

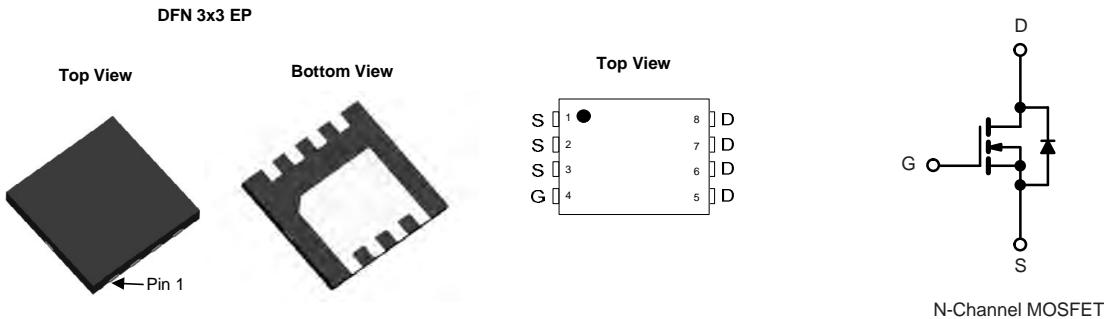
SQ7414EN-T1-GE3-VB Datasheet

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
60	0.010 at $V_{GS} = 10$ V	15
	0.013 at $V_{GS} = 4.5$ V	12

FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:



ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current ($T_J = 175$ °C) ^b	I_D	15	A	
		13 ^a		
Pulsed Drain Current	I_{DM}	100	A	
Continuous Source Current (Diode Conduction)	I_S	50 ^a		
Avalanche Current	I_{AS}	50		
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	125	mJ	
Maximum Power Dissipation	P_D	136	W	
		3 ^b , 8.3 ^{b, c}		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case	R_{thJC}	0.85	1.1		

Notes:

a. Package limited.

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

c. $t \leq 10$ s.

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1	2	3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	
		$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$			50	μA
		$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$			250	
On-State Drain Current ^b	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	60			A
Drain-Source On-State Resistance ^b	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$		0.010		
		$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$, $T_J = 125^\circ\text{C}$		0.016		Ω
		$V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$, $T_J = 175^\circ\text{C}$		0.020		
		$V_{GS} = 4.5 \text{ V}$, $I_D = 15 \text{ A}$		0.013		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 20 \text{ A}$		60		S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$		2650		
Output Capacitance	C_{oss}			470		pF
Reverse Transfer Capacitance	C_{rss}			225		
Total Gate Charge ^c	Q_g	$V_{DS} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 50 \text{ A}$		47	70	
Gate-Source Charge ^c	Q_{gs}			10		nC
Gate-Drain Charge ^c	Q_{gd}			12		
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$, $R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 2.5 \Omega$		10	20	
Rise Time ^c	t_r			15	25	ns
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			35	50	
Fall Time ^c	t_f			20	30	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)						
Pulsed Current	I_{SM}				60	A
Diode Forward Voltage	V_{SD}	$I_F = 20 \text{ A}$, $V_{GS} = 0 \text{ V}$		1	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 20 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$		45	100	ns

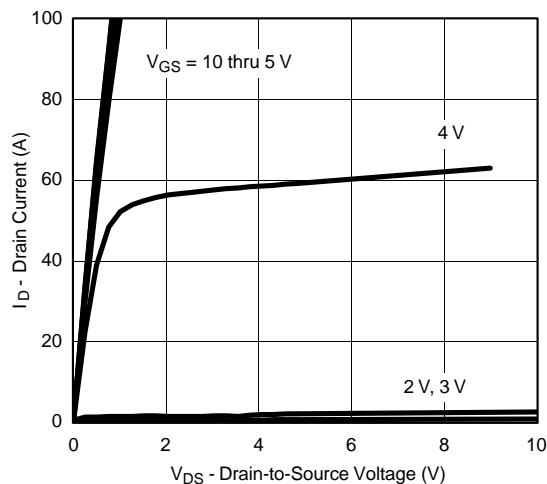
Notes:

a. For design aid only; not subject to production testing.

