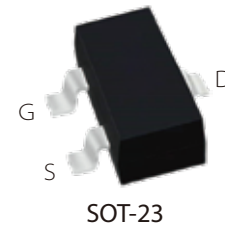
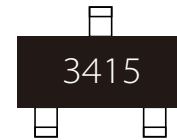
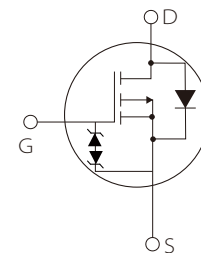


FEATURES

- | High Density Cell Design For Low $R_{DS(On)}$
- | Voltage Controlled Small Signal Switch
- | Rugged and Reliable
- | High Saturation Current Capability
- | ESD Protected


SOT-23

Marking

Schematic Symbol

APPLICATION

- | Direct logic-level interface: TTL/CMOS
- | Drivers: relays, solenoids, lamps
- | hammers, display, memories, etc.
- | Battery operated systems
- | Solid-state relays

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Symbol	Value	Unit
Drain-Source Voltage	$T_A=25^\circ\text{C}$	V_{DS}	-20	V
Drain Current- Pulsed	$T_A=25^\circ\text{C}$	V_{GS}	± 8	V
Drain Current	$T_A=25^\circ\text{C}, V_{GS}=-4.5\text{V}$	I_D^*	-4	A
Pulsed Drain Current	$T_A=25^\circ\text{C}, V_{GS}=-4.5\text{V}$	I_{DM}^{***}	-16	A
Total Power Dissipation	$T_A=25^\circ\text{C}$	P_{tot}	0.83	W
	$T_A=100^\circ\text{C}$		0.3	W
Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 to 150	$^\circ\text{C}$
Maximum Resistance –Junction to Ambient	$T_A=25^\circ\text{C}$	I_S	-1	A
Thermal Resistance- Junction to Ambient		$R_{\theta JA}^*$	150	$^\circ\text{C}/\text{W}$

Notes:

* Surface Mounted on 1 in² pad area, $t \leq 10$ sec

** Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _{DS} =-250μA	-20			V	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _{DS} =-250μA	-0.5		-1	V	
Drain Leakage Current	I _{DSS}	V _{DS} =-16V, V _{GS} =0V			-1	uA	
Drain Leakage Current (T _J =85°C)					-30	uA	
Gate Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V			±10	uA	
On-State Resistance	R _{DS(on)} ^a	V _{GS} =-4.5V, I _{DS} =-4A		30	37	mΩ	
			V _{GS} =-2.5V, I _{DS} =-3A		42	52	mΩ
			V _{GS} =-1.8V, I _{DS} =-2A		57	72	mΩ
Diode Characteristics							
Diode Forward Voltage	V _{SD} ^a	I _{SD} =0.2A, V _{GS} =0V	-0.5		-1.3	V	
Reverse Recovery Time	t _{rr}	I _{SD} = -4A, dI _{SD} /dt = 100 A/μs		49.5		ns	
Reverse Recovery Charge	Q _{rr}			16.5		nC	
Dynamic Characteristics^b							
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-10V, Frequency = 1 MHz		1121		pF	
Output capacitance	C _{oss}			161		pF	
Reverse transfer capacitance	C _{rss}			148		pF	
Turn-on Delay Time	t _{d(on)}	V _{DS} = -10V, V _{GEN} = -4.5V R _G = 3.3Ω, R _L = 2.5Ω, I _{DS} = -4A		5.5		ns	
Turn-on Rise Time	t _r			60.5		ns	
Turn-Off Delay Time	t _{d(off)}			89		ns	
Turn-Off Fall Time	t _f			73		ns	
Gate Charge Characteristics^b							
Total Gate Charge	Q _g	V _{GS} =-4.5V, V _{DS} =-10V, I _{DS} =-4A		17.4		nC	
Gate-Source Charge	Q _{gs}			1.9		nC	
Gate-Drain Charge	Q _{gd}			4.1		nC	

Notes:

a : Pulse test ; pulse width ≤ 300us, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

