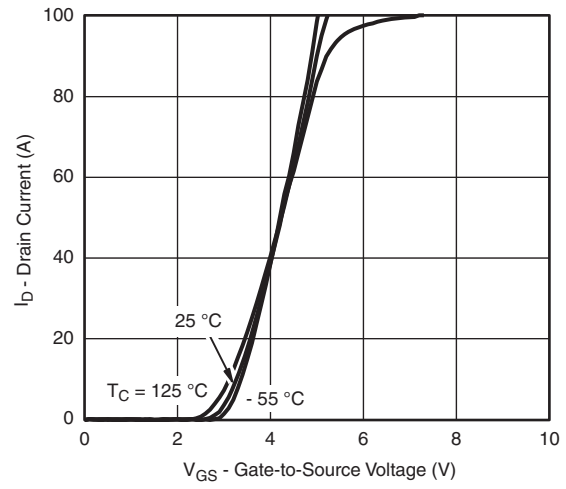
Notes

- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

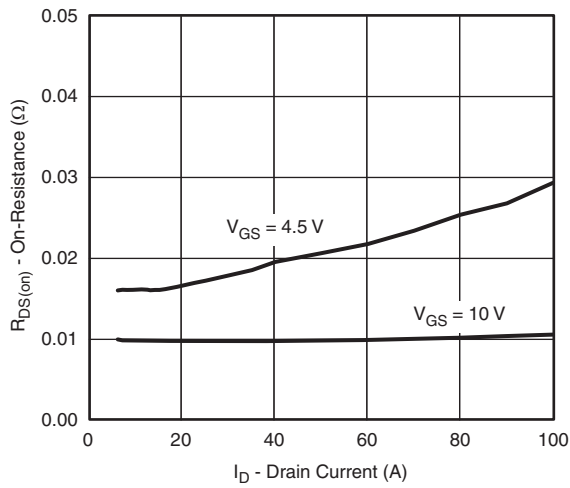
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