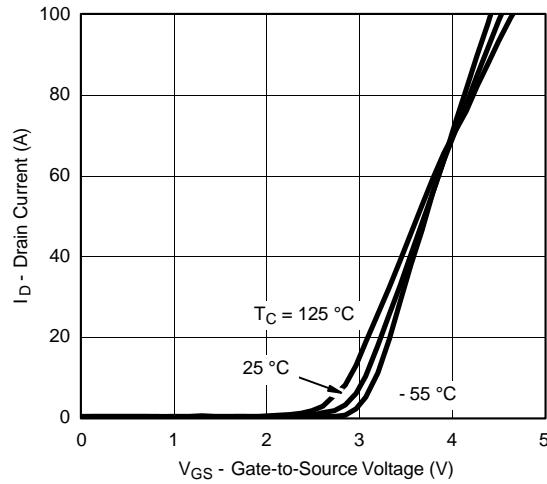
b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

c. Independent of operating temperature.

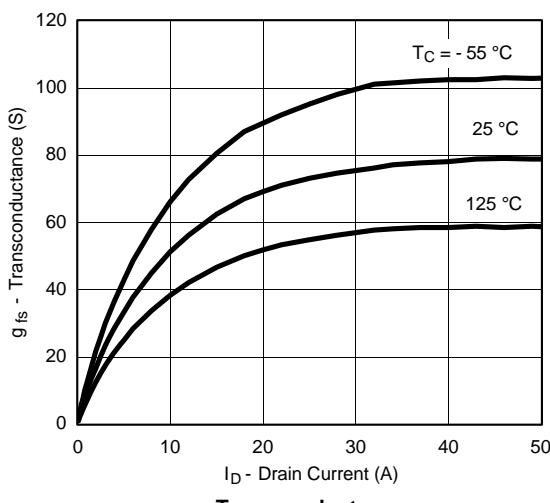
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C unless noted)