PARAMETER CHARACTERISTIC CURVE

Figure1: Power Dissipation

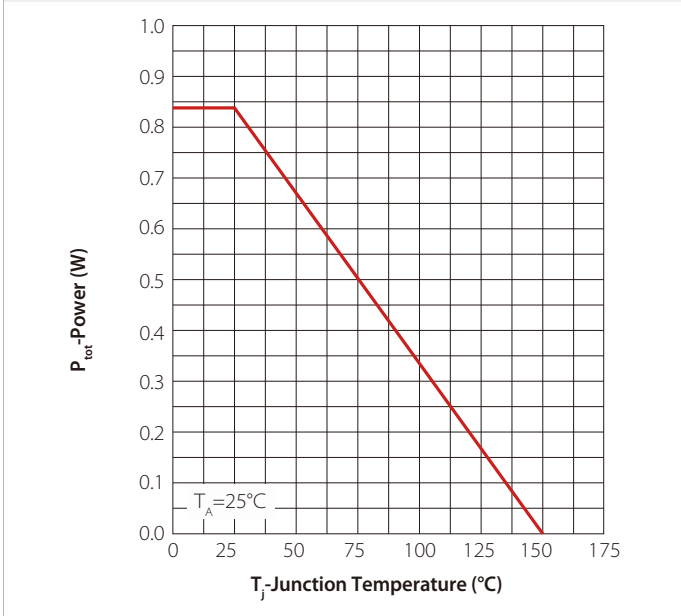


Figure2: Current Capability

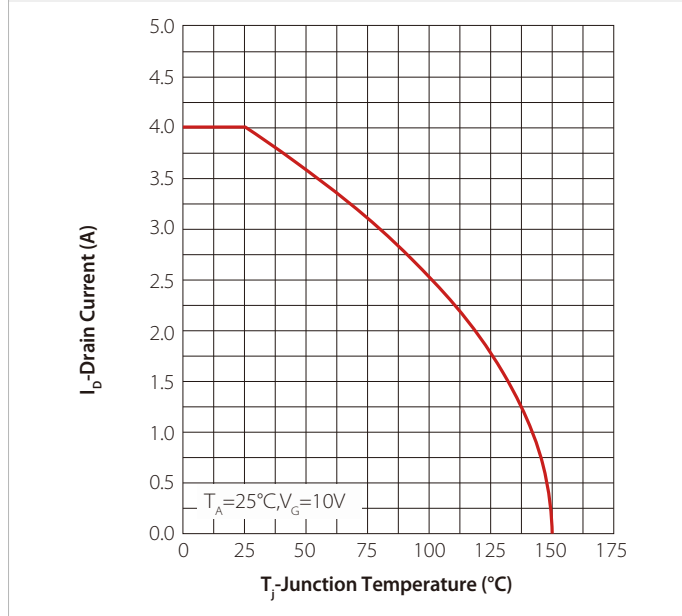


Figure3: Safe Operation Area

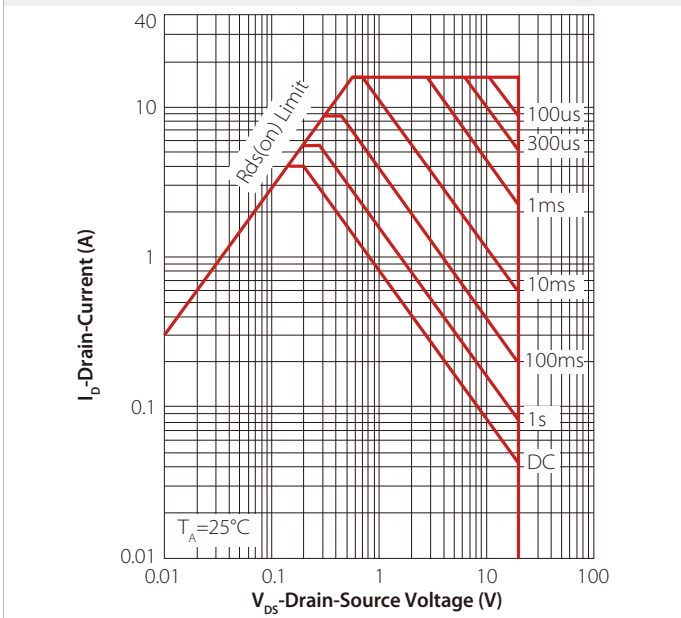


Figure 4: Transient Thermal Impedance

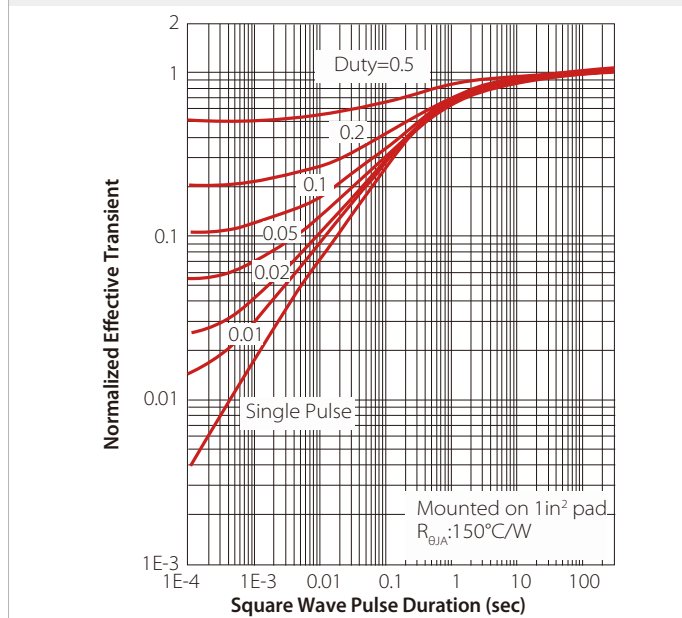


Figure 5: Output Characteristics