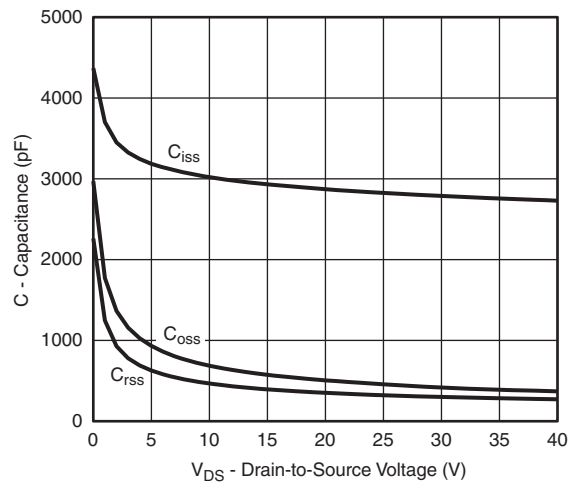
Output Characteristics



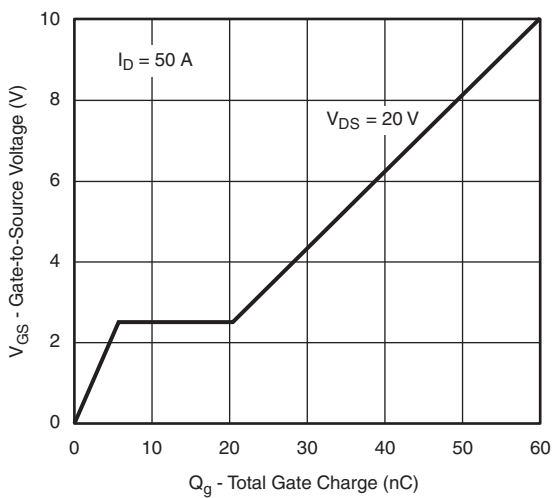
Transfer Characteristics



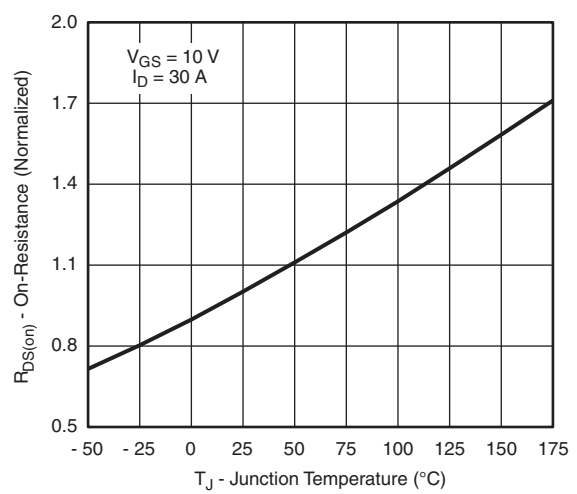
On-Resistance vs. Drain Current



Capacitance

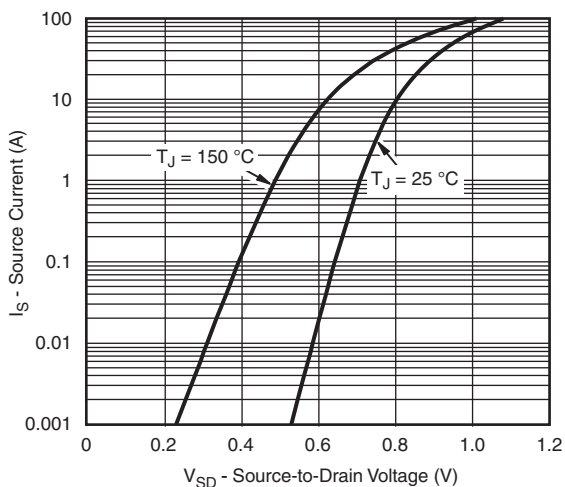


Gate Charge

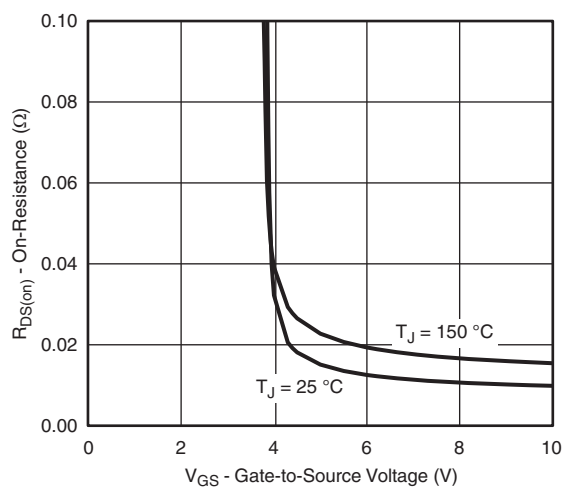


On-Resistance vs. Junction Temperature

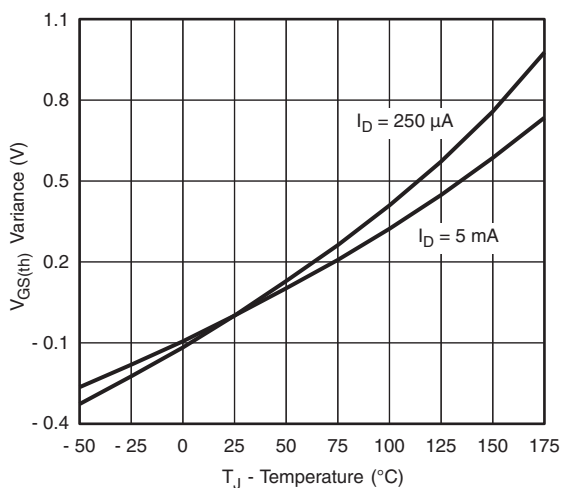
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