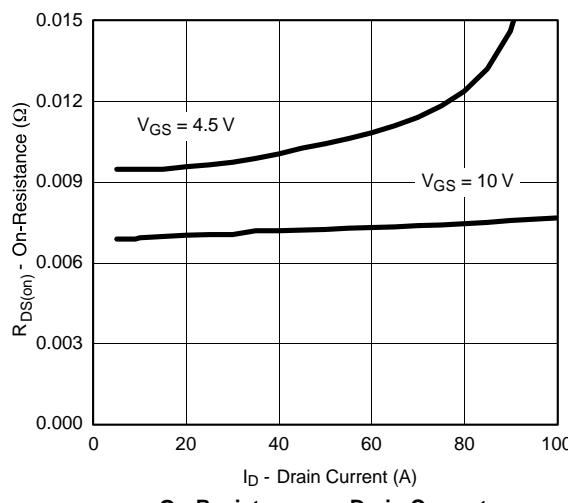
Output Characteristics



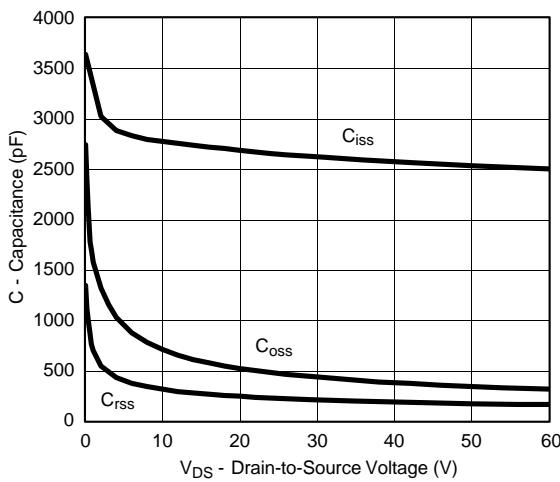
Transfer Characteristics



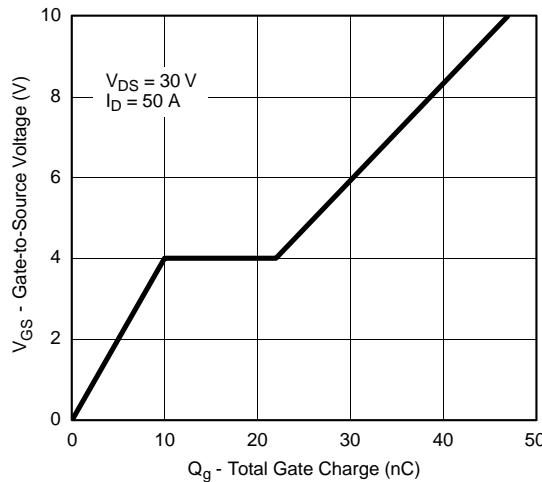
Transconductance



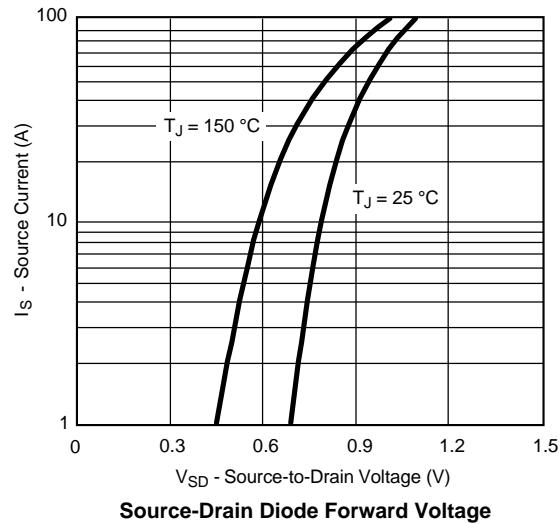
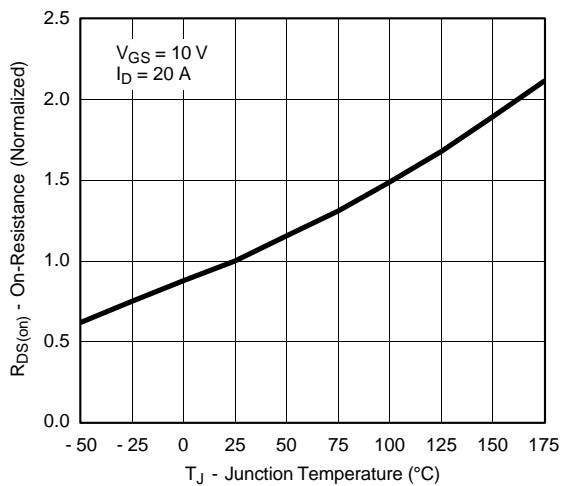
On-Resistance vs. Drain Current



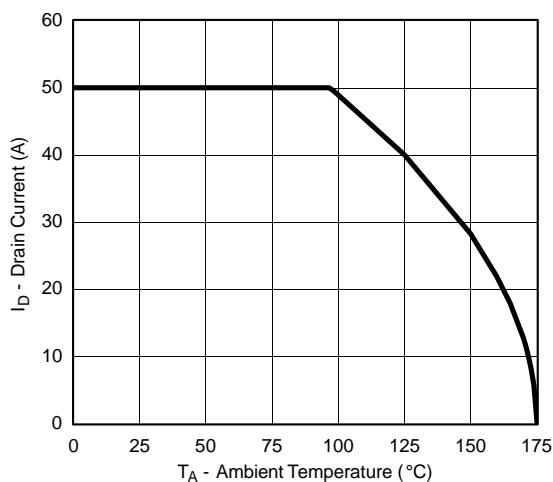
Capacitance



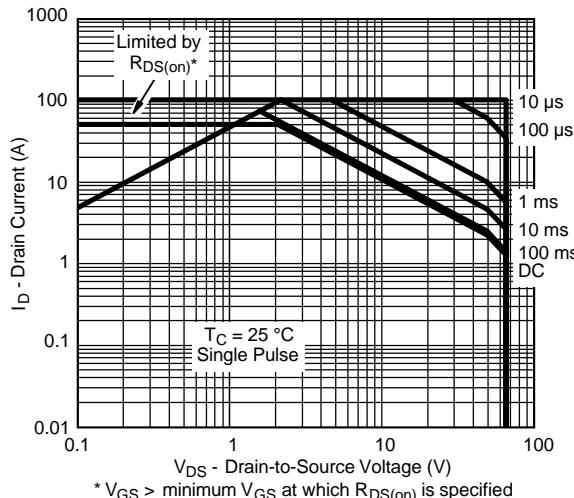
Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)