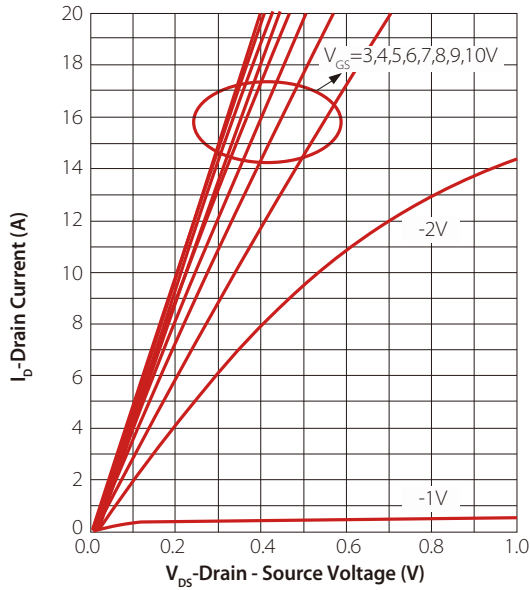


Figure 6: Drain-Source On Resistance

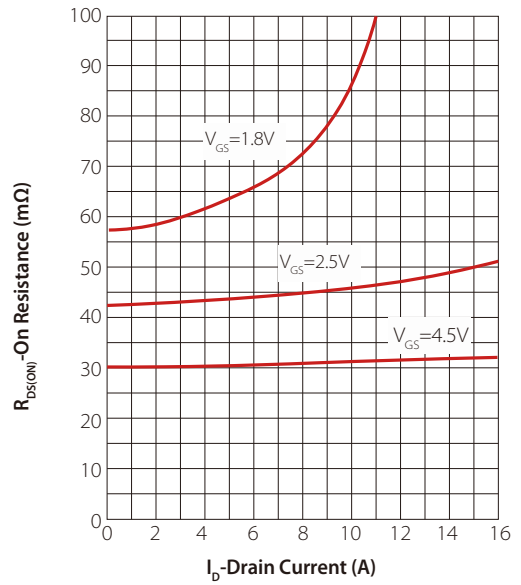


Figure 7: Transfer Characteristics

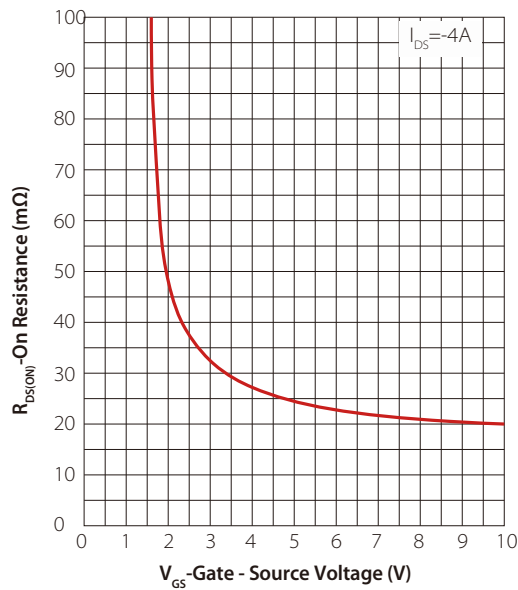


Figure 8: Normalized Threshold Voltage

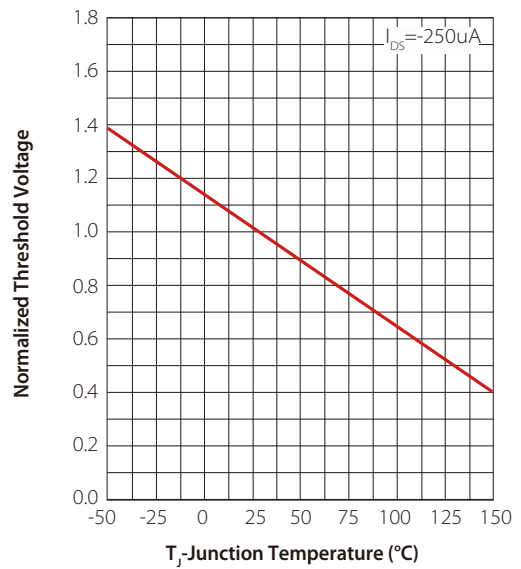


Figure 9: Normalized On Resistance

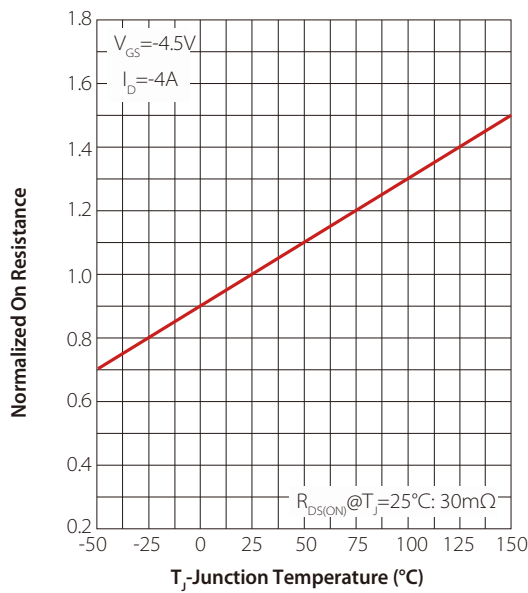