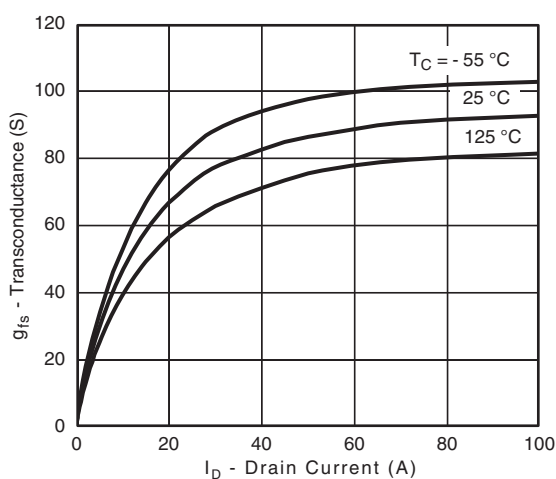
Source Drain Diode Forward Voltage



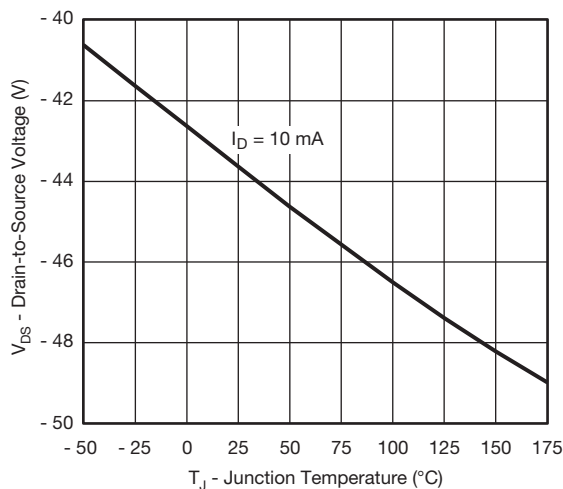
On-Resistance vs. Gate-to Source Voltage