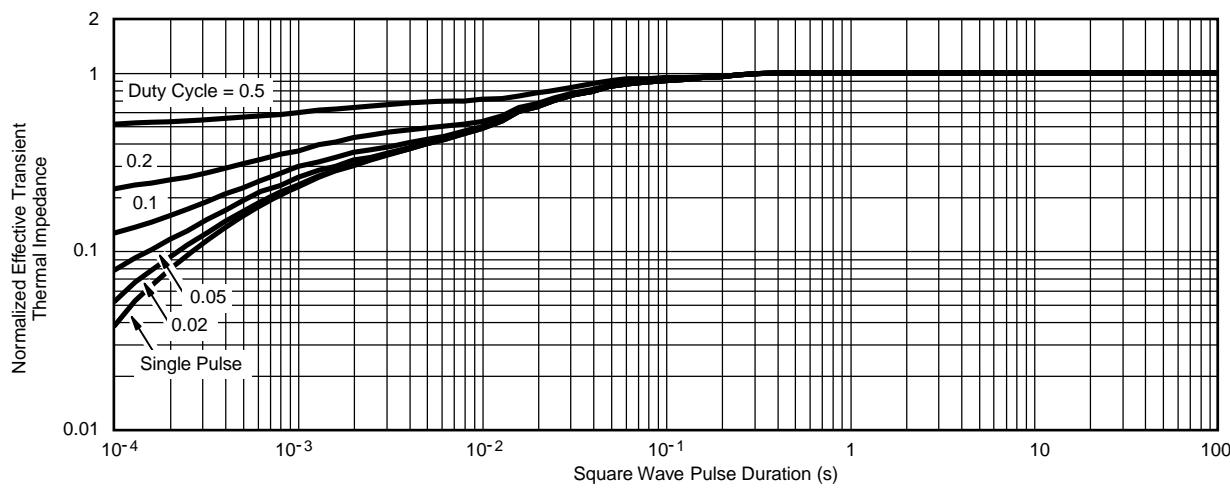
THERMAL RATINGS



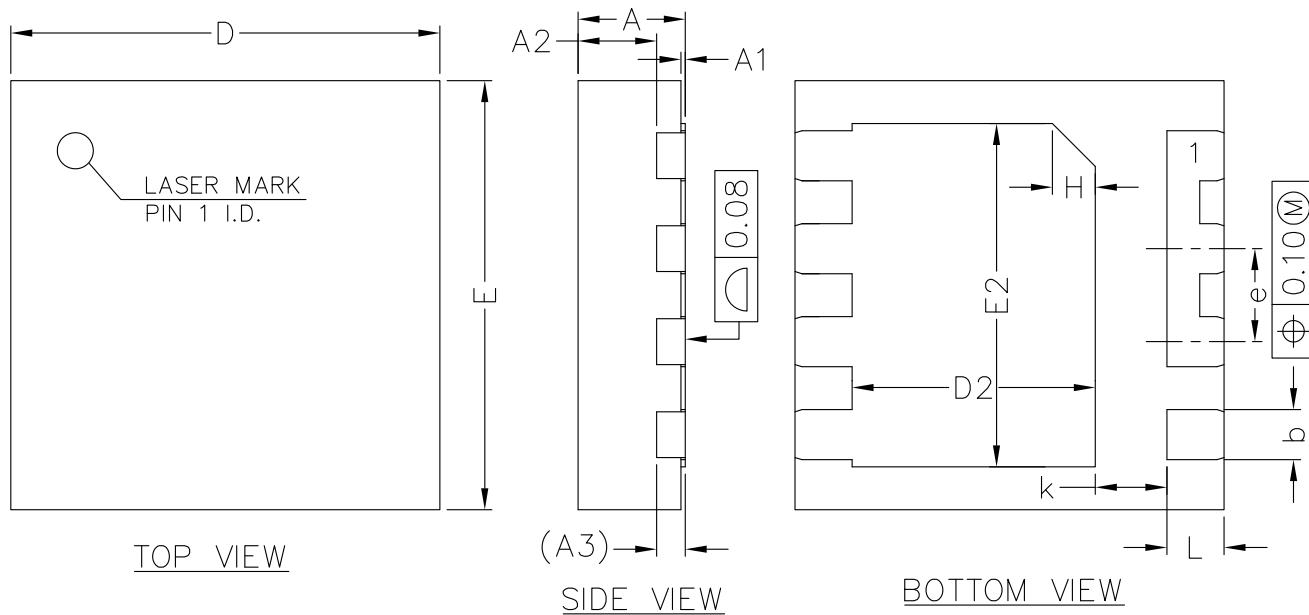
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

SIDE VIEW

COMMON DIMENSIONS
 (UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3	0.20REF		
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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