Figure 10: Current Diode Forward

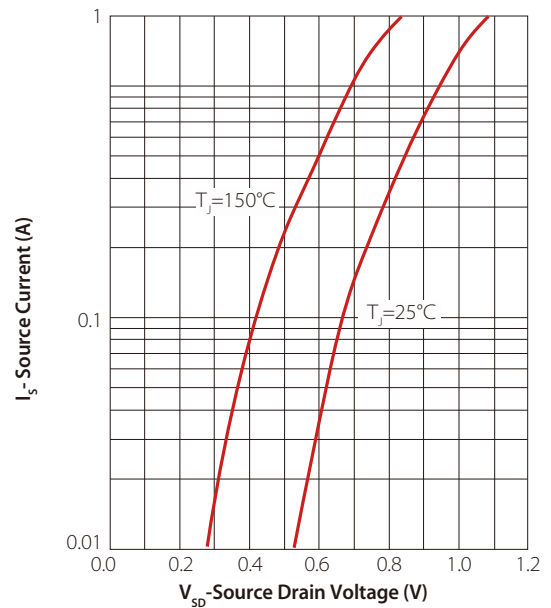


Figure 11: Capacitance

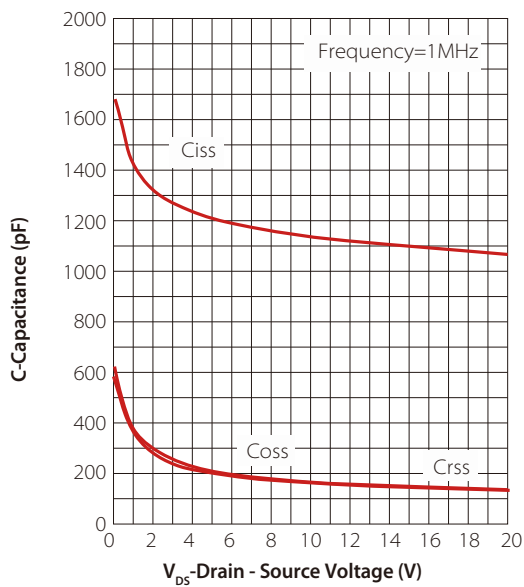
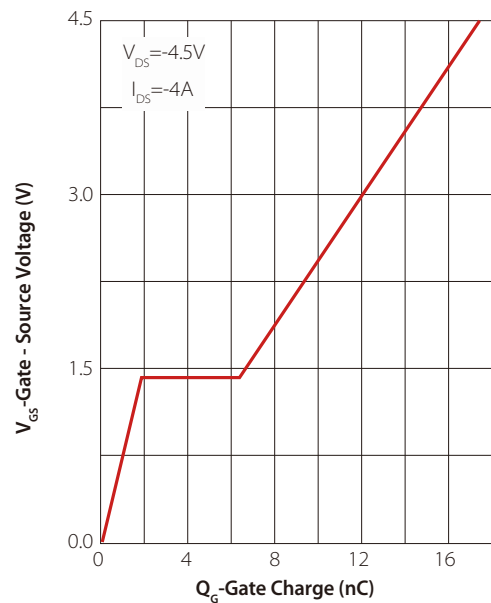
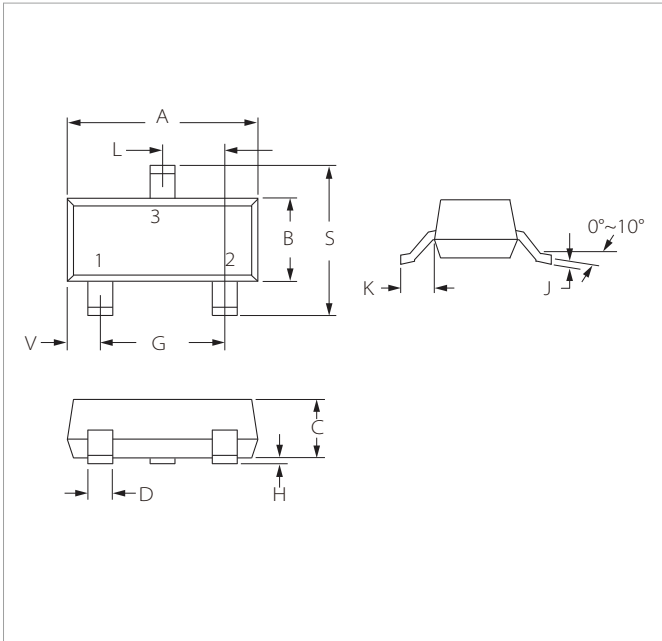


Figure 12: Gate Charge

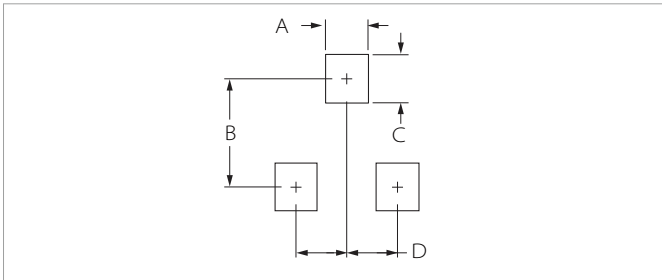


SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.04	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.89	1.11	0.035	0.044
D	0.37	0.50	0.015	0.020
G	1.78	2.04	0.070	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.64	0.083	0.104
V	0.45	0.60	0.018	0.024

RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM3415E	SOT-23	3000PCS	7"

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