Threshold Voltage

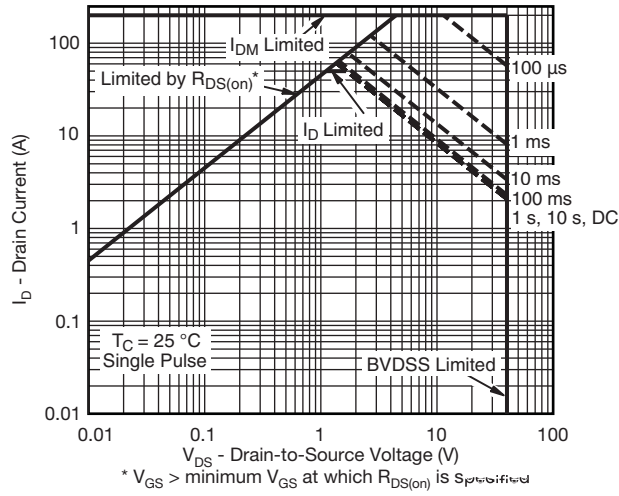


Transconductance

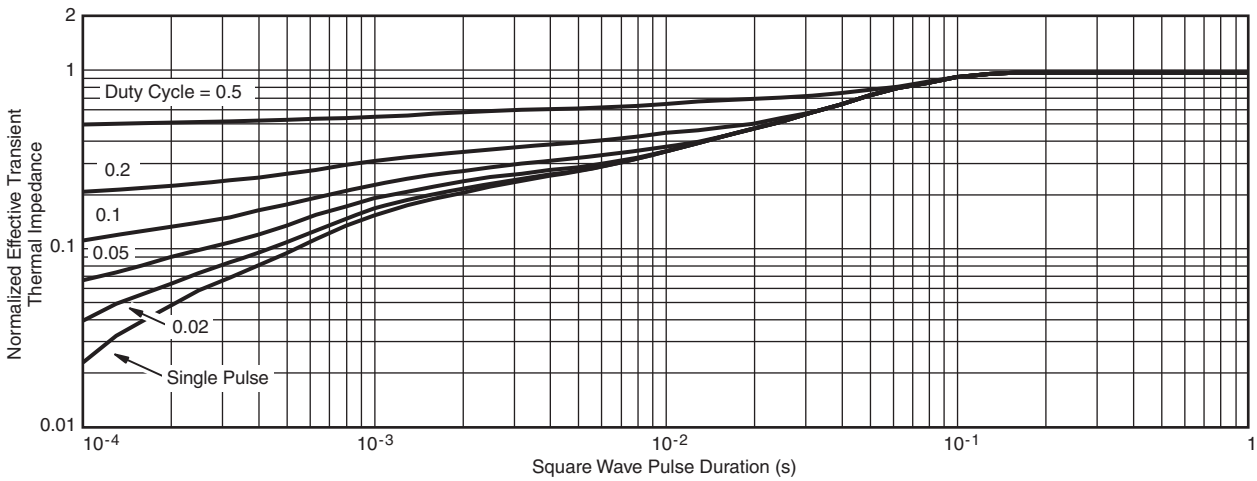


Drain Source Breakdown vs. Junction Temperature

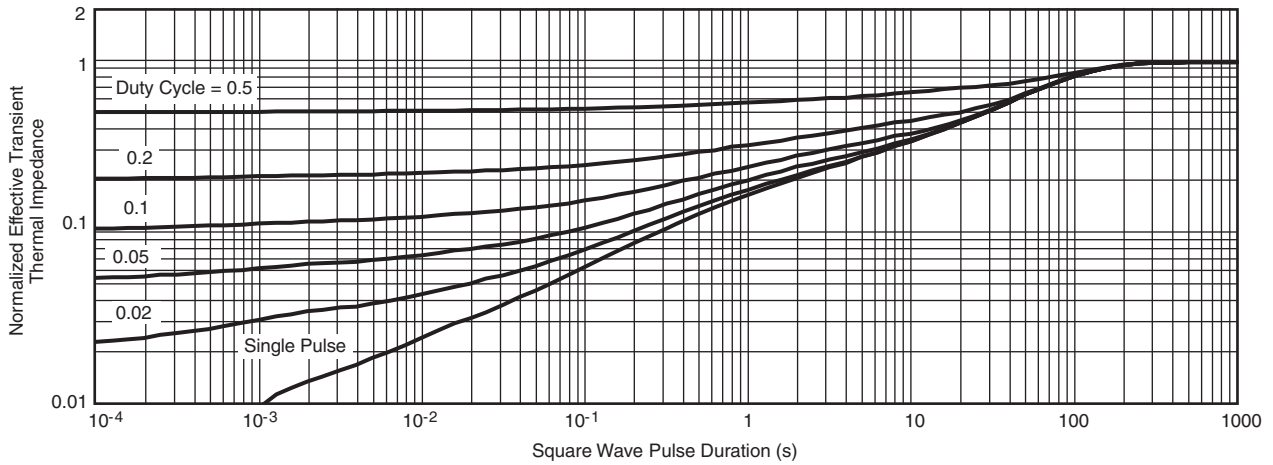
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient

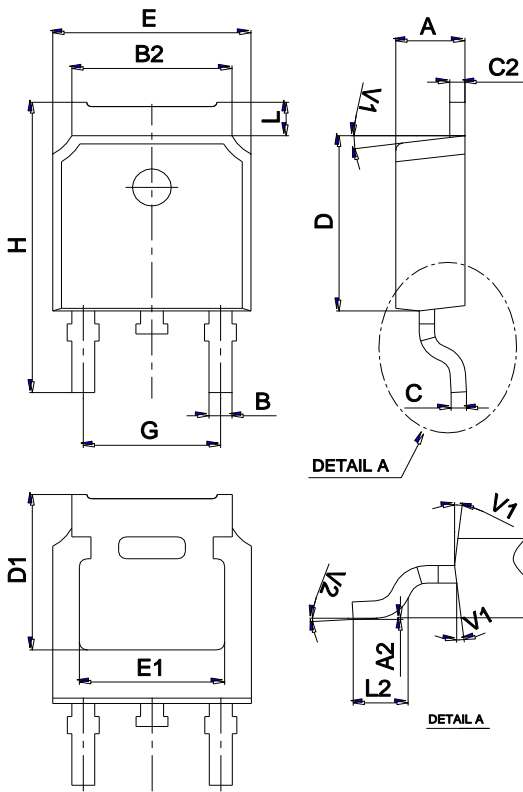
Note

The characteristics shown in the two graphs

- Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
- Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

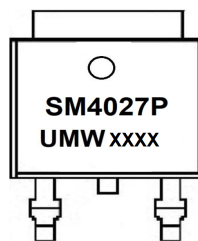
are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
SM4027PSU	TO-252	2500	Tape and